Part 2 – How To Set Up Your Urban Beehive
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How To Prepare Your Backyard For Beekeeping

**Tip 1:** You need to contact your local authorities to see if they will permit you keeping bees and what kind of bees they will allow you to keep.

**Tip 2: Source of Water**

You need to provide a shallow dish with fresh water at all times so that your bees can keep working to their maximum potential and so that they do not wander onto your neighbor’s properties.

Bees will usually remember the first source of water that they have drunk from and it is almost impossible to then stop them from going there. It is advisable to set the water source up at the same time as you set your hive up so that they go there first. Put it quite near the hive.

**Tip 3: The Fence**

It is also advisable to protect your bees from the environment and from people as well as to protect people from your bees.

Erect a fence at least 6ft high around the hives. This will protect the hive from strong winds, hide it from sight and also force the bees to fly higher.

**Tip 4: Low Profile**

Bees do not seem to like very bright colours and you need to paint your hives in a bland colour such as white or even better cream. This also makes the hives blend in and less visible.
**Tip 5: Neighbors**

All neighbors might not be fine with the idea of living near a beekeeper. It would be a good idea to talk to your neighbors and let them know what you will be doing rather than spring it on them. You could reassure them and answer any questions they may have.

It would be wise to find out if anyone has bee allergies or worst still anaphylaxis in your local area or certainly immediately around you.

Sharing honey with your immediate neighbors would be a gesture of goodwill as would inviting them to see your set up and showing them exactly what you do.

Some people are genuinely scared of bees and this would be a hard one to overcome. This is why it is a good idea to keep your bees harvesting in your own backyard.

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**Tip 6: Keep your bees at home.**

Preparing your own backyard so that bees can forage year round there rather than leaving your property would be really helpful in alleviating some of the fears of your neighbors.

It will also put less strain on the bees as they do not have to fly so far away to do their work.

The trick is to have as many bee attracting flowers, bushes and trees as possible.

Congratulations! You have just become a gardener. Now, not only will you have bees and honey, but you will have lots of other foods to eat as well and your property is going to look awesome.

One way to have lots of flowers is to replace your lawn by a clover lawn and even a chamomile lawn is some areas. It will smell nice and you’ll have fresh tea to boot.
How to Grow a Clover Or Chamomile Lawn

Clover is a low-cost, low-maintenance field crop that's perfect for lawns, especially lawns in shady, poorly-drained and other problem areas. It chokes out weeds, thrives in dry conditions, puts nitrogen nutrients back into the soil, and most importantly it feeds the bees!

Chamomile is just as awesome, smells great and you can make a wonderful tea out of it by steeping the leaves and flowers in boiling water.

Both of these lawns will also make your life easier as you will not need to mow the lawn as often if at all. You need to let them go to flower for the bees.

As well as this see the free e-book on growing and maintaining lawns. The material is general but applies to all kinds of lawns and there is a lot more detail in those books than we can provide here. They are in your bonus package.

1
Buy some clover seeds or chamomile seeds at your local nursery. Dutch clover is the more common type and has little white flowers. Because it is relatively low-growing, it is ideal for lawns. You may also be able to find red clover, which has red flowers ranging from light pink to shocking scarlet but tends to grow taller than white clover. Red clover is considered a medicinal herb and great to have as a tea.
2.
Rake the soil relatively flat. It doesn't have to be perfect; the clover will cover up minor irregularities. You may even wish to put in some top soil with a little good fertilizer in it.

Because clover is so hardy and adaptable, it can be sown at most times of the year provided that it won't be threatened with frost. You will have to decide when to sow according to your climatic zone.

3.
In a wheelbarrow, mix the seed with garden soil or tri-mix. (Clover will grow in almost any kind of dirt, so any reasonably clean fill will do.) Try to have about four seeds per square inch of soil. Three will fail to germinate, so you'll be left with the ideal one plant per inch.
4
With a shovel, evenly spread the mix over the ground. Make sure there are seeds everywhere.

5
With a shovel, evenly spread the mix over the ground. Make sure there are seeds everywhere.
6
Go back to where you started and cover the mix with 1/4 inch of plain (unseeded) soil. Spread thinly, as clover shoots can't break through more than 1/2 inch of earth.

7
Water the area gently using a fine spray nozzle. (A hard stream of water will wash the tiny seeds away.) Keep it moist for a week (don't let it dry out at all) and don't walk on it. In about two weeks, you'll have tiny two-bladed sprouts everywhere. That's the beginning of a perfect clover lawn.

**Tips**

- Mature clover is drought-resistant, but it will grow much better if it's watered once a week or so.

- Resist the temptation to hand-sow clover seeds. You'll end up with an uneven lawn. If you must re-seed patches, use the planting method above.

- Consider micro clover, developed specifically for lawns. It grows shorter, has smaller leaves, and has fewer flowers that are less attractive to bees. It can be seeded into existing lawns.

- To pass the time, look for 'lucky' four leaf clovers! There are many stories of patches of them growing together and if you find loads, they make brilliant gifts!

- Soak the seeds for an hour or so before mixing them with dirt and spreading.

- Clover is not very resistant to heavy foot traffic. Put down slabs or stone pavers for people to walk on.

- Clover flowers attract bees. That can be a problem if you have young children that play in the lawn or have a family member who's allergic to bee stings. Stings are most likely when running barefoot through the lawn. Keeping the clover cut short helps but some of the clover plants will flower even then.
• Clover is a short-lived perennial, meaning that it will only reproduce itself for about two or three years. If you haven’t allowed it to self-seed (i.e. if you mow it every time it flowers so that it never gets a chance to produce seeds), you'll need to re-seed after that.

• Dutch white clover grows to about 8 inches tall and then stops. If this is too tall and you decide to mow your clover, be warned that the clippings stick to everything and make a terrible mess. It may be better to just let it grow.

• Don't fertilize your clover. It fixes its own nitrogen and doesn't need any extra from you. Herbicides will also kill it, so just leave it alone.

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More Plants To Attract Bees
And Butterflies.

Remember that whatever attracts a butterfly will attract bees so use the recommended plants interchangeably for both species.

Not only will you have a beautiful garden producing honey but you will be graced with magnificent butterflies.
Perennial plants live for 3 or more years.

- Golden Aster (Heterotheca villosa)
- Sky blue Aster (Aster azureus)
- Swamp Aster (Aster puniceus)
- Basket of Gold (Alussumaxatile)
- Bergamot Bee balm (Monarda fistulosa)
- Bird’s Foot Trefoil (Lotus corniculatus)
- Boneset (Eupatorium perfoliatum)
- Brown-Eyed Susan (Rudbeckia triloba)
- Catnip (Nepeta cataria)
- Chicory (Cichoriumintybus)
- Chives (Allium schoenoprasm)
- White clover (Trifolium repens)
- Columbine (Aquilegia caerulea)
- Columbine Eastern (Aquilegia Canadensis)
- Coneflower Cutleaf (Rudbeckia laciniata)
- Purple Coneflower (Echinacea purpurea)
- Coreopsis, Lance-Leaved (Coreopsis lanceolata)
- Cup Plant (Silphium perfoliatum)
- Aspen Daisy (Erigeron Speciosus))
- Shasta Daisy (Chryanthemum maximum)
- Gaura (Gaura Imdhemeri)
- Gaillardia/Blanket flower (Gaillardia aristata)
- Gayfeather (Liatris spicata)
- Golden Alexander (Zizia aurea)
- Rigid goldenrod (Solidago rigida)
- Iceland Poppy (Papaver nudicaule)
- Joepueweed (Eupatorium maculatum)
- Lavender (Lavendula angustolia)
- Lavender Hyssop (Agastache toeniculum)
- Lewis Flax (Linum lewisii)
- Mountain Lupine (Lupinus alpestris)
- Perennial Lupine (Lupinus perennis)
- New England Aster (Aster novae-angliae)
- Oregano (Eriophyllum vulgare)
- Oregon sunshine (Enophullum lanatum)
- Penstemon showy (Penstemon spectabilis)
- Purple Prairie clover (Dalea purpurea)
- Rockcress (Arabis alpine)
- Prairie Aster (Machera thera tanacetifolia)
- Black-eyed Susan (Rudbeckia hirta)
- Garden Sage (salvia officinalis)
- Pitcher Sage (salvia azurea)
- Siberian Wallflower (cheiranthus allionii)
- Autumn Sneezeweed (Helenium autumnale)
- Ohio Spiderwort (Tradescantia obiensisi)
- Ox Eye Sunflower (Halipsis belianthoides)
- Creeping thume (thmus serpul lum)
- Wild Blue Indigo (Raptisia australis)
- White Yarrow (Achillea millefolium)
Special Tips

**Plant flowers which are native to your area.** Bees evolved with wildflowers, and the bees in your area will respond best to the flowers they "grew up with," so to speak. What flowers are native to your area? If you're not sure, go to a local gardening store and ask for a native wildflower mix, or do some research online before ordering seeds. If you don't want your garden to be completely wild, choose at least a few species that will complement the rest of your garden and attract bees.

The more wildflowers you plant, the more bees you'll attract, and the better your garden will grow. Planting wildflowers is beneficial in more ways than one!

Aim to plant a great diversity of flowers with a range of shapes and textures, not just one or two types. The more diverse your garden is, the better it will support different bee species as well as other beneficial insects and wildlife.

**Plant flowers with single petals.** Flowers with a single row of petals, rather than flowers with more than one row, are more attractive to bees. Single-petalled flowers have more pollen than other flowers, so they provide a little more food for hungry honey bees. It's also easier for bees to reach the pollen when there is only one row of petals to crawl across. Here are a few flowers bees particularly love:

- Asters
- Calliopsis
- Clover
- Cosmos
- Crocuses
- Dahlias
- Foxglove
- Geraniums
- Hollyhocks
- Hyacinth
- Marigolds
- Poppies
- Roses
- Snowdrops
- Sunflowers
- Zinnias

Plant yellow, white, blue and purple flowers. These colors attract bees more than pinks, oranges and reds do. Your garden doesn't have to be exclusively yellow, blue and purple, but having a good amount of flowers with these hues will keep the bees buzzing in your yard.

Plant flowers that bloom in sequence. If all of your flowers bloom at the same time, the bees will have a feast, then run out of food before the summer's end. Plant a variety of flowers that will bloom throughout the spring, summer, and into the fall to keep the bees in your neighborhood fed and happy.

Plant flowering vegetable and fruit plants. Berries, melons, squash, cucumbers, and fruit trees, especially cherry trees, all produce fragrant flowers and fruit that are attractive to bees. Bees are beneficial to these plants, so providing them in your garden will be a treat for you both. Bees adore these fruits and vegetables:

- Blackberries
- Cantaloupe
- Cucumbers
- Gourds
- Cherry trees
- Peppers
- Pumpkins
- Squash
- Strawberries
- Watermelons
Whilst You Wait For Your Garden to Grow

If you have decided to pursue beekeeping as a hobby, then as already suggested it is a good idea to make contact with your local club and attend regular meetings.

You may ask some of the members if you can come and have a look at their set up. Ask where they bought their material and bees from. Ask if anyone has some discounted second hand materials.

See if your local club has some classes. Maybe you could even spend a few weekends handling bees with one of the members to build your confidence. I personally think that you do not want to get hives and then have to figure out how to do it all. It is best if you have a little experience first.

I know that you are excited but it would not be wise to go out and buy equipment straight away. Give it some time and do your homework.

You can also study this book and then start building some of your hives as we show you later.

Start talking to your neighbors and get them on side.

Start setting up your fences also.

Get your water source organized.

Get your clothing organized.

Source bees and see if there are any for sale in your local area. The closer to your local area you buy them, the best it is for the bees as they are used to the area and the climate.
Plant herbs that attract bees

If you have space for a little herb garden, that's another great way to attract bees. Mints attract certain types of bees, as do sage, rosemary, thyme, bee balm, and a number of other herbs. Here's a list of herbs that bees love, for your reference:

- Bee Balm
- Borage
- Catnip
- Coriander/Cilantro
- Fennel
- Lavender
- Mints
- Rosemary
- Sage
- Thyme

Let it get a little wild.

If your grass is close-clipped, every stick has been picked up, and there's not a muddy spot to be found, bees will have trouble finding a home in your yard, no matter how many wildflowers you plant. Bees are wild creatures who need a wild habitat to thrive. If you want them to take up residence in your yard, do the following:

Allow for some open, meadow-like spaces in your yard and garden.

Leave an area unmowed and let wild clover grow.

Leave a small brush pile and some leaves lying where they fell. Bees will use them to make a home.
Leave patches of exposed dirt that turn to mud when it rains. Some bees live underground and will thank you for access to the mud they need.

Make a bee bath.

Bees have trouble using birdbaths, because they aren’t able to land in deep water. They need an island to land on so they can walk to the edge and take a drink or a bath without drowning. To make a bee bath, take a wide, shallow dish or tray and line the edges with flat rocks. Pour water over the rocks and into the bottom of the tray. Place it in your garden near the flowers that attract the most bees. The bees will be able to land on the rocks and access the water.

Provide a bee shelter.

Rotting vegetation and stumps are great shelters for bees. More and more backyard gardeners are installing hives and other bee shelters to provide nesting spots for bees. If you’re serious about attracting bees to your yard and helping them thrive, this option might be something to consider. You can start by building a small bee "house" using the following method:

Take a small wooden box and paint it a bright color, preferably white, yellow, bright blue or purple. Use organic paint so the bees won’t get sick.

Layer the box with nesting tubes, standing them upright. You can buy them from a garden store or make your own by rolling brown craft paper around a pencil, pinching off the end and holding it together with tape, leaving the ends open. Fill the box to the top with these tubes standing upright, so that the exposed holes are open for the bees to climb in.
Turn the box on its side. Be sure you’ve used enough tubes so that they don't slip out when you move the box. Hang from a tree or a post at eye level in an area sheltered from rain.

Dig up an area of the ground nearby to expose dirt and clay the bees can use to build their nest.

**Stop using pesticides of any kind.**

Bees are susceptible to pesticides and other chemicals sprayed and used in gardens. Aim to have a pesticide-free garden and use pest-riding remedies that are natural and not reliant on chemicals. If you do spray plants, only do so after dusk, when pollinators are least active, avoid using chemicals known to harm bees.

**Tips:**

- Create bee nesting areas if you're happy to have bees living in your garden. The type of nest will depend on which bees visit your garden—bumble bees, ground nesting or cavity/wood nesting bees.
- Plants which attract bees often attract hummingbirds and butterflies as well.
- Find a local beekeeper and see if he or she would like to have their bees forage on your property.
- Bees like shallow pools of water; provide some for them but refresh regularly to avoid stagnation and keep a watch out for mosquito larvae—you don't want to create a different problem!
- Instead of using pesticides, use natural pest eaters such as spiders and ladybugs, picking off pests by hand and natural pesticides made from plants.
Be Careful

- Avoid leaving sugar water, syrup or confection sugar out for bee feeding. Bees need healthy sources of food, not manufactured sweetness.
- If you or a family member has a bee allergy, be extremely careful. Consider not making any efforts to attract bees or have the allergic person take extra precautions such as wearing shoes, not going near bee-attracting bushes or plants and carrying an epi-pen—this is doable provided the allergic person behaves responsibly.
- Do not harass bees at their nest.
- Once there are more bees present on your property, be more careful about your movements, especially walking barefoot or walking among the flowers.
Bee Families

Here is a little science for those who are interested.

There are around 25,000 known species of bee worldwide (about 4000 species in the US, and over 250 species in Britain)....and there are probably more to be discovered!

These 25,000 species can be divided into over 4000 genera (types of bees) belonging within 9 groups or 'families', all under the banner - or 'Super-family' - 'Apoidea'.

**Super-family:** Apoidea

**Family**

**Apidae**
Includes: honey bees and bumblebees.

**Megachilidae**
Mostly solitary bees, including leafcutter and mason bees.

**Andrenidae**
Mining bees. A large family of bees, with many species. It includes the genera 'Andrena', with other 1300 species alone.

**Colletidae**
Believed to consist of around 2,000 species, and includes plasterer and yellow-faced bees.
**Halictidae**
Often called 'sweat bees', these are smallish bees, mostly dark coloured, but some having green, yellow or red markings.

**Melittidae**
A small family of bees in Africa, with around 60 species belonging to 4 genera.

**Meganomiidae**
Small bee family of about 10 species in 4 genera. Found in Africa.

**Dasypodaidae**
Originally called 'dasypodidae'. Small bee family found in Africa, with more than 100 species in 8 genera.

**Stenotritidae**
Small bee family with around 21 species in 2 genera. Found in Australia. Originally part of the 'Colletidae' family.

**The Honey Bee -(Family: Apidae)**

Honey bees are classed as ‘social’ bees, as they live in colonies usually consisting of around 50,000 – 60,000 workers.

There are 10 types of honey bees world- wide, and one hybrid: the Africanized bee. The European Honey Bee Apis Mellifera is one of the most commonly kept bees.
The Bumblebee (Family: Apidae)

Most bumblebee colonies are fairly small, from 50 to 400 workers, with an average of around 120 to 200. Most species are 'social', but there are also 'social parasite' species, known as 'cuckoo bumblebees'. These parasitic bumblebees inhabit the nests of other bumblebees.

Bumblebees are also excellent pollinators of all kinds of flowers. Their efficiency as pollinators is partially down to their furry body shape, but also because they have the ability to 'buzz pollinate'.

Leafcutter and Mason bees (Family: Megachilidae)

These types of bees are solitary bees. With solitary bees, usually, a single female mates, then constructs a nest alone, and provides for the egg cells that will become larvae.

However, some solitary bees nest close to each other, and in some cases, even share nest guarding and foraging duties.

Mason bees like to make nests in crevices, sometimes in old mortar, whereas leaf cutter bees like hollow stems and readymade holes in wood which they stuff with leaves.
Main Types Of Honey Bees

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We understand that would be beekeepers from all over the world and the various continents will be reading this, so we have tried to give a little insight on bees from different parts of the world.

When deciding on which bee is best for you to keep, you will need to research what is appropriate for your local area and what people are already keeping in your area.
Most bees are fuzzy and carry an electrostatic charge, which aids in the adherence of pollen. Female bees periodically stop foraging and groom themselves to pack the pollen into the scopa, which is on the legs in most bees, and on the ventral abdomen on others, and modified into specialized pollen baskets on the legs of honey bees and their relatives. Many bees are opportunistic foragers, and will gather pollen from a variety of plants, while others are oligolectic, gathering pollen from only one or a few types of plant.

A small number of plants produce nutritious floral oils rather than pollen, which are gathered and used by oligolectic bees.

One small subgroup of stingless bees, called "vulture bees," is specialized to feed on carrion, and these are the only bees that do not use plant products as food.
Bee Species

You will need to choose an appropriate species for your area.

**Dorsada** – Asian, Large, Single Comb, Outside Dwelling
Also known as the “Giant Honey Bee”.

**Kingdom**: Animalia  
**Phylum**: Arthropod  
**Class**: Insecta  
**Sub-Class**: Pterygota  
**Infra-Class**: Neoptera  
**Super-Order**: Endopterygota  
**Order**: Hymenoptera  
**Sub-Order**: Apocrita  
**Infra-Order**: Aculeata (not often used anymore)  
**Super-Family**: Apoidea  
**Family**: Apidae  
**Sub-Family**: Apinae  
**Tribe**: Apini  
**Genus**: Apis  
**Sub-Genus**: Micrapis  
**Species**: Apis andreniformis  
**Species**: Apis florea  
**Sub-Genus**: Megapis  
**Species**: Apis dorsata  
**Sub-Genus**: Apis  
**Species**: Apis cerana  
**Species**: Apis koschevnikovi  
**Species**: Apis mellifera  
**Species**: Apis nigrocincta
**Cerana** – Asian, Small, Parallel Comb, Cavity Dwelling

Also known as the Eastern Asiatic Honey Bee.
**Florea** – Asian, Small, Single Comb, Outside Dwelling

The dwarf honey bee (or red dwarf honey bee), *Apis florea*, is one of two species of small, wild honey bees of southern and southeastern Asia.

A florea nest.
The western honey bee or European honey bee (*Apis mellifera*) is a species of honey bees most people are familiar with. Honey bees are social bees, belonging to the family ‘Apidae’ along with bumblebees who belong to the same group.
Apis Mellifera

Kingdom
Animalia, Food Chain Consumers

Phylum
Arthropoda, exoskeleton, segmented, jointed appendages

Class
Insecta

Order
Hymenoptera, membranous wings, 2 sets, hooked

Family
Apiidae, Bees (20,000), Wasps, Ants

Genus
Apis, Honeybees, (7)

Species
Melli
The Carniolan Honey Bees
One of The Best Bees For The Urban Environment

The Carniolan bees (Apis mellifera carnica), are also called as carniolans or carni for short. This bee is native to Slovenia (Carniola is a place in Slovenia) including to some other regions like southern Austria, parts of Romania, Hungary and Bulgaria and some areas of the former Yugoslavia.

The carniolans are one of the best bees to keep as they are strpmger and thus less prone to diseases. They are also gentler and extremely hard workers. They are thus very good for an urban environment as they will not tend to attack. They tend not to drift from one hive to another and unlike the Italian bees, Carniolan bees are less prone to rob honey.

The Carniolan bees also tend to produce more honey as they adjust their breeding rate for worker bees. As soon as they detect the increasing availability of nectar in springtime they multiply their worker bee population and with the same speed they can decrease the worker population when there is a lack of nectar. As such they eat less honey and leave more for the beekeeper to collect.

They are hardy and far more resistant to brood diseases than other bee species. A Carniolan worker bee also has a longer lifespan compared to other bees.

In spite of their benefits, Carniolans also possess some disadvantages, which include their proneness to swarming when overcrowded and less ability to thrive during hot summer weather. They like smaller hives and do not enjoy being in large groups. This could off course be an advantage in urban areas as there are less of them but they produce more honey with smaller numbers.

It is also difficult to find the queen amongst thousands of worker bees as she is very dark in colouring.

Other than that Carniolan bees are a joy to keep and are very safe for an urban environment. They are perfect for first time beekeepers as they will tolerate the beekeeper’s mistakes and be slightly more forgiving than other species.
The Africanised Honey Bee
The Africanized Honeybee is also known as the “killer bee”. They are called killer bees not because their venom is any more toxic than other bees but because they tend to chase people for a long time and they attack in numbers. Even if you jump in a pond or a like, they will wait around for when you come up for air. Do not jump in the water! They will just wait around until you come up for air.

If you are chased by an Africanized honey bee then you run in a zig zag pattern and try to find a shelter such as a house or a car. Something that you can lock yourself away in.

**How to Identify Africanized Honey Bees**

It is hard to tell the difference between the Africanized Honey Bee and a normal Honey Bee because they are very similar. They are however a little smaller than normal bees and they have different behavioural patterns. That is about all the differences there are.

They will tend to nest just about anywhere. Honey bees will not do that. They will go in chimneys, empty containers, water meters, old tyres, sheds, piles of wood, crawlspaces in houses and so forth.

These bees tend to forage on their own rather than in groups. So look for bees which are alone. They also come out early in the morning or late in the evening rather than coming out during the day.
Check chimneys or crawlspaces for nests.

AHBs will nest in many places regular honey bees won’t. Other possible nesting sites include empty containers, water meters, abandoned vehicles, old tires, lumber piles, outbuildings and sheds.

Note that this is for the Northern Hemisphere.
For the Southern Hemisphere you will have to reverse the seasons.
**Look for swarms of bees.**

The best chance of identifying AHBs is during their swarming season, which is March through July. Bees swarm as a means to reproduce their colonies. Worker bees will follow the queen from the hive at this time. AHBs will typically produce 6 to 12 swarms in a year.

Look for bees that forage for pollen in small groups or alone. Africanized bees are more solitary foragers than European honey bees.
Look for bees out looking for pollen early in the day or late in the evening, not in the middle of the day. They can be seen foraging for pollen earlier in the morning than regular honey bees, and will often go late into the evening, regardless of the amount of sunlight.
A Little More Information About Bees

Social or Solitary
There are effectively two known types of bees. There are solitary bees and social ones. Solitary bees are bees that do not live in a colony. Social bees do the contrary.

Disturbance Level
Bees also differ in their tolerance of disturbance. In fact, certain colonies may abandon their hives because of disturbance. However, the level of disturbance tolerated by bees varies. Some bees can tolerate more disturbance than others.

Apis Florae
If the Apis Florae feels disturbed it is likely to leave its hive. This species is characterized by a smaller size when compared to other honeybees. The Apis Florae builds a single comb hive and are generally found in forest as well as in lush areas of farming.

Apis Dorsata
The rock bee or Apis Dorsata is another type of honeybee. It is bigger when compared to the others honeybees. It may also abandon its hive because of disturbance. The Apis Dorsata, construct single comb hives like the Apis Florae. Their hive can also be found suspended like those of the dwarf bees. Having the hive suspended above the ground serves as a protection against predators.

Apis Cerana
Apis Cerana, differs from the dwarf and rock bees in that the Apis cerana can live and be raised in man-made beehives.
Another good quality bee to keep is the Buckfast bee as it is extremely resistant to parasites and it is very strong. It has come from England and was bred by Brothers at a monastery. Brother Adam Kehrie was an enthusiastic apiarist and devoted his whole life to keeping and studying bees. The monastery was in Buckfast Alley, thus the name of the bee.

He joined the monastery and was in charge of the bees when a disaster struck and almost wiped out his whole colony. The colonies were infected with Acarine disease of which you can read in section 4 of our book. This disease prevents the bees from breathing and thus reduces their lifespans. As a result he only had a few colonies left.

Upon examining the bees, Brother Adam found out that the remaining colonies were hybrids between the Italian bee and British native black bees.

He made a plan to rebuild the colonies with a clear objective to develop a new breed that is strong like the black bees and at the same time possesses resistance against disease like the Italian bee by the means of cross-breeding. After years and years of work, the final result was the now famous Buckfast bee.

The superior Buckfast possesses many positive traits that include: a good pollen collector, highly tolerant to tracheal mites, very gentle, low sting instinct, chalkbrood disease resistant, low swarming instinct and they do well in winter times.

However there is a main disadvantage of the Buckfast bees which is that they are very generous in the use of propolis to adhere the surfaces of their hive, which is against the principle of the modern hive where the comb should be easily removed for inspection.

However, I do not think that this is necessarily a bad thing, because we should be treating our bees the same way that they survive in nature. If it is a little more inconvenient for us to collect our honey, then so be it. Trying to manipulate nature is what causes all the problems in the first place.
Keeping Other Types Of Bees

Even if you cannot keep honeybees, you can do your bit for the environment and for keeping food on the plate by keeping other types of bees. You can boost the world bee population by keeping other bees and even stingless native bees which should definitely not worry the neighbors.

How to Identify Carpenter Bees

Carpenter bees are large, black bees that closely resemble bumble bees. They are often referred to as wood bees because of their interest in boring holes in wood. Carpenter bees bore holes in wood because they are looking for nesting areas. They are capable of boring 1/2-inch (13 mm) holes into wood structures, and won't think twice about trying out areas on your home. While carpenter bees will typically only produce cosmetic damage, there is a potential for structural damage to wood if the behavior is repeated over time. Male carpenter bees are not capable of stinging. Females can sting, but only if provoked. To identify carpenter bees, check for the following characteristics.
1. Look for a bee with a black shiny body, with white, orange or yellow hairs on the thorax.

2. Measure the bee by holding a ruler behind it.

Carpenter bees are about 3/4 inch to 1 inch (1.9 to 2.54 cm) in length.
Look for white markings on the head.

Females have black heads, and males have white markings on their heads.

Look for dark, thick hair on the legs.
Look for bees boring holes into wood or flying near holes in trees.

Carpenter bees will seek out wood, and will often fly close to it, examining it for possible nesting. A bee that is boring or coming in and out of a hole is creating the nesting area. Male carpenter bees will often hover, protecting the female while she is working.

Examine weathered wood for holes.

Carpenter bees enjoy a range of soft and hardwoods, and particularly like wood that is weathered. Look for carpenter bees in firewood and lawn furniture. Along your house, carpenter bees will try to bore into the bare wood near the roof, such as in eaves, gables
and fascia. If you have had carpenter bees nest in an area of your house before, bees in the same place will likely be carpenter bees, as they like to return to old nesting sites.

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Mining Bees (Family: Andrenidae)

Some bees live underground. Sometimes in your lawn, especially the weaker, patchier areas of your lawn, you might see lots of little holes with piles of dirt next to them. These are the homes of the ground dwelling mining bees, so take good care of this area and leave it alone.

Mining bees are solitary bees meaning that the female bee digs a hole in the ground herself and builds an underground chamber which she layers with pollen and nectar for laying her eggs. Even though they are solitary bees, they tend to build ground nests close together in mass numbers.

The adult mining bee is actually about ½ inch in length and is black with small lighter colored hairs around its mid-section.

The female mining bee stocks food, including nectar and pollen, in each brood chamber and then lays an egg in the chamber. As the egg hatches during the summer, the larva survives underground by feeding on the nectar and pollen. The larva then develops into a pupa through the winter and finally an adult bee develops and emerges in Spring.

They are not harmful and are not prone to attack you. They are valuable pollinators.
Stingless Native Bees

Native bees are found all over the world and there are many species in each country. Research the ones available in your area.

Here we show you some of the native bees available in Australia.

1. Stingless Bees
(Austrolebeia and Tetragonula*)

Australia’s native honey bees are tiny (3 - 5 mm), black and stingless. They usually nest inside hollow trees but in northern areas they also nest in urban situations such as inside wall cavities or underneath concrete footpaths. So you see providing them with a habitat should be easy.

Do Any Native Bees Sting?

Australia has over 1,500 species of native bees. Only 10 of these species are stingless. These are the native honey-producing bees (Tetragonula - previously called Trigona - and Austrolebeia). All of the other species of native bees in Australia can sting.

Yellow and Black Carpenter Bees
(Xylocopa)

These 15 to 24 mm long bees are the largest native bees in Australia. The females have a glossy black abdomen and bright yellow fur on the thorax. They like a warm climate. They are great pollinators of passionfruit all over the world.
Green Carpenter Bees
(*Xylocopa*, formerly in genus *Lestis*)

These bees (up to 17 mm long) are glossy metallic green with tints of yellow or blue. They cut 7 to 10 mm wide nest burrows in the flower stalks of the grass tree (*Xanthorrhoea*) or in other soft pithy dead timber.

Reed Bees (*Exoneura* and *Braunsapis*)

Reed bees are slender black bees less than 8 mm long. Some species have a red abdomen. They nest inside dry pithy twigs in plants such as raspberries and blackberries or in the dead fronds of tree ferns.
Blue Banded Bees (*Amegilla*)

These bees (mostly 8-13 mm long), with glittering stripes of blue or whitish hair across their black abdomens, are often seen darting around the flowers of lavenders and abelias.

Teddy Bear Bees (*Amegilla (Asaropoda*)

Most species of these furry brown bees are 7 to 15 mm long. They are quite fat and chubby just like teddy bears hence the name. They build shallow nest burrows in soft soil and sometimes nest underneath houses.

Leafcutter Bees (*Megachile*)

Leafcutters use the disks of leaf they cut as nest building material. They particularly like the soft leaves of roses, *Bauhinia* and *Buddleja*. 
Resin Bees (*Megachile*, formerly in genus *Chalicodoma*)

Resin bees come in many colours and sizes. For example there are large black 14 mm bees with white tufts of hair, and small 8 mm black bees with bright orange abdomens. They nest in pre-existing holes or gaps in timber or stonework. They are called resin bees because they collect resins and gums to build partitions between their brood cells and to seal their nest holes.

*Homalictus* Bees (*Homalictus*)
*(44 Australian species)*

Although very small (most less than 8 mm long), come in many colours. ‘Golden blue’, ‘coppery red’ and ‘green tinged with purple, red or gold’ are just a few of the colours. They dig intricate branching nests in the ground.

Masked Bees (*Amphylaeus*, *Hylaeus* and *Meroglossa*)

These slender black bees (most less than 10 mm long) are called ‘masked bees’ because they have pale markings on their faces. Many species also have a distinctive yellow spot on the thorax. Masked bees have very little hair and carry pollen to their nests by swallowing it.
Keeping Bees in a Suburban Area

If you want to keep bees in a populated area, you will need to know the basics of bee biology, property rights, and human psychology. It can be done with very few problems. Even in a city it is possible for bees to find enough pollen to feed them and produce a honey crop at harvest.

Beekeepers in the suburbs and cities need to manage their bees so they do not create a problem for the neighbors. Measures can be takes to alter the keep the bees from becoming a nuisance to other people. To do this we need to understand the circumstances, which cause bees to bother other people.

The bees flight pattern is one of the ways bees can be a problem for other people. When the bees leave their hives to gather food, they will fly 3-4 feet off the ground. You can prevent them from crossing paths of people walking in their flight path by planting a hedge or building a fence at least 6 feet tall. This forces the bees to fly above the fence. The hives can also be placed on the rooftop, which starts them out flying at a higher level than most people walk.

Fence, hedges, and rooftops also provide seclusion, which is very important. By keeping bees out of sight they will not be the target of vandalism or theft, also keeping bees out of sight will alleviate worried neighbors.

To keep the bees happy it is important for their hives have to be in a certain condition. A good location is for the hive to be in full sun all day, shaded bees will be more aggressive. The hives should be dry and the bottom boards angled so that water runs out of the hives. The hives need to be elevated with hive stands to keep the bees off the ground and to allow for airflow to keep the bottom board dry. Also with the hives 4 to 6 inches off the ground will make it less likely for grass and weeds to obstruct the view.

If you live in a congested area, a top entrance is probably not a good idea, especially during the summer. Whenever a hive with a top entrance is opened and hive bodies moved, hundreds of confused bees will be flung around because their entrance is gone. This will probably worry you and your neighbors. By providing only a bottom entrance, and working from the side or from behind the hive, the bees are not impeded from flying home even when all the upper boxes are removed. Always keep the equipment in good repair. You don't want the cracks or chips in the hives providing extra holes for flight.

A bee only stings as a defense against intruders that might want to cause harm to the hive. Whenever a hive is open, the bees are in their most dangerous state.
During a nectar flow, many of the older workers will be in the field hunting for food. This is the best time to examine the colony. During the summer more bees will be in the hive and the situation can change, especially between the nectar flows. There can be some robbing going on at this time, which will make the bees even more defensive at any intrusion to their hive. Leaving the colony open for more than a few minutes can accelerate a robbing as can leaving cappings or honey exposed. It will become a necessity to reduce the entrance of a weak colony to prevent stronger hives attempt to rob from it. A honey flow will reduce the likelihood of robbing.

The mood of the bees can have a lot to do with the weather or the time of day. On the days of rainy weather, cool temperatures, early in the morning or late in the afternoon will be more likely to make them angry and they will attack. Always inspect them on warm, sunny days in the middle of the day when most of the bees are foraging.

Keep a constant warm water supply for the bees to cool the hive and dilute honey to feed their young. They will collect water from the closest water source. If you do not have a constant supply of shallow water for the bees, they will look for it somewhere else, like the neighbor’s pool, birdbath or wading ponds. The bees are more likely to drown in those sources. If you have a water supply for them when they first fly out in spring, they will not go anywhere else for water. Once they find a water source, it is hard to keep them from going back to it.

A beekeeper must keep the bees in control every time the hive is open. A typical hive can house thousands of workers all capable of stinging. There are measures a beekeeper can take in the open that he cannot take in the city because of the closeness of other people.

Smoke is the most important tool for the beekeeper opening a hive. Smoke should be used in moderation, but the smoker should be capable of producing large volumes of smoke on short notice. The beekeeper must smoke the entrance of the hive, under the cover, and periodically smoke the frames while the hive is open. Try not to jar the hive or the frames as that may anger the bees, which will make it hard for a beekeeper to do his work. The beekeeper must work quickly and carefully. By going through the frames several times a year, the beekeeper keeps the frames movable. Remove any excess combs.
**All Important Water**

Keep a constant supply of water for the bees to cool the hive and dilute honey to feed their young. They will collect water from the closest water source. If you do not have a constant supply of shallow water for the bees, they will look for it somewhere else, like the neighbour's pool, birdbath or pond. The bees are more likely to drown in these sources. If you have a water supply for them when they first fly out in spring, they will not go anywhere else for water. Once they find a water source, it is hard to keep them from going back to it. This is why your water source must be the first they come across.
How to Handle Bees

Intruders are going to get stung by the bees protecting the hive. As a beekeeper you will have to be prepared to receive your share of stings. If you have any fear of bees or of being stung, you will have to conquer these apprehensions. As you gain confidence and become more adept at handling bees, stings will happen less frequently. Before acquiring bees it is advisable to find out if you have any allergic reaction to bee stings.

One of the tips you will want to learn is when to manipulate bees. You should only open and examine your bee colonies on days that are warm and sunny with no wind. As stated earlier, the older bees will be out searching for food on those days; unlike colder, windy and rainy days when older bees will stay in the hive.

When there is an abundance of nectar bees are much easier to examine. When there is a shortage of nectar, plying them with sugar syrup may help; but not always. Spring is the easiest time to examine the bees because of smaller populations.

Bees will usually tolerate a moderate beekeeper manipulation for 10 to 15 minutes. It is best not to keep the hives open any longer than you have to. Brood examinations should never be drawn out. When examining the hives, if bees become noisy or very nervous, the hive needs to be closed. If there is honey in the combs, this will attract robber bees unless there is an over abundance of nectar. If robbing starts, stop examinations for the rest of the day and reduce the entrances to the hives.

Once robbing starts it is difficult to stop. If you need to manipulate a colony, have a lighted smoker that omits cool smoke. Before you open the hives, you want to puff smoke into the entrance of the hive. Move on to the other colonies allowing time for the bees to react to the smoke. Keep your smoker handy because you will need it while you are making your close inspections of each colony. If you have

MOVING BEE HIVES

Take the correct steps when moving a hive to a different position and the process will be an easy operation. This task is normally carried out for either pollination purposes or to good nectar sources.

It is essential that the hives are well prepared in advance. The full supers and the crown board have to be removed. Replace with a travelling screen. Fix hive parts with fasteners to secure all the components.

The best time for moving is the evening or early morning, when the bees have stopped flying. Close the entrance, remove the roof and relocate. To calm any agitated bees pour half a cup of weak sugar syrup on each colony. Once relocated in the new position replace the roof and open the entrance.
some of the bees looking at you, make them scatter with a few puffs of smoke. When you are around the bees, you should move smoothly and carefully so that you don’t alarm them. When prying off the cover to the hive, be as gentle as possible, bees are sensitive to vibrations. Avoid any jolting of the hives. After removing the cover to the hive, work from the back or the side of the hive. Remove the frame nearest the outside to be examined. If robbing is not a problem, lean the frame against the outside of the hive to give you more room to work. If robbing could be a problem make sure to cover the hives and never leave a frame out in the open.

If you are going to examine all the boxes, start with the lowest one. Make sure the boxes you are not examining stay covered. After examining the lowest box, examine each box after it has been replaced on the lower one.

When you need to remove the frame, pry it loose with the hive tool. With a firm grip on the loosened frame, gently lift it, trying not to scrape the bees on the adjoining frame. Leave the frame outside the hive or box, to give you a larger working area. If you scrape the comb, do not leave the bits and pieces in the hive or box. Only scrape comb that is in the way, scraping is irritating to the bees.
How Beekeepers Can Reduce Whilst Inspecting Their Hives

A smoker is considered to be an essential piece of equipment for the beekeeper. It produces smoke which results in quieting the bees when the beekeeper goes into the hive. A beekeeper should always have a smoker with him or her when inspecting a hive as a means of controlling the bees, this is particularly important if the hive is in an urban setting.

On approaching the hive the beekeeper puffs smoke from the smoker into the entrance and underneath the hive, allowing time for it to drift up through the colony before taking off the roof.

The smoke interferes with the pheromones the bees use to communicate with each other and so they cannot co-ordinate an attack against the intruder which in this case is you. It is also said to trigger an instinct in the bees that makes them believe that there is a forest fire which causes them to start eating their honey stores in preparation for leaving the hive. When a bee has a stomach full of honey it cannot flex its body as easily and therefore cannot get its stinger in the right position to be able to sting you.

Although it is a way of controlling bees, the stress response that it produces is not good for your bees. It is not a natural way. I do not believe that it calms the bees down at all, rather it redirects them into trying to save their honey and thus this is why they do not attack as much. If you had a house full of smoke, you would not be attacking anyone either. Instead, you would be trying to collect your children and get out of there. Think of honey as the children.

The smoke does not go away instantly either and the bees do not know that the beekeeper has finished doing whatever he or she was doing. A way of reducing smoking is not to inspect or touch your hives unless absolutely necessary. It takes at least 48 hours for all the smoke and the smoke smell to leave the hive and for the bees to settle down again, so it is very stressful to them.

In addition your hive is in danger during this time as the bees cannot communicate as well with each other and the collective cannot work. Again, think Borg. How stressful to be left on your own without an ability to communicate or to act in unison. You may also lose some of your honey as not all will be put back.
You do need your smoker however in case of danger. For example if you are stung you should smoke the area of the sting to prevent the pheromones released from causing other bees to be alerted and inflict further stings.

Always try to inspect your hives on a good day, preferably between 10 am and 3 pm. There will be more foragers out in the field and therefore less bees to control and also the absent bees will not be able to panic and gorge themselves on the honey stores. Bees are also in a better mood on a warm sunny day.

If you handle the hive gently with slow but confident movements the bees will also stay calmer. Bees cannot hear but are very susceptible to vibration, so banging frames and boxes will get a reaction.

Keeping these things in mind and having good hive management will allow you to not use smoke as often. After all, in nature there is no smoke and you want to remain as natural as possible. Most beekeepers are not aware of the lingering after effects of the smoke and think that when they are finished, that is that. Remember, it will take up to 48 hours for your bees to get back to normal.
How to Care for an Injured Honeybee

Have you found an injured honeybee? Do you want to look after it? Well, if you need some help on how to care for it, here I will give you as much help as I can.

Steps

1. Detect what happened to the honeybee? Has it been in water and it can't fly or has its leg or wing broken?

2. Once you have recognised the injury you need to treat it.

3. If the bee has been in water, put it in a container that air can flow in but the bee can't escape and stick it in a sunny area so that it's wings can dry off. Make sure that it is in part shade and that there is a flower and some small sticks.

4. If the bee has a broken wing then it is like a death sentence. The bee will be able to live a while if cared for properly. Make sure you keep it in a large container with a dirt ground, a bit of water and a couple of flowers. (this is the best advice I have for this problem).

5. BROKEN LEG: If this is the case, get a spoonful of warm tap water with lemon juice and sugar. Drip a tiny bit in front of the honey bee, but not on it, it can actually suck it, and then, it gives it strength. Leave it lying there for a while, and then within a couple of minutes, it should be able to fly away.

Warnings

- Even though it is hurt, it still might sting you so don't directly pick it up, carefully move it around on wide leaves or other materials
Feeding a Hive of Bees

Feeding a hive of bees especially one just started on new foundation helps the bees immensely. They need to build new comb, raise brood, and store food for those days they cannot get out to gather nectar. However, there will come a point when the feeding should stop. I have been asked, "Why not let the bees convert the sugar syrup into honey? First, if you feed the bees and they do convert the sugar syrup into honey – you will have adulterated honey. The sugars that make up the honey will not be honey sugars.

Second, these sugars from cane or sugar beets can be identified if they are put to scientific test. Third, it is illegal to sell adulterated honey as pure honey. Why not just Go out and mix corn syrup with honey? It is the same thing. It is a degraded product! When a nectar flow is on and you need to add additional supers, the feeding should stop. The bees will then store pure honey in the comb they build on the foundation you provide. Pure honey is a wholesome food and has an outstanding reputation. Don’t Mess it up. Quite frankly, most bee books don't even touch the subject of feeding bees too much
Using Nectar Substitutes

Plants have a glandular secretion, called nectar, which usually collects at the base of the flowers. Bees depend on this nectar for their source of energy. Honeybees dehydrate nectar to produce honey because it contains a low to moderate concentration of sugar. If a little pollen is incorporated into it, there can be barely measurable amounts of proteins, vitamins and other nutrients in the nectar.

There is two different ways bees use nectar. The nectar will work as a substitute for water, used to dilute brood food and air condition the hive. The bees can also ripen the nectar to become a stored resource for carbohydrate. The nectar substitute can also be used in either one of those ways, but the beekeeper use different sugar concentrations for different purposes.

Inspections of the colony should be conducted about every ten days during early and late spring. A beekeeper must stay aware of the conditions of the colony and the inspections will accomplish this. During the early spring the beekeeper must be aware of the food supply and if it is enough. During the late spring the beekeeper must be attentive to the possibility of swarming to keep it under control. Every inspection should inform the beekeeper if the bees have adequate food to get them through the times of bad weather. If they have enough to get them through until the next inspection, the beekeeper will again check their supply. If not, then the bees will have to be fed.

In the spring beekeepers will always feed the bees a pollen substitute and if the bees need to be fed sugar syrup. The sugar syrups fed early in the season are used for brood rearing. Feeding sugar usually stimulates egg laying and the syrup is usually a "light" syrup mixed with 1 part sugar and 1 par water. A heavy syrup, a mixture of 2 parts sugar and 1 part water, is fed late in the season to ensure adequate winter food supplies. They are stored as ripened syrup. If a medicated treatment is needed in the fall, feed for weight first, and then top off the colony with medicated syrup. There are beekeepers who use high fructose corn syrup to feed their bees, but they do not usually dilute the syrup regardless of the season. There are some levels of hydroxymethylfurfural (HMF) that will increase over time, especially with heat. HMG is toxic to honeybees at high enough concentrations.
It is best to feed the syrup to each colony individually. Every colony should receive its full share regardless of the size of the colony. It is best to feed in the evening, after the bees have settled down for the day. If there is a sudden abundance of syrup, bees will interpret this as an opportunity for robbing, by feeding after flying has ceased; the potential robbers find a source at home. Don’t spill any on the hive, this will attract ants and robbing bees.

**Using Pollen Substitutes**

Pollen is a source of protein, vitamins, mineral and some carbohydrates for honeybees. One pollen alone does not provide a bee with all the nutrients they need to stay healthy, so a variety of pollens are needed to provide them with all the nutrients they need. Without these nutrients, bees would not be able to produce the royal jelly required to feed the queen and rear brood. If the weather will not allow the bees to leave the hive for several days to collect pollen, and there is very little stored in the combs, it will be necessary the beekeeper to feed the bees a pollen substitute. At the same time the beekeeper will feed them sugar syrup.

The main ingredient used in making a pollen substitute is brewer's yeast. The yeast can be fed to the bees dry, but the bees can better utilize the yeast when it is made into patties with the consistency of peanut butter. The yeast is often mixed with 50% sucrose syrup to moisten the patties. The patties are wrapped in wax paper or placed inside plastic bags to keep them moist. The beekeepers that use the high fructose corn syrup will mix the patties using that syrup. Other ingredients can be added to the patties that offer more nutrients than the yeast and syrup mixture alone. Beekeepers will add casein, lactalbumin or soy flour to their mixtures. If the beekeeper use the casein and lactalbumin it is necessary for them to watch out for lactose and over two-percent sodium. When the beekeepers use soy flour, they try to get the "debittered" soy flour that has been processed and retains some lipids, and toasted to knock out enzymes that interfere with the bees' digestion. Always make sure to check the data on the soy flour. The beekeeper will want to determine if the soy is a "high sucrose" variety or contains mostly stachyose. Stachyose is toxic to bees. Beekeepers will sometimes add a "feed yeast" like Torula to the pollen mixture to enhance the nutrients in the substitute. Most of them don't use it because of the high cost.
Pollen substitutes do not increase brood production as well as pollen sources brought in by the bees themselves. Because of the pollen substitute brood rearing will not stop all together should the weather stay bad for a while. A beekeeper will have a fatter bee when using a pollen substitute. There are some areas where pollen is scarce in the late summer and fall. If the beekeeper feeds the bees pollen substitute for a fatter bee, a fatter bee will winter better and rear more brood the next spring than their non-fed counterparts.

Bees are not fond of pollen substitutes. It must be place directly in contact with the bees and as close to the brood as possible. As long as the bees are bringing in a trickle of pollen the substitute will be eaten. If there is no pollen being brought in, the substitute will be ignored and will spoil over time. There are some commercially formulated pollen substitutes on the market that claim the pollen substitute is so attractive to the bees that they will eat it anytime the substitute is offered. No one has investigated those claims.

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<th>The FIVE rules of inspection</th>
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<td>To check that:</td>
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<td>1. The queen is present</td>
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<td>and actively laying</td>
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<td>2. No swarm preparation</td>
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<td>3. Space is available for</td>
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<td>honey, bee and brood</td>
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<td>4. No diseases or pests are</td>
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<td>5. There are stores of food</td>
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The Different Bees In The Hive
And What They Do

Bee Fact: Anatomy

- Bees have different tongue lengths, depending on the species.

- Bees have 5 eyes – 3 simple eyes on top of the head, and 2 compound eyes, with numerous hexagonal facets. Read more about Bee Anatomy.

- Bees are trichromatic – just like humans. However, humans base their colour vision on the colours red, green and blue, whereas bees base their colour vision on blue, green and UV. Bees cannot see red, but visit red flowers because they are able to see the UV markings on the petals.

- All bees have two pairs of wings as do wasps.

A typical colony may have:

1 queen

50,000 workers

300 drones

9000 new larvae

20,000 older larvae and pupae in sealed cells.

6000 eggs from which new larvae will hatch
Many people think of honey bees as belonging naturally in hives, but of course, this is the result of humans domestication.

In the wild, however, they may nest in hollow tree cavities or even holes in buildings.

Size comparison of the different bees in a hive.
The Queen Bee

Before a female bee becomes a queen she will go through a metamorphosis from an egg to a stage of a mature queen which will occur in about 23 days. The phases are: egg - larva - capping of the queen cell - pupa - emerging pupa, virgin queen bee - nuptial flight - a mature queen bee ready to lay eggs.

After a queen bee has laid eggs in queen cups, the worker bees start to select which among all those larvae should be developed to be queens. They will then provide more quality food, royal jelly, to those selected larvae. Although all larvae are fed with royal jelly at the beginning for several days, only queen larvae will be fed continuously and exclusively with royal jelly during the entire growth period. The rest of the larvae will become worker bees.

Queen bees are raised in very special constructed cells. Initially the eggs are laid in queen cups. As the larva emerge, the worker bees then build the queen cups further to become a queen cells to exclusively feed the larva. The worker bees then will cap the queen cell with beeswax. In these cells larvae will develop into pupae. In about 7 - 10 days the pupa emerge as virgin queen bees from the queen cells.

Upon maturity the virgin queen bee chews her way out of the cap on her cell. She will then quickly go to the other queens who have not emerged yet and sting them to death. With the presence of the virgin queen, the old mother queen will give way to the young virgin and voluntarily leave the hive with the primary swarm.
When the swarm has left the hive, the worker bees can temporarily hold the virgin bees fighting each other. Some virgin bees may leave and follow an after-swarm, while other virgin bees will stay and continue to fights till there is only one of them left.

If a swarm has both a new young queen and an old queen at the same time, the new queen will let the old queen live. After a few weeks the old queen will eventually die naturally and time has come for the young queen to take over.

**The nuptial flight**

The queen starts to release pheromones to attract the males. However, after releasing the pheromone it often happens that the queen tries to escape the males letting only the fastest and fittest male bees mate with her. They mate in full flight and this is why it is called the Nuptial Flight.

The queen will mate with a number of males and store the sperm in a special organ in her abdomen which can last for her whole life.
The queen now ready to lay eggs continuously and this is what she will do for the rest of her life.

Honey Queen bees may live up to 4 or 5 years.

You can read all about the Queen Bee and other bees in your bonus material. A good bit of science if you are interested, down to the nitty- gritty section describing the bees inside and out can be found in the book “The Natural Histories of Bees.” This is a very special bonus as it was one for the very earliest books written on bees.

**This is a much more scientific article for those so inclined. Some people like to know the ins and outs of things and why they work the way they do and this article is for you.**
How to Identify a Queen Bee

A queen bee is the leader of a bee colony and the mother of most—if not all—of its worker and drone bees. A queen honeybee lives from 3 to 5 years and, in her prime, can lay up to 2,000 eggs in a day. A healthy queen is necessary to the health of the hive; when she gets old or dies, a new queen must be selected, either by the bees themselves or through artificial means. To maintain their hives, beekeepers must know how to identify a queen bee from the others and mark it once it is identified. To identify a queen bee yourself, here's what to look for.

1. Look for a bee larger than the others in the hive.

The easiest way to tell the queen bee apart from other bees is by her size. Queens mated with drones are the largest bees in the hive, both longer and wider than other bees, while queens who have yet to mate, or virgin queens, are smaller than mated queens but larger than either worker bees or drones.
• The queen bee's larger size, as well as her ability to lay eggs, is due to eating protein-rich royal jelly, which is secreted from glands on the heads of young worker bees and mixed with pollen to form a whitish milk or mush. All bees are fed royal jelly for the first few days after hatching, but only queen bees are fed royal jelly until reaching physical maturity. Royal jelly not only enables queen bees to mature sexually, it also enables them to reach physical maturity sooner (after 16 days as opposed to 21 days for worker bees) and contributes to their extended lifespan.

• Virgin queens are reared in the event the mated queen becomes old or incapacitated. They are kept separate from the mated queen and each other; if 1 virgin queen encounters another, she will attack and attempt to kill it.
2

**Look for a bee with a pointed abdomen.**

A queen bee's larger abdomen is noticeably more pointed than the abdomens of either worker or drone bees.

3

**Using a magnifying glass, look for a bee without a barb on its stinger.**

Worker bees' stingers are barbed; once they sting a target, the barb catches and pulls the stinger from their abdomen, killing the worker. Queen bees, however, have no barbs on their stingers, enabling them to sting a target repeatedly.
Look for a bee that stands with its legs splayed apart.

Necessary because of her greater size, keeping her legs splayed apart enables the queen bee to move quickly through the hive.
Watch the way the other bees act subserviently around her.

As long as the queen bee is healthy and productive, worker bees are notably deferential to her, getting out of her way when she moves forward and standing at attention facing her when she stops.

- A queen bee communicates her fitness to lead the colony through pheromones. If the pheromones taper off or change in any way, the workers will rear a new queen and dispose of the original by clustering around her to suffocate her. (This practice is called "balling," and the overall practice of rearing and installing a new queen is called "supersedure.")

- Rich in both protein and B-vitamins, royal jelly is sometimes sold as a dietary supplement. It has been fed to pigs and chickens, increasing their lifespans by up to 30 percent and increasing the hens' ability to lay eggs. It has been known to heal wounds and reportedly can arrest the symptoms of menopause in some women.

- Once identified, queen bees are tagged with a small swatch of paint so that beekeepers can find them again. Beekeepers use a color code to indicate when the queen was introduced to the colony: blue for years ending in 0 or 5, white or gray for years ending in 1 or 6, yellow for years ending in 2 or 7, red for years ending in 3 or 8, and green for years ending in 4 or 9. Beekeepers may also clip either or both of the left wings of queens introduced in odd-numbered years and either or both of the right wings of queens introduced in even-numbered years.

It is important for you to know this as you will be using it to buy bees and to tag your own bees which you may wish to sell. You will also know how old your queen is and when it is time to replace her.
Queen Management Techniques

When a colony is not performing well, it is common practice to introduce a new queen into the colony. There are certain qualities that a beekeeper looks for in a queen's offspring, such as good collectors of honey or pollen, resistance to disease and pests, reduced swarming, gentleness, effective pollination, and minimal propolis use. Propolis is the wax-type resin derived from a tree bees use as glue.

It is a common practice to mark the queen with a small spot of paint on her back because the queen is the source of all the worker bees in the colony. They are impossible to distinguish one from another without an identifying mark. The beekeeping industry uses a color code that indicates the year the queen was introduced into the colony. Model car paint is often used to place a very small dot on the back of the queen. The queen is usually marked prior to the introduction into the colony, but she can be marked at any time. Sometimes a purchased queen will come already marked. Once again, the color code used is:

- White (or gray) for years ending 1 or 6
- Yellow for years ending 2 or 7
- Red for years ending 3 or 8
- Green for years ending 4 or 9
- Blue for years ending 5 or 0

I know we gave it to you earlier on but it is important that you know this information. Especially if buying Queens as you will need to check it.

The residents of the colony may reject or even kill a newly introduced queen, unless certain requirements are met. There are several different methods that have been published over the years, but a particular procedure has not been accepted as the best procedure for all occasions. The most common practice of all the procedures requires an introductory period of about three days. The queen is placed in a cage and is fed by the colony bees though the wire gauze covering the cage. The only way she can be released is by the worker bees eating a candy entrance. The beekeeper can decide to release the queen into the colony manually.
The older more established worker bees are not as receptive as the younger bees to a new queen. You can turn the colony entrance to face the opposite direction to separate the older from the younger bees. In an empty hive place at least one frame of honey facing the original direction. The older bees will leave the original hive and return to the new empty hive. The original hive will only have the younger bees, while most of the new hive will have accumulated the older bees. The queen can then be introduced into the hive of the younger bees without problems. The two colonies can be reunited after the new queen is established.

Before introducing a new queen into a colony, make sure the colony does not have a queen, and any of the developing queen cells are destroyed. Leave the colony without queen for a day or so. Let the queen be caged for about two days. To release a queen, place the cage between the frames with the screen side down and the candy plug exposed to the younger bees and the brood. Allow the bees two days to release the queen and then remove the cage as soon as possible. If the queen is to be release manually, watch the surrounding bees to determine if they are clinging tightly to the cage the queen is in. If they behave in an aggressive behavior, do not release the queen until the bees act passively toward the cage.

Once you have released the queen, watch closely to see if the other bees are react with hostility to the new queen as she explores the comb on which she was released. Don’t open the hive again for a few days allowing the queen time to start her brood nest.

A good technique and careful handling will ensure the success of introducing a new queen into the colony. Other factors can also play a part, such as environment conditions, changing seasons, the availability of food, and beekeeper competence.

**Raising Queen Bees**

The success of the colony depends largely on the quality of the queen. As a beekeeper you may notice a difference in the production of honey from one colony to the next. The difference in production can depend on several factors, one of which is the queen.
Beekeepers call this trait as "queenlessness". When the queen is in the state does less brood rearing, drone layers and shows queenlessness, must be replaced. When beekeepers spot this condition going on in one of his colonies he will, what is known as "requeen " the colony. Requeening is basically introducing a new queen into the colony. Although queen bees can be purchased from commercial beekeepers, but prefer to raise the queen themselves in order to continue with a queen of the strain or stock of previous queens that has produced so much success in his colonies. Purchasing queen bees from a commercial beekeeper does not guarantee a queen of from a good strain.

When rearing queens it is best to use larvae that are under 24 hours old. Larvae of this age have not been exposed to the worker's diet. It is important that the future queen larvae be fed queen jelly. Queens are raised from the same fertilized eggs as the worker bees. When the eggs are newly hatched, they are neither a queen nor a worker bee. Once the hatched larvae is 3 days old pollen is introduced into the diet of the larvae destined to become worker bees. On the other hand the hatched larvae destined to become queen bees are raised in what is known as the queen cell which has been specially built.

There are requirements to raising a good queen. The needs to be an ample supply of nectar and good quality pollen, as well as an abundance of sexually mature, high-quality drones for mating with the newly emerge virgin queens. There must be suitable weather for mating of the drones and the queens. There needs to be a good queen mother to breed from, whose offspring worker bees (and colonies) seem to have the qualities desired, such as gentle temperament, disease resistance, low swarming tendency and excellent honey production.

This is a summary of the steps to be taken for queen raising. A starter colony must be established for the beginning of raising queen cells. A cell building colony must be established. Then there is the grafting of the honey bee larvae. Last but not lest the transferring the mature queen cells to honey bee nucleus colonies for the mating stage.

As a starter colony, choose a strong two-story colony that is headed by a two-year old queen. It will be necessary to locate and temporarily remove the queen along with the comb she is sitting on with bees, to a spare empty 8-frame box or nucleus hive. Then the 2-story hive needs to move about 2 meters to the rear of its original site.
Now you can prepare the starter colony by placing an empty box with a bottom board and the lid on the bottom of the hive. Four combs of unsealed brood with the adult bees from the two-story hive must be moved to the empty hive. Also place a comb of unsealed honey and pollen with bees on each side of the brood. Fill in the rest of the empty box with empty combs.

Take another 2 or 3 other brood combs with extra young bees and shake them into the 2-story hive. Add a feeder of sugar syrup to the starter colony. Since the bees will be what is known as "queenless", the nurse bees in the starter colony will be stimulated to feed and produce more brood food. Return the 2-year old queen and her comb to the bottom box of the 2-story hive.

The cell builder colony is another important step in raising queen bees. The aim of this procedure is to create a situation under which bees will carefully nurture the young, developing queens. You will want to select a cell builder colony that is a strong colony that fully occupies a large hive. A 3-story hive will work to your best advantage, by reducing the available space to two hives. Confine the queen to the bottom box. This brood chamber should be equipped with an equal amount of brood and empty drawn cells for the queen to lay eggs.

Two combs of very young larvae should be placed in the center of the super (the hive body) and fill in the remaining space with combs of honey and pollen. It is necessary to place the combs of unsealed honey and pollen alongside of the combs of unsealed larvae. This makes it look like a natural brood nest. With the queen being confined, it will prevent her from entering into the super. Recruited nurse bees will feed the unsealed larvae in the super. The bees will soon become aware the queen is not occupying the nest. This begins the impulse of the nurse bees taking the steps to rear a new queen. This is the type of environment you will want to place newly grafted or started cells to be introduced for rearing. You will want to leave the cell building colony for 24 hours before inserting the newly grafted or started cells.

You will want to leave a space between the two brood combs in the super. The space needs to be wide enough to fit a cell bar. A cell bar is a wooden strip that holds queen cups for rearing queens.
If possible it is best not to rear queen during a heavy honey flow. A light nectar flow with ample pollen, preferably a mixture of pollens, is the best condition for rearing queens. If supplementary feeding becomes necessary, always use a mixture of 2 parts sugar to 1 part water for sugar syrup to simulate nectar. Never use diluted honey.

Grafting is the process of removing worker larvae from its cell and placing it into an artificial queen cup for rearing the larvae into a queen. You start the grafting process by preparing the bars of cells by sticking 20 plastic cups onto a wax covered board. The bar must be placed into a hive for at least 24 hours before grafting. During this time the bees will clean and condition the cell cups.

You will need a grafting tool to transfer larvae. Each larva is floating on a little raft of royal jelly and must be placed undisturbed into the bottom of the conditioned cups. The grafting tool must be able to follow the curve of the bottom of the cup to allow it to be inserted under the back of the tiny floating larva without touching it.

The best conditions to graft in is cool temperatures and well fed larvae, the priming of the cell cups with diluted royal jelly should not be necessary. Do not graft in very hot weather or in low humidity. The larvae could potential be damaged by dehydration. Only graft larvae that are under 24 hours of age from hatching and are floating on a good amount of royal jelly. Never expose the larvae to direct sunlight and work as quickly as possible.

The grafted larvae should be placed into an abundance of nurse bees that are far enough away from a queen that they will attempt to rear all the cells. The age of the nurse bees range from 9 days to 12 days after they have emerged from a cell. It is always important to have a large number of replacement young bees available to the colony in order to provide nurse bees. The production of royal jelly depends on an ample supply of pollen or pollen substitutes. Lack of pollens leads to smaller, less well-fed larvae and queens. Also the nurse bees will lose their body reserves of stored nutrients and become susceptible to disease.
It is very important to record the day the cells were grafted and the day the queens are due to emerge. A queen will emerge 16 days after the egg was laid, or 13 days after the egg hatches into a larva. Since the larva was grafted at 24 hours old, the queen will emerge 12 days later. If one of the queens emerge early, she will kill all the remaining cells. It is best if the cells are left until the day before they are due to emerge, it is then possible to move the cells from the cell build colony to the nuclei.

When you are transporting the cells to the nuclei, the cells must be handled gently to avoid damage to the immature queens. Make the transition to the mating yard. Do not shake or jar the combs or bars with cells, and avoid turning the cells from the natural position. Do not allow them to be exposed to direct sunlight, and because the queen nymph is susceptible to cold do not allow the cells out of the hive too long, or exposed to cold winds or a chilly atmosphere.

Cells should be distributed to the mating yard as soon as possible after the nucleus colony has set up. You do not want too much time to lapse or the bees in the nucleus will start building cells. It will be necessary to destroy all of these cells before inserting the raised cells into the nuclei. Only one cell is given to a nucleus. A wet, sharp knife can be used to separate adjoining cells on the cell bar. Each cell must be carefully removed from the bar and placed into the nucleus hive. First a side comb is removed from the nucleus to allow room for manipulation. A small depression is pressed into the face of the center brood comb and the plastic base of the cell gently pressed into it.

Mark every nucleus with a date the young queen is due to emerge and the mother queen she was bred from should be noted. A virgin queen will mate and start laying about 10 days after she has emerged from the cell. In the fall this period can continue longer than the normal time. Do not open or move the nucleus during the mating period. It is important that the virgin queen start mating. The mating takes place while she is flying in the open and not in the hive. The mating does not begin until the queen is sexually mature. This takes place 5 to 6 days after emerging. The queen must mate within 20 days, if not she will remain infertile. Most of the queen rears will destroy all the queens that fail to lay on time, except in the fall when mating and expected laying time can be extended because of cooler weather.
Drones

Males (drones) differ from females in that they are slightly larger, and have bigger eyes. The queen however, is definitely the boss. She is about twice the size of a worker, and one and a half times the size of a drone, measuring around 2 cm in length.

The number of drone bees in a colony varies seasonally. There may be none when the bees have little food, but up to 1000 during the honey collecting season. When the honey season is over and food and water become scarce, the drones are expelled from the hive.

It takes 24 days for drone to develop from an egg into an adult. The drone does not work in the hive. The duty of the drone that is the only male in the hive is to mate with the queen and it dies after mating with her.

Drones are larger and fatter than the queen or the workers. Their bodies are not long as the queen’s. The drone has a short tongue it uses to take food from workers and from stored honey in the hive. It does not have legs fit to carry pollen and it is unable to produce wax. It has no stinger to defend itself.
Drones and workers, will live for only a few weeks, but possibly a few months, depending on their role in the colony and the time of year when they were born.
The Workers

There are 5,000 to 75,000 worker bees in a colony. They do the entire house and field work. Some workers go out of the hive to bring in water, pollen, nectar, and propolis (bee glue). Other workers remain in the hive to guard against the enemies. Still others clean the hive, build wax comb, nurse the young, and control the temperature of the hive. Workers eat honey to produce heat in cold weather and fan their wings to keep the hive cool in the hot weather.

It takes 21 days for a worker to grow from an egg into an adult. During the honey-collecting period, workers have special legs equipped with pollen baskets. They also have glands that produce wax and the scent necessary for carrying out their many duties. Workers are smaller than either the drones or the queen. They have the stinger which when it stings the stinger remains behind and the bee dies.
Life Cycle Of The Hive

Bee hives also go through a process or life cycle if you will.

They will:

Build combs
Gather nectar and rear a brood
Produce a new queen
Swarm
Find a new nest or go into a new hive

Honey bee colonies can survive the winter, provided they have enough food resources, are able to keep sufficiently warm, and are free of diseases and predators. However, in the winter, colonies are smaller than in the summer: there are no drones, and perhaps part of the colony left the hive (in a swarm) to form a new nest elsewhere.

Some of the workers will of course, die naturally, including during the winter months (this is 'normal winter mortality'). There may be up to 20,000 workers left, and a queen.

The queen and the rest of the colony will form a cluster to keep warm during the cold months. There will be no brood to tend to, and no eggs are laid during this time. However, as the days begin to warm up, and the flowers begin to bloom, honey bees will begin to go out foraging again, and the queen honey bee will begin to lay eggs.

After 3 days, eggs hatch into worker larvae. During this stage, each larva will be fed about 1,300 times a day! They are fed by worker bees that have the specific task of tending the brood, and are referred to as the ‘brood nurses’.

The food given is made from pollen, honey and secretions from the brood nurses, and is called ‘bee bread’
<table>
<thead>
<tr>
<th>Period</th>
<th>Work Activity</th>
</tr>
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<tr>
<td>Days 1-3</td>
<td>Clearing cells and incubation</td>
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<tr>
<td>Days 4-6</td>
<td>Feeding older larvae</td>
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<tr>
<td>Days 7-10</td>
<td>Feeding younger larvae</td>
</tr>
<tr>
<td>Days 8-16</td>
<td>Receiving honey and pollen from the field bees</td>
</tr>
<tr>
<td>Days 12-18</td>
<td>Wax making and cell building</td>
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<tr>
<td>Days 14 onwards</td>
<td>Entrance guarding and nectar and pollen foraging</td>
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<table>
<thead>
<tr>
<th>Stage of development</th>
<th>Queen</th>
<th>Worker</th>
<th>Drone</th>
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<td>larva</td>
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<tr>
<td>Pupa</td>
<td>4 days</td>
<td>8 days</td>
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</tr>
<tr>
<td>Total</td>
<td>15 days</td>
<td>21 days</td>
<td>24 days</td>
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</table>
For How Long do Honey Bees Live?

The life spans of honey bees can vary greatly, depending on their function in the colony, and when they emerged in the season.

**Drones:**
Drones may live just a few weeks, or they could live up to 4 months. Drones that mate with new honey bee queens, will die immediately after mating. Poor things!

By the end of the summer, they will no longer be needed by the colony. Honey bees need reasonable weather to forage, and of course, during the winter time, there is far less nectar and pollen available. Drones do not collect pollen or nectar, and those still alive will be killed by the workers, so that winter food resources are not drained.

**Workers:**
Workers raised in the spring and summer have shorter, busier lives, and may live 6 or 7 weeks. This is the most productive time for the colony, with larvae to be fed, nectar and pollen to be gathered, and honeycomb to be built.

Those raised in the autumn will have far less to do, with no brood to care for. Their main concern will be to survive the cold until the following spring. However, they may live 4 to 6 months.

Whereas the queen honey bee life cycle revolves primarily around mating and laying eggs, the life of worker honey bees progresses through various stages of functions within the colony.

**Queen Honey Bees:**
A productive queen, favoured by the colony and free from disease should certainly live for about 2 yrs, but could live for up to 3 or 4 years, partly depending on whether the beekeeper decides to get rid of the queen, or whether the colony decide to replace her. The act of deposing the queen by the colony is called ‘supersedure’.
Why Do Bees Become Aggressive?

1. The hive becomes larger. There actually are not more bees which are aggressive or defensive. The percentage of aggressive bees remain the same but since there are a larger number of bees in the hive, there will be more aggressive bees.

2. The more bees in the hive, the more pheromones. This means that the bees might respond more to an intrusion of their hives.

3. There may be more female bees in a hive. It is the females who sting. Their stinger is called an ovipositor. It is part of their reproductive system. When a bee stings, the ovipositor gets stuck in whatever or whoever it has stung and as the bee pulls away, their insides come out as they are attached to the stinger. This is why the bee dies once it has stung.

4. If a colony replaces its queen and she mates with drones that have a more defensive nature, then the entire hive can become more defensive. This is another reason why it is important to mark your queens so that you know which one does what.

5. If a hive is continually annoyed it can cause the colony to become defensive.

   For example if an insect loving animal attacks the hive at night, the bees might be defensive even during the day.

   In America, an animal which loves to eat bees is the skunk. It loves to eat bees straight from the hive at night. An animal which eats insects is called “Insectivorous.”

**Signs of animal predators:** Grass in front of the hive is laying down or the dirt is scratched up. The entrance of the hive can show signs of being scratched as well. Wads of compacted chewed up bee parts lying around the front of the hive can also be seen.
There is an easy solution to this though, and that is to raise your hives higher off the ground.

Another reason hives become defensive is from rocks or sticks or other objects being thrown at a hive. Bees do not like banging.

6. As a colony increases in size they will have more stored honey and more brood to protect. This usually will result in the bees being more protective as they have more to protect.

7. During rainy days, cold days, storms or humid days bees are generally more defensive, as well as in the evening and at night. Bees enjoy sunny, hot days. Bees can also sting more a time when not much nectar is available.

8. Africanized bees (AHB) are extremely touchy, sting in higher number, and pursue the beekeeper longer and over a greater distance. If these bees are in your area, make sure that AHB drones do not mate with your gentler queen or else your whole hive can turn. This means that you might even have to replace your queen.
How to Keep Bees Away from a Pool

Bees will sometimes become a nuisance around a pool. They may even drown and you could lose many of your bees.

1. Find out where the bees are trying to gather. Firstly, which part of the pool are they most interested in? You will usually find that they concentrate near the shallow areas, like steps or puddles on the surrounds. Quite often they will be more interested in water retained when the pool blanket is rolled up and put aside. They could be really thirsty because they have run out of a water supply. So check that you are providing adequately for them.

2. Your bees might be lack in mineral salts. As the water evaporates from the shallow end of the pool or from the blanket, then the salts are left behind and the bees can lick these up.

   Perhaps Calcium, Sodium, Magnesium will be more concentrated at these places. They need these to help with brood hatching, so you should aim to provide these.

3. They also take water back to the hive to set up a cooling effect through evaporation. Colder water will only slow down their ability to fly. So they prefer warm water.

4. Provide water in a birdbath and let evaporate before you fill it up again. This will help the mineral salts leach out of the concrete. Make sure that you have two water sources though. One that is full at all times and one that you let evaporate.

5. You could also try putting in Epsom’s Salts in the water of the full one. These are magnesium salts and will do your bees some good.
Clothing and Equipment Needed

One of the most important pieces of clothing a beekeeper wears is the veil. Bee stings on the face can be very painful and there is the possibility of damage to the eyes and ears. If by chance a bee gets inside the veil, walk away from the hives and remove the bees. Never remove the veil when you are in with the hives.

Use protective clothing to avoid getting hive product on your regular clothes, and to protect sensitive areas of your body. Avoid dark or rough textured clothes. Bees are able to hold on to a rough texture material than smooth material. Wear white or light colored coveralls. If you are not using boots, do not wear dark socks. Boots that fasten over the coveralls or in the coveralls should be worn. A windbreaker jacket will help you to avoid being stung. Pants, veil, sleeves should be fasten securely to prevent bees from getting into your clothes. If a bee does get into your clothing, squeeze it in the clothing or walk away from the hives and open up your clothing to allow the bee to escape. Before handling bees, do not use any sweet smelling cologne, hair spray or any other products. The odor may irritate the bees or attract them. Glove should be used sparingly. Gloves are useful during bad weather or when moving colonies, but gloves can hinder the manipulating of the colonies. Without the interference of gloves, you will find that the bees respond better to a lighter touch.

As a beginner you will want to contemplate the number of colonies you want to start out with. Two or three is a good number to start off with because it will give you a chance to compare the two colonies, such as the growth and the production.
The equipment you will need to start off with for a complete hive:

- 1 metal covered roof (top)
- 1 inner cover (crown board)
- 1 (bottom) floor board
- 1 hive body (referred to as a brood box in the UK)
- 2 standard frame hive bodies (depending on the hive type) - each body contains 10 or 11 frames
- 1 queen excluder
- 2 shallow frame supers with frames
- 1 bee smoker
- 1 hive tool
- 1 pr. bee gloves
- 1 pr. overalls
- 1 bee vest

You can buy this equipment new or used. If it is used you will want to make sure it is in good condition. Also have it examined by the Apiary Inspection Service for any possibility of disease. If you are really talented and ambitious you can build your own hives. Just make sure you have the dimensions correct because bees will build combs where you least want them.

You can also make your own clothing and we show you how.
Developed by expert beekeeper Jerry Freeman- a great beekeeping suit

http://freemanbeetletrap.com

If you live in the US or that side of the world and you want to get yourself some good gear, contact Jerry. You can go to his website above and get all the information you like. Jerry is a top guy and really knowledgeable. He has consulted on many parts of this book so you just know that he knows what he is talking about.
What Kind Of Hive Will You Get?

Hive

Hive is the name given to any container in which bees are kept by beekeeper. The hives are available in various sizes and shapes and are merely a tool of beekeeping. A skillful beekeeper with proper system of management can make use of available size and shape of a hive as successful as the other size and shape of the hive. There are different types of hives such as (1) open hives (2) traditional hives, and (3) Lang troth hive, etc. which are described here.

1. Open Hive

Honey bees make their hive in the open, on the trunks of the tree, under the roof, in the wall or slopes of the hills. Only a few natural dwelling places for honey bees are available which are often a few nesting enclosures available to bees in hills and rocks.

Large trees are scarcely available. Only a few trees have hollows large enough to house a colony. All such natural nest of bees have following problems.

i. From open hives honey combs cannot be easily harvested, as they are placed beyond approach or not easily accessible.

ii. Open colonies are exposed to predators and requires numerous worker bees as guards to fight against intruders.

iii. Open bee colonies consume large quantities of honey, which they use as fuel, to enable them to cluster, to stop the wind which cools down their combs and to generate enough heat to maintain proper temperature for brood development. During severely hot days, more bees use honey as fuel to enable them to fan and cool melting combs to avoid disaster. The exposed colony will also keep more house bees than tile foraging bees which bring nectar and other essentials from the field. Such exposed colonies always produce less honey of poor quality.
Beekeeping is not new. It has been practiced from time immemorial and various kinds of traditional beehives made from grass, mud and wood have been in use. With the increasing interest in beekeeping and the growing demand for bee products and services, bees can no longer be maintained in their few natural dwelling places, but must be provided with special artificial hollows in the form of bee-hives. In traditional hives, the honey was extracted by the method known as “cut comb honey production" i.e. after cutting the comb with honey from hives, the honey was squeezed out from it. Some of these hives, though at present not in use, are described here.

**3. Pottery Hive.**

It is also known as sub-baked mud hive. A hollow pipe is made from mud and dried in sun. It is closed at both ends leaving a small entrance at one end. The other end is used as access for the bee keeper. Honey is harvested by opening the access end and cutting lumps of combs without killing the colony.
3. **Basket Hive**

A cylindrical basket is made from the stripped bark of trees or grasses, keeping an entry point for bees at both ends. The hive is installed high in tree to avoid the attack of termites. The hive is carefully lowered to ground during harvest time and honey is collected by cutting lumps of combs. These types of hives are usually useful for seasonal bee keeping only i.e. for less than one year.

4. **Horizontal Hive**

Horizontal hives are made from planks of wood and hollowed logs. The open sides of hollowed-cylindrical log are sealed with woven grass, leaving some small holes for passage. During harvest time, the hive is split open and the honey combs are squeezed for honey. The two halves can be rejoined for the bees to start the next honey crop. These hives are expensive and inefficient.

5. **Wall Hive**

A rectangular recesses in house walls of varying dimensions having a small hole outside which the bees use as entrance and a large opening inside covered with basket, is used to hive bees. This type of hive is useful in observing what is going on in the colony.
6. **Top Bar Hive**

It is a wooden beehive box, fitted with wooden bars across the top. The bees build their combs hanging down from the centre of the bar. Since the combs are not supported on all four sides, they can take off more easily. Because they are fixed only to the top bars, and not to the hive body, therefore it is possible to remove and replace them at any time during inspection or other management practices. This type of hive is much better than other traditional hives made from mud, grass or wood. But these top bar hives failed as the bees usually propolized the frames firmly to the hive walls.

7. **Langstroth Hive**

These hives consists of two wooden boxes separated by a queen excluder. The lower box is brood chamber while upper one is super. The hive contains ten movable frames. The hive chambers and frames of this type are designed keeping in mind the following principles.
Parts Of A Langstroth Bee Hive

Appendix

- Top cover
- Inner cover
- Frames
- Super
- Brood Chamber
- Frames
- Bottom board
- Alighting board
- Stand

Fig: A ten frame Langstroth hive
Parts Of The Bee Hive
Each part of the bee hive explained:

The Bottom Board

We are going to start at ground level and move up. The bottom board supports the hive. It is the floor of the hive with a 3/4 inch rim around three sides to allow the bees to enter the hive. It also extends 2 inches in front of the boxes to provide a landing board for the bees. Here bees take off for the fields to gather nectar and return to be met by other bees, called guard bees who check to make sure the arriving bee belongs to the hive. Bottom boards must be strong to hold the weight of the hive. They must also be well protected against rot. Because it is close to moisture in the soil, it is the first to show any sign of decay or rot. Another piece of equipment associated with the bottom board is a hive entrance reducer. The purpose of the reducer is to restrict the entrance so a weak hive can defend itself and is installed in the fall to reduce damage from mice and prevent drafts from blowing wind.

The Hive Body

The standard 10 frame Langstroth hive body will vary from dealer to dealer. The inside dimensions are critical. Depending on the thickness of the wood, the inside dimensions are: 9 19/32 inches from top to bottom, 14 11/16 inches from side to side for the front of the box, and 18 5/16 inches from side to side for the side of the box.

A rebate is provided on the top side of the box fronts for a resting place for the hanging frames. A great advantage of this type of hive box is that more boxes with the same dimension can be stacked one above the other and the bees will move up into the upper boxes and store honey there.
Frames
The purpose of the frame is to hold the comb made of wax securely within the hive box.

A frame is made of up a top bar usually 1 1/8 inches wide and 19 inches across the top. It is notched for the end bars. The end bars can be of various depths. If the end bars are 9 1/8 inches they will go into a deep hive body "super". If the end bars are 6 1/4 inches they will go into a medium hive box "super". If the end bars are 5 3/8 inches they will go into a shallow hive box. Notice that I have been using the term "super". Beekeepers usually refer to boxes as supers. The bottom bar can be either solid or split.

If you are buying frames in a catalog, you will need to know the size of box the to go in before you buy the frame.

Foundation
Foundation is what the bees build wax comb on. Foundation comes in many sizes and thickness. Usually we have thought of foundation being the wax sheet with starter cells pressed into the wax. Things have changed. You can still buy wax foundation in all sizes. It even can be bought with supporting wire embedded in the wax. If one is working with wax foundation, it has to be placed into the frames. You would need to have frames with a top bar that has a removable wedge. You would also need a split bottom bar. The wax foundation is held in the frame by fastening the wax sheet to the top bar with the removable wedge. The split bottom bar holds the wax sheet at the bottom of the frame.

To hold the foundation straight in the frame, a beekeeper usually uses cross wires stretched from the end bars and embedded into the wax.

However, many beekeepers are turning to plastic foundation. The ad shown above for plastic foundation gives you an idea of the various sizes and choices one has when selecting it. One can buy one piece plastic frames which include the foundation. No work at all in getting them ready for the bees. Just put them into the hive box and you and the bees are ready to go. Plastic foundation is also made for wood frames.
Every beekeeper has an opinion on what is best. Our advice would be for the new beekeeper to try both. This way you can also learn to develop knowledge and prejudice toward which you favor.

What happens if you don’t use frames and foundation in a box? I was hoping that no one was really thinking this way but here is the answer. The bees build a mess in a hive body. This is not much better than the skep of old. One cannot inspect or examine a box that has no frames in it if the bees have filled the box with comb.

Believe it or not, but I have seen this situation occur to new beekeepers who were just too busy to build frames to put into their new hive body. You need to put frames into the box.

**Queen Excluders**
A big question often discussed at bee meetings is "Do you really need a queen excluder?" Again, you will find individual beekeepers who like or don’t like them.

They are often called honey excluders because bees don’t like to go up into the supers above through the queen excluder. The purpose of the queen excluder is to keep the queen in the brood chamber so the queen doesn’t lay eggs and thus have brood in the honey supers. It is almost mandatory to have queen excluders on bees when you are producing comb honey for sale. Queen excluders can be purchased with a wood rim around the metal excluder or one can buy all metal excluders. They even come in zinc and plastic.

**Honey Supers**
These are the boxes with frames and foundation for the bees to store surplus honey. They come in four basic sizes.

- The shallow 5 3/4 inch super that uses 5 3/8 frames.
- The medium (Illinois) 6 5/8 inch super that uses 6 1/4 inch frames.
  
  The deep 9 9/16 inch super that takes 9 1/8 inch frame.
**Comb honey supers**

*Comb honey supers are 4 3/4 inches deep. They require special supplies to produce the comb honey. The beekeeper has the choice of the old standard section boxes that require section holders, separators, flat tins and springs. Or the beekeeper can use what are called "Ross Rounds". In a Ross Round super the bees build comb into round section rings. Our advice to a beginner is to pass on the comb honey sections until you have a year or two experience. It takes strong bees and special management to produce good comb honey sections. If you really want comb honey, an easier way is to use the standard shallow frame with thin wax foundation and when the bees have capped the honey in the frame, you can cut sections of it out and put it into freezer bags or jars. One will find clear boxes or cut comb honey trays in the bee catalog which can be used to sell cut honey.*

**Inner Cover**

The inner cover does several thing. First it provides a dead air space for insulation against heat and cold. Second it prevents the bees from gluing the top cover to the top bars of the super under it. With an inner cover, the top cover is easy to remove from the hive. One other advantage that comes to mind is the hole allows bees to reach emergency food if it is required. Granulated sugar can be poured onto the inner cover near the hole and the bees will be able to get to it during even the coldest of days.

**The Top Cover**

This is a cover that fits on the top of the hive. In the north, the cover is usually one that telescopes down around the inner cover and an inch or so down over the top super. This is called a telescoping cover. Many commercial beekeepers use what is called a migratory cover. This cover is a solid cover that does not extend beyond the sides of a hive body. The reason for this is the bee hives are usually on a pallet and the hives on the pallet are set against each other - side to side. There is no space between the hives for a telescoping cover to fit down into them from getting there. Bee supply firms sell leg straps as well as leggings.
How To Make A Honey Bee Box

People who have gardens and appreciate the importance of bees in the natural environment may seek to keep bees of their own. Bee boxes, or hives, today are designed to encourage the health of the bee society as well as make it easy for the beekeeper to remove the honey from the hive with the least disruption possible. A honey bee box is made up of a hive stand, bottom board, hive bodies (brooder), smaller boxes called honey supers, and a cover. The lower hive body is separated from the supers above by an excluder. Learn how to make a honey bee box to begin the beekeeping process.

1. Purchase the wooden ware for your hive bodies from a reputable bee supplier.

You will need at least 1 brooder and 1 super to start. You will also need a cover, excluder, baseboard, and a hive stand.

2. Order the frames to fit both the brooder and the super as the frames for the brooder will be larger. The brooder will need 9 frames and the super 8 frames.
3 Lay out the parts for the brooder.

There will be 2 short sides that are 16.25-by-9.56 inches (41.28-by-24.28 cm) and 2 long sides that are 20-by-9.56 inches (50.8-by-24.28 cm). All 4 sides will have tongue and groove or dovetailed ends.

4. Lay a thin bead of all-weather wood glue along the edges that will go together.
5. Assemble a bee box.

Press the sides of the box together to form a rectangle, and fit the dovetailed ends so that they interlock.

6. Use a hammer to fasten the sides together with nails in the pre-drilled nail holes.

You will need 10 nails for each corner of the brooder.
The nails must be bought separately.

7. **Assemble the super, which is 20-by-16.** 25-by-6.63 inches (50.8-by-41.28-by-16.83 cm), the same way. Use 8 nails for each corner.

8. **Cover an area with newspapers or plastic, and paint the outside of the hive bodies with white outdoor paint.**
Do not paint the inside of the box.

Buy or build your own baseboard at home that creates the correct size bee entry.

It needs to be .75 inches (1.91 cm) for summer entrance and .38 inches (.95 cm) for winter entrance.

An entrance that are larger may encourage an infestation of rodents. Some commercially bought bases are reversible for the correct seasonal entrance. This reduces the cost of the setup as well as circumventing the need for the storage of 1 base during the off-season.

Use white paint on the exposed areas of the baseboard. Remember bees cannot see red, so this is a colour which must never be used.
10. **Buy an excluder for your bee box.**

This fits on the top inside of the brooder and prevents the queen from moving into the supers.

11. **Buy or make a cover for your beehive.**

The cover should telescope out over the sides of the hive bodies and fit snugly. Many covers are topped with a thin sheet of metal to protect it from weather.
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**Assemble a beehive.**

Place frames in the notched metal bars on the brooder and super. Then place the baseboard on a hive stand, followed by the brooder, then the excluder, and a super. Top with a cover.

The hive stand can keeps the beehive up off the ground to help keep the bottom dry and to insulate the hive. The hive stand can be made of anything that holds the hive up, or you can use a commercially purchased one.
Construction of Langs Troth Hive

If you do not wish to put your own together, you can construct one following the steps in the diagram above. These are usually special dimensions and we have given you everything you will need here.

Anyone can make his own hive. The details of the construction should be rigidly followed to avoid unnecessary annoyance and irritation during the use of the hives (appendix fig.1). The parts and size of each part of the hive are given here.

**Stand**
Any four-legged stand having 15 -20 cm height with upper dimensions that supports the bottom board of the hive properly works as stand.

**Bottom Board**
It is made from a piece of wood 558.8 mm x 406.2 mm x 23 millimetre. Along each end of the longer side, is nailed a wooden rod measuring 558.8 x 23 mm x 23 millimeters. Another wooden rod of 361 mm x 23 mm size is nailed at the back. The front is provided with an entrance rod of 361 mm 23 mm x 23 mm size and this rod has an hole measuring 76.2 mm long and 9.6 mm deep in its middle. Two wooden blocks, to be used for shortening the entrance when necessary, should also be prepared, each block being 76.2 mm x 33 mm x 23 mm. in size.

**Brood Chamber**
It is a rectangular box without top and bottom and is made of 23 mm thick wood. Its length and width outside is 508 mm and 406.2 mm inside the length is 455 mm, and width 361 mm respectively. Its height inside is 233 millimetre. A rabbet 19 mm deep and 11 mm wide is cut along the entire length of its width plank.
C  **Standard Frame**

There are ten frames in each hive. Each frame on completion has outside measurement of 441 mm x 221.3 millimetre. It consists of a top bar, two side bars and a bottom bar. There are two types of frames (1) self spacing frame and (2) staple spacing frame.

1. **Self spacing frame**

The dimensions of this type of frame is given here.

(i) **Top bar:** It is 482.6 mm long, 25.4 mm wide and 23 mm thick. It is cut to 9.6 mm thickness on both sides for a length of 22.1 millimetre. It has a groove in the middle of its lower side for fixing the comb foundation sheet.

(ii) **Side bar:** Each side bar is made from 9.6 mm thick wood and is 221.3 mm long. The upper part of each is 37 mm wide and lower part is 25.4 mm wide. Each is cut out from the middle portion at either end to accommodate the top and the bottom bars respectively. There are four holes in each side bar for wiring the frame.

(iii) **Bottom bar:** It is 441 mm long, 17 mm wide and 9.6 mm thick.

(iv) **Wire:** Tinned wire of 28 gauze should be used in wiring the frame.

**Staple spacing Frame**

The dimensions of staple spacing frame are mentioned here.

(i) **Top bar:** Top bar is 482.6 mm long, 25.4 mm wide and 23 mm thick. It is cut to 9.6 mm thickness on both sides to obtain a length of 22.1 millimetre. It has a groove in the middle of its lower side for fixing the comb foundation sheet. It is furnished with metal spacing devices on each end of its opposite faces.

(ii) **Side bar:** Each side bar is made up of 9.6 mm thick wood measuring 217 mm long and 254 mm wide. There are four holes on each side of the bar for wiring the frame.
(iii) **Bottom bar:** It is 423 mm long, 25.4 mm wide and 9.6 mm thick.

(iv) **Staple:** Two staple, each of 19 mm size should be driven in (to leave only 9.6 mm outside) the top bar on its opposite sides so that the frames stand 37 mm apart.

(v) **Wire:** Tinned wire of 28 gauze should be used in wiring the frame.

**D. Super**

The dimension of the super and the super frames should be same as those of the brood chamber and the brood chamber frames, respectively.

**E. Inner Cover**

This is a wooden board to cover the brood chamber or the super as the case may be. It is a 508 mm long, 406.2 mm broad and 9.6 mm thick wood. It has 9.6 mm thick and 23 mm wide wooden bar nailed on to each of its four sides.

**G. Top Cover**

The beekeeper has a choice to use either sloping top cover or flat top cover depending on the situation.
1. **Sloping Top Cover**

A wooden frame with 408x406.2 mm measurements is made with eave sides and 660.4 mm long slanting boards are nailed on top for the rain water to shed off the sides. The joints should be securely covered over. It rests loosely over the hive.

2. **Flat Top Cover**

It is made of 9.6 mm thick wooden board to a rectangular frame 50.8mm high, all covered over with a zinc sheet so as to make it waterproof. Its inside measurements are 533.4 x 431.8mm. It also rests loosely over the hive.
Top Bar Hive An Alternative Beekeeping Method

The topbar beehive has been around for many years and had several advantages, especially for a beginner.

1. It is simple and maintainance free. The top bar hive has only a few components: the hive body (box), 20 to 30 top bars (frames), and a lid. That’s all you will ever need. Compare that to your Langstroth hive. Bees build their own comb which eliminates the need for costly frames. The top bars are re-used after the harvest.

2. The top bar hive is healthier for bees. To check your bees, you will not have to take the whole thing apart. Hence, your bees will be less disturbed when you are checking the honeycomb.

3. It is much easier to harvest your honey. To harvest your honey, you simply remove the bars with honeycomb. You don’t need to take the hive apart and disturb the bees as much.

4. Smoking is completely unnecessary and many top bar hive users do not wear protective clothing either. (For the beginner I do advise to use some kind of protection, gloves and veil as the minimum!) Once you remove the honey comb, the bees will go about their business as usual.

5. The top bar hive is designed for the bees’ optimal living conditions. This makes a colony much stronger and enables it to fight off pests and diseases on their own.

6. It is much cheaper to build and maintain.

The top bar hive does have one disadvantage. It is not designed for maximum honey production. However as a hobby farmer this should not bother you.
**Lid**

The lid protects the top bars underneath. A flat top lid can easily be made by using the dimensions above. It can be covered with galvanised sheet metal, tar paper, or other waterproof materials.

To assist ventilation on the top bars, the lid can be lifted a bit by putting sticks on the top bar so that the lid is placed on it.

If it is a lid metal or tar paper or others, you must help the temperature in the hives by placing a thick layer of grass on top of the lid. This protects it from cold and heat.

**Painting**

The outside of the wood can be painted with light coloured exterior paint to protect the wood from weathering (decaying or rotting) quickly. It is recommended to first paint the hive with water paint outside only so as to get a good penetration possibly two coats. Paint should not be applied on the inside of the hive because other than that it is more expensive; the unpainted wood will absorb moisture generated by the colony. The bees themselves coat the inner surface with a thin layer of propolis. For better results two coats of water paint should be applied before oil-based (enamel) is applied.

**How to hang the hive**

You can place your hive off the ground on a wooden, rock, brick stand or on live stands. Stands should be made strong and must hold the hive in a level position.

The hive can also be hung:
Of special importance is the height at which you should place the hive. You place your hive at your chest height for easier handling of bees.

Top bar hives if possible should be made from light, well-seasoned, good quality wood. The wood should not have a strong smell. The parts of the hive can be glued together with water-resistant glue before carefully nailing the hive.
Where To Keep Your Hive

You will need a location for your hive. Where to put the hive is a question new beekeepers must deal with. Consider the following:

- Do not put the hive on the lot line facing your neighbour’s property.

- Locate it so that it get early morning sun. However, on very hot days the bee hive needs some shade. Shade helps the beekeeper as well when working the hive during very hot weather.

- Do not place the hive in a location where there is going to be a lot of foot traffic.

  Check your zoning laws.

- You can keep bees on someone else's property. There are many local farmers who desire bees for pollination.

- Do not keep more than two hives on a city lot. You could stretch it to three but not many more than that. Use common sense.

- Don't work your bees while the neighbours are present.

  Make sure anyone with you is wearing protective clothing also.
Principles Of Bee Space

Bee space or bee-way is the space that bee requires as a corridor. It is generally 6 mm to 10 mm, and in normal practice it is usually 8 millimeter. The principle of bee space states that if the space between any two parts of hive is less than 6 mm, the bee will fill it with propolis. If it is more than 10 mm, the bee will build or brace comb.
Principles Of Bee Population

It states that the size of population of bees in a bee colony shows appreciable variation in plains and hills. Therefore it is likely that small colony in large hives may get their brood chilled during a sudden cold spell or their surplus combs may get attacked by wax-moths.

Based on the above two principles the Lang troth hive is mostly used in India. Beekeepers, mostly use hive having same frame size of the brood chamber and super, because the frames from one chamber is often placed in the other chamber. The Indian Standards Institute have standardized the hive specifications for Lang troth bee hives, some suiting the small type hives and the other big ones. The former accommodates frames of 21 cm x 14.5 cm and the latter of 31 cm x 20.4 cm or 44.1 cm x 22.1 cm size.
Moving a hive of honey bees

The first topic under management that we are going to discuss is how to move a hive of bees. I include this topic here first because some of you may purchase a complete hive of bees and that hive must be moved from the sellers property to your location.

You should be aware of the fact that bees almost always return to their own hive. When a young bee (about 20 days old) first leaves the hive, she takes an orientation flight. She will fly about in front of the hive -- fixing its location in her navigation system. If you move the hive just a few yards away, the honey bee will return to the exact spot where she knows her hive should be. In fact, all the field bee “the bees that are out looking for water, pollen, nectar, or propolis” will return and fly about very confused over and around the spot where the hive was located. Certainly you would think that they would discover their own hive just yards away. These "lost" bees will enter any box that looks like a shelter placed on that old location. It could even be a cardboard box. Or if the hive was sitting under a tree, the field bees may gather on a low hanging limb close to where the hive had been. If their hive is only a few yards away, they will eventually work their way to it. This interesting fact can be used in your management of bees.

First, if you have a very weak hive and you would like to make it stronger, you can just swap positions with a strong hive. The bees from the strong hive will then enter the weak hive there-by increasing its population. It is said that bees will fly up to two miles from their hive to gather nectar. Some studies show that bees will fly even further.

How does all of this affect moving bees? If you are moving bees to a new location which is more than two miles away, no problem. If you are moving the hive to a location much less than two miles, you will lose all of your field bees because they will return to the old hive location.

What can you do? If you want to move your bees only a short distance from where they are now, it would be best to move them to a location several miles away first. Leave them there for a week or more. After they get used to the distant location, you can then move them without the loss of the field bees to your new location.
**Tips on moving a hive of bees:**

- Night is the best time to move a hive of bees. All the bees are inside then.

- If the weather is cold, you can completely seal the hive by taping and blocking all escape holes.

- If the weather is warm, do not seal the hive entrance. Use wire screen wire in the shape of a "V".

- Slide the pointed "V" of the screen wire into the hive entrance to keep the bees in but allow air passage.

- Prepare the new location by putting down blocks for the new hive to sit on. Keep it off the ground to avoid moisture rotting the bottom board.

- Staple, crate, or tie the hive in advance of moving it. There is no experience like the one you will have if the bottom board drops off during the move to the vehicle and you are forced to walk through thousands of bees that fall to the ground.

- Make sure the hive is securely fasten or tied down in the vehicle you are using to move the bees.

- Avoid quick stops. Drive defensively.

- Do not leave the bees in or on a vehicle until you get up in the morning to locate them. Do it when you get them to the site.

- Remove any screen wire used to block the entrance. Remove any block used to seal the entrance. The bees must have air circulation and they must be able to fly.

- One final important step::: Check to make sure the queen survived the move. This should be done four or five days after you have moved the hive (spring, summer, and early fall). If you wait at least four day and you see eggs in cells, you have a queen. It takes eggs three days to hatch into larva. If you see no eggs, then you have a problem.
**Uniting Colonies**

Beekeepers may find it necessary to do this when they are short of beehives or when a colony needs strengthening. This can be done by uniting two swarms, two colonies, or a swarm and a colony.

When uniting one, or the other has to be queenless. If a colony loses its queen it is a good measure to unite it with another colony instead of waiting for it to produce a queen of its own.

Two queens cannot live together and will fight to the death if this happens, but this can be avoided if this is the case, by removing one of the queens or by killing one. This prevents both queens being injured in the fight and maybe losing both queens.

A step to help the preparation of uniting colonies is to put some kind of fragrant materials in both the hives, such as lavender, camphor etc. A quick spray of household floral deodorant usually does the trick. This helps both colonies familiarize themselves with each other’s smells and will also make them less aggressive when they unite.

The best time to unite the bees is in the evening, after they have stopped flying. This prevents robbing and also makes the unification easier. One of the two colonies has to be carried to the other, so in the case of uniting a swarm and a colony, the swarm would always be taken to the colony. With two swarms or two colonies the weaker of the two is always carried to the other. Always take the queenless to the queen.

The groups of bees should be smoked by the beekeeper before uniting as this method calms the bees down and also makes them more receptive. Once they have been united this process should be repeated as this makes sure they have a homogeneous smell so that fighting among the worker bees does not occur. It is a process that should be used before inspecting, handling and manipulating the bees.

Check the next day for any dead bees at the entrance to the hive. If there are no casualties, then they have accepted each other.
What You Need To Do To Keep Your Hives Growing

We are going to assume you have your hive of honey bees started. As your bee colony grows, it will be necessary to add more boxes "supers" for them to expand into. If bees become crowded and there is not enough room for expansion of the brood nest, the bees will swarm (fly off in large numbers along with the queen to start a new colony). The loss of a swarm may leave the remaining colony too weak to store surplus honey for the winter.

When a hive swarms the queen leaves with the bees but before leaving, she lays eggs in special cells called queen cells. These cells (20 or more of them) will be located at the edge or bottom of the frames. What can you do if you see queen cells?

1. First, you can try to cut all of them out and this must be done every six or seven days. Once bees start building queen cells, it is hard to stop them from building more.

2. You can give them more room by putting a new super on the hive. This doesn't always work.

3. You can take several frames with queen cells on them and start a new hive. The new queens will emerge, fight, and the survivor will mate and begin to produce more brood. Don't use this method after mid July. Add new brood frames to the old hive and cut all remaining queen cells.

4. You can clip the wings of the queen so she can not fly. When she tries to leave the hive with the swarm, she will be unable to fly and can usually be found on the ground in front of the hive. The swarm without a queen will return to the hive and wait until one of the virgin queens emerges and take off again with her. The bees will swarm before this new virgin queen emerges (hatches- is an incorrect term). If you again go through the hive and find queen cells, you can destroy them and put the old queen back into the hive.

5. The best thing you can do is just make sure your bees do not reach the critical point of being too crowded.
Heater Bees and Why The Hives Has Empty Cells

Until very recently empty cells in a bee hive were generally thought to be a negative thing. Beekeepers did not know why bees and the queen left particular cells empty.

A lot of study has been carried out on this and as a result of new scientific equipment such as thermal imaging, it has now been discovered that these cells are critical to the functioning of the bee hive.

There are specialized bees which live in these empty cells. They are called “Heater Bees” because their job is to heat up the beehive when it gets too cool. They crawl inside the empty cells and heat the surrounding cells with their body heat.

A heater bee has decoupled wings which means that it can bend its wings in different positions. A bit like being disjointed and it can also heat its body about 10 degrees Celsius higher than the average bee. This helps the larvae develop and according to how much heat they receive, this will decide what kind of bee they develop into.

For example, a larva which is exposed to 35 degrees Celsius will become a forager bee, and a larva exposed to 34 degrees Celsius will become a housekeeper bee. A colony's success and survival relies on creating a certain number of each type of bee so that all of the functions of the hive are dutifully carried out and life can be sustained.

So now we know why there are empty cells in a beehive and it is not a bad thing. There are reasons why not all cells are filled with honey or larvae and this should not worry the beekeeper.
Hive Inspection In More Detail

A beekeeper should know what his bees are doing. You should examine the hive every two weeks to make sure they have plenty of room, that the queen is laying eggs, that they are storing honey, and that the bees are free of disease.

You should also keep a notebook of your observations. They will become important as years come and go. Every bee years seems to present us with something different.

Your notebook will provide some means of comparison. Our memories seem to fade and are not as reliable as notes taken at the time an event occurs.

**How to open and examine your hive:**

You should always wear protective equipment when you work your hive.

You should light your smoker before getting started. I have often been asked how I keep my smoker going. Seems some people’s smokers go out just about the time they need them. The key is to time to get the smoker going before rushing off to the bees.

There are many types of smoker fuel. Don’t dump a lot of smoker fuel onto a newly started fire. You will smoother the fire and it will go out. It is important to have a good cool flow of smoke when you press the bellows the smoker. One other thing, inspect the hive during the middle part the day.
Select a day when the bees are flying and seem very busy. Avoid cloudy overcast days or days with threatening weather.

First, make sure all is ready. Do you have your hive tool? Is the smoker going? What about neighbors? Children?

- Approach the hive from the side if possible. Do not stand in front of the entrance. If you do, you will notice a crowd of bees in a holding pattern behind you.

- Use your hive tool to remove the top cover. I like to lay the top cover on the ground next to the hive with the bottom side up. Blow a little smoke toward the entrance. Notice that I said a little smoke. You don't need a lot.

- Next remove the inner cover. Bees have a tendency to glue this down to the inner side of the hive with propolis, so you may have to pry the inner cover off. Keep your smoker handy.

- Once the inner cover is off the top bars of the frames in the top box (super) are exposed. Bees will start to migrate toward the disturbance and you will notice them coming up between the top bars. You can apply a little smoke to calm them down. A few may become air borne and fly about you. Ignore them.
Now What?
What are you doing in the hive? Do you know?

- Move slowly -- avoid quick sudden movement.
- Don't spend a lot of time with the hive open.
- Since this is a new hive, you could or should be looking for:

1. Are the bees building new comb on the foundation you put into the hive? New comb is nice and white or slightly yellow. See the photo below.

2. Are all frames drawn out? This depends on how long the bees have been in the hive. If the comb is drawn out (the bees have made new comb over the foundation), do you have a new super to add to the colony? I like to add a new super when 3/4 of the comb is drawn out. The last frames to be drawn out are the ones on the outside of the hive body. The bees will instinctively store honey in these outside frames. Don't take it away from them.

3. Can you recognize brood?

It will be located in the center of the frame of comb. It is tan to dark brown in color. It may be hard to see eggs especially in new comb that is demonstrated above, but you should learn how to spot them. They look like little spots of sugar at the bottom of cells. Larva is easier to spot -- they look like pearly white worms coiled within a cell. The capped brook is brownish in color. Older comb turns dark in color.

4. Can you recognize capped honey? Capped honey will be found in an arch across the top of the comb. If it is unsealed, it will be a liquid. When sealed, the cappings are a distinct whitish color.

5. You will also see cells that have a yellow or brownish substance in them. These cells contain pollen. A normal hive will have most of the frame filled with brood, a small arch of honey at the top of the frame and some pollen stored between the two. It is not unusual to find a frame which is almost all brood in a strong hive.
Late Summer Honey Bee Management

It is not unheard of for a package of bees put on new foundation to have surplus honey. A number of factors determine the amount of honey a hive of honey bees can gather.

- Favorable weather
- Nearness of nectar honey plants
- Your management of the bees
- How much you feed your new colony to get it going
- The honey bee population of the hive
How To Prepare A New Hive

You can prepare the hive so that the bees can accept it by rubbing either of the following substance (or a mixture of both) on the inside of the hive:

§ Propolis
§ Beeswax

Before using them, you can soften it in hot water, near fire or in the sun.

WHERE TO SET UP AN APIARY

It is well known that bees can be kept anywhere. However, if the interest is to increase honey yields and profit margin, the place where hives are placed is paramount to the beekeeper

African bees are defensive in nature hence they must be kept away from the public or a place where they cannot sting anyone. Bees also require food sources that are nectar and pollen therefore they must be able to find their food sources within their vicinity - at least 2km. While bees can fly many kilometers to look for the food, this is uneconomical when it comes to honey production. The shorter the distance for the bees the more they collect the food.

The apiary must have good air drainage (good air circulation). This means it must have a good airflow. The hives must be protected from strong wind, which may cause drifting of bees. It must also be protected from hot sun by providing a partial shade. Bees need water and must be able to find the water within 500m. Sometimes water can be provided in containers and to prevent bees from drowning, sticks or stones can be provided for landing and taking off of bees.

To protect the hives from ants and termites, no weeds must be allowed to grow around the hive as they form the bridge for the ants to reach the hive. The scent from weeding usually upset the bees; hence the apiary must be well prepared in advance. During dry spell, a firebreak can be made around the apiary to prevent the hives from being burnt. The apiary must be kept clean and tidy all the time.
How To Move Bees To A New Hive

Capturing a swarm

If bees sometimes do not occupy the hive on their own, they have to be moved in the hive. Bees easily occupy hives when they are swarming. Swarming is a process of producing a new colony. Bees swarm for different reasons:

When they are overcrowded before the honey season, they will start swarming.
When the hive is destroyed, food sources or water become scarce

The sudden failure of the queen to lay eggs, a hot or poorly ventilated beehive, lack of space for egg laying and honey storage

Swarm may be found hanging on tree or under hangs of buildings. Once you have located a swarm, it should be caught immediately and transferred to a hive. Brush or shake the bees off into the basket, empty calabash or a cardboard box. Then, shake the bees into the empty new hive.
Unless forced from their home ruthlessly, bees in a swarm rarely sting. However, to make the transfer safe, NEVER brush the bees without smoking but have a veil and smoker ready. After the swarm has been captured, it must be shaken into the new hive and be left undisturbed for a few days. Shortly, the bees will settle down and start storing the food and caring for the young ones. Bees can best be transferred during the honey season (swarming season). The swarming season is immediately during the dry spell after the rain season (probably February -May) and during the spring (August-November).

**Using bait hives**

A well-baited hive can be placed high on a tree or on a roof. As soon as the swarm has taken occupation of the hive, the bees will begin to orient themselves on the position of the hive. It is therefore advisable to place the hive in its desired place the very day that the swarm has taken occupation of it. If the hive has already been occupied for some days, the bees will already have oriented themselves to the hive. The hive can then only be moved over long distances and some weeks later it can be moved back to the desired place.

It is very expensive to make a swarm box hence other innovations can employed like card boxes, baskets, gourds.
Inspecting The Colony

The best time for inspecting the colony is a bright, sunny day when the bees are working normally. Bees should not be disturbed on cold, rainy, or windy days or at night.

When inspecting the colony, light the smoker and approach the hive from the side to avoid blocking the bees’ entrance. Smoke a bit on the entrance holes especially the busiest. Lift the lid and smoke on the surface and place back the lid. Then it should be removed after a short time and placed upside down. The top bars should be loosened part with the knife, taken out, and examined one by one. The top bars should be handled carefully and always holds the combs vertically to avoid them breaking as shown below.

As you inspect the colony, always be mindful of the queen. The top bar where she may be located must be put back as soon as possible as losing the queen would be tantamount to murdering the colony. Therefore, the top bars must be handled with care and they should be no crushing of bees. ALWAYS smoke reasonably after inspecting each top bar to calm the bees.
Inspection of Colonies

Frequency of inspection and manipulation depends on the time of year and your five key purposes.

**These are to check that:**
1. The queen is present and actively laying
2. No swarm preparation is taking place
3. Space is available for honey, bee and brood expansion
4. No diseases or pests are present
5. There are stores of food until next inspection

Whilst carrying out inspections a beekeeper must respect and maintain bee space. This is a space of around 6mm-9mm between combs, the walls, floor and ceiling of the cavity they occupy. It is there to allow them to move around. Gaps that are too small are filled with propolis, those that are too large are filled with propolis.

During a nectar flow, many of the older workers will be out flying and foraging. This is the best time to examine the colony. In the summer more bees will be in the hive and the situation can change, especially between the nectar flows. There can also be some robbing going on at this time, which will make the bees even more defensive to any intrusion to their hive. Leaving the colony open for more than a few minutes can accelerate a robbing as can leaving cappings or honey exposed. It will become a necessity to reduce the entrance of a weak colony to prevent stronger hives attempt to rob from it. A honey flow will reduce the likelihood of robbing.

The mood of the bees can have a lot to do with the weather or the time of day. On days of rainy weather, electrical storms or cool temperatures, early morning or late afternoon inspections will be more likely to make bees angry and they will attack. Always try to inspect them on warm, sunny days in the middle of the day when most of the bees are foraging.
Swarm Catching Equipments

1. Swarm catcher

A Swarm catcher is a small beehive usually containing five or six top bars or frames. Several types of containers can be used i.e. a travelling box with a lid, an open topped box or a straw basket. The latter is more useful when collecting the swarm from a difficult place. The open box is best made of wood or cardboard. The travelling box is often bulky. It becomes more advantageous, if it is made like a beehive as explained above containing 3-4 frames of foundation or drawn comb. The collected swarm is left in it for a couple of days before hiving the bees. It can be done only by shifting frames with bees from the box to the hive.

2. Queen cage

A Queen cage or Benton mailing cage is a small container designed to hold and carry the queen and a few "attendants", usually six to ten worker bees. This is important only when the queen is being transported from one place to another. It is made from a block of wood about 20 mm thick, 90 mm long and 38 mm broad. Three overlapping holes, about 13 mm deep are drilled into the block. One of these is filled with sugar candy. A queen with attendants is placed in other two holes and the face of the cage is covered with a metal fly-screening, for a week required for the journey. It is helpful if the cage is so constructed that an inspection certificate and the address label are easily attached to it. In the absence of a neatly designed queen cage, a match box can be used. It is important to perforate the box with tiny holes to give the bee the needed ventilation. This is done by simply heating a metallic rod and drilling it into the light wooden cover of the match box.
Other Equipments

There are a number of equipment that are used for various purposes. They are: queen introduction cage, queen excluder smoker, hive tool, bee veil, overall, gloves and bee brush.

1. Queen introduction cage
This kind of cage is required when a weak old queen is replaced by a young queen. The new queen is also introduced to bees of the old queenless colony. The new queen is kept this cage for about 36 hours, so that bees get acquainted to her odour, and become friendly before it is released in the hive.

This cage is made from wire having holes of 3 square millimeter. The wire is bent into a square section tube about 89 mm long and 19 mm x .2.7 mm in cross-section. One end of this tube is plugged with wood, and other end is left open. The queen is placed in the cage on her own, the open end is covered with newspaper (single thick) and held with an elastic band. The cage is then jammed between two frames containing the brood. The queen is released by the worker bees of the colony within 36 hours bees by chewing away the newspaper covering.

2. Queen excluder
The purpose of a queen excluder is to exclude the queen from the honey supers, thus restricting brood to the brood frames, while allowing the workers for free movement between the brood chamber and supers. A queen excluder consists of a flat screen with parallel slots or gaps at spacing of 0.15 inches (3.8 mm). It is placed over the brood chamber and below the super. The worker with their thorax varying from 2.3 to 3.5 mm can easily pass through these holes of 3.8 mm size. But the queen with her thorax of 4.3 mm to 4.5 mm size is unable to pass. A similar device is used as entrance guard.
3. **Smoker**
Honey bees are known for their aggressiveness and no honeybee will ever allow a bee-keeper to harvest its honey without a fight. Smoke produced by using smoldering rotten wood, dried cow dung or twisted straw has appreciable effect on bees. The smoke renders bees docile, so that the beekeeper can work undisturbed.

The smoker has two main parts i.e. the container and the bellow section. The container is a metallic can, big enough to carry dry material to last at least for 40 minutes. The bellow section, puffs air into the container to drive the smoke out of the can. The container is loaded with wood shavings, smoldering cow -dung or dry material which provides white smoke. Kerosene oil should not be used in smoker.

4. **Hive tool**

It is a piece of flattened iron with hammered down edges and is used for prying apart the frames in the hive and for scrapping bee glue and superfluous pieces of comb from the various parts of the hive. It is like a knife.
1. **Bee veil**
   It is worn over the face for protection against stings. It should be made of black light material such as silk, cotton or wire.

2. **Overall**
   It is a protective garment over the clothes so that bees cannot get under them. Strong cheap white cloth can be used.

3. **Gloves**
   Gloves are useful for beginners to develop confidence.
4. **Bee brush**
A bee brush or a whisk broom is often employed to brush off bees from a honeycomb before it is taken away for extraction.

II. **Feeding Equipments**

There are several ways to feed sugar syrup, liquid honey or honey to bees in the comb. The normal position for a feeder is immediately above the brood nest or placing food alongside the brood nest.

1. **Top feeder**
In top feeding glass or plastic containers or jars are used. Many small holes of about 1.5 mm in diameter are punched or drilled in the cover of the jar. The jar is filled with sugar syrup and after replacing, the perforated cover is inverted. In the beginning syrup exudes quickly through the small holes. Since container is air tight and a vacuum is formed above the syrup in the jar, this slows down the rate of flow. Then feeder is placed inverted over an inner cover having an aperture of about 70 x 40 mm, through which the bees can pass.

2. **Division board feeder**
It is a wooden trough of the shape and size of one or two Lang troth frame dimensions, with shoulders so made that it may hang in the hive just like any oilier frame. They are equipped with a float or wire gauze, to which bees cling while feeding the syrup.
3. **Syrup filled combs.**

Another technique of feeding sugar syrup is to fill empty combs with syrup. This can be done by spraying syrup through nozzle, which breaks the syrup into fine droplets. After the comb is filled, it is given a light shake to remove droplets clinging to the surface. The frame is then placed into the hive.

III. **Additional Hive Equipment**

Besides the above described types of hives and hive equipment following additional equipment is also needed.

A. **Dummy or Division Board**

Dummy is a wooden partition which serves as a movable wall and helps to reduce the size of the brood chamber so that bees can keep the brood nest warm and well protected from bee enemies. It is also called division board. Its size is same as that of the frame.
B. Bee-escape

These are wooden or metal passages through which bees may pass in one direction only. They are used to remove bees from supers of honey that are to be harvested. Two types of bee-escapes, i.e., porter and wire gauze cone bee-escape, are described here.

1. Porter bee-escape or spring bee-escape.
This type of escape is also known as spring bee-escape. This escape is a metal device that provides the bees in the supers with an avenue of escape to the area below, without the privilege of returning. Each escape has two exits between thin and pliable bars of copper that yield as the bee seeks passage between them.

The tips of the springs are about 1.6 mm apart. The escape must be kept clean and free from drones. The brood must be fitted with two or more escapes. The bees usually leave through the porter bee escape in 48 hours. This type of device is useful in cleaning the super from bees for harvesting honey.

2. Wire gauze cone escape
This is also known as V-shaped clearer board. The cone-like structure is made from wire-screen having two ends, one end is broad and the other is narrow. The broad end is attached to the super and the narrow end hangs in the brood chamber.

The hole of the narrow end is so small that only one bee can pass at one time through it. Therefore, bees from the super begin to pass through its narrow end, one by one, into the brood chamber. But reverse passage is not possible as the opening of the escape device in the brood chamber is not large enough to attract the attention of bees for reentry.

Therefore, the cone or V-shaped structure with broad and narrow opening serves as the exit only. The device is used in cleaning super from bees, before harvesting honey. This is also used in catching swarms hidden deep in the wall or tree trunk without breaking walls or cutting trees.
C. **Comb Foundation**
It is an artificial comb prepared from a sheet of wax. They are technically called comb foundation sheets. Use of such combs helps to produce more honey as the bees do not have to build new combs. The comb foundations are fixed on wired frames, with the help of a device known as a spun wire embedder or a piece wire embedder. The following precautions should be observed while fixing these combs to the frames.

1. **Selection**
The Apis indica bees build cells of various size in combs in different parts of the country. Accordingly the manufacturer are building two types of comb foundations, one is suitable for hilly area and other for plains. When placing an order, it should be based upon the variety of bees and altitude of the place from sea level. The comb foundation for Apis indica bees generally weigh seven sheets to 454 g as compared to ten sheets to 454 g for *Apis mellifera* bees.

2. **Fixing**
In nature, bees build new combs parallel to combs on the upper edges of the frames. Therefore, combs may be built in the direction of the entrance, or at right angle to it, or in an oblique fashion. In movable frame hive it is imperative that straight combs be build in the frames, so that when shifted from one hive to another they may maintain the correct bee-space between them.

Do not use too soft comb foundation sheet or the combs showing buckle inward or outward. New comb foundation sheet is usually soft and will sag easily when filled with brood. Sagging has adverse effect on brood development. It produces the drone instead of worker. Heavy brood foundation should be used as it adds strength to the comb in its early life. Use string or a metal or plastic midrib tinned wire no. 28 which is by far tile most satisfactory and widely used method of preventing sagging. It is better to purchase comb foundation already embedded with wires.
A good comb has long life. The brood combs and combs with honey after extraction can be used for several years. The combs are lasting asset of a beekeeper. Before reinforcing these combs, be sure that they are not infected with some disease like acarine, nosema, etc.

**VIII. Honey Extracting Equipments**

Honey extractor is a machine with which honey is separated in its purest form from the honey comb. The honey comb is whirled in a cage enclosed in an outside container and honey is thrown out under the centrifugal force and is free from any extraneous matter. The comb is undamaged and can be used again. The Indian Standards
Institute has standardized two types of honey extractors. They are (1) tangential type and parallel radial type.

**Tangential type**

It is a simple honey extractor known as Fletcher model type, in which the faces of the combs are placed at right angles to the radii of the rotor i.e tangentially. The direction of rotation is reversed periodically. In the non-reversing type which is mostly used at small bee farms the extractor is stopped and the frame is reversed by hand to clear the honey from both sides of the comb.

The face of the comb must rest against a screen during rotation otherwise the comb will be thrown out and smashed. This type of extractor can be made in a barrel of quite small diameter. This is because frames moving around the circumference of the barrel will be subjected to greater centrifugal force.

**Parallel radial type.**

In this type of extractor the frames are placed in a plane circle of the barrel. The top and bottom bars of the frame are at right angles to the radius like spokes of a wheel.

This type of extractor is usually constructed with the barrel lying in its side, and the frames are set parallel to each outer in batches around the circumference. While loading combs into an extractor care is taken to balance the load. Honey flows out from the bottom centre opening. This type of extractors are most commonly used on commercial beekeeping farms.
Centrifugal extractor

The Centrifugal extractor is based on the same principal of a centrifuge. The frame is rotated in order to throw out the honey of the super. As a beginner you may be able to borrow one or rent one from your local beekeeping association. If you are planning a purchase, you will have some choices to make. You can choose:

1. Tangential or radial
2. Plastic or stainless steel
3. Manual or electric

Let's look at tangential first. In a tangential machine the frames lie almost against the barrel of the drum. The outer side of the frame is part that empty's when spinning. The machine is evenly loaded. Then it spins until about half the outer side has been extracted. You will be able to see tiny dots of honey flying from the frame and hitting the barrel.

Turn the frames around so that the other side of the frame is facing outward. Spin the machine again until all the honey has spun out. The frame is turned one last time and spun for the final removal of the honey. This method prevents the combs breaking, the middle being full and the outer side empty. Each frame does have to be handled four times and the machine stopped and started 3 times.

The handling time using this machine is a disadvantage; however, the extraction of the honey is more thorough than other machines. It is the most compact extractor available, so therefore cheaper than other machine. If you are extracting heather honey, this is the only type of machine to cope with it.

With radical machines the frames sit between rings, arranged like the spokes of a wheel. The extraction takes place on both sides at the same time, so there is no need to move the frames once they have been loaded. The radial machine is larger than the tangential machine. This is to ensure that the frames are far enough from the centre to extract evenly.
Because of the size of the machine it is capable of handling a lot more frames than a tangential. In both machines there is no difference in rotation direction, but the electric radial machines have a reverse position to remove a little more honey from the cells and dry out the combs.

The traditional material used in the construction of the machines is usually tin-plated steel. A good quality tin-plated steel will last for many years unless it starts rusting. But do not try this in the UK as it is not legal. Once the machine starts rusting there is very little to be done about the rust. The barrel can no longer be used for the processing of a food product. Recently tin-plated extractors have been replaced with plastic and stainless steel barrels. If you get a choice, stainless steel is more durable than plastic.

If you are only extracting honey from two or three hives, a manual extractor will do the job. However, if you have a considerable number of hives, the manual machine can become extremely tiring to use. When it comes to making a choice, it may depend on the money available, the stamina and the outlook of the beekeeper. The electric extractor will not only save you labour, but also reduces the time taken. The beekeeper could be uncapping while the extractor is running with the previous load.

**Uncapping tray**
A tray used to capture honey and wax when uncapping frames removed from the hive. Trays can be either heated or cold; the latter being provided with a frame to allow multiple frames to be uncapped and extracted simultaneously. Heated trays quickly melt the honey and wax cappings, which drain through a filter, allowing frames to be worked on quickly.

The beekeeper should fill his tray with water and allow the temperature to reach the desired level. Frames can then be rested on the tray and uncapped. Tilt the top of the frame to ensure the cappings fall away. Start with the knife blade at the top and move down underneath the cappings, allowing them to drop into the tray. Molten wax and honey will drain through the perforated strainer into the collecting container.
**Bottling tank**

Bottling tanks are used to prepare honey for bottling in jars. Units vary in size but all work in a similar way. The honey is loaded into the bottling tank which contains a heater and filter. It is heated gradually and flows through a fine mesh filter. The honey can then be drawn off and bottled for sale and consumption.
Don’t get caught

As you read through bee catalogs you will see many things that seem to attract your attention. Some items are useful and others are just a waste of money.

I often see bee brushes offered with beginner hives. If you really want to get a whole bunch of bees very angry, just try brushing them. If you want to get bees off of a frame, it is quite easy to take the frame and with a quick downward motion with a sudden stop causes many of them to fall off.

Another item that I see quite often is something called frame grips. Frame grips are used to pick up a frame from the hive. Maybe beekeepers buy these things because they do not have to come too close to the bees. You will still need to use the hive tool to loosen the frame in the hive in order to lift it out. Why not just use your gloved hand to grab hold of the frame and lift it out. That way you can view both sides of the frame and the bottom of the frame! If you will be looking for your queen, you will have to do exactly that.

Things that would be nice to have but you can get along without them:

- A bee tight work room
- Electric Hand uncapping knife
- An extractor
- A storage tank for honey
  Woodworking tools - Electric saw, hammers, etc

Some honey jars or honey containers (5 gal. bucket) would be good to have on the other hand.
How To Make A Beekeeping Suit

A beekeeper's suit is one of the most important tools a beekeeper can have. It will protect against the stings of bees if they are agitated. Here are some simple instructions on how to make a beekeeping suit if you do not want to buy one.

1. You will need to purchase a long sleeved white coverall, the type that mechanics use.
   - Bees are not color blind and dark colors can aggravate bees since these colors remind them of their predators
   - You also do not want to be multi-colored and have them thinking that you are a flower.
   - Bees rarely land on anything white so this is the safest colour.
   - Make sure the coverall fits loosely in order to keep the material from directly contacting the skin. This helps to avoid stingers that might pierce the fabric.
     Maybe you could get one a size or two too big for you

2. Measure elastic to fit the neck, pants and wrists holes.
   - Sew the elastic around all the holes firmly. Don’t make it too tight but make sure that it fits well and that the bees will not be able to get in.

3. Add boots to the suit.
   - Boots should be ankle or calf length and made of leather or other durable material. Work boots or steel tipped boots are great and hard enough for the stingers not to be able to pierce them. I like to have longer boots to that I can stuff my coveralls a long way into them.

4. Make a beekeeper’s hat with a veil.
   Making a beekeeper’s hat is quick and easy. Use a wide-brimmed, well-fitting hat. Something like a straw hat is good, although I like something a little sturdier that cannot be pierced so easily such as a cowboy hat.
5. Cut and sew nylon mesh to fit.

- After cutting the mesh to size you will need to sew it.
- There should be enough mesh so that it fits over the hat and drapes down well past your shoulders.
- If you are hand-sewing, be sure to use small whip-stitches to keep all openings too small for the bees to enter and get underneath the mesh.
- You will also need to sew the mesh to the brim of the hat. I like sewing it twice. Once to the top of the hat and once around the brim. I like to leave a little space at the top of the hat to make it harder for the bees to reach the hat. A bit like an air gap.
- When putting on the beekeeper's suit, put the hat on first, then the coveralls. This is to make sure the mesh of the hat is securely tucked in under the neck of your coveralls.

6. Add gloves.

Gloves should be heavy duty, thick and durable. The wrist cuffs of the coveralls should be tucked firmly into each glove. You could also do it the other way around and put your coveralls on top of the gloves or boots. The choice is yours. Whatever works best for you.

At first, you might find it hard to work with such gloves, but you will get used to it.

If you decide to put them on top, make sure that they are a bit longer than you need them to be so that when you stretch, they do not ride up and expose your skin.
Acquiring Bees

There are several ways to acquire bees. No matter the method you choose Spring is the best time to purchase bees. Buying locally is usually best as bees will be adapted to your local climate. Imported bees may be easier to handle and will improve the gene pool but may also result in a halo of bad tempered colonies as cross breeding occurs. This won’t make you popular with other beekeepers. Listed below are methods by which to acquire bees.

Established colonies
Established colonies will cost you more, but they can be worth the extra money. Before you purchase the bees have them and their equipment inspected by a bee inspector. You should stay away from dilapidated equipment or weak colonies as it could cost you more in the long run, such as repairing the equipment or bees not producing honey.

When purchasing established colonies, the equipment will not require any assembly. Since the queen is already laying eggs, you will be able to judge her brood pattern. The chance of producing a honey crop the first year with an established colony is very good. The previous owner should be able to give you any history or background information of the bees.

If you are a beginner, a strong colony may be more than you are ready to handle. The equipment may be old and need replacing, or it may not be standard equipment.

Nucleus colonies (nucs)
The nucleus colony is a smaller colony of bees possibly taken from an established colony. A "nucs" hive has fewer frames than a standard hive. The nucleus colony consists of only four or five frames instead of the standard 10 or 11 frames. They can be used as part of a queen raising program and are for keeping spare queens. The nucleus colony comes with the four or five frames of brood, honey and pollen, a laying queen, and every frame should be full of adult bees.

Nucleus colonies are less expensive than established colonies. The queens are usually new, giving you the opportunity to judge her brood pattern. If the nucleus colony has a strong nectar flow, there is a possibility of a honey crop the first year. Usually they can be purchased locally. Since the nucleus colony is not as strong as an established colony, they may be easier for a beginner to handle. You still need to have them inspected for disease.
**Package bees**
Producers of packaged bees are mainly found in the southern United States. A package of bees consists of 2 or 3 pounds of bees, a queen in a separate cage, and a canister of sugar syrup used to feed the bees during transport. They are shipped in a special box.

The package bees are cheaper than the established or the nucleus colonies. Beginners should be able to handle them easily. The possibility of the broods having a disease is slim.

The package bees may not produce a honey crop the first year. It will be more difficult to judge the queen with no brood. Because of the strain of being transported, a queen may be out-dated which can lead to an unproductive queen. If the weather is bad, you will have a difficult time introducing the bees into the hives. The bees will have to be fed until the start of the nectar flow.

**Swarms**
Swarms can be a fun way to get bees, and they are free, but could be carrying disease and will be of unknown temperament. Although they can be easily collected and placed in prepared equipment don’t collect swarms until you have experience handling bees at conflict. It is a good idea to introduce a new queen as soon as possible because the queen in a swarm is usually old. The swarms can be rather large but they can be easily handled.

The bees from swarms are unlikely to produce a honey crop the first year, but that does depend on the size of the swarm and when the swarm takes place. The availability of swarms is very unpredictable.

When a swarm migrates the individual bees do not move in lines or straight forward like a flock of birds, but round and round like chaff in a whirlwind. United they form a humming, revolving, nebulous mass, ten or fifteen feet across, which stays just high enough to clear obstacles. (Except when crossing valleys or other depressions when the swarm may be very high.) The swarm seems to be guided by a line of couriers, which may be seen (at least at the outset) constantly going and coming. If they take a direct course there is always a chance of following them to their new home. If the bees are successfully followed two plans are feasible:

1. Seek to hive them at once, perhaps bring them home in the section of the tree that contains the cavity.
2. Leave until autumn then go and cut the tree and see the ground flow with honey.

The former course is more business-like; the latter is usually preferred by neighbours.
A swarm of honey bees, even though quite scary is not really interested in you and if you leave them alone, they will go by and mind their own business.

What scares most people is that there are so many of them. The noise is also incredible and can sound like a fast moving train.

A normal honey bee hive will go through the winter with a population of approximately 12,000 bees. The Queen Bee will start laying eggs in Summer for the purpose of building up the population to a workforce of about 50,000 to 60,000 honey bees. So you can imagine if you had a swarm of 50,000 buzzing bees how loud it would be. Just one bee is really loud.

When a bee hive sees that it is running out of room to store honey, it will swarm and build a new hive to store an adequate supply of honey for the oncoming winter.

Astute beekeepers who are properly managing their hives will anticipate this need for more storeroom space and add another box to the top of the hive "before the bees need it".
As a beekeeper, it is important for you to know this and to recognize the signs that your hive is about to swarm. After all, you do not want to lose all your bees do you? If you are astute enough, you will know when to place another box on top of your hive or place a new hive nearby so that you can keep your bees. You must be like a good boy scout and be prepared.

What do you need to look for?

1. Larger than normal cells on the bottom of your frames. This is so that a new queen can be reared.

2. When the new queen has emerged, the worker bees who are going to leave with her engorge themselves with honey so that they can have a ready-made food supply in their new home.

3. You might have less bees as scouts have left the hive to find new homes.
4. The new queen gives off her own pheromones and the workers leaving with her form a swarming ball around her.

5. They will fly off then and start a new hive.

If the queen bee gets injured on this journey, the swarm will stop where she falls and wait for her to get better and resume flight. If she is dead, then the swarm will stop in place and will eventually die themselves as they fail to set up a new home.

Swarm Control

Swarming is a natural form of reproduction in the colonies of the honeybee. It is achieved by the old queen leaving the nest and taking part of the colony with her. This is a problem for many beekeepers. If they do not give their colonies enough attention during the swarm season they will inevitably lose part of their honey crop.

SWARMING AND ITS CONTROL

It is our duty as beekeepers to minimise to the nuisance that our bees cause, even if watching a swarm is a glorious sight. Left to their own devices, colonies will produce swarms - mainly in May, June and July, although not every colony will swarm every year. The first swarm contains the original queen, and perhaps half the workers (mostly young ones). Subsequent swarms may still emerge with virgin queens.

Any of the following will reduce the amount of swarming but not eliminate it entirely.

1. Give plenty of room in the supers.
2. Keep young queens.
3. Give them foundation to draw out.
4. Remove some bees and/or brood.

Swarming will not be prevented simply by
1. Clipping the queen.
2. Cutting out occupied queen cells.
There are numerous swarm control techniques. One of the most reliable is the artificial swarm which is described in every text. Examine each brood frame once a week for queen cells with eggs or larvae. If they are found, move the hive to one side, and put a new brood box and floor in the same position. Put in the new box one frame of brood with the old queen, and fill it up with new frames and foundation. The queen excluder and supers (with bees) go onto the new brood box. The other portion of the hive may be located anywhere in the apiary. Flying bees go back to the old site. Cut out all queen cells, and one week later, cut out all the new queen cells, leaving one open one. This will produce the new queen. If increase is not needed, the two colonies can be reunited later in the season.

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A swarm leaving a hive often hangs near the hive before moving on. This situation can be dealt with by the beekeeper as they can collect the swarm, but this is assuming that the keeper is near at the time of the swarm. If not, things get more complicated especially in suburban areas.

The beekeeper will have to locate his swarm and, depending where it is, this could prove difficult. Especially if the swarm is over:

- Private land where you are not welcome
- Houses where the owners are afraid of the bees, especially those with children
- An area where collecting the bees can take time

There are several steps to be taken to avoid and this problem is less likely to happen.

- Use a young and vigorous queen to head the colony.
- A strain of bee should be used that has a low tendency to swarm.
- A hive should have good ventilation.
- Ample space should be used in the brood-nest and supers, which is a hive body used for storing surplus honey, for the developing colony.
- One wing of the queen bee can be clipped as this prevents the queen from flying. Although the colony may be ready to swarm, because the queen is unable to fly the swarm will only collect outside the hive and this is a lot easier for the beekeeper to collect.
- Inspect the hive weekly during the months of May and June to check for signs of swarming, to leave it any longer than this would be too risky.
If signs of swarming are noticeable then it is possible to prevent this by creating an artificial swarm. The queen, one frame of brood - bees not yet emerged from their cells - and attached bees and flying bees in the area are put in a brood chamber to one side on the original site. The rest is moved away either above or to the other side or to another stand. The colony then behaves rather like a swarm and draws foundation, finishing the job in a few days.

This method is useful before mid May because the daughter of the queen will mate and make her own brood and bees and be ready to act as a replacement for the old queen, if desired, by the time of the summer flow.
Packaged Bees

Package bees are usually available during the spring time. You can find a reputable dealer and start your hives this way.

Bees are packaged along with one Queen-bee and shipped to the beekeeper.

The packaged bees are usually transported in a wooden box which has screening on the front and rear ends. This is done for ventilation. A can of syrup is usually placed inside for them to feed on. The Queen-bee and the other bees that are kept inside the box are from separate individual hives. They are kept apart to ensure that their respective odors don't mix and become one. This is done by a queen excluder. This is done so as to ensure the safety of the Queen-bee as the other bees would kill her as she isn't one of them.

Most of the time, the bees will die during the transport if they aren't taken care properly. If placed in direct sunlight or without proper ventilation and shade, then you will get many dead bees also. This is why it is important to only buy from a reputable dealer who lives as close to you as possible.

The only disadvantage of obtaining packaged bees it is that the packaged bees take time to develop their nest into a honey gathering unit.
Guidelines for Buying Packaged Bees

1. Packaged bees allow you to start small and give your hive a chance to grow slowly. This is a great advantage for a new and inexperienced beekeeper.

2. Make sure they are certified healthy.

3. Make sure they have a clearly documented history.

4. They should only be available seasonally.

5. If you can pick up your bees yourself, it would be better as you will be more gentle than the post office department or even a carrier.

6. You can buy an established colony from a reputable breeder so that your bees are already working.

7. If you buy packaged bees, it will be a slower process as the hive has to establish itself and build its combs before the queen can begin laying her eggs.

8. Whichever way you go, it is good to start with two colonies so that if one becomes weaker, then you can reinforce it by just exchanging some of the frames of brood and honey.

9. It is better to buy bees from your area or as close as possible to your local area, so that they can adapt more easily.
Handling The Bees

Intruders are going to get stung by the bees protecting the hive. As a beekeeper you will have to be prepared to receive your share of stings. If you have any fear of bees or of being stung, you will have to conquer these apprehensions. As you gain confidence and become more adept at handling bees, stings will happen less frequently. Before acquiring bees it is advisable to find out if you have any allergic reaction to bee stings.

One of the tips you will want to learn is when to manipulate bees. You should only open and examine your bee colonies on days that are warm and sunny with no wind. As stated earlier, the older bees will be out searching for food on those days; unlike colder, windy and rainy days when older bees will stay in the hive.

When there is an abundance of nectar bees are much easier to examine. When there is a shortage of nectar, plying them with sugar syrup may help; but not always. Spring is the easiest time to examine the bees because of smaller populations.

Bees will usually tolerate a moderate beekeeper manipulation for 10 to 15 minutes. It is best not to keep the hive open any longer than you have to. Brood examinations should never be drawn out. When examining the hives, if bees become noisy or very nervous, the hive needs to be closed. If there is honey in the combs, this will attract robber bees unless there is an over abundance of nectar. If robbing starts, stop examinations for the rest of the day and reduce the entrances to the hives. Once robbing starts it is difficult to stop.

If you need to manipulate a colony, have a lighted smoker that omits cool smoke.

Before you open the hives, you want to puff smoke into the entrance of the hive. Move on to the other colonies allowing time for the bees to react to the smoke. Keep your smoker handy because you will need it while you are making your close inspections of each colony. If you have some of the bees looking at you, make them scatter with a few puffs of smoke.

MOVING BEE HIVES

Take the correct steps when moving a hive to a different position and the process will be an easy operation. This task is normally carried out for either pollination purposes or to good nectar sources. It is essential that the hives are well prepared in advance. The full supers and the crown board have to be removed. Replace with a travelling screen. Fix hive parts with fasteners to secure all the components. The best time for moving is the evening or early morning, when the bees have stopped flying. Close the entrance, remove the roof and relocate. To calm any agitated bees pour half a cup of weak sugar syrup on each colony. Once relocated in the new position replace the roof and open the entrance.
you don't alarm them. When prying off the cover to the hive, be as gentle as possible, bees are sensitive to vibrations. Avoid any jolting of the hives. After removing the cover to the hive, work from the back or the side of the hive. Remove the frame nearest the outside to be examined. If robbing is not a problem, lean the frame against the outside of the hive to give you more room to work. If robbing could be a problem make sure to cover the hives and never leave a frame out in the open.

If you are going to examine all the boxes, start with the lowest one. Make sure the boxes you are not examining stay covered. After examining the lowest box, examine each box after it has been replaced on the lower one.

When you need to remove the frame, pry it loose with the hive tool. With a firm grip on the loosened frame, gently lift it, trying not to scrape the bees on the adjoining frame. Leave the frame outside the hive or box, to give you a larger working area. If you scrape the comb, do not leave the bits and pieces in the hive or box. Only scrape comb that is in the way, scraping is irritating to the bees.