Apiculture

1.Rearing of honey bee for honey is called apiculture.

2.This term is derived from the scientic name of honey bee, Apis.

3.It is also called bee – keeping.

4.Apiculture is an applied zoology.

5.This is a cottage industry.

6.Formerly this industry was called bee-keeping.

7.L.L.Lanstroth is the father of bee- keeping.

8.The honey bee is domesticated by the farmers to produce honey and bees-wax,

9.As a result, bee-keeping is developed as a agro-based cottage industry.

Scope of apiculture

1.Apiculture provides employment to the rural people.

2.Apiculture is a cottage industry , it needs minimum semi -skilled industry.

3.It is economically important because it is a profitable rural- based industry.

4.Apiculture develops as small scale industry with less capital investment.

5.Apiculture related research institution also offers employment to the research workers.

6.The important product of bee-keeping is the honey which is used as medicine and nutritive supplement.

Varieties of honey bees

Honey bees are divided into 4 types.

They are

Apis dorsata

Apis florea

Apis cerana indica

Dammer bee

Apis mellifera is an exotic species.

Apis dorsata

1.It is commonly called rock bees.

2.It is distributed all over India.

3.It is one of the largest honey bee.

4.It is wild and violent.

5.It is found in the hills.

6.It builds a single comb which is one meter in length.

7.It is found hanging down from the rocks and branches of tall trees.

8.The comb consists of hexagonal cells.

9.The size of brood cells of worker and drone are equal.

10.The queen bee is easily distinguished by its larger size.

11.The colour of the queen is darker in colour than worker bee.

12.They are good honey gatherers.

13.A single colony can yield 30 kg of honey per year.

14.Since these bees are ferocious and venomous, they are not domesticated.

15.So they are also called wild bees.

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Apis florea

1.These are popularly called little bees.

2.They are small in size.

3.They are distributed all over India.

4.They migrate from one place to another at regular intervals (5 months).

5.The colony consists of a single comb which is small in size.

6.The comb is suspended from the branches of bushes.

7.A single colony yields 200-500 gms of honey per year.

8.These bees are helpful to pollinate flowers.

9.They are not domesticated.


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Apis indica

1.They are generally called Indian bees.

2.They are very clam.

3.They are suitable for agriculture.

4.They build their combs in dark places.

5.They are yellowish brown in colour.

6.They have two types of combs.

7.They are honey comb and brood comb.

8.They can produce 2-3 kg of honey per year.

9.They are domesticated in South India.

Dammer bee

1.These bees are small.

2.They posses a vestigial win

3.The body is black in colour.

4.The comb is built by a dark material called cerumen.

5.The honey has high medicinal value.

6.It is not easy to tame these bees.

7.They bite enemies.

8.The adults live for about 15 days only.

Bee colony

1.Honey bee social insect.

2.They live in colonies.

3.They show high degree of division labour.

4.Each colony consists of three castes.

5.They are queen, drones and workers.

6.The colony is comprised of only one queen, 40000 workers and 200 drones.

Queen

1.The queen is the largest member of the bee colony.

2.There is only queen in a colony.

3.She is the mother for all the members of the colony.

4.She is the only fertile female of the colony.

5.The queen is characterized by the presence of short wings.

6.The body is dark brown in colour.

7.The body consists of a head , a throax and an abdomen.

8.The head consists of a pair of compound eyes, mouth parts and a pair of antennae.

9.The thorax is made up of 3 segments namely a prothorax, a mesothorax and a metathorax.

10.The thorax bears 3 pair of legs and two pairs wings.

11.Her main function is to lay eggs.

12.So the queen is called mother of the colony.

13.She lays about 1500-2000 eggs per day.

14.She is larger than the workers and larger than the drones.

15.She does not have the wax plates or pollen baskets.

16.She has pointed mandibles and shorter mouth parts.

17.She develops from a fertilized egg.

18.The developing larva feeds on royal jelly.

19.Mating occurs during nuptial flight.

20.Eggs are laid after 8 hours of mating.

21.The life span of a queen bee is 5-

6 years.

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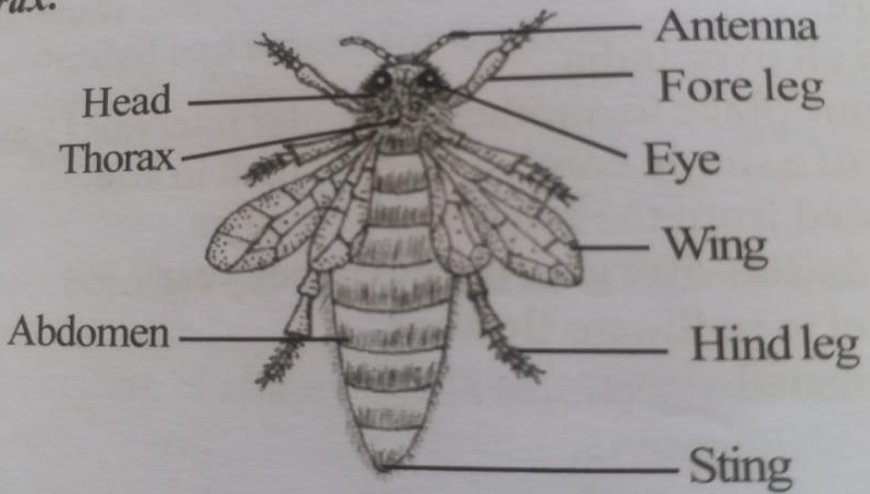


Fig.20.1: Queen.

ax bears three pairs of ***legs*** and two pairs of
function is to lay eggs.

Drones

1.Drones are male bees .

2.They are fertile.

3.They are larger than the workers.

4.The body is black in colour.

5.The body consists of a head, a thorax and a abdomen.

6.The head consists of a pair of compound eyes, mouth parts and a pair of antennae.

7.The thorax is a made up of 3 segments, namely a prothorax, a mesothorax and a metathorax.

8.The thorax bears three pairs of legs and two pairs of wings.

9.They can mate with the queen.

10.They will die after mating.

11.They do not possess pollen basket, sting glands and wax glands.

12.They have short proboscis.

13.They are the laziest flies among the members of the colony.

14.They do not work.

15.They develop from unfertilized eggs.

16.The nuptial flight takes place after 12 days.

17.The life span is for about 21 days.

18.Their main function is to fertilize the eggs by the production of sperms.

Workers

1.The workers are sterile female bees.

2.They are smallest members of the colony.

3.The body consists of a head , a thorax and an abdomen.

4.The head consists of a pair of compound eyes, mouth parts and a pair of antennae.

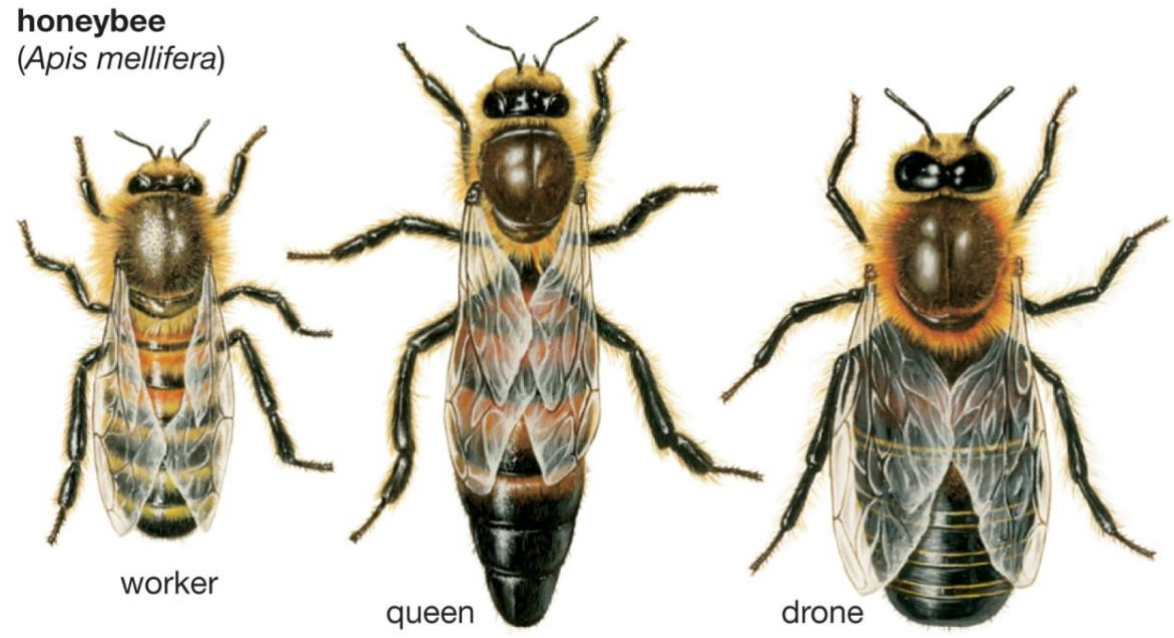
5.The thorax is made up of 3 segments namely a prothorax, a mesothorax and a metathorax.

6.The thorax bears 3 pairs of legs and 2 pairs of wings.

7.They do not produce eggs.

8.They have the organs such as pollen baskets, wax glands, and scent glands.

9.The head is longer and triangular than queen.



Bee -keeping

1.Bee keeping refers to the rearing of honey bees.

Primitive hives

1.The earliest method of bee- keeping is called primitive method.

2.The primitive method is adopted by villagers.

3.They use various types of hives.

4.Such hives are called primitive hives.

5.The primitive hives are two types.

6.They are fixed type and movable type.

Modern hives

1.Modern method of bee keeping involves the use of movable frame hives.

2.In such a type of method , artificial hives are used.

3.Thus hives are used as the tools of the bee keeper.

4.This helps to improve the method of keeping bees.

5.There are two types of modern hives.

6.They are Langstroth ten frame,

Newton”s hive

1.It is modern hive designed by Rev,Fr. Newton in 1919.

2.It is formed of two movable frames.

3.It is useful to rear small colony.

4.This hive consists of 5 components.

5.They are

Floor broad

Brood chamber

Brood frame

Super chamber and super frame

Stand

Top cover

6.Floor board has a dimension of 40cm x 30 cm.

7.Brood chamber is a box of 27 cm x 15 cm size without top and bottom.

8.At the base there is an entrance [8 cm x 1 cm].

9.The brood chamber is placed over the floor board.

10.Brood frame has top bars and side bars.

11.It is hanged down inside the brood chamber.

12.The brood chamber consists of seven frames.

13.A super chamber of 27 cm x 25 cm x 7 cm size is placed over the brood chamber.

14.There are seven super frames [20.5 cm x 14 cm x 6.1 cm].

15.Stand is a piece of wood [10 cm in diameter].

16.It is fixed deep in the ground.

17.A board is attached on its top.

18.The hive is placed on the platform.

19.The top cover consists of two slopping planks.

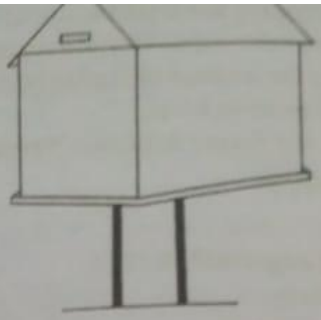


Fig.20.11: Newton hive.

- It is hanged down inside the brood chamber.
- The brood chamber consists of seven frames.
- A ***super chamber*** of 27 cm x 25 cm x 7cm size is placed over the brood chamber
- There are seven ***super frames*** (20.5 cm x 14 cm x 6.1cm).
- ***Stand*** is a piece of wood (10 cm in diameter).
- It is fixed deep in the ground.
- A board is attached on its top.

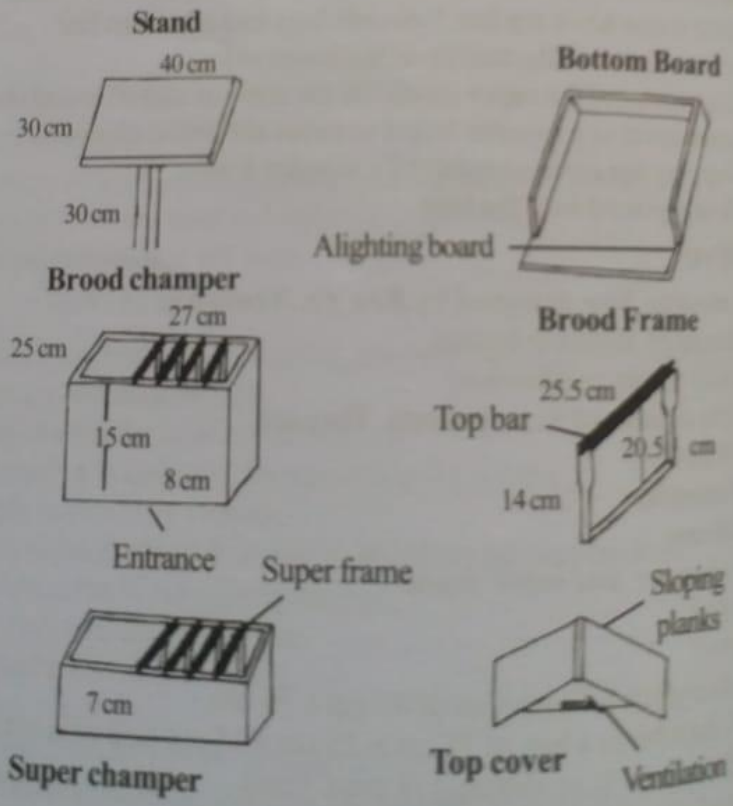


Fig.20.12: Hive architecture.

Bee-keeping equipments

1.Equipments are accessories required for modern method of bee- keeping.

The equipments are

Comb foundation sheet

1.It is a sheet formed of pure wax.

2.It is proper size and attached to super frames of thin wires.

3.The bees make comb cells over this sheet.

- The hive is placed on the platform.
- The *top cover* consists of two slopping planks.

Bee-keeping Equipments

Equipments are accessories required for modern method of bee-keeping. equipments are :

1. Comb Foundation Sheet

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- It is of proper size and attached to super frames by means of thin wires.
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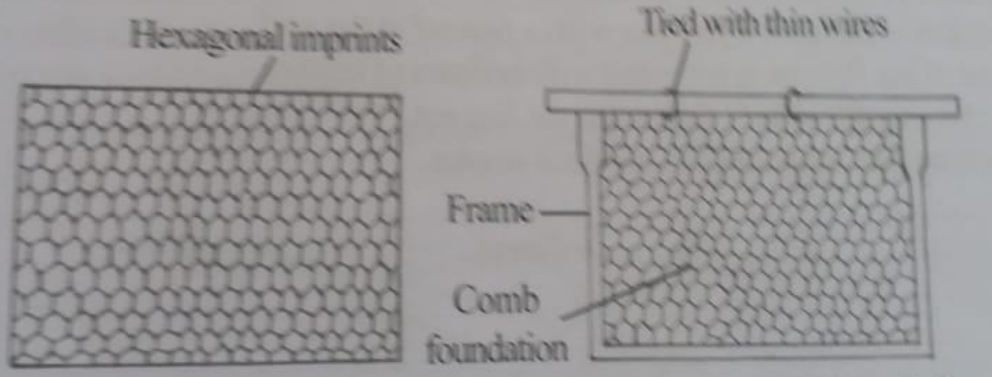

Fig.20.13: Comb foundation; Frame with comb foundation.

Dummy Division Board

- It is a frame usually placed with regular frames.
- It provides limited space to the bees.

Porter Bee Escape Board

Dummy division board

1.It is a frame usually placed with regular frames.

2.It provides limited space to the bees,

Porter bee escape board

1.It is a board which covers the brood chamber.

2.It has one-way opening at the centre,

3.It is useful to clean the super.

Drone excluder

1.Drone excluder is otherwise called drone trap.

2.It is made of a long of wood with a shallow opening.

3.Drones are trapped by this equipment.

Swarm trap

1.It is a rectangular box which opens at the broad side and a wire guage is attached to the other side (2/3 of its weight).

2.The queen excluder is fixed onto the other one third.

3.Then one or two frames with comb foundation sheets are placed inside the box.

4.When a swarm comes in this way, settles down along with queen and workers.

5.Now the swarm is transferred to the hive.

Queen excluder

1.It is an equipment which is helpful to keep the queen in a particular portion of the hive.

2.Queen excluder can separate brood chamber .

3.It is perforated zinc sheet mounted on a wooden frame.

4.The size of the pores is 3.5mm.

5.The queen bee is prevented from passing through it.

Smoker

1.Smoker is an equipment to produce smoke.

2.Smoker is useful to handle the bees.

3.Smoker is made of a fire pot with a funnel at the end.

4.Base of the pot is provided with bellows of leather.

5.A tube connects the bellows and the fire pot.

6.Coconut fibres are used to produce smoke.

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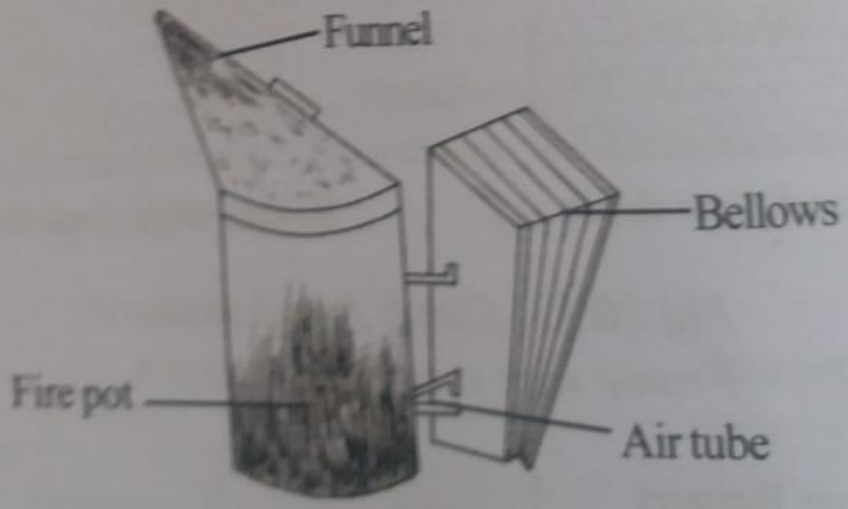

Fig.20.14: Smoker.

loney Extractor

Honey extractor

1.It is machine used to extract honey from the honey combs.

2.Honey comb is rotated in a wire cage placed in a container made a metal.

3.Modern extractor is provided with a wheel and a hand crank.

4.The inner wire cage is rotated to a speed of 60 rpm per minute.

5.Honey is separated from the comb by the centrifugal force.

6.Firstly the wax is removed from the combs.

7.They are placed in the cage.

8.The cage is rotated using the crank.

9.The honey is accumulated at the bottom.

10.The honey is accumulated at the bottom.

11.Then the honey is removed for storage.

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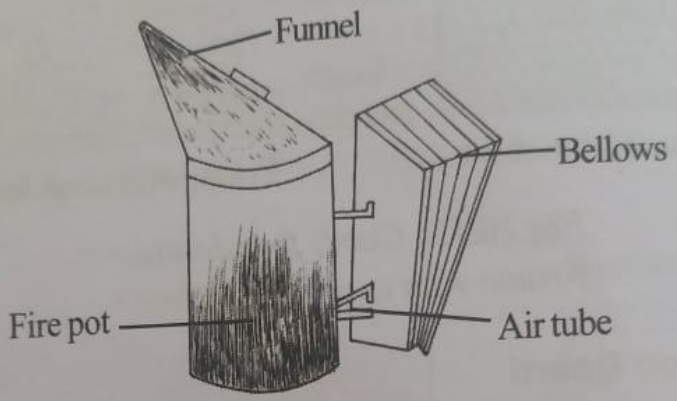

Fig.20.14: Smoker.

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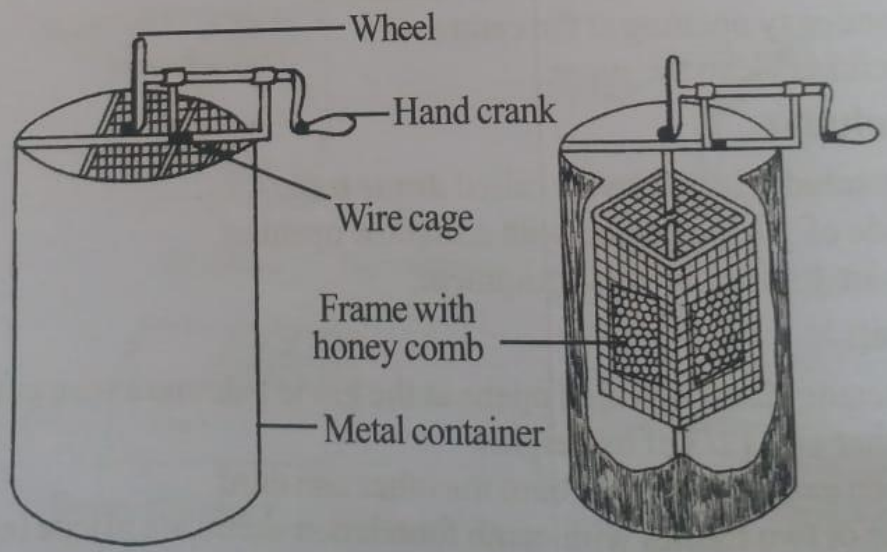


Fig.20.15: Extractor.

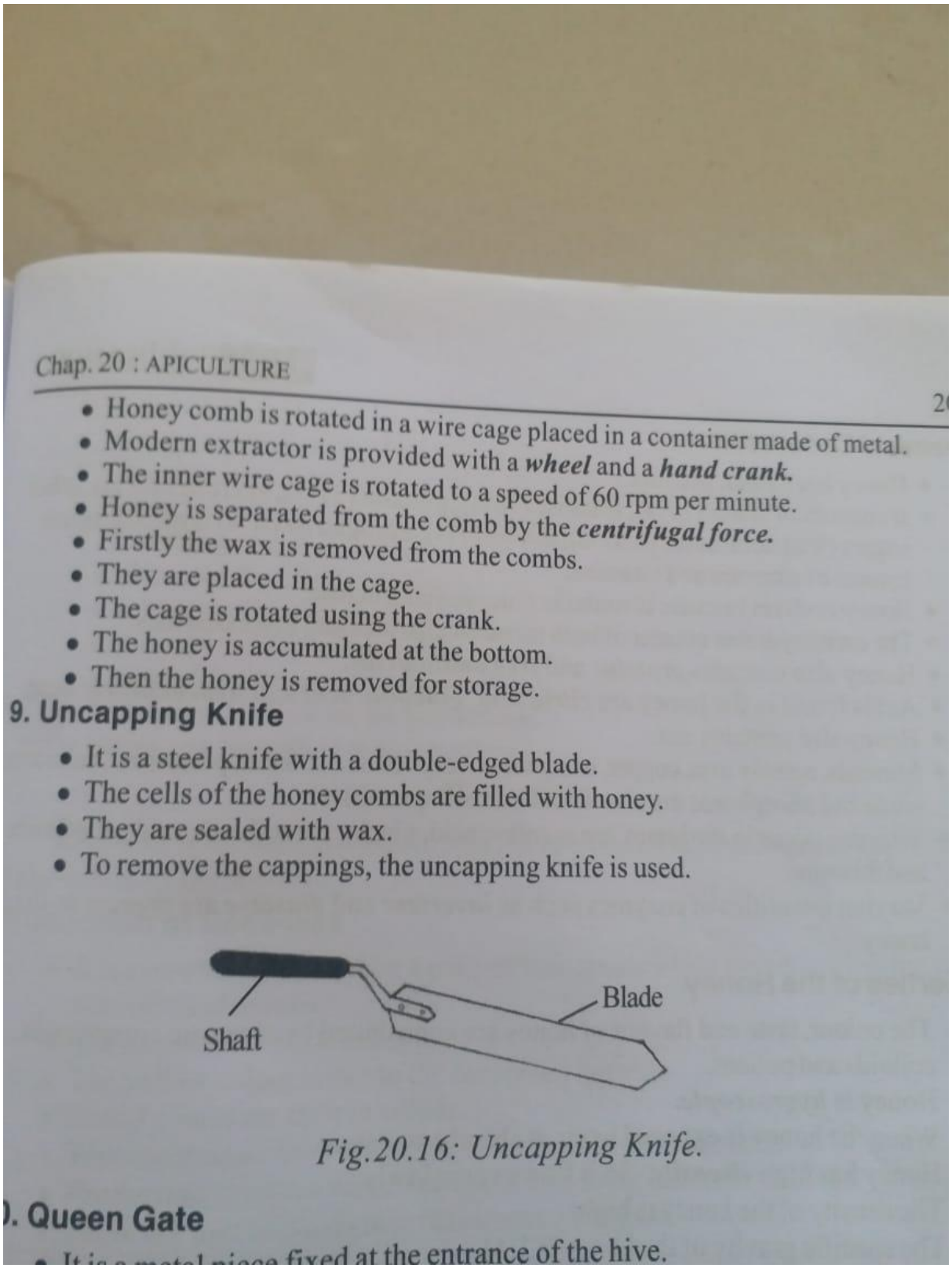
Uncapping knife

1.It is steel knife with a double -edged blade.

2.The cells of the honey combs are filled with honey.

3.They are sealed with wax.

4.To remove the cappings , the uncapping knife is used.



- Honey comb is rotated in a wire cage placed in a container made of metal.
- Modern extractor is provided with a ***wheel*** and a ***hand crank.***
- The inner wire cage is rotated to a speed of 60 rpm per minute.
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- Firstly the wax is removed from the combs.
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9. Uncapping Knife

- It is a steel knife with a double-edged blade.
- The cells of the honey combs are filled with honey.
- They are sealed with wax.
- To remove the cappings, the uncapping knife is used.

Fig.20.16: Uncapping Knife.

). Queen Gate

- It is a metal piece fixed at the entrance of the hive.

Queen gate

1.It is metal piece fixed at the entrance of the hive.

2.It is used to prevent the escape of queen from the hive.

3.It is made of a slit-like opening of at 4 mm size.

Bee veils

1.It is a protective covering used when handling the bees.

2.It is made up of various materials like silk, cotton and mosquito net.

3.It can cover the face.

4.It protects the essential parts of the head.

Bee brush

1.It is a brush with soft bristles.

2.It is used to remove bees from the honey combs.

Feeders

1.Feeders are the devices used to feed the sugar syrup.

2.Bees are fed with honey syrup or sugar syrup when there is insufficient amount of honey in the hive.

Honey uses

1.Honey is an aromatic sweet material collected by honey bees from the nector of plants.

2.It is a natural food.

Chemical composition

1.Honey is a natural product.

2.It consists of water (17%), fructose(38%), sucrose(1.3%), other sugars (9 %), total acids (0.57%), ash (0.17%),

nitrogen (0.04%) with negligible amount of enzymes and vitamins.

3.Honey is sweet because it contains glucose and fructose.

4.The carbohydrates consist of both monosaccharides and disaccharides.

5.Honey also contains proteins and free aminoacids.

6.Acids found in the honey are citric acid, gluconic acid and hydrochloric acid.

7.Honey also contains ash.

8.Minerals, namely iron, copper, magnesim, sodium, potassium, calcium, silica and phosphorus are also found in small quantities.

9.Vitamins occur in the honey are ascorbic acid, niacin, pantothenic acid, riboflavin and thiamine.

9.Varying quantities of enzymes such as invertase and diastase are present in the honey.

Nutritional value of honey

1.Honey is full of energy since it contains carbohydrates.

2.A teaspoon of honey liberates 100 calories.

3.Honey is formed of dextrose and levulose which provides energy.

4.Honey is also considered to be the drug of immortality.

5.It has the antibacterial property.

6.It enhances appetite.

7.It is useful in relieving dryness of the mouth and body.

8.It provides essential aminoacids required for the growth of the body.

9.Honey improves metabolism.

10.Minerals found in the honey aids in blood circulation.

Medicinal value

1.Honey plays an important role as medicine.

2.Honey possesses antibacterial property.

3.Honey can cure cuts, burns and sore throat.

4.It acts as an antibiotic.

5.It products the skin and eyes.

6.It promotes the growth of healthy tissues.

7.Honey is also used to treat cough, cold and intestinal disturbances.

8.Honey cures headache due to sleeplessness.

9.It has antieosinophilic property.

10.It enhances digestion and appetite.

11.It acts as medicine to cure jaundice.

12.It protects the deposition of fats.

13.It is good for kidney patients.

14.It is used as a medicine for bedwetting.

15.Honey can be applied to any swelling.

Bee-wax

1.Bees wax is the natural product.

2.It is the by- product secreted by the worker bees to make combs of the bee-hive.

Production of bees- wax

1.It is a true wax produced by 4 pairs of wax glands which are situated on the ventral side of the abdomen.

2.The pure is white in colour.

3.The yellow colour is due to the carotene pigments.

4.Brood combs are dark in colour.

5.Wax is obtained from cappings, bits of combs and old combs.

Production involves the extraction of wax using different methods.

There are four methods to produce wax. They are

1.Solar wax extractor

2.Submerged brood chamber method

3.Submerged sack method

4.Steam wax extraction

1.Wax is extracted by a solar wax extractor.

2.It consists of an empty tin. On one side there is a glass pane. The extractor is placed in the sunlight.inside the tin there is a wire gauge on which comps are placed. The heat melts the wax.

3.In the submerged brood chamber method the hive filled with combs is closed above and below with wire mesh.

4.It is introduced into a tank of boiling water. The tank is cooled. The hardened wax is removed from the water.

5.In submerged sack method the pieces of combs are kept in a sac and the sac is placed in boiling water. Then the wax may float on the surface.

6.Steam wax extraction involves steam to melt the wax. Thus the melted wax settles down in the vessel located at the base.

Uses

1.The bee wax is used in many ways.

2.They are widely used in cosmetic industry.

3.The wax is used to polish the shoe.

4.Bees wax is used to manufacture cold creams, lip sticks .

5.Bees wax is also used to make candles.

6.The bee wax is used to coat papers and to fill the pores in the wood.

7.It is also helpful to produce comb foundation sheets.

8.Quality wax is utilized for the preparation of ointment.

9.It is used to make models and pharmaceutical preparations.