Beetalk June 2019

General info and news about bees

Hello and welcome.

Beetalk is a compilation of news from across the bee keeping word.

Its not affiliated to any beekeeping group so you wont get things like the next meeting and what we are doing and such like.

We hope that the articles provided will be useful to anyone interested in the a rewarding hobby and in some way we also hope that you may gain some pleasure in reading some of the article that are included.

Also we intend to include articles that may be helpful to anyone new to the hobby.

Being based in Lancashire it would be great for any contributions from Beekeepers from the county. But as stated above, please nothing about your association or group.

Hope you enjoy.

Editor

If you have any articles that you think may be useful to have included in Beetalk.

Please e-mail them to the editor

at

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Candy Feeding - January/February

Something to be thinking about .

Recent mild winters have meant that beekeepers need to think of feeding their bees relatively early in the New Year or even later on in the season.Hives had several frames of brood so we need to assume that there may be large numbers of quite active bees that are using the winter stores we fed last autumn and it is time to supplement those stores with candy.

Candy or fondant is recommended at this time of the year rather than sugar syrup, which cannot safely be given until March. Blocks of fondant can be bought from confectionary suppliers but it is also easy to make candy. This recipe comes from Ron Brown's book 'Beekeeping A Seasonal Guide' but has been modified - the quantities to suit metric bags of sugar. The candy making is really trouble free if done whilst one is doing other tasks.
You will need 5kg granulated sugar and 2 ¼ pints/1 litre of water (cold or from the kettle to speed things up). This amount fits comfortably in a preserving pan and allows room for the liquid to boil. It produces enough candy for 4 or 5 hives.
Put the water and sugar in the pan over a medium heat; slowly bring to the boil, stirring the syrup occasionally.
Boil until it reaches 234 °F (soft ball stage), in reality this temperature is reached 5-10 minutes after the syrup be-gins to boil and at the point when the foamy syrup settles to a clear, gently boiling liquid.

Remove the pan from the heat and leave it to stand until the candy begins to set and forms a white streaky mass (160°), this takes a couple of hours but can be hastened by standing the pan in a sink of cold water. Then stir vigorously and pour the mixture into containers to solidify. To feed the candy to the bees invert a carton of candy over the tops of the frames or over the hole in the crown board. Alternatively, save foil trays and pie dishes and put the setting candy into these. When you remove the crown board watch for which spaces between frames fill with bees and gently lower these slim blocks of candy vertically into these gaps. That way the candy is near the bees and there is no question of having to fuss about with spare empty supers to make space for a carton on top of the hive. The blocks of candy look unpromising but honey has 18% or 19% water content, slightly less than the solid candy made this way. It does not matter if you feed too soon because the candy does not spoil and will just sit in the hive until the bees need it. I suspect that having a low threshold for feeding candy is much 'safer' than hefting a hive and thinking there are adequate stores and not feeding. Cool winter weather probably greatly reduces the bees' ability to move laterally in a box of frames and they may never find frames of stores 'beyond' the cluster, which always tends to move upwards

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NORTHERN BEE BOOKS

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UK Honey Labelling Regulations

Below is our simple advice on honey labelling. For more detailed information - go to the website of the Food Standards Agency. www.food.gov.uk

1. The Word "HONEY" is required.

2. The weight must be on the label - we will ensure it is the legal size and format.

3. You can specify the area where the honey is produced. For example, Lincolnshire, Forest of Dean, Scottish Borders.

4. You can specify the type of honey. For example, Heather, Borage. The honey must be at least 75% of that particular type.

5. If you are selling the honey, you must have your name and address on the label. It does not need to be complete but you should be able to be found from the information.

6. If you are selling the honey through a third party, you must have a lot number.

7. New for 2003 You must have a best before date on the jar. We suggest 2-5 years from now.

8. New for 2003 You must have a country of origin on the jar. For example - Produce of England, Product of Scotland, Harvested in Wales. Adding the country to the end of your address is not acceptable.

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From EH Thorne's online catalogue 2010 - other sources are available

I have read that Apis cerana can live happily with Varroa, so why don't we all just switch to that breed?

We should say that they have both evolved methods of co-existing, after all it would be a poor strategy for a parasite to completely destroy its host. This brings up an interesting point about how Varroa destructor might evolve in conjunction with our European honeybee Apis mellifera. The mites that wipe out hives completely would die (due to lack of food from the decimated host bees), leaving the more "benign" mites that had not quite killed off their host colonies to pass on their genetic material to produce more 'benign' mites. Simultaneously the bees would be developing added defence mechanisms such as varroa sensitive hygiene – chewing mites off their sisters (and brothers) and removing varroa infested pupae. It is easy to see how a stable relationship could occur between bees and mites over a quite protracted period of time. Evolution always moves faster when there are pressure points occurring. However we are far from being in a natural evolutionary situation, due to the interference of beekeepers and it is unlikely, but not impossible, that such a natural co-evolution will occur.

Apis cerana have various methods of dealing with varroa mites such as chewing them off their sisters, having a shorter worker brood cycle to restrict the opportunity of mite reproduction (mites choose drone larva cells as the drone development cycle is longer). Unfortunately adopting Apis cerana in place of mellifera as our main bee species has one major drawback - they are not nearly so productive.

The lack of productivity is ironically the reason for varroa having had the opportunity to jump species. European Apis mellifera were taken to Asia to improve honey yields and when kept alongside Apis cerana the varroa mites had a chance to explore the possibilities of exploiting a new host – successfully as it unfortunately transpired. Re-export of bees back to Europe completed varroa's successful new strategy.

Apis cerana also has a tendency towards absconding behaviour – when there is a shortage of food, they move on to another area. They tend to build smaller colonies than Apis mellifera and therefore store less honey. This would not bode well for bringing a colony through an English winter. Lack of productivity is considered of great importance in the beekeeping world. Recent attempts by American queen breeders to develop varroa resistant stocks were hampered by beekeepers complaining of a slight reduction in productivity. The common belief was that it was better to have highly productive bees, albeit that needed dosing with varroa suppressing chemicals, rather than having naturally resistant bees which were less productive. It has been reported that Apis mellifera are indeed developing varroa sensitive hygienic behaviour including the ability to sense varroa activity within sealed cells. Some cells are being opened by workers and the infested pupa pulled out. Even if the mature female varroa mite should escape this action, it would halt that particular varroa reproduction cycle. We should keep an eye open for this type of new behaviour, which may be manifested by odd parts of bee pupa appearing as debris on the hive floors or varroa trays. However suffice to say that there are no copper bottomed scientific proofs of such behaviour yet recorded. Until such times as our highly productive Apis mellifera develop a natural method of controlling varroa we are stuck with beekeeper intervention methods such as chemical and bio-technical controls. Hopefully new tools will become available in the near future and it is to be hoped that Dr Bowman's double strand RNA interference system can be successfully developed as an effective method of dealing with this very successful little mite.

Favourite Books

Throughout the year friends picked out their favourite beekeeping books, they are listed below in their order of popularity. *(The figure in brackets defines the number of times the book featured as a favourite.*

Guide to Bees and Honey
by Ted Hooper (7)
The Art of Beekeeping
by William Hamilton (3)
Principles of Practical Beekeeping
by Robert Couston (2)
Practical Beekeeping
by Clive de Bruyn (1)
The Hive and the Honeybee
edited by Joe M Graham (1)
Honey Production in the British Isles
by R O B Manley (1)
The Honeybee Inside and Out
by Celia Davis (1)
The Wisdom of the Hive
by Tom Seeley (1)
Honeybee Democracy
by Tom Seeley (1)
The Biology of the Honeybee
by Mark Winston (1)
At the Hive Entrance
by H Storch (1)
Bad Science
by Ben Goldacre (1)
Sixty Years with Bees

In its role as a pollinator the honeybee (Apis mellifera), plays a fundamental role in the functioning of nearly all existing terrestrial ecosystems including those that are agriculturally dominated (Thompson 2003). In 2007 the value of the honeybee to the UK agricultural sector, through increased output, was estimated to be worth between £165 million (Aston et al 2009) and £200 million (Cuthbertson, Brown 2009) per annum. The overall annual monetary value of bees globally, is an estimated $212 billion (USD) (vanEngelsdrop, Meixner 2010). Huge bee losses could threaten the supply of around 100 pollinated crop types (Dotterl, Vereecken 2010), equating to 35 per cent of the global food production (Genersch 2010). Natural biodiversity could also be threatened, should the rate of pollination in wild flowers continue to fall (Dotterl, Vereecken 2010; Genersch 2010). Honeybee decline has been linked to many possible causes including varroa, nosema and climate change to name a few; however no single factor has been identified as solely responsible for the witnessed global declines. Our focus at Keele University is concerned with the role in which pesticides play in honeybee decline. Pesticides are considered to cause what is known as sub-lethal effects, which could be for example a disruption to a honeybee's orientation (Thompson 2003) as well as its ability to effectively communicate (Thompson 2003; Underwood & Vanengelsdorp 2007). Research has also noted the link between pesticides use possible increases in brood mortality and reduced adult bee longevity (Wu et al 2011). The purpose of focusing on wax samples is because beeswax is considered to be a 'chemical sink' for various compounds, these compounds have been found to be stable within wax and have a half-life (the time it takes for the compound to naturally reduce by half) of around five years (Bogdanov 2004). There is currently no published data on pesticides found within UK apiaries, although America and European countries i.e. France and Germany have all investigated pesticide levels in beeswax. Wax frames containing brood were chosen as the most preferable samples for analysis as it would then allow us to also determine whether there any detectable levels of pesticides within the developing brood, again if any. Overall, the purpose of this study is to be able to say whether or not pesticides occur at a persistent enough level to be of concern within the UK. Response Obtained In order to get an idea of the levels of pesticides contained within the UK a collection point was established at Stoneleigh Park (16 th April 2011) which allowed beekeepers to obtain a collection pack, with this it was hoped that the packs would be randomly dispersed throughout the country. A total of 70 collection packs were distributed throughout Scotland courtesy of Dr C Connolly (Dundee University); of these 45 (64 per cent) have been returned to Keele University for analysis. Overall there has been a good Scottish response and the distribution is across the central belt, Fife and Perthshire, with others in the Borders, the west coast and the Highlands. What is Being Recorded? Using the wax obtained Keele University aim to qualitatively identify pesticides found within the wax comb and brood and where possible quantify the amount of those found. This is achieved through extracting any possible pesticides using a specially developed extraction technique. Once this step has been completed each sample will be which separates out all extracted chemicals so that they can be individually identified.
General Implications for Beekeepers Although investigations carried out on foreign soils have looked at and linked pesticides to honeybee decline, it is still uncertain whether pesticides will be detected and in what concentrations within UK apiaries. The work conducted throughout this project will help us to understand and determine whether pesticides are a likely contributor to honeybee declines within the UK; this may then help to establish tighter laws on pesticide use should they deemed to be a threat.
Future Projects Using the data from the current wax samples we will distribute new frames of foundation wax out to willing participants, from this we then hope to be able to monitor any possible pesticide accumulations over a three year period (
It must be noted however that the results of this year's study are only an indication of possible pesticides used in the UK and may not be representative of pesticide use within individual areas; this is because some pesticides can still be found present within wax even after thermal treatments and so these may be already found within recycled waxes (Tremolada et al 2004).

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The Yellow peril!
WASPS! WASPS! WASPS!

I've never known such a year. Following the early warm spring when aphid increase was rapid, so the wasps got going too. The bees suffered from the on-off weather but it did not seem to affect the wasp population. As early as June, in one of my apiaries, there were an unusually large number of wasps to be seen. In all I have lost twelve colonies; full hives, nuclei and newly run-in swarms. This was despite closing any hive seeming to be under attack down to a very small entrance. The attack came from a mixture of both native wasps and the larger German variety. One hive I did not close up as I had judged it to be too strong to succumb. I was away for a week and on my return I found it completely empty of bees, brood and two supers of honey. On another occasion in late August, I was hiving a medium sized swarm with wasps running in with the bees. Next day unsurprisingly there were only wasps in the nuc-box, the bees having been driven out again. The final straw came on the 7th DEC. Following the gales of the 5th and 6th I went to check all my bees. It was a glorious day and at one apiary in the shelter of a wood, in full sunlight, there were wasps all over the outside of all the hives. As the bees were clustering and few flying, there were no guard bees at the entrances, so the wasps were going in and out unimpeded. All these wasps were our own endemic specie. I did not feel I should open the hives to see how far the wasps had penetrated but could not see any where I lifted the lids. It only remains to see, when I do the early spring inspection, just exactly how the bees have been affected. I already know that with the long warm autumn the bees have got through a considerable amount of their winter supplies, so I will be feeding with fondant as I carry out the Oxalic treatment in the coming weeks. Is this increase in wasp attack something extra which we will have to deal with as a result of warmer summers?

A Device for easily obtaining the last few jars of Honey from the Settling Tank.

The photos show this device in operation on a Thorne's 150 lb model plastic settling tank, although the idea can be applied to other sizes and shapes of settling tanks. The device consists of two pieces of plywood (or other strong board) each 450 x 400 and 15 mm thick and held together by two hinges, each 40 x 50 mm. The position of the hinges allows the two pieces to be folded together as if they were the cover of a book. The design incorporates a further hinge as often used in gates … referred to as a Tee hinge (T-hinge) and a pair may be purchased for around a pound from an iron monger (or screwfix.com). The size required is such that its arm may be cut to a length of 130 mm or near. This hinge is attached under the board on which the settling tank rests. The arrangement of the parts isshown in photos.

When the boards are folded a length of right-angled strip is screwed to the long 450 mm hinged edge on the opposite side of the board to which the T-hinge is screwed. This stops the tank sliding off the sloping board once the T-hinge is opened; otherwise the hinge lies flat so that the two boards may lie horizontally when emptying the bulk of the honey. The T-hinge is cut so that the angle between the open boards is approximately 25°when screwed into position.

Why does a large colony seem to make so disproportionately more honey than a smaller colony?

It is well known that exceptional honey harvests are obtained by colonies with large populations. In fact the ability to gather a surplus increases non-linearly with population – doubling the population more than doubles the ability to gather nectar. This is due to there being a certain fairly fixed number of bees which are required to feed and look after the brood, all remaining bees being available for foraging, drawing comb and processing nectar into honey. Arranging for the maximum population point to coincide with the honey flows has to be one of the main aims of the beekeeper. This sometimes happens serendipitously, as during the brief July flow(s) this year. Due to the previously very poor summer weather, few of the foragers had become worn out and died and were available (albeit as old bees) to lend a hand with the July flow.

Some thought must therefore be given to the relationship between queen laying rate, colony population and population growth. The period from egg laying to emerging worker bee is 21 days. In this consideration we can concentrate on worker population since the quantity of drones is usually small and more or less a sideshow compared to the queen's main task of producing worker bees.

Laying rate and Brood population

Because of the 21 day brood period, the average queen laying rate can be obtained by counting the (worker) brood –all stages, eggs, open and sealed brood, and dividing the total brood population by 21 to obtain the average daily laying rate. If the brood count is e.g. 21000 then the queen's average daily laying rate over the past 21 days will have been 1000 eggs per day. If the brood population was 31500, then the daily laying rate will have been 1500 eggs per day. Laying rate and brood population are inextricably tied together by the 21 day factor. The stabilised maximum brood population is always Queen average daily laying rate x 21.

Laying rate and Total Colony Population

Extrapolating from laying rate to total colony population is rather less fixed since it depends on the life of the worker. A worker life of 50 days is often assumed for summer bees in the foraging periods. However worker bee life is, like aircraft life, a bit dependant on air miles. In periods of lax, non foraging activity, the life is likely to be extended somewhat. Staying with the 50 day average life then, the maximum colony population is simply queen average daily laying rate multiplied by 50 e.g. for a queen capable of sustaining a daily laying rate of 1000, the maximum colony population will be 50x 1000 =50000 workers – every day a thousand bees are born and a thousand die.

Increasing either the average life time of a worker or the average daily laying rate of the queen will increase the maximum population e.g. 55 day average life and 1200 average daily egg laying will give a maximum population of 55 x 1200 = 66000 workers.

Laying rate and Colony Population Build-Up Rate

Let us take a typical springtime scenario. Assuming that the colony comes through the winter with a population of say 10000 and virtually no brood. The queen then starts laying at say 500 eggs per day and sustains that for say 2 weeks. The brood population is now 7000, the adult population may have dwindled by say 2000 due to losses of winter bees foraging in difficult conditions.

Provided sufficient pollen and stores of honey are still available and that some fresh pollen sources have been found, the laying rate may now increase, say to1000 per day.

The population progress from start of serious laying will be as follows:

End of week number	Winter bees	Assumed Queen rate of lay per day	Brood population	New adult population	Total Number of adults
1	9000	500	3500	0	9000
2	8000	500	7000	0	8000
3	7000	1000	14000	0	7000
4	6000	1000	17500	3500	9500
5	4000	1000	21000	7000	11000
6	1000	1000	21000	14000	15000
7	0	1000	21000	21000	21000
8	0	1000	21000	28000	28000

For interest, if the queen's laying rate had increased in week 5 to say 1500 then by the end of week 8 the population would be 31500 instead of 28000 As long as the colony foraging economics can sustain a high laying rate (1000 per day or higher), the build-up will continue rapidly. This is the advantage of good early spring forage availability and a great advantage of winter sown oil seed rape. At the end of week 8 we may now have an adult population of almost 30000 (winter bees have all died off) and increasing at 7000 per week and a stabilised brood population of 21000 capable of producing 7000 new bees per week. Now that your head is swimming with numbers, we can say, don't worry about the numbers shown, they're only typical, but they illustrate the method by which a high population can be achieved quite quickly, but all depending on food availability. The Count (from Sesame Street) would have loved all these figures – I wonder if he kept bees? Bees that were well fed the previous autumn will still have a good reservoir of food available for these quick building spring activities. Of equal importance is a good carry-over of autumn pollen –Himalayan balsam and ivy are very valuable as sources of autumn pollen and please, do always leave the bees with their stores of winter pollen. If the main sources of nectar in your area are from early summer flowers, then trying to achieve a quick build up in spring is important. If late summer flowers are your main source then the bees will have time for a more leisurely build up. But remember "Bees make honey" and the more bees the better.

Queen Pheromones.

Social insect groups, including the honey bee colony, are organised in a way that, to us, seems amazing. Not for them the structure of Chief Executive Officer and a hierarchy of managers but rather a system of co-operation where every individual has input and is able to communicate with all the other individuals, and where feed-back mechanisms are used constantly as a monitoring and driving tool.
Of course there is one insect which is given the title 'queen' and is regarded as special, but although she does indeed possess qualities which the other insects in the community do not have, and is essential to the smooth running of the colony, she is still a cog in a very large wheel and in no way resembles our CEO. This month I am going to explore the pheromones that the queen produces and their effects on the other bees in the colony.

The function of the queen in the colony

In a normally-functioning colony, the single queen is the sole female reproductive individual. She is very important due to her ability to lay fertilised eggs, an ability that none of the workers have, although they are all females. All females are derived from fertilised eggs and it is the differential feeding of queen larvae, followed by changes in the hormonal system, leading to the expression of different genes in the adult insect that allow the queen to become a fully functioning reproductive female. It is important to realise, however, that she is very limited in her capabilities and is unable, for example, to produce wax, collect pollen and undertake the various tasks that occupy the lives of workers. In many ways she is a simpler insect and her life is very limited when compared to her daughters.
A second function is down to her pheromones and this can broadly be stated as keeping the colony together as a single entity. This may be inside or, in some circumstances, outside the nest.

The queen's pheromones

The existence of queen pheromones was first shown in the 1950's by Colin Butler of Rothamsted and he used the term 'queen substance' to describe a mix of chemicals, the composition of which was unknown. Research has continued, and is still ongoing, on the chemical composition and method of function of the various queen pheromones and we now know that it is a very complicated business. The queen has a number of glands producing pheromones:

Mandibular glands

These are a pair of glands situated just above the mandibles in the queen's head. The original pheromones identified by Butler are produced here, and the glands are very big. (They are also present in the worker bee where they are smaller and produce completely different substances). The main constituents of the pheromonal mix are 9-oxodec-2- enoic acid (9ODA) and 9-hydroxydec-2-enoic acid (9HDA) but many others have now been identified. The pheromone is produced continuously and transmitted by the queen's retinue, and from bee to bee, either by contact or by food sharing. Each worker bee needs a small amount to 'tell' it that a queen is present and if the queen goes missing the whole colony becomes aware of this in a very short time. It prevents ovary development in workers (but brood pheromones also interact with it here) and a drop in the amount received by the workers is one of the triggers that initiates swarming. Outside the colony it attracts drones to the queen in Drone Congregation areas and it is also vital for the formation of the swarm cluster and keeping the swarm together while it travels to a new nest cavity. Interestingly 9ODA attracts bees to the swarm cluster but 9HDA stabilises the swarm.

Tergite glands (Renner-Baumann)

The tergite gland pheromone is produced from small patches of cells on the terga (plates covering the back) and is attractive to the pursuing drone on the queen's mating flight. It is not as far-reaching as 9ODA but stimulates copulatory behaviour when the drone is quite close. It is also instrumental in maintaining the retinue which surrounds the queen in the nest and appears to induce the stinging behaviour that starts when two queens meet.

Dufours gland

This is also present in workers. It is part of the sting apparatus and used to be called the alkaline gland. Its pheromone mix indicates to the workers the fertility and fecundity of the insect producing it, so it varies from virgin queen, mated queen and aging queen. In laying workers the gland enlarges and the secretion closely resembles that of a queen.

Koshevnikov glands

These are a pair of glands found on part of the sting apparatus. They are patches of cells and produce a pheromone which is very attractive to workers and helps to maintain the queen's retinue in the nest. The glands seem to degenerate in one-year old mated queens. (In workers these glands release alarm pheromones.)

Tarsal gland (Arnhart)

Glands found in the 5th tarsomere (small division) of each leg and the pheromone leaves an oily trail everywhere that the queen walks. It seems that, together with 9ODA, a drop in the production of this pheromone, and its absence from some parts of the brood nest, initiates swarm preparations. (The tarsal glands are also present in the workers.)
From this brief account it is clear that there are many queen pheromones, which interact with one another. They also interact with the pheromones produced by workers and brood in some circumstances. Production of various pheromones varies with a queen's age and condition and it is noticeable that a newly-hatched queen is unattractive to the workers. Gradually her attraction increases, and a newly-mated queen is probably at her most attractive. Pheromones decline with age and some of these changes will elicit swarming behaviour and supersedure. Since pheromones are complex mixes their composition varies too and different parts of the mix may be important in different situations.

February is a suitable month for dying. Everything around is dead, the trees black and frozen so that the appearance of green shoots two months hence seems preposterous, the ground hard and cold, the snow dirty, the winter hateful, hanging on too long."by Anna Quindlen.

"Late February, and the air's so balmy snowdrops and crocuses might be fooled into early blooming. Then, the inevitable blizzard will come, blighting our harbingers of spring, and the numbed yards will go back undercover. ."
by Gail Mazur.

Two short extracts of poetry which reflect the uncertainty of February and the risk to our bees. More colonies perish in the coming five or six weeks than at any other time in the year. Why? Well let's consider what's happening in the hive.

Number of worker bees in your colony	5000 to 10000	Numbers will be falling daily
Number of drones in the colony	0	
Number of Queens in the colony	1	
Number of eggs being laid by the queen	A few hundred	With milder winters this could be higher
Amount of brood in the colony	A small patch	This will grow steadily as te weeks pass
Average age of the workers	5 months or more	A few young bees may emerge.
Colony activity	Increasing	

The bees 'know'1 that the day length is increasing and will be feeding the queen to prompt her to lay more and eggs as the month progresses into March. This is needed because it takes six weeks2 to produce a forager and the old bees from last year are not up to it anymore. If the colony is to be ready for the spring hedgerows new foragers are needed. All this activity needs energy to warm a larger area of comb and secrete the extra food for the queen and the growing larvae. More energy means more food and together with the current mild spell this will lead to those precious food reserves dwindling – any one 'hefting' their hives will have noticed the dramatic decrease in weight. Another factor is the strain on those remaining adult bees doing all this work! The outcome will be either starvation if they have insufficient stores and/or fewer adult bees; too few and the colony will perish or at the best struggle to build up. So it is no wonder so many colonies die out! If you are in an oil seed rape area, which looks to be early this year, then by late March to mid-April you need a strong foraging force to make use of this valuable crop. This is why many Beekeepers will begin to feed from mid-February to get their colonies going in time for this crop. They will feed a small but regular amount of weak (1:1) syrup via a contact or rapid feeder.

Beekeeper's actions for the month:

Keep checking each hive is secure & weather proof as spring can be a stormy time. I have already had some trees blow down but luckily none hit a hive so out with the chainsaw.

Keep hefting your hives and be ready to feed – ALWAYS take some emergency rations on every apiary visit.

Observe the front of each hive for bees coming and going, and check the woodwork. No flight activity from one hive on a warm day? First check that the entrance is not blocked before lifting the roof to peer down through the feeder hole. No activity? Lift the crown board off and see if they are still alive. If they are dead seal the hive up to prevent any disease risk, and then remove it to investigate why it died. If there is brown dysentery stains around the entrance then there may be a Nosema infection, note this on the records and either treat or if not too bad mark them for a new box and a FULL comb change.

Watch the mite drop and use the Bee Base calculator to plan when to treat. The following table shows sample obtained from Bee Base and as you can see a daily mite drop below two is OK. Five and over then you need to treat now and I would suggest a half dose of Apiguard before your supers go on would be appropriate.

Number of mites falling over 10 days	Daily mite drop.	Estimated mites in the whole colony	Suggested time before treatment is needed
8	0.8	320	In 5 months
12	1.2	480	In 4 months
16	1.6	640	In 4 months
20	2	800	In 4 months
26	2.6	1000	Immediately

Get your supers out for airing and replace any damaged or dirty ones. Remember honey is a human food so the condition your super combs should reflect this. March will soon be here so get ready for the spring rush!

Notes

1 A Bee's brain is prewired and so they do not really think or know! Their three simple eyes, called ocelli, detect the photoperiod length and this affects their activity.

2 From a worker egg being laid it takes 21 days for a the adult bee to emerge and then the young bee undergoes house duties; only after a further 21 days does it become a forager.

Talking Beekeeping.

I know bees have five eyes and the two large compound eyes are the most obvious, but what are those three little ones used for on the top of their heads?

It is likely that the Ocelli or Simple eyes (simple here means single lens –our eyes are also "simple"), are valuable for rapid response in flight control. The light falling on the ocelli (from the sun), will vary as the bee swerves in flight. These minute variations in light intensity can be used to control flight. To fly straight and true, keep the ocelli in a constant orientation to the sun.
Bee ocelli cannot focus to produce an image or picture, (the compound eye can, although it is a rather pixellated (fuzzy) picture, instead the ocelli are honed for the rapid detection (and onward transmission) of light intensity changes. Incidentally let us not dismiss the bee's compound eyes as inferior –compound eyes have very fast flicker response –we humans can just about resolve images arriving at about 30 per second (conveniently the Power engineers have arranged that alternating current (AC) mains electricity cycles at 50 cycles per second so we see the light from our living room bulb as continuous). Bees (and most other insects) can resolve images arriving at their compound eyes at up to 300 images per second. Next time you try to swat a fly, it will see a large aerial object (your hand) arriving in pretty slow motion –it will already have processed 150 or 200 images by the time your hand arrives and of course the fly will have long departed –it may also be wandering why you're continuously switching your living room light on and off!
But to return to the bee's simple eyes or ocelli. Initial pre-war research by Parry of Cambridge showed that the bee's simple eyes have high speed connections straight into the nervous system, such that a variation in light could produce a very rapid nerve response. Thus a variation in light stimulus can produce a rapid flight control muscle response – in the words of Gerald Kastberger (one of the preeminent ocelli researchers) " the ocelli help the bee to react photokinetically to photic stimuli in a much shorter time than do the compound eyes alone". Kastberger flashed lights suddenly at bees in flight. The control bees braked rapidly (cautious). The bees that had their ocelli covered, wobbled a bit but blundered on at high speed. It is interesting that the current designers of unmanned aircraft also have difficulty in keeping their craft stable in a "three dimensional world", and they have become
very interested in the workings of insect ocelli. Why three ocelli? That probably gives the optimum input of light intensity change information. Two would give a nice stereo (3D) effect for 2D ground movers such as us but three are probably better if you are a 3D flyer. They are notably near the top of the head (more exposed to the sun?), although Drone ocelli are pushed down the head to allow for the much larger compound eyes. The drone has perhaps had to sacrifice flight control a little to gain better compound eye acuity, (they always locate the queen, even though they may crash into her occasionally). When I teased an aircraft designer friend about the number of main flight computers they use (there are usually at least three, all operating different software regimes) he commented "Yes, but 3D crashes are so messy and three gives some confidence". Perhaps three is a magic number if you're a 3D flyer!

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Back From The Dead

Having been believed extinct in Britain for 65 years, the solitary bee *Halictus eurygnathus* has once again been recorded at seven sites in East Sussex. It was last seen here in 1946 and was rediscovered during a survey of fifteen chalk grassland and chalky heath sites on the East Sussex South Downs which recorded a total of two hundred and twenty-seven bee and wasp species.
Some of the bee species seen were very rare though others were more populace than expected.
The report was not all good news though and some species, including one of Britain's largest mining bees, *Andrena hattorfiana,* are in steep decline.
The research also highlighted the importance of arable field margins with wildflowers and blackthorn for foraging bees and has been used to draw attention to the under-funding of bee research in the U.K.

A Right Royal Kerfuffle.

The problems beekeepers tend to have with queens will usually revolve around the lack of one, or from trying to keep their majesties from buzzing off with half the colony during the spring. The demoralising experience of opening a brood box and finding no eggs, no sign of that little white dot, or maybe a queen cell hanging off the bottom of a frame that was missed at the last inspection is one that most apiculturists will know all too much about. This year though presented a different royal challenge, with no less than two queens in a hive, rather than the more standard one. The colony started as a nuc early in the season and I'd pretty much left them to it. With no probable swarming issue, inspections had been rather relaxed and done after the other more time-consuming colonies had been dealt with, where I was still engaged in on-going swarm control. By mid-June the colony was well established and I put a super on and everything was text-book. At some stage after this was when things took a turn for the unexpected and I should say that I admit full culpability for a situation that was almost certainly of my own making. A routine inspection revealed a single large queen cell in the middle of a central frame. My first thought was supersedure, though this would be surprising given the age of the queen and that the colony had appeared to be doing so well before hand. As I was putting the hive back together again, I noticed a small bit of brace comb on top of the queen excluder – with a great big grub in it. Having returned the super back on the hive I took off the crown board to reveal frame upon frame of neat brood in various states of development and somewhere, among all the bees going about their business, was my unmarked queen. Rather than acting in haste and repenting at leisure, I put the hive back together and went home to decide what to do. The natural lifecycle of the colony had continued, albeit in a slightly unconventional manner, and I was keen not to cause any unnecessary disruption to a healthy, flourishing colony. I concluded that, at some point, I had placed the excluder on top of the super while I inspected the brood box and the queen had been on it and instinctively crawled down in to the darkness. The thing which I found most surprising was that the bees in the brood box had decided to try and raise a new queen; even though there was one alive and well just the other side of the queen excluder. If I'd have ever thought about such a situation before I had to deal with it, I would have reasoned that the bees would be able to smell the queen pheromone ebbing down from the super, and would assume that all was well. Of course, deducing what has happened does not equate to determining the most profitable way to deal with it. However, I have always been one to try and turn adversity into opportunity and before I had to resort to blind panic, the solution to my mis-placed royal presented itself when an established colony swarmed - in spite of my best efforts. After a good deal of cat and mouse, the errant queen was whipped out of her super and placed safe and sound in a Butler cage in the queenless hive, leaving her daughter-to-be to take over the colony she left behind in the brood box - where she belonged. Needless to say that I now consciously remind myself to check the queen excluder thoroughly upon removing it and, as the 2018 season draws to its end, I look forward to 2019. Hopefully, I will see the next year out with the same four queens that I start off with.

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Oxalic acid Treatment

The novice beekeeper is apt to be a nervous wreck during cold weather such as we have experienced this winter, but there is little to be done at this time of year except leave the hives alone and wait and see. However, that does not mean that there is nothing to occupy us: the apiary should be checked at regular intervals for damage by falling branches, animals and, particularly woodpeckers. It is the Green Woodpecker that is responsible for damage to beehives. It uses its extremely strong beak to break through the walls of the hives and reach the insects inside, but this usually only happens when the weather is very cold and the ground is frozen, so making the woodpeckers' normal diet of ants inaccessible. The best way to protect hives is chicken netting put loosely round the hives so that the birds cannot gain access. Thick plastic sacks hung round the hives are said to be effective, as the birds can no longer get a grip, but if you go down this route, do ensure that the entrance is free. Left unchecked woodpeckers can do a tremendous amount of damage both to the hives and to the colonies inside them, which can die.

Another job to be done, is Varroa treatment with oxalic acid, if you think it necessary. This must be carried out when there is no brood present, around the beginning of January . It is essential that the acid is mixed with water very carefully and that the concentration is precise. Accurate scales are necessary. The mix we use is:

½ litre water + ½ kg white sugar

Mix these into a syrup and then add

37 g of oxalic acid

Mix very thoroughly.

Choose a day when the bees will be clustered but when it is dry and not too cold. Have everything ready, open up the hive and administer 5ml of the mixture for each seam of bees, using a syringe. The maximum for any hive should be 50 ml. A simple syringe can be purchased from a chemist and this is adequate if you have only one or two hives, but other types of syringe are available from the suppliers if many hives are to be treated. Oxalic acid can be bought ready mixed in a 100ml bottle or a single-hive dose with snip-off end can be used.

Other ongoing jobs are cleaning out and sterilising old frames, both brood and, less often, super, so that the new season starts with nice clean comb or foundation and clean, or new, frames. All other equipment should be cleaned in readiness. Hot washing soda solution does a wonderful job of cleaning wood and plastic parts, but do rinse it off afterwards. Boxes can be sterilised by singeing lightly with a blowtorch, or by using 80% ethanoic (acetic) acid solution. The latter is used at the rate of about 150ml, sprinkled onto pads of cloth or cotton wool, one pad per box. The boxes can be piled one on top of another and it is important to seal them well. Wheelie bin liners will enclose more than one box and can be securely knotted. Frames, even those containing wax and/or stores can be put in the boxes and form a convenient place to put the acid-soaked pads, or even small dishes of acid. Leave for one week, dismantle and air well before use.

Precautions:

Protect eyes and bare skin while using ethanoic acid, it is corrosive.

Use a face mask to protect from inhalation of the acid.

Remove metal parts or cover them with Vaseline, eg. metal runners.

Do not use on a concrete floor as the acid attacks concrete.

Air boxes well before use.

So, as you see, there are many jobs to be done, even in the depths of winter. After all, before the end of this month, your queens should be starting to lay and beginning the build-up to those bumper crops you will be harvesting this year

End spacers or Hoffman frames - what's your choice?

I am not sure who invented the dreaded metal (now plastic) end, but I do remember walking to work for many years past the Waldron factory in Great William Street and hearing the thump of the press as it stamped them out. I have a feeling that these ends probably originated with the WBC hive which needed them in order to prevent bees accessing the space between the inner and outer walls - not that they even did that very well! So what is wrong with metal or plastic ends? If used in the brood box they do a good enough job of spacing when clean and new, but as they become propolised the spacing inevitably increases a little and it is not possible to squeeze the frames up with a hive tool as the ends will deform or break. If placed on the end of the lug they are liable to drop off during manipulations and if some get pushed part way in then spacing is lost completely. Some prefer to push them right onto the lug so that they are up against the side bar, but this encourages propolisation and they also then sit on the runner and raise the frame a little – losing or increasing top or bottom bee space. The answer is to throw them away and use Hoffman self-spacing frames in brood boxes with a dummy board at one end of the box; this gives perfect spacing as the frames can be squeezed together to maintain correct spacing. In the supers 'ends' are even worse because they all have to be removed when extracting - and then replaced afterwards. Because of propolis on the lugs, this is difficult and dangerous with metal ends – many a finger has been cut – and the plastic ones often break. Throw them away and use 9-slot castellations in your supers!

The Powers of the Pest Controller - and how it affects us all

Your pest controller has advised you that the insects you have living in your property are bees. They are therefore important and useful for the pollination of a large variety of plants so should be preserved, if at all possible. Many species are either harmless or are very unaggressive so it may be possible to live alongside them without fear. Your pest controller will be able to advise you accordingly. If possible, please live with the bees in your property.

From time to time, however, bees can become a nuisance or even a danger to humans, so may need to be destroyed. This is perfectly legal, as no bees are protected by Law but, how they are dealt with is affected by a number of legal constraints, particularly if they are Honey Bees.

These bees will have come from a nearby hive and anything done to your bees could affect other, innocent, hives. Everyone, including you and your pest controller must - by Law -take every reasonable effort to prevent these other hives being affected by what is done to your, unwanted bees. This, unfortunately, may have significant cost implications.

Preventing Access to Your Treated Bees' Nest

Bees are relatively easy to control, but it may be difficult and therefore costly to take all the necessary measures to protect other bees from the control treatment carried out. This will almost certainly include the necessity to seal up the nest entrance and to do this safely may require specialist access equipment.

Removing Treated Honey Combs

It is strongly advised that the honey combs made by your bees be removed, as the honey they contain will eventually leak out and could cause significant damage to your property. However, depending on where they are, this work may involve a builder or roofer to get to them and to make good your property afterwards.

These honey combs will also be contaminated with insecticide, so must by Law be disposed of by incineration, using a Licensed Waste Contractor. Your pest controller may be able to arrange for this extra work to be done, but this will inevitably lead to additional costs.

Code of Practice

Your pest controller will be working within the constraints of a **"Code of Practice Relating to the Control of Feral Honey Bees"**

If you would like to see a copy of this, contact the National Pest Technicians Association, whose details are below.

I apologise for having to bring you this unwelcome news, but we all have a responsibility to protect these important creatures wherever we can. Your cooperation is greatly appreciated. If you would like to speak to someone to discuss this further, please contact the

National Pest Technicians Association

and we will be happy to help you any way we can.

The National Pest Technicians Association

Tel: 01949 81133 email::office@npta.org.uk

Is Line Breeding Still Relevant Today?

When purchasing queen bees many beekeepers prefer Line bred Queens. There is reason to believe however, that Line Breeding does not offer better colonies or higher honey yields according to the latest research carried out by Professor Dr Kaspar Bienefeld, Länderinstitut für Bienenkunde, Hohen Neuendorf, Berlin. Some seventy percent of breeders define their queens with a line name. Many buyers are guided by these names. The beekeepers give essentially three reasons for their loyalty to the line: The lines promise particular tested fixed characteristic – "I experience no surprises when I again decide on the same line"; the lines are essentially different – "The familiar line suits my method of beekeeping and my area; crosses between lines produce especially good honey yields." But what constitutes a line relative to the honeybee?In animal breeding in general, the term line breeding is understood as the selection within a particular small sub-group of a specific race in order to retain the genes of a special ancestor. In the honeybee line breeding normally does not depend on individual colonies, but rather on the stock of known breeders (Sklenar, Peschetz) or on mating station (Troiseck, Lattbusch). According to Friedrich Ruttner: Lines are defined as being derived from the female parentage. All colonies which possess at least 50 perent of the genes of the particular line are considered as line members. Germany, according to the 'Breeding Value Appraisal Databank', possesses 120 lines. Most of these consist of very few colonies, which the founder of the line identifies by his family name. Most lines only last for a few years, so it is really not possible to talk of a further development and consolidation of a particular line. Relative to the evaluation process, only lines which have a supraregional influence were considered. Now, the next consideration must be: How uniform are the lines? If really persistent mating were to occur within the lines, inbreeding values at least ten times higher than the values listed would arise. Inbreeding occurs when the progeny resulting from the pairing of related individuals receive identical genes from the mother and father. The Inbreeding Coefficient gives the probability for such an event. It is dependent on how closely the parents are related. The smaller a line, the greater the risk of inbreeding. In bee breeding, by virtue of the limited number of mating stations, every year only a limited number of 'fathers' can be employed. A look at the data makes it clear that it is not possible to speak of a persistent selected line. The Hoffman Line is the only line in which a nominal inbreeding rate can be confirmed. In the Sklenar sub-line, the values in relation to the size of the sub-lines are extremely small. This accounts for the frequent crossing between the individual Sklenar sub-lines, and also for the outcrossing with unrelated lines (or queens, which do not have a pedigree). Out-crossing with unrelated lines is not practised merely by Sklenar alone. There are of course differences, out-crossing, however is carried out in all lines, the per-centage of out-crossing varies between 20 – 60 percent. So, do the lines differ from each other? At the start of the Breeding Value Assessment only the Hoffmann Line indicates clear differences relative to gentleness and (swarm impulse). This comes as no surprise, since the Hoffmann Line can be designated as the earliest line to achieve stability. There are two reasons for the closeness of the other lines to the Hoffman Line with reference to the behavioural characteristics: The Hoffmann Line was crossed directly with the other lines due to its superior behavioural Breeding Value. However, still more important is the fact that the behavioural characteristics have been considered more deeply in the selection process since the start of the Breeding Value Assessment and more accurate information about the genetic value of colonies has been available. Behavioural characteristics have a higher hereditability than honey yield, thus the selection was a success. It is very clear, that all the lines improved, but they were also similar. There are no noticeable distinctly different selection targets present. Are honey yields improved by line out-crossing? The more diverse the parentage, the greater the improvement in performance from cross breeding may be expected. A cross breeding effect (heterosis) occurs when the resulting progeny are an improvement on the average parental qualities. Practical, meaningful heterosis occurs, when the performance of the progeny surpasses the best individual parental performance. This situation is reported in cross breeding between different races – thus a carnica and mellifera cross should result in improved honey yields, but also lead to increased aggression. In line breeding the inbreeding effect has to be considered. Line breeding as a rule leads to higher levels of inbreeding and inbreeding leads to noticeably reduced honey yields. Surpassing the performance of a parent line which is already affected by inbreeding is therefore no great challenge. A more accurate measure would be results from an average population, which is not affected by inbreeding. Colonies without line breeding input produced, on average, 38.9 kg of honey and thus exceeded by 0.7kg, the performance of line bred colonies, which gathered on average 38.2 kg. Also in quite special line combinations the results are disenchanting. By way of comparison the highest yields are found when breeding lines are combined with stock from the average population. The Peschetz and Sklenar Lines – as already described, not distinctly marked by fixed characteristics, indicate clearly better results due to this influence than the Celler Line, but better especially than the Hoffmann Line. A special problem of bee breeding is seen here: If two inbred lines are crossed, the worker bees are crosses – but not the queen. The queen remains a representative of the ancestral line and, because of this, affected by inbreeding. Inbred queens negatively affect the performance and behaviour of the crossed colony, hence the reason for the poorer results, when the maternal line comes from the comparatively heavily inbred Hoffmann Line. If the Hoffmann Line is the paternal source and the queens derive from Lines exhibiting little inbreeding, the honey yields are considerable better. Does Line Breeding Result in Variety? The genetic variety of many canine races is certainly much higher than that within the wolf races, from which the dog was originally bred. The example demonstrates that breeding need not necessarily lead to genetic paucity. It could also be argued that the genetic variety among selectively bred races of bees, at best remains intact if the total population is divided into many lines. That is the theory, in practice especially with the honeybee this does not happen. During the peak period of line breeding in the 1960s to 80s, colonies with low Inbreeding Coefficients provided almost twice as much breeding stock as colonies with extremely high Inbreeding Coefficients. The reason for the preference was their some 15 percent higher honey yield. The breeders had observed the negative results of inbreeding, which due to their selection decisions had worked against a standardisation of the lines. These decisions from the views current at the time were correct, because there were no Breeding Coefficients available to the breeders at that time. They were unable to differentiate between reduced yields due to inbreeding pressure and poor genetic quality. The consequence was that the principle of line breeding, in which inbreeding was the basic concept, in the case of the honey bee, led to the elimination of extreme (mostly very good) colonies and which accelerated the genetic impoverishment. Positive Statements on Quality Results from the breeding practices tends to indicate a more negative picture of line breeding. But possibly this is not due to the principle but more to inadequate methodology. As previously described, breeding is carried out using a preponderance of very small lines with a discipline exists.

There is only minimal evidence within the lines of any long term planning. Line specific breeding targets are not discernible, as a rule no distinct line and specific goals in line breeding. Not one single element of the points raised offers support for line breeding of the honeybee. The honest answer to the question posed in the title of this article must therefore be: No, line breeding is no longer suited to modern beekeeping. Despite this the particular line will continue to play a role in the choice of bee and purchase decisions, because it is trusted by many beekeepers and at least with many established lines within certain limits allows a prediction of the quality of the queen. Today however according to the results from the Breeding Value Assessment there are significant improvements possible for breeder and beekeeper.

The following table lists the average number of colonies as well as the average, minimal and the maximum level of inbreeding in the line per year. All of the lines are alarmingly small.
Average Number of Colonies per Year and Average Inbreeding Coefficient over the years.

Line	Colonies/year	Inbreeding in % x	Inbreeding in % min	Inbreeding in % max
03	54	1,09	0	4,37
Celle	111	1,53	0	4,29
Peschetz	142	0,36	0	1.39
Troiseck 07	43	1,18	0	7,20
Troiseck 1012	17	0,78	0	2,93
Troiseck 1075	96	0,31	0	1,35
Troiseck – Hoffmann	186	6,69	3,11	8,91
Sklenar 47/09/15	17	0,12	0	1,49
Sklenar 47/09/24	24	1,21	0	5,66
Sklenar 47/09/26	43	1,66	0	7,29
Sklenar 47/G/10	66	0,58	0	2,66
Sklenar 47/H/47	51	0.69	0	2,82
Sklenar 47/19/48	14	0,00	0	0

When is honey not honey?

There's nothing quite like honey straight from the hive. As it drains from the extractor and into a honey bucket, it's hard to resist dibbing a spoon in – just for a taste. The quality of flavour enables hobby beekeepers to sell their product at a premium price that customers, who are after the real thing, are prepared to pay.

However, in the U.S. there is a storm brewing as to whether much of the honey for sale in supermarkets there can actually be classed as honey.

A recent report published in the American journal, *Food Safety News,* found that three quarters of all the honey sold by major chains had been processed so heavily that it bore little resemblance to the raw product produced by the bees.

The argument revolves around high-tech ultra-filtration processes used by some producers whereby honey is heated, sometimes watered down and then forced at high pressure through extremely fine filters to remove pollen.

The U.S. Food and Drug Administration (FDA) says that any product that's been ultra-filtered and no longer contains pollen does not conform to its official definition of honey – a position that is shared by the European Union.

Producers say they ultra-filter the honey to lengthen its shelf life at the behest of the supermarkets that don't want crystallised honey on their shelves and claim that consumers prefer the product crystal clear.

Another more sinister possibility is that removal of pollen makes it almost impossible to trace the origin of the honey and therefore determine if it came from a safe and legitimate source. The European Union banned Indian honey some years ago after it was found to contain illegal contaminants and antibiotics. Similar concerns have been voiced about Chinese honey, though it continues to flood the market, especially for use in manufactured food products. Without the pollen however, it is all but impossible to prove that imported honey does not originate from a banned supplier.

It's hard to think of any other commercial reason to use ultra-filtration processes. It costs producers a considerable amount of money and time by adding an extra stage to the process of getting the honey from hive to jar. Furthermore, the removal of pollen affects the taste and aroma of the end-product – i.e. it reduces quality.

The bottom line for consumers in any country is that it's very difficult for them to know what they're buying when the supermarket label declares the ingredients somewhat ambiguously as: "Blended E.U. and non-E.U. honey" – and given how easy it now is to conceal a product's source, they are perhaps right to be cautious.

A Tale of Two Allergies.

I must have been about 8 years old when, one night, Dad came home from work looking very ill, ashen-grey in the face, and went straight to the Doctor's. He was a Rural Science teacher at a Secondary School and kept bees in an observation hive. This had been showing signs of swarming and, while dealing with this, Dad had been stung on the arm. The doctor and Headteacher agreed: Dad had to give up beekeeping and carry tablets with him in case he should be stung again, as this could be lifethreatening. This all happened in Bedfordshire around 1956, and was a tragedy for me, as I could have learnt a lot about beekeeping from my father. At my Primary School we kept bees, and I was entered for a Junior Beekeeping exam, which I passed in 1958 (I still have the certificate!). I had to lie, or so I thought at the time, in the oral part of the exam, as I'd been told I must say I would keep my own bees, when asked. I knew very well, because of Dad's allergy, that this was impossible: we couldn't have bees at home.

Actually, I hadn't lied. In 1982, living in Cheshire, I started beekeeping—with a nucleus bought from the late Frank Griffiths - and I have kept bees ever since, with reasonable successes and a range of mishaps and disasters. Many people helped me: Sydney Hollinshead, David Buckley, and Andrew Easterbrook especially. I am not the best beekeeper in the County, and over the years I have had to balance the demands of family and work, and haven't always been able to put the bees first. Nevertheless, we've always had plenty of honey, I have helped lead a beginners' course and I've given many talks about beekeeping.

When Andrew and I were beekeeping together, we were of course stung from time to time. We had an opposite attitude to this. Whereas I felt this was to be avoided at all costs, Andrew was often pleased if he felt that his body resisted well and did not overreact to stings. This was something we never resolved. One funny incident—funny for everyone else at least—was when the bees all attacked my ankles. I had foolishly gone beekeeping in walking boots with hand-knitted woollen socks, which , for some reason, the bees took a violent objection to, and I had perhaps 20 or 30 stings in each ankle as I ran off.

In 2010 I was extracting honey, indoors. A stray bee hit the overhead light and dropped down my neck inside my shirt and stung. I advise anyone stung like this to pull off the shirt and remove the sting as soon as possible. However, I didn't bother to do this. After a few minutes, though, my palms and the soles of my feet were red and itching and "hives" (blisters) came up over my chest. I felt so weak and weird that I went and lay down for a while . When I'd recovered after a couple of hours, I put this all down to being stung in a neck vein in an unlucky way.

In 2011 I was out in a rape field, late in the evening. The weather was cold and unsuitable, but we needed to separate supers for extracting by putting in clearer boards. The rape crop was finished, which is always a dangerous time. We did well under these difficult conditions at first, and dealt with three hives successfully, but the fourth colony attacked me ferociously. We got the clearer board on and put the hive back together but by then I had been stung many times on the arms, legs and back, sometimes through two layers of clothing. Never underestimate these half-inch long insects!

Back at the car and with most of the followers and attacking bees shaken off, I din't feel fit to drive. I had the symptoms of the previous year, but much worse. On the way home, with Cynthia driving, we had to stop so I could throw up in the hedge. The route home is also the route to Leighton Hospital, and Cynthia was in two minds whether to take me to casualty or home. In the end, it was home, to have a bath, sleep it off and recover by the next morning—except for my confidence. At one stage, in the car, I had passed out.

I expect all beekeepers have had a range of mishaps and disasters over the years. I freely admit much of what happened was my own fault.

Doctors' responses varied, but I was issued with Epipens and refered to the Allergy unit at Manchester Royal infirmary. I am familiar with Epipens now: they are emergency injection devices which fire adrenaline into the leg, through clothing if necessary, and can save people who are going into anap0hylactic shock owing to severe allergy. I now carry three such pens, hoping never to have need of them. They are dangerous devices, involving small explosive charges, and are easy to misuse. One former beekeeper—a petite lady—described using an Epipen as an unpleasant, frightening experience—but effective. I also heard of someone who died after being stung in the garden, as no-one could get the Epipen from inside the house in time to save him.

The Allergy Unit at Manchester interviewed me thoroughly and did blood tests, showing that I am indeed allergic to bee-venom, but not to wasp venom (not very handy this, as I have no wish to keep wasps!) They offered me a programme of desensitisation, which would take some years and involve many journeys to Manchester for a serious series of injection. So here I am in a quandary: I am a paid up member of Cheshire Beekeeepers, although I live in North Wales and have bees on both sides of Offa's Dyke—the Cheshire bees still on the original farmhouse site, now in family hands. I see three possibilities, at least:

a) Give up beekeeping and sell up. In effect, retire from beekeeping.