

Animals other than Man in Relation to Bees

5.1 Introduction

This Chapter considers mammals and birds which exploited honey-storing bees or their nests before and during man's existence, and were his major competitors for the food in a bees' nest or hive; Table 2.1A lists some important groups. Certain insects – especially wasps and ants – and amphibia also preyed on bees in some parts of the world. In beekeeping books, animals that exploit bees appeared in the guise of bee enemies, and Figures 5.1a and 27.2a show mediaeval European concepts of them; a recent book by Morse and Nowogrodski (1990) discusses them worldwide.

Bees' nests built in the open, by *Apis dorsata* and *A. florea*, may be exploited by flying birds and by mammals that can climb trees. Fewer animals are able to break into nest cavities or hives, but bears and some smaller carnivores can do so, and also birds such as woodpeckers with powerful beaks. Insects and very small mammals, including wasps, ants, and

some mice and shrews, might enter some nest cavities through the bees' flight entrance.

Strong day-flying predatory birds and insects can catch bees in flight, and some of these operate near the flight entrance where many bees are present. Certain amphibians also catch live bees at a nest entrance.

Except man, who uses beeswax and propolis, animals exploit bees or their nests only for food. They consume mostly brood (and honey) but may eat adult bees, and honeyguide birds can also digest beeswax. The animals rarely rely on bees for their food throughout the year but, like man, exploit them at the season when the nests contain most food (Figure 5.3b).

Figure 5.1a Mediaeval German woodcut showing honey bee enemies, from a 1502 edition of Virgil's works (Strassburg: Grüninger).



5. Animals other than Man in Relation to Bees

Bee stings: prevention and effects

Starr (1985) suggested that the development of a sting was an important factor in enabling Aculeate (stinging) Hymenoptera to evolve. It allowed individuals to protect their colony against large marauders, with minimal loss to the colony as a whole.

Mammals and birds that obtain food by attacking bees' nests may be protected from being stung round the mouth, by specially adapted fur or feathers or by a tough thick skin that a bee's sting can hardly penetrate. Individuals may learn to behave in a way that minimizes the chance of alerting the bees to sting, or by some other means reduces the chance of being stung (Radford, 1988). But in general an animal's behavioural response to the sudden sharp pain produced by a bee sting does not prevent stinging by further bees.

Animals vary in their sensitivity to bee venom. Species reported to be highly sensitive to stings – probably of temperate-zone *Apis mellifera* – include the dog, horse, goose, chicken, sparrow, macaw, also frog. Species said to be relatively unaffected include rabbit, cat, pig (because of the subcutaneous layer of fat), toad and wax moth (Croft, 1988), but it is not always clear whether the comparison was between the effect of one sting or of 1 mg venom per 1 kg body weight. The toxicity of the venom of different honey bee species also differs. Tested on mice (Benton & Morse, 1968), venoms from *Apis mellifera* and *A. dorsata* were equally toxic, *A. florea* venom less toxic, and *A. cerana* venom twice as toxic.

5.2 Bears

Bears (Ursidae) evolved after the development of honey bees into different species had begun (Table 2.1A), and they are likely to have been an important exploiter of honey-storing bees well before man was present. They are now found from the tropics to beyond the northern extremity of *Apis mellifera*, and the following species search for, and feed on, nests of honey-storing bees (Caron, 1978):

- Selenarctos thibetanus*, Asiatic black bear, in Asia
- Ursus arctos*, brown/grizzly bear, in Europe (Figure 5.2a), Asia, North America
- Ursus americanus*, American black bear, in North America (Figure 5.2c)
- Helarctos malayanus*, Malayan sun bear, in Asia
- Melursus ursinus*, sloth, honey, or Indian bear, in Asia.



Figure 5.2a Engraving in a Spanish book of emblems, showing a European brown bear drowning bees before taking their honey combs (Saavedra Fajardo, 1640).

A rudimentary Mesolithic rock painting in eastern Spain – not far from that in Figure 7.3a – shows the leg and foot of an animal, possibly a bear, reaching down towards a hole near which are five flying insects thought to be bees (Jorda Cerda & Alcácer Grau, 1951). Many illustrations of bears as enemies of bees survive from later centuries, and Figures 5.2b and 33.2b show examples. Campbell (1793) reported that bears were 'very destructive to the hives in the interior of North America'.

From what I have seen in different countries, I believe that where bears were present the damage they could do was a main constraint to beekeeping. A belief that a bear would take a hive and hold it under water to kill the bees was illustrated in Spain in 1640 (Figure 5.2a), and some of the beekeepers' devices to kill bears attacking bees' nests were published in Germany in 1774 (Figure 5.2b). Throughout much of Europe and Asia, people went to extraordinary lengths to protect colonies of bees against bears, and to site hives where bears could not reach them. In parts of northern Spain and south-east France remains have recently been found of apiaries on al-

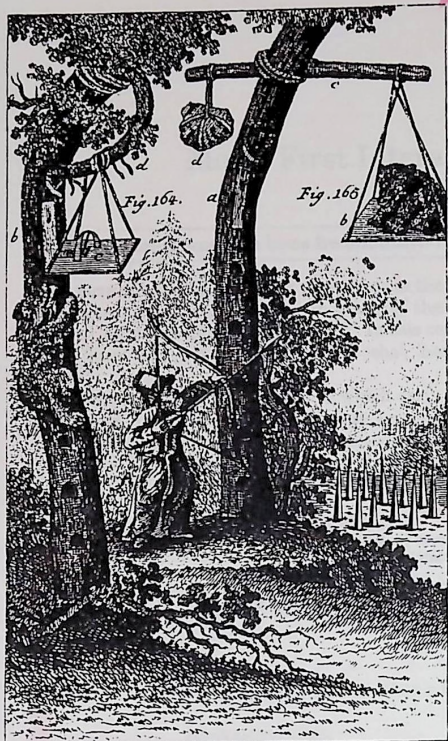


Figure 5.2b Anti-bear devices used by Cheremis and Bashkir tree beekeepers (Krunitz, 1774). One bear, trying to raid a bees' nest (door in tree marked *a*, has released a counterweight and been swung aloft. If the archer hits this bear, it is likely to fall on to the array of spikes below. A second bear is approaching nest *b*, where the trap is set but not yet sprung

most inaccessible rock ledges, or within by massive stone walls (Section 32.53).

Recent observations include the following. In the hot season in India, the sloth bear is 'on the lookout for the combs of the small forest-bee [*Apis cerana*] in hollow trees, and also for the huge combs of the large rock-bee [*Apis dorsata*], which hang in clusters from the branches of trees or from the undersides of rocks. The latter he knocks down to the ground but the combs of forest-bees ... must be taken the hard way.' Perry (1970), who wrote this description, quoted a long passage by V.K. Arseniev about the behaviour of an Asiatic black bear getting honey in the Manchurian taiga. In north-west Spain the brown



Figure 5.2c American black bear (140 kg) shot on Vancouver Island, BC, Canada (photo: W. Atkins).

bear still does much damage, which Dendaletche (1986) studied in the 1970s-1980s. He found great variations from year to year and from district to district, and suggested that there must be individual 'melliphile' bears which become very skilled in selecting the hives that contain most honey. In Palencia region, around 90% of bear damage in 1978 and 1979 was to hives, but in 1980 there was none – as if the melliphile bear(s) had moved away or died. The American black bear in Figure 5.2c had been shot because it destroyed many hives.

Before eating a comb, a bear sometimes carries it well away from the nest it came from, in an attempt to escape from flying bees. About 1960 in the Peace River area in northern Canada, Corner (1990) watched a black bear carry part of a hive containing honey and brood combs from an apiary into the woods, walking on two legs as a man would.

5.3 Other carnivores

The first Mustelidae (which are also carnivores) evolved before the bears. Though smaller than bears, their very powerful forelegs and claws equip them for exploiting honey bee nests. A strong-smelling secre-

Man's First Interactions with Bees and Honey

6.1 Early man, and the bees he encountered

For ease of reading, here and elsewhere in the book, the word 'man' is often used in place of the more literal 'human being' or 'humankind'. In this context, 'he', 'him' and 'his' also encompass 'she', 'her' and 'hers'.

Table 6.1A shows the extent to which early hominids had access to nests of various honey-storing bees, although many of the dates quoted are still the subject of discussion in the light of the most recent

finds. During the Pliocene, when honey-storing bees had already existed for perhaps a hundred million years (Table 2.1A), early hominids lived in tropical Africa, and fossils of them have been dated to 4 million years ago. Later, species of *Australopithecus* developed in Africa, but the whole genus died out some time during the Pleistocene. Meanwhile another branch of hominids appeared: *Homo*, the direct ancestors of modern man. The first was *H. habilis*, perhaps about 2.5 million years ago (Table 6.1A), who had the same sources of honey and who made

Table 6.1A

Notional chronology of early man's ancestry, development and spread over the earth, and his interactions with honey-storing bees

See Table 2.1A for the period before 10,000 years ago.

1000s of years BP	Development and spread	The bees, and man's probable interactions with them
		stingless bees (<i>Meliponinae</i>) honey bees (<i>Apis</i>)
5000		
Pliocene	<i>Ardipithecus</i> and <i>Australopithecus</i> in Africa	hunted nests of honey bees (<i>Apis mellifera</i>), also stingless bees in the tropics
	<i>Homo habilis</i> in Africa	as above
2000		
Pleistocene	<i>Homo erectus</i> : in Africa also in Asia	hunted nests of <i>A. mellifera</i> , and stingless bees (tropics) hunted nests of <i>A. dorsata</i> , <i>A. cerana</i> , <i>A. florea</i> , and stingless bees (tropics)
	also in Europe <i>Homo sapiens</i> (Palaeolithic began)	hunted nests of <i>A. mellifera</i> (temperate-zone) as above
250		
	<i>H. sapiens neanderthalensis</i> , Neanderthal man, in Europe, Asia	as <i>H. sapiens</i>
	<i>H. sapiens sapiens</i> in Africa, Europe, Asia — whence spread to Australia — and to Americas	as <i>H. sapiens</i> honey bees absent; hunted nests of stingless bees (tropics) as in Australia
20		
	earliest known rock art in SW France	no known depictions of bees or honey hunting
10		
Holocene (to present)	(final glaciation retreating)	
	(Mesolithic in Europe)	earliest known rock paintings of honey hunting (Europe, Asia)

6. Man's First Interactions with Bees and Honey

and used tools. Then came *H. erectus* about 1.7 million years ago, whose fossils have been found in Europe and Asia as well as Africa.*

Colonies of a 'temperate-zone' type of *Apis mellifera* which survived cold winters were living in Europe by the time *H. erectus* arrived there. In Asia, remains of *H. erectus* have been found in widely separated sites: in Java (the first finds), northern China and Japan. Within *Homo sapiens*, two subspecies have been recognized: *H. s. neanderthalensis* (Neanderthal man), and *H. s. sapiens* (modern man). Neanderthal man is known only from Europe and western Asia. In tropical regions, including Java, there were three honey bee species: *Apis dorsata*, *A. cerana* and *A. florea*; in northern China and Japan ecotypes of *A. cerana* survived cold winters.

Morris (1967) suggested that man's great love of sweetness in foods is derived from primates' general consumption of fruits, whose ripeness and suitability for eating were indicated by sweetness. Naim and Kare (1982) found evidence of an innate liking for sweetness: in their experiments, newborn infants consistently chose to drink more of a sugar solution than of water alone.

For the first 99% of their existence, *Homo sapiens* peoples were hunter-gatherers' living in the culture of the Old Stone Age (Palaeolithic). They obtained food by hunting animals (mammals, birds, fish, insects) and collecting plants and their seeds and fruits. Bees' nests were usually sought, and honey combs collected, by men on hunting trips. Several later Chapters describe methods of honey harvesting by some of the hunter-gatherer peoples who have survived to recent times. Women did most of the general food gathering, near where they lived or camped, and Section 53.2 explores the small part they also played in honey hunting.

Man and honey-storing bees in new continents

Man (*H. s. sapiens*) was at first confined to the Old World – Africa, Europe and Asia, where most regions had at least one species of honey bee (*Apis*). However, periods of a warm world climate alternated with cold periods during which additional water froze at the earth's poles; this lowered the sea level, with the

result that land was exposed where some shallow seas had been, and individuals in Asia were able to reach new lands. The sea level rose again when the next warm period melted some of this polar ice.

Around 50,000 years ago or even earlier, people from south-east Asia succeeded in 'island-hopping' to the land mass that included present New Guinea, mainland Australia and Tasmania. The travellers had to cross sea channels over 100 km wide, including the deep Macassar Strait where the Wallace Line runs, but some managed to do so. Their descendants reached as far as southern Australia and Tasmania over 30,000 years ago, and descendants of these people were later referred to as Aborigines. In parts of Australia, Aborigines found stingless bees (Section 3.6) and used their honey and wax (Section 11.51). In dry areas there were honey ants instead (Section 3.9).

Some time later, the sea level dropped sufficiently for – probably quite small – groups of people to cross from the north-east of Asia to North America, which were later separated again by the Bering Strait. It is not known when the cold period occurred which allowed the first crossing, but a date about 30,000 BC is commonly suggested. Once in America, the people could move south along an ice-free corridor east of the Rocky Mountains. Their descendants might have encountered bumble bees in North America, but would not have found permanent nests of honey-storing bees until they reached the tropics where there were stingless bees (Meliponinae), perhaps between 15 and 10 thousand years ago. These bees now occur approximately from the present USA-Mexico border in the north to the Bolivia-Argentina border in the south (Figure 3.2a). Within most of this large region, early man could harvest honey from them, and also wax which was essential to some of his later descendants for gold casting (Section 49.46).

6.2 Evidence from rock art

The earliest known representations of bees and their nests are in rock art which is also discussed in Sections 7.1, 8.11, 8.6, 10.22 and 11.51, and a further example is shown in Figure 53.2a. Early knowledge about bees is dealt with in Chapter 52, and early beliefs about them in Section 54.1.

Extent and dates of rock art showing bee-related subjects

Man's earliest representations of animals date from the later part of the Palaeolithic period in southern

*Examination of bone from a very early *Homo erectus* in Kenya (c. 1.6 million years ago) indicated that the individual suffered from hypervitaminosis. Skinner (1991) proposed that the living conditions could have been such that the disorder was caused by excessive consumption of *Apis mellifera* brood, but this proposal was later withdrawn (Skinner *et al.*, 1995) as having been based on an invalid determination of vitamin A in bee brood.

†In this book the alternative term 'foragers' is avoided, because it is commonly used for bees collecting nectar or pollen.

6.2. Evidence from rock art

France and northern Spain, where many paintings and engravings have been found in caves and on walls of rock ledges. Paintings in caves at Lascaux in France and Altamira in Spain date from perhaps around 15,000 and 13,500 BC, respectively. Most animals depicted are mammals, and paintings of bears at Ekain (Guipúzcoa) in northern Spain have been dated to between 15,000 and 10,000 BC. Birds and fish also occur, but very few insects or plants. The only suggestion I know of Palaeolithic paintings which might possibly be connected with honey hunting refers to Altamira. On the walls of a side chamber there are patterns of multiple ladders, and on the ceiling four parallel shapes in a pattern similar to some of the 'formlings' in Figure 6.2a(E) which are believed to represent bees' combs viewed from below (Section 8.11). Over the entrance to this side chamber is 'an extraordinary, global stalactite' whose shape Pager (1976) likened to a clustered swarm of bees.

Splendid examples of Mesolithic rock art relating to bees are known in Spain and India, but most examples are later and undated, in Southern Africa.

Register of the rock art

A 'Register of rock art relating to bees and honey hunting' set up in 1985 (Crane, 1986) included records of 118 likely sites in 18 countries by 1997. The majority, in Southern Africa, are discussed in Section 8.11 together with 163 further sites in Zimbabwe that show 'formlings'. Probably more than twice this number are known but not yet recorded in the Register (Genge, 1994). In the Mediterranean region, 14 sites are in Spain, and 1 each in Algeria and Morocco; the bee throughout Europe and Africa is *Apis mellifera*. Representations in Asia show *A. dorsata* nests, with paintings at 12 sites in India and 2 in Sri Lanka; a site in Bhutan at about 2500 m shows engraved nests, perhaps of *A. laboriosa* (Section 3.4). Three sites in Namibia have engravings, but most sites have paintings. In Australia 5 paintings of stingless bees' nests are known. There are no records from the Americas.

Subjects depicted

The following rock paintings, most of which are reproduced in this book, show a honey hunter at a bees' nest.

	Register no.	Figure
Europe (Spain)	AI-01	6.2a(C), 7.1a
	AI-02	7.1b
Africa (KwaZulu Natal)	SN-01	6.2a(A)

	Register no.	Figure
Africa (Zimbabwe)	ZW-001	6.2(D), 8.6a
	ZN-005	53.2a
Asia (India)	AN-03	6.2a(B), 10.2d
	AN-08	10.2b
	AN-09	—
	AN-10	—
	AN-11	10.2c
Asia (Bhutan)	AV-01	—
Australia (Queensland)	AU-04	6.2a(F)

Table 6.2A summarizes subjects relating to bees portrayed in rock art; group b refers to bees, and group m to man. In Figure 6.2a, A to G show seven representative examples. B is painted in white; three single-comb nests of *A. dorsata* hang from tree branches, and each has a segment painted solid that probably indicates stored honey; Figures 10.2a and 10.2b show other such nests. Flying creatures in a crowd but not associated with a bees' nest (b5) could be bees, although in Asia the species might be in question; or they might be other insects, or a flock of birds. Writers on rock art often refer to bees in large numbers as a swarm, and the bees in Botha's Shelter (Figure 6.2b) have the appearance of a swarm about to settle. But the word is often used loosely, and most 'swarms' look more like bees from a disturbed colony than a cohesive swarm flying with its queen. I know of no certain depiction in rock art of a clustered swarm, shown in Figure 4.2c, but the stalactite referred to above might have symbolized one. However, a swarm has no combs, and yields no honey.

How subjects were represented, and how they have been interpreted

Mesolithic and post-Mesolithic rock art in India showed individual bees as dots or blobs, but some Mesolithic examples in Spain (for instance Figures 6.2a(C), also 7.1a and 7.1b) gave an indication of body shape, and a number of later San paintings in Southern Africa portrayed flying bees very realistically; see Figure 6.2b. The shape of the combs is clear in Mesolithic and later Indian paintings (*Apis dorsata*), and in later San paintings (*A. mellifera*). No paintings of honey bee nests (*Apis*) are known which show realistic cells of the comb, or brood in them, but several Aboriginal rock paintings of nests of stingless bees gave some indication of nest structure, as in Figure 11.5a.

In Table 6.2A, a man is regarded as a honey hunter (m1) if he appears in association with a notional bees' nest — sometimes an actual depression or hole in the

rock surface (see Section 7.1) – and is carrying a suitable container (m2) or a smoker (m4) or other implement, or with a ladder or rope (m3). In tropical Asia, rock paintings of honey collection from *Apis dorsata* nests may show a long pronged rod (m5), and such a tool is still used in some Himalayan regions for breaking off pieces of comb from a distance (Figure 10.2b). For stingless bees, one honey hunter in Australia is shown holding a short stick (m6), used to break into cells and drain the honey (Figure 6.2a,F).

Ladders, ropes or lianas (m3) are present in many rock paintings, and unless they are shown leading to bees' nests, they could be connected with the gathering of fruit, birds' eggs, or other food.

Interpretation of rock paintings which show the combs of a nest of *A. mellifera* viewed from below has a chequered history. In Figure 6.2a(D) the combs are viewed from below although the man smoking the nest to drive out the bees is viewed from the side; such a shift in perspective is not unusual in early art. Comparison of some of the drawings in Figure 6.2a(E) with the photograph of combs viewed from below (Figure 6.2c) suggests that the drawings may also represent the view of multiple combs of a nest from below. These have been referred to as 'formlings' and are discussed further in Section 8.11.

Use of beeswax as a painting medium in Palaeolithic rock art

A few sites are known in Australia where Aborigines used beeswax to make paintings of humans and ani-

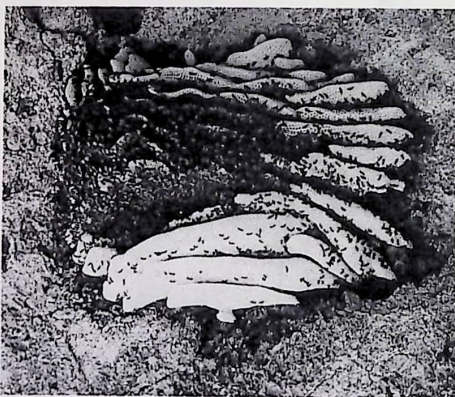


Figure 6.2c Nest of *Apis mellifera* at the entrance to a rock cavity viewed from below, Arizona, USA (photo: G.M. Loper).

mals (not bees), and Nelson *et al.* (1995) obtained radiocarbon dates between 2000 BC and AD 1900 for the beeswax used at 8 of the sites in northern Australia. Figure 49.5a shows an example.

6.3 Other early representations of bees

Artefacts discussed here were found in or near the Mediterranean region. Those from Egypt follow a 3000-year sequence ending at 30 BC, and some elsewhere are dated before 3000 BC.

Many remarkable paintings on plaster walls were found in a complex Neolithic shrine at Çatal Hüyük in Anatolia, dated to around 7000 BC. Mellaart (1967; also 1963) described the one shown in Figure 6.3a as 'a cellular structure in red ... In the central portion white circles, sometimes with a central dot, fill the cells, and most of those on the right are filled with a flower-like pattern, parallel wavy lines, winged or wingless insects ... The interpretation suggested was that of the life-cycle of the bee in a honeycomb with closed cells on the left, from which, in the middle, the bees emerge to fly freely in a field of flowers on the right.' Such an early representation of immature bees within closed cells would be astonishing, although in Egypt there are many representations of *adult* bees from 3000 BC onwards, which are discussed below. Mellaart *et al.* (1989) published drawings of two other paintings at Çatal Hüyük dated to c. 6540 BC, which include flying insects that might be bees – forming a sort of halo round the head of a goddess (VIA.shrine E.VIA.34). In an unpublished drawing of a painting dated to c. 6300 BC, similar insects fly around and above a stylized oval shape (Level II, Building A.II.1; c. 6300 BC; Mellaart, 1990). Symbolic bull heads were also found in a shrine at Çatal Hüyük.

Individual adult bees are shown in early portable art, and Ransome (1937) reproduced many examples. Gimbutas (1974) published Neolithic representations of 'bee goddesses' from Europe; the earliest are:

- c. 6000 BC, on a painted Proto-Sesklo vase from Otzaki, Thessaly.
- 6000-5000 BC, in a relief on a shard from Kopancs, SE Hungary.
- 6000-5000 BC in a Classical Cucuteni pottery relief from Trusesti, W. Ukraine.

Figure 6.3b shows an example from Ukraine dated to 4000-3500 BC.

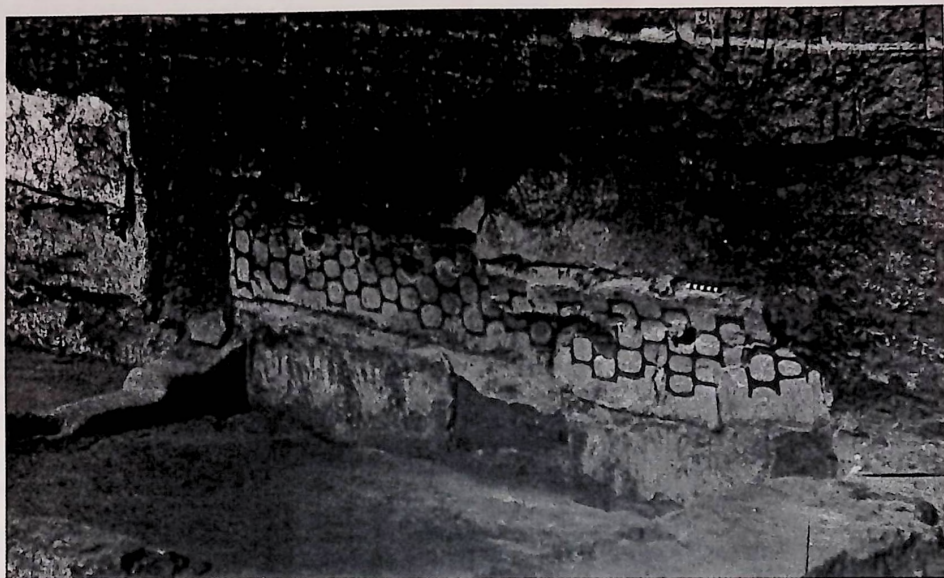


Figure 6.3a Painting at Çatal Hüyük, Anatolia, c. 6600 BC, suggested as representing honey bees' comb containing brood; east wall of shrine VI B.8, level VI B (photo: J. Mellaart).

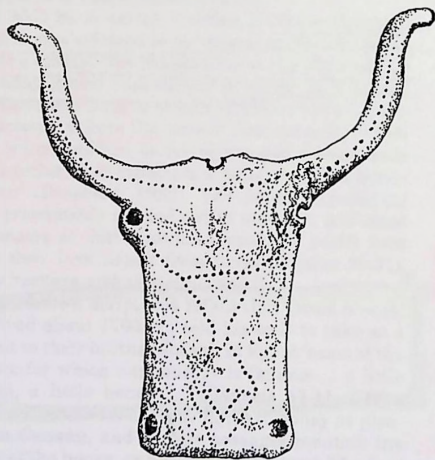


Figure 6.3b Goddess of Regeneration in the shape of a bee, with antennae, rendered on a stylized bull's head carved out of bone, height 17 cm, Bilcze Złote, Ukraine, Late Cucuteni, 4000 to 3500 BC (after photograph by Gimbutas, 1974).

From the establishment of the First Dynasty in Egypt about 3100 BC until the period when the Ptolemies ruled the country in the 330s BC, the honey bee was much portrayed because it was part of the topographical symbol of Egypt and of the King's titular. The accepted reason for this is that beekeeping was already very important before 3000 BC, especially in the Nile delta (Hassan Khattab, 1988, also Section 20.2). Thousands of such representations of a bee can be found in Egypt and in Egyptian museums throughout the world. The bee was viewed from the side, and showed both antennae and at least 2 of the 4 wings and 3 of the 6 legs, but the style of the representation necessarily varied according to the surface used. Figure 6.3c shows examples from the first two Dynasties, between 3100 and 2686 BC. Later, segments of the abdomen became more clearly delineated, although rarely in the correct number (6 are visible). By about 2400 BC in the Fifth Dynasty one hind leg was shown, but it sometimes appeared to come from the abdomen instead of the thorax. By around 1500 BC the bee was depicted more realistically and to a much larger size on stone surfaces (Figure 54.5d).

In Australia, there is a long tradition – said to be unchanged for 10,000 years – of painting on bark stripped from certain *Eucalyptus* trees (Tettamanti,

18463

7.2. Nests in rocks or in trees

most rock could not, although in a few places honey hunters fractured the rock by alternate application of fire to heat it and water to cool it. A log containing a nest could be separated from a tree, if necessary after felling it, and taken home. A nest in rock could not be moved unless the rock was very soft; a few types such as tuff and loess are so soft that cavities were scraped out for bees to nest in (Section 16.4).

7.3 Honey hunting in the Ancient World

Here, as in many other contexts in this book, the only knowledge we have of events and practices before recent times comes from a few pictorial records and sporadic references and anecdotes; we have no continuous history. The earliest certain evidence of honey hunting consists of Mesolithic rock paintings such as those in Figures 7.1a and 7.1b.

Section 49.42 refers to copper objects, cast with the aid of beeswax, found in a cave in the Judean desert and dated to between 3500 and 3000 BC. Beeswax was used similarly in Sumer between 2500 and 2250 BC. There are references to honey from the first dynasty of Ur, about 2400 BC (Section 54.32), and from the empire established by Hammurabi with Babylon as its capital, c. 1500 BC (Section 21.1). No such early record of hive beekeeping in or near Mesopotamia is known. So the beeswax and honey were probably harvested from natural nests, possibly from the mountains of Habha (Section 21.1).

In 3000 BC or earlier (Section 20.7) the Egyptian god Min was referred to as 'master of the wild bees' and one official was responsible to the Pharaoh for mounting desert expeditions to collect wild honey, and also resin from terebinth (*Pistacia terebinthus*). A manuscript from the time of Ramesses III (1194-1163 BC) quoted him as saying to a god: 'I have made to you archers and collectors of honey to collect honey for you' (Breasted, 1962). The desert expeditions were presumably carried out in daylight, and since beekeepers at that time used smoke to pacify bees when they took honey from hives (Section 20.31), honey hunters probably also used it.

The Hebrew scriptures relate that Israel (Jacob) who lived about 1700 BC, told his sons to take as a present to their brother Joseph in Egypt 'some of the produce for which our country is famous ... a little balsam, a little honey ...' (Genesis 43.11 NEB).

These scriptures refer many times to honey as plentiful in Canaan, and in four passages mention the source of the honey, or how it was obtained. The first and fourth refer to a period perhaps about 1700 BC and the others to 1100 or 1000 BC.

1. The Lord 'satisfied him [Jacob] with honey from the crags'. Deuteronomy 32.13
2. Samson 'turned aside to look at the carcass of the lion, and he saw a swarm of bees in it, and honey. He scraped the honey into his hands and went on, eating as he went.' Judges 14.8
3. 'Now there was honeycomb in the country-side'; Jonathan 'stretched out the stick that was in his hand, dipped the end of it in the honeycomb, put it to his mouth and was refreshed.' 1 Samuel 14.25-7
4. The God of Jacob 'satisfied him with honey from the rocks'. Psalm 81.16

There have been many discussions as to just how these passages should be rendered in English (e.g. Bodenheimer, 1934), but 1 and 4 refer to nests in rocks, and 2 to one in a (dry) lion carcass; 2 and 3 describe the actions men took when they came across a bees' nest - which are similar to those observed more recently in both man and the chimpanzee (Section 5.4). There is no mention of bees' nests in trees or in hives, or of methods used to locate nests.

Several early references quoted by other authors testify to the abundance and good quality of honey in Arabia. Around 1000 BC, the celebrated Chatramotis honey in Thugba and Irma valley in Saba was the only product of economic consequence other than incense (Tersiesi, 1968). Much later, Pliny said that the Sabaei in the extreme south were 'the most wealthy people owing to [various natural resources, including] their production of honey and wax' (VI.32.161). Strabo had quoted Eratosthenes (c. 276-196 BC) as saying that Arabia 'abounds with places for making honey' (XVI.4.2). Tersiesi referred to Pliny's quotation from Yule's *Gulyas* (25 BC), that 'honey bees are abundantly distributed in crevices in rocks and mountains; the most famous area in Arabia is Beni Saleem Mountains', and there is a further comment that 'some people are well acquainted to climb up and down in accessible crags to collect honey'.

Homer was the first Greek writer to refer to bees. In the *Iliad* (II.87) he used the simile: 'Even as when the tribes of thronging bees issue from some hollow rock, ever in fresh procession, and fly clustering among the flowers in spring, and some on this side and some on that fly thick.' Later (XII.105-6) he referred to a cave in Ithaca (off the west coast, near Cephalonia) where 'there are mixing bowls and two-handled jars; and the bees store up honey there'. Empty jars left in the cave had probably been occupied by swarms.

Honey hunters featured in a legend concerning Zeus, the supreme God of Olympus in Greece, and

*despite his reluctance
to quote the Bible*



Figure 7.3a Decoration on a vase from the Etruscan city of Vulci, dated to c. 540 bc., showing mythical honey hunters in a cave on Mount Dikte, Crete (British Museum Cat. no. B177)

Cook (1895) told the story as follows. When Zeus was an infant, his mother Rhea concealed him in a cave in Mount Dikte (Ida) in Crete, where he was fed on honey from sacred bees there. One day, four men protected themselves with armour and entered the sacred cave to steal honey. They began to take it, but at the sight of Zeus the joints of their armour burst and it fell off, leaving their bodies unprotected against the bees. The amphora in Figure 7.3a is one of two vases decorated with a picture of the naked men trying to beat off the bees.

We know little of honey hunting in Italy before or during the time of Ancient Rome, but Cicero (106-43 BC) referred to slaves collecting wild honey from the forests (*De senectute*, Beck, 1938), and Columella described a method for locating nests which is quoted in Section 7.5.

Diodorus Siculus (60-30 BC) wrote of the Corsican people when they were subject to the Etruscans; they paid tribute in resin, beeswax and honey: 'They fed on milk, honey and flesh, which the country offers plentifully, and they excel all other barbarians in justice and humanity one towards another; for where any find honey in a hollow tree in the mountains, it is certainly his that finds it, without any further dispute' (*Historical library* V.13.4).

7.4 Honey hunting in later centuries

Honey hunting was little referred to after the Western Roman Empire ended in AD 476, probably because by then hives were used for honey production in much of the Mediterranean region. It doubtless continued, and there is a description from Arabia in a poem compiled during the 500s by a mulatto, Thabit ibn Jabur – one of the 'Ravens of the Arabs' and a superb runner – to commemorate an unusual exploit. His companions had let him down a cliff face by a rope, to collect honey from a cave, when hostile tribesmen attacked and defeated them, and then demanded that he should give himself up as their prisoner. But he kept them talking while he poured forth the honey upon the rock from the mouth of the cave; then he bound upon his breast the skin in which he had stored the honey, and spread himself out upon the slide thus prepared. And he did not cease to slide down thus, kept from slipping by the tenacity of the honey, until he reached the level safe (translated by Lyall, 1885).

The prophet Muhammad, who lived in Mecca and Medina (AD 570-632), mentioned bees and honey in the Koran (Sura 16.68), including the words: 'thy Lord inspired the bee, saying: Choose thou habitations in the hills and in the trees ... it seems likely that the habitations in the hills were in rocks, since trees were mentioned separately. There is a record

7.4. Honey hunting in later centuries

of honey hunting near Jerusalem in the 900s, and in 1540 in Cyprus, when bees were also kept in hives (P. Androudis; Fr. Igoumenidou; see Nikiti, 1966).

Whitcombe (1985) quoted some travellers' reports in Arabia since 1830; several refer to wild honey as a delicacy and a few to honey hunting, which continued after hive beekeeping had started. In northern Hajaz, bordering the Red Sea coast, Wellsted (1838) considered honey to be one of the principal foods of the Bedouins; it was obtained from bees that live in hollows of the rocks'. Honey was also taken by smoking bees from their nests in rock crevices in the deserts of Inner Arabia. A tribe of savage men was reported near Kheybar 'who are very long-lived and of marvellous vigour in their extreme age, as they are nourished of venison and wild honey' (Bodenheimer, 1951). Doughty (1888) referred to wild honey 170 km north of Medina, and Whitcombe (1984a) quoted a 1908 report of beeswax as a hill product in Dhofar District, now in Oman. Even in the 1970s, honey combs were obtained there from nests of native *A. mellifera jemenitica* in steep cliff sides.

Apis florea is present in southern parts of Iran and the eastern part of the Arabian peninsula opposite, and its honey was harvested as described in Sections 10.4 and 19.22.

There are recent descriptions of honey hunting in the Eastern Mediterranean region. In limestone hills in Palestine such as those north of Akko (Acre), many rock crevices and cavities were occupied by bees, and 'not a few desert Bedouins made a living from harvesting and selling their honey' (Buttel-Reepen, 1921). In the Baruk mountain forests of Lebanon, few colonies of honey bees nested in trees, but many in fissures in rocks, most of which were horizontal (Yazbek, 1989). Every year specialist honey collectors went there and harvested honey. They were let down from the top of the rocks by a rope, latterly wearing a metal gauze face mask held in position by the customary headcloth, and socks over the hands. The smoker consisted of glowing charcoal on a flat piece of tin, and the smoke produced was directed by blowing. If the entrance to the nest was too small, the man might enlarge it by using a charge of dynamite. When his bucket was filled with honey combs it was raised to the top by the rope, which left the honey collector without any safety line and, on several occasions, a mass attack by bees from a harvested nest resulted in his falling to death on rocks below: one of the places where the nests were found is named Sannine, 'valley of skulls'. (In Turkey, honey hunters sometimes blasted the rocks, or struck and broke them, to

open the nests, and then used water or smoke to get rid of the bees.)

Section 47.2 describes how Xenophon's soldiers were poisoned near the north coast of Asia Minor in 399 BC, by eating honey – which may have been collected from bees' nests in trees, or possibly hives. In the 1900s honey hunting was still practised throughout Asia Minor (the Asiatic part of Turkey), although traditional beekeeping was well developed. Forests included especially pine, oak and walnut, all of which could provide sites for nests. Bodenheimer (1942), who collected information directly from individual Vilâyets (Districts) in 1937, recorded honey hunting in 70% of them, and had personal knowledge of it in some others. During the season, it was a favourite sport enjoyed by organized parties. In some places colonies were destroyed, but in others – such as Manyas near the north coast – they were preserved. In forests of the southern parts of Edremit, between Izmir and Troy in the west, colonies were smoked through a hole bored in the trunk, level with the nest.

In many parts of Turkey rock cavities provided nest sites – some recorded as 5 or 6 m deep – and in the north, Trabzon (Trebizond) and neighbouring Vilâyets were famed for their 'honeyed' mountains. In Central Anatolia, some of the nests in rocks became so hot during the summer that combs melted and honey trickled down the face of the rock, where villagers collected it. Part of Cappadocia in Central Anatolia is formed of soft volcanic tuff, and this provided many nest cavities to which honey hunters could fairly easily gain access. In various parts of Turkey honey was also harvested by digging out underground nests.

Much less is known about honey hunting in lands south and west of the Mediterranean. In Libya in North Africa, bees nested in rock fissures in the steep sides of wadis 100–200 m high (Saad, 1989), but not in the 'green' mountains above. Strong winds could blow along the wadis, which made it difficult for laden bees to fly up to their nests, and too dangerous for men to climb to them to collect honey.

After Muslim Arabs crossed from North Africa to Spain in 711, and conquered much of it, one of their rulers had four residences. In spring he moves to the city of Mérida because of the abundance of the chase [game], butter and honey' (Monferrer, 1991). But perhaps the honey came from hives.

8.1. Introduction

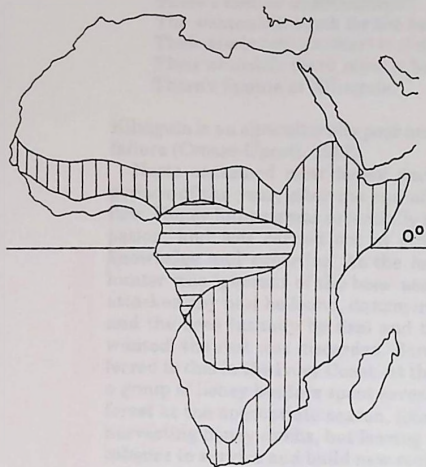


Figure 8.1f Map of tropical Africa showing areas where the greater honeyguide is found (Short, 1989), and where Pygmy peoples live in rain forests (Silcock, 1988).

vertical hatching: greater honeyguide

horizontal hatching: Pygmy people in or near this area

different peoples, and suggest that some groups of hunter-gatherers obtained sufficient food without undue effort (2 hours a day by the Hadza in Tanzania; Woodburn, 1968); they had a happy life on the whole, and old people among them were cared for and respected and might survive to a good age (Barraclough, 1978).

Pygmies in rain forests of equatorial Africa (Figure 8.1f) still follow a hunter-gatherer way of life, and they seem to get more pleasure from the honey hunting season than any other in the year. Ichikawa (1981) recorded the results of 12 days' honey hunting by six Mbuti Pygmies in Zaire. They harvested between 5.5 and 32.5 kg of honey daily, from between 1 and 10 honey bee nests, and on 4 days they also got 5-7 kg from a nest of stingless bees. Their average daily honey harvest was about 19 kg. Ichikawa stressed the social significance of honey hunting. When the honey season began, a large camp split up into small groups. The men in each group hunted together and lived mostly on honey, which constituted 70% by weight of their food during the 12 days of the hunt. Life in the small groups 'helps the settlement of various disputes which normally arise when many people live together' as they do during the season when they hunt animals using nets. Also

in the Zaire rain forest, the Ngandu practised slash-and-burn agriculture and hunted for bees' nests (Takeda, 1990).

In the Wum area of nearby Cameroon only rather primitive honey hunting was known, and the colonies raided were usually destroyed. The honey hunters were often away from home for several days, and returned with as much honey as they could carry (Paterson, 1989).

To many peoples, honey was the most important and exciting part of the harvest, whether from nests of honey bees or stingless bees. To the Ngindo, a Bantu-speaking people in southern Tanzania, honey was more tasty and more sustaining than bush fruits; also, a poor honey season did not necessarily coincide with crop failure. To them, honey could also be a vital subsistence food in times of famine (Crosse-Upcott, 1958). Songs of the San people testify to its similar value in the Kalahari in Botswana. The following verses are quoted from Markowitz (1971).

Hunter's Prayer

I am weak from thirst and hunger.

Abo Itse,* let me live ...

Let me find sweet roots and honey,
let me come upon a pool.

Let me eat and drink. Ho Itse*,
give me that which I must have.

Hunter's Dance

Look! The people carry honey,
also flesh. They bring it home
to the women who are hungry.
that the women may have food.

In Botswana the people noted that bees could also face starvation, and that they reacted to it 'by tearing down sealed honey combs' (Heinz, 1978).

Honey hunters needed to be strong and agile; they were commonly young men and boys, as in Senegal (Gessain & Kinzler, 1975), or young boys, as in Guinea-Bissau (Svensson, 1984). In Lesotho herd boys - usually young - hunted for the few wild colonies that remained (Mahalefele, 1989). But in southern Sudan both young and older men of the Ndogo were honey hunters.

Among most peoples, women might or might not collect honey from nests of stingless bees, but they did not collect it from honey bee nests except in an emergency. Their help was, however, little appreciated by the men, who ridiculed their inexperience:

*Great Father

8. Honey Hunting in Africa South of the Sahara

There's famine in Kilingula,
The womenfolk climb for the bees.
Their *kimbundi* (smoker) is clothing,
Their *ntulakilo* (bark rope) is beads,
There's famine at Kilingula.

Kilingula is an agriculturally poor area, liable to crop failure (Crosse-Upcott, 1956).

Nests contained most honey during one or two periods of the year, after the end of a major honey flow. Honey hunting was essentially a seasonal occupation, and was carried out at different levels of knowledge and expertise. At the lowest level, the hunter was ignorant of the bees' seasonal cycle; he attacked any nest he found, destroying both the nest and the bees (usually by fire) and taking what he wanted; the rest was discarded. Borneck (1976) referred to this in the Ivory Coast. At the highest level, a group of honey hunters spent several weeks in the forest at the appropriate season, locating nests and harvesting honey combs, but leaving enough for the colonies to survive and build new combs for the next season; the Mbuti (Ichikawa, 1981) are one example.

Some peoples collected honey at night (from either nests or hives), using a torch to give light and a smouldering bundle of vegetation producing smoke to drive the bees away and discourage them from stinging the honey collector. I found no records of the use of protective clothing by traditional honey hunters. Some tried to protect the face with their clothing, but often they removed clothes because bees easily became trapped in them; many worked naked, as the Bviri did in southern Sudan (Brown, 1984).

8.2 Preparations, and methods of finding honey bee nests

Various rituals and taboos had to be observed before hunting for honey, and those observed in recent years are probably long-standing. Sexual abstinence was commonly required. For instance, among the Bassari in Senegal, a group of men who were going into the bush on a hunting expedition had to refrain from sexual relations for the previous two or three days. If this taboo was broken the offender had to confess to the others, who decided on his punishment, and he himself could not go on the hunt. Also, it was believed that a husband would be wounded while he was away hunting, if his wife then had sexual relations with another man (Gessain & Kinzler, 1975).

A nest might be found by chance, either when bee activity round its flight entrance was noticed by someone scanning the trees for a monkey or squirrel

to shoot, or when a humming sound was heard, as Anno (1973) described in Ghana. Men who knew the locations of nest sites harvested in earlier years might revisit them in case they had been occupied by a new swarm (for instance in South Africa, Guy, 1972). Reoccupation could occur only if a nest site had been left in a suitable state after the previous harvest. Other things being equal, the reoccupation rate was most likely to be high where there was a scarcity of suitable nest cavities.

Some honey hunters with keen eyesight looked for bees' droppings (faeces) on leaves – for instance the San (Hahn, 1870) and in Madagascar (Fert, 1985). Pager (1972) quoted a German report of a mountain people in the Okombahe Reservation in Namibia who went to the Brandberg each year in the honey-collecting season. By tradition, a honey hunter would observe bees collecting water, as described by Columella (Section 7.5), but when he had established the direction of the flight of the bees as far as the horizon, he would take up the trail following bee droppings, 'here a spot, there a spot', which were barely visible to the unpractised eye. If he was overtaken by night in a place too far from home, he would set up camp and follow the trail again at first light. From the colour of the droppings he could deduce whether the nest was near or far away. Whereas Columella caught bees and marked them with ochre so that they were easier to follow, the San tied a fine thread on them (Guy, 1972). In the evening the bees (even without a tell-tale thread) would 'fly straight to their habitation, and with their keenness of vision a San hunter would be able to detect the direction which the industrious insects took. This they would follow, still watching for returning bees, until at last they came to the spot where the nest was hidden. Should they pass ... it they would soon perceive that the bees were coming from the opposite direction' (in South Africa, Stow, 1905). In the evening, honey hunters looked uphill towards the setting sun, watching for the shimmering wings of flying bees (in Swaziland, Bechtel, 1989). Searches were usually made in early morning or late evening.

A Mbuti in the Ituri forest might find 2 or 3 nests in an hour or two (Ichikawa, 1981), but in dry bush country a Boran could take 9 hours; see Section 8.3. In general, honey hunters did not like to spend many days on a hunt, camping in the bush away from their homes and families. Among the Ndogo people in southern Sudan (Brown, 1984), a group of honey hunters stayed away for 3 or 4 days, travelling 8-10 km. They did not return until each man's containers were full of honey. He carried two, balanced on the two ends of a branch resting on his shoulder, and the

Honey Hunting in Temperate-Zone Europe

9.1 The circumstances of honey hunting

Beekeeping started early in much of Europe north of the Mediterranean countries, but honey hunting continued long afterwards in many areas. So when honey or beeswax is referred to as a material used, traded or bartered, it is not always clear whether it was obtained by hunting nests or from hives.

Apis mellifera is the only species of honey bee native to Europe. The important vegetation belt for honey hunting was that of cool temperate deciduous (broad-leaved) forests shown in Figure 9.1a; it extended from about 35°N to 50°N and some areas farther north. The region is characterized by an annual rainfall of 750-1500 mm fairly evenly distributed through the year, and moderate summer temperatures but cold winters. Deciduous trees shed their leaves before winter, and their buds remain dormant until air temperatures rise again to 6°, so in spring the herb and shrub layers below the trees break bud and flower before the trees come into leaf. Trees, shrubs and herbs all provide forage for honey

bees, and the trees – especially older oaks – provide cavities for nest sites, and a sheltered environment. Wild colonies could not survive the long cold winters in the far north (Section 9.5).

In European deciduous forests, nests have been found especially in the following trees:

alder	<i>Alnus glutinosa</i>	limes	<i>Tilia</i> spp.
ash	<i>Fraxinus excelsa</i>	maples	<i>Acer</i> spp.
beech	<i>Fagus sylvatica</i>	oaks	<i>Quercus robur</i> , <i>Q. petraea</i>
birches	<i>Betula</i> spp.	willows	<i>Salix</i> spp.
elms	<i>Ulmus</i> spp.		

The most important sources of honey were the limes; see Figure 9.1a. At the end of the Neolithic period, around 2000-1000 BC, the climate was mild and supported rich forest vegetation, probably including species listed above and, in more open areas, raspberries, brambles and herbaceous plants that produced nectar and pollen.

Seeley and Morse (1976) examined 21 honey bee nests in trees in a somewhat similar deciduous forest in North America, and their records and others suggest the following. A nest normally grew in size until it filled its cavity, whose capacity was commonly about 40 litres but might be only 20, or up to 100 litres or more. The flight entrance was likely to be at or near the bottom of the cavity, and only a few nests had more than one entrance. Figure 9.1b shows a 'generalized' nest in a tree, and an actual nest (which is unusual in having a sloping entrance through which rain had run into the bottom part of the cavity, not shown). In most deciduous forests, the diameter of trees and their cavities limits the width of a nest to about 30 cm, and thus the number of combs in it to 8 or 9.

Pliny (AD 23-79) was one of several early writers who commented on the large size of combs found in honey bee nests in the northern Europe. In *Naturalis historia* (XI.14.33) he referred to 'a comb ... in Germany that was 8 ft [2.5 m] long' – much longer than the combs shown in Figure 9.1b.

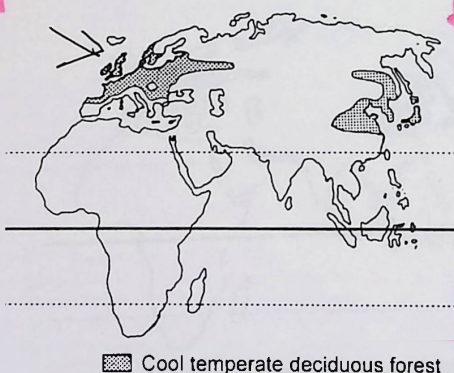


Figure 9.1a Distribution of cool temperate deciduous forests in the Old World (based on Robinson, 1972). Limes, *Tilia* spp., were of major importance in slightly more extended areas (Avetisyan, 1978).

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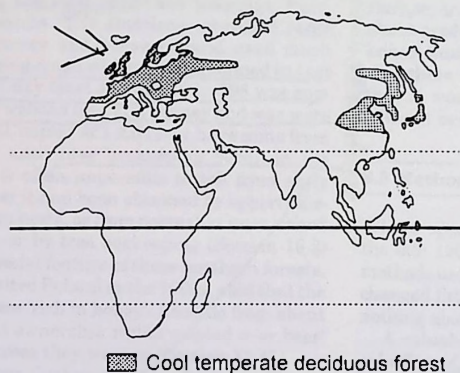


Figure 9.1a Distribution of cool temperate deciduous forests in the Old World (based on Robinson, 1972). Limes, *Tilia* spp., were of major importance in slightly more extended areas (Avetisyan, 1978).

9.2. Early honey hunting in eastern Europe

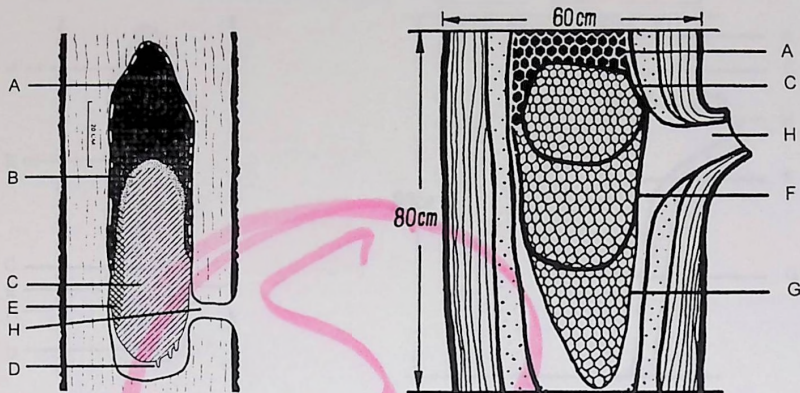


Figure 9.1b Structure of a large honey bee nest (*Apis mellifera*) in a northern deciduous forest tree. left Generalized nest at 42°N in New York State, USA (Seeley & Morse, 1976). right Actual nest at c. 50°N in Germany (Gütschow, 1952).

A stored honey B stored pollen C brood nest
D queen cells E drone comb F bee cluster
G empty comb H flight hole

9.2 Early honey hunting in eastern Europe

Written records survive from mediaeval times onwards, and Dorothy Galton quoted a number in *A thousand years of beekeeping in Russia* (1971). By the 700s-800s some of the place names in Yaroslavl, Ivanov and Gorki regions incorporated the word for honey beer in the local Meryvane language: Pure, Purekh, Pureshka. The Russians produced large amounts of honey and beeswax, and used much honey for making mead which they consumed in vast quantities: a 7-day feast at Vasil'ev in 996 was supplied with 300 wooden tubs of it. Honey and wax were also exported (Chapter 46). All must have come from natural nests until hive beekeeping began in the 1200s, but it is often impossible to tell from early records whether it had been obtained by opportunistic hunting from nests, or from nests that were owned (Section 14.4), or by tree beekeeping (Section 16.2) which was a special feature of these northern forests. Gallus, who visited Poland in the 1000s, said that the woods there were 'rich in honey'. Records from about 1100 show that ownership rights existed over bees' nests and the trees they were in (Section 14.41).

Olaus Magnus Gothus (1556) referred to Pliny's record quoted above and said that: 'even longer ones have been found in the lands of Podolia that are subject to the King of Poland'. Also, 'bees fill very great pits in the dry land with combs brimming with

honey, so that monstrous bears fall into such pits and are suffocated by the quantity of honey they have devoured.' But not all the statements of Olaus Magnus are necessarily believed. Seaton (1985) said of the Ural Cossacks in the 1600s and 1700s: 'most preferred the habits of a half-nomad people, the rearing of cattle, the collection of wild honey ...'.

There are many early records of an abundance of bee forage, honey and wax in other parts of eastern Europe, and some examples in Sections 25.4 and 25.5 about traditional beekeeping may relate instead to honey hunting. Herodotus (c. 425 BC) commented that there were so many bees in the Danube region that it was almost impossible to travel through it without being stung.

9.3 Methods in eastern Europe

Where opportunistic honey hunting continued into the late 1900s, it has been studied in detail, and the methods used are described below. They may well have changed little over the centuries, but we know almost nothing about the chronology of their development.

A valuable source of information is the *Ethnological atlas of Yugoslavia* (1989) which contains maps by Domaćinović relating to bees. Mountain ranges in former Yugoslavia stretch from south of the Hungarian plain as far as Albania and Greece, and like the Carpathians they are a continuing stronghold of traditional practices. Domaćinović identified over a

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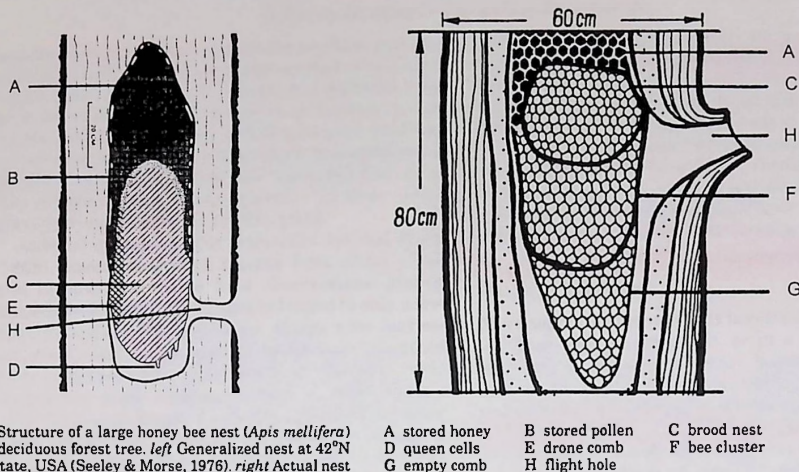


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9. Honey Hunting in Temperate-Zone Europe

hundred localities where nests of honey bees in rocks and cliffs, and below ground, were exploited by honey hunters in recent times. His Map 1.514 differentiates between reaching nests by ropes or ladders, using smoke, and killing the bees with fire. In some localities access was made beforehand to nests underground or in rock cavities. Honey was also harvested from colonies of bees nesting in stone walls – in Sica, in the graveyard wall where the crucifix stood.

Another valuable source is Gunda's detailed study (1968), based on written records from about 1700, and his own extensive field observations. Honey hunters in Hungarian villages belonged to only a few families; among those in Zagra village were four especially famed honey hunters. Skills were passed on from one generation of a family to the next, thus continuing older traditions based on close contact with the environment. The honey hunters were quite open about their methods, in striking contrast to poachers in the same region who worked in great secrecy, with snares and traps.

9.31 Finding nests, including the use of baits and traps for bees

More varied methods of finding bees' nests were used in the forests of eastern Europe (at 46°-48°N) than in the African tropics: some in early spring while snow was lying; others during the early summer burst of flowering; still others at the end of the late summer flowering when most of the honey hunting was done.

When the snow was melting in spring, honey hunters of some Hungarian, Slovak and Russian peoples would walk through the woods, especially any fringes facing south, looking for dead bees or other nest debris on the snow beneath a tree. Honey would be taken straight away from any nest that contained some, because the cold would prevent the bees stinging. In many parts of the Carpathians and also in Latvia, honey hunters looked for fresh tracks made in the snow by a pine marten (*Martes martes*, Mustelidae; Section 5.3). These could lead to a nest, which might be indicated by wood debris on the snow below a tree, where a marten had tried to open up a nest with its teeth and claws. Ukrainians followed bear tracks.

After flowers appeared, a common method for locating nests was to watch the direction in which bees flew away after visiting flowers. In Slovakia, honey hunters walking near flowering goat willow (*Salix caprea*) in early spring would listen for the hum of bees working the catkins. Methods used to track foraging bees back to their nest in the Carpathians were similar to those used farther south (Sections 7.5 and 8.2), except that bees were watched when collect-

ing nectar rather than water. As in Africa, it was easiest to see the flying bees against the sun, and in Europe the sun is low in the sky for a longer part of the day. Honey hunters made an individual bee easier to see by attaching to its body a blade of grass (Ukrainians), or a small piece of paper (Estonians); this also slowed the bees down. Throughout the summer, as a honey hunter walked through the woods he would listen for the humming of bees near their nest, a sound which 'could be heard from a great distance'.

Bee baits and traps

More sophisticated methods involved catching foraging bees with an open bait, or in a bee trap baited with honey. Carpathian honey hunters used a great variety of bee traps; Gunda (1968) published maps showing locations where horn traps were in use from the 1700s, and Figure 9.3a illustrates these and other types, of which H2 – made from an elder tube – was perhaps the most like Columella's in Ancient Rome (Section 7.5). There were still others, including one made from a deer's antler. With a bee trap of the type H1, T1, R1 or S1 in Figure 9.3a, one or more bees taking honey or nectar were captured by closing the movable door within its slot. With one of the type H2 or R2, the aperture was closed with the thumb; a leaf was pressed against the egg-shaped pot T2 to close it. When the closure was in place, the bees inside could see daylight only through a grid or perforated section, and they gathered there. This enabled the operator to release bees one at a time when and where he wished, by opening the door slightly. Box traps were described in Sweden (Section 9.42), but do not seem to have been used by Ukrainians, or by Turkic-Tatar or Volga Finno-Ugrian peoples. In the Lapos valley in Transylvania a spent sunflower head was used as an auxiliary bee bait in late summer. Seeds were removed from the seed cases, which were then filled with honey, and the flower was set up in a forest clearing so that bees taking the honey could be trapped. In general, traps were most effective at this season when bees were searching for food after the end of the nectar flow. During the early 1900s, itinerant Hungarian wax merchants from southern Slovakia came each autumn to Tardona in the Bükk Mountains where they located nests by using horn traps, smoked out the bees and took the combs.

John Geddes's *The English apiary*, published in England in 1721/22, was issued in Hungarian in 1759, 1768 and 1781 together with the translator's own detailed descriptions of honey and bee hunting, including the burning of pressed honey comb to attract bees (see below). Methods of 'lining up' a bee

Alvis talks at dinner non-stop creating the reflex in A.H.

9.3. Methods in eastern Europe

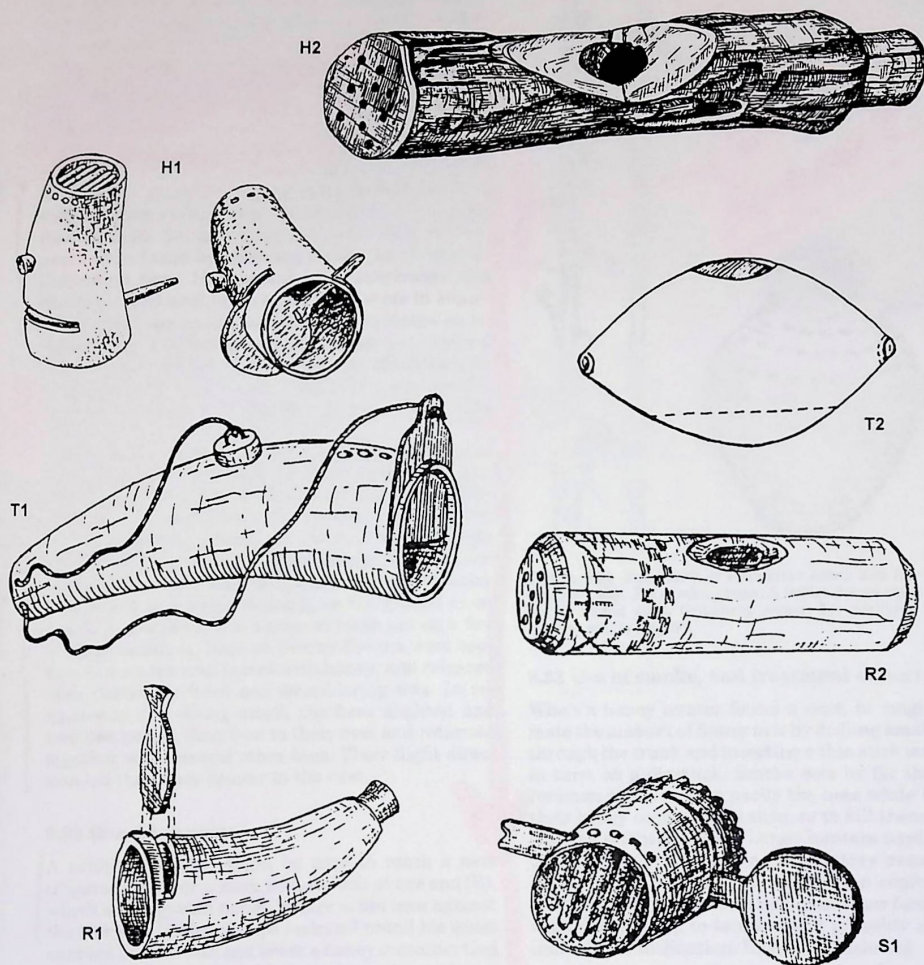


Figure 9.3a Some bee traps used in honey hunting, made of horn unless otherwise stated; not to scale (Gunda, 1968).

Hungarian, used in Hungary:

H1 Domaháza, Bükk Mountains

H2 Pusztafalu, Zemplén Mountains (elder tube)

Hungarian, used in Transylvania now in Romania:

T1 Lővéte, Harghita Mountains

T2 Rév, Bihar region (unglazed pottery, egg-size)

Romanian, used in Transylvania:

R1 Zagra, Radna Mountains

R2 Cristioru de Sus, Bihar region (wooden tube)

Slovak:

S1 Hradec, Upper Nitra region.

9. Honey Hunting in Temperate-Zone Europe

tree from different directions by releasing bees at predetermined points were used in parts of the Carpathians, and Bulgaria, Estonia and Sweden.

our and nest
In a few places in the Carpathians, urine was used as a bait. It probably attracts honey bees by its odour (see Butler, 1954) and it can also be very attractive to stingless bees (Schwarz, 1948). Methods for using a urine bait were described in detail by Hungarian authors in 1740, 1748, 1763, 1782, 1793, and 1795. In autumn, bunches of moss were spread out in a marshy place in the forest and soaked in urine. Bees flew to them 'in large numbers', and their several nests were found by following directions of flight of individual bees. Hungarians in Transylvania and Moldavia gathered large amounts of moss in sunny forest clearings in the summer, and urinated on it. Russians and Poles, as well as Hungarians, 'bathed a bee in ill-smelling human urine' and released it, to locate its nest. Gunda supposed that a bee became dazed by the urine, and so flew slowly enough to be followed.

During the intense flowering of late spring and early summer, a bait had to be very strong to compete successfully for a bee's attention. It was often a combination of hot or burning beeswax comb which attracts bees and – close to it – honey which the bees would collect, remember, and return to. The practice in the Lăpos valley was fairly typical. A bowl of honey was placed in a forest clearing, on the ground or on a pole or platform, and a piece of comb put on a fire of twigs beside it. Bees on nearby flowers were captured in a horn trap baited with honey, and released near the honey bowl and smouldering wax. In response to the strong smell, the bees alighted and imbibed honey, then flew to their nest and returned together with several other bees. Their flight direction led the honey hunter to the nest.

9.32 Reaching nests

A primitive ladder might be used to reach a nest (Figure 9.3b,A) or a stick with a crook at one end (B), which a Hungarian honey hunter could lean against the tree as a ladder. A rope fastened round his waist enabled him to raise and lower a honey container tied to the other end. If working access to the nest was unsafe, he might bind himself to the trunk, or – again in the Lăpos valley – construct a platform of poles before he started work at the nest. This was done mostly in early evening, when diminishing light would discourage bees from flying out. Less frequently, it was done at night.



Figure 9.3b Equipment of Hungarian honey and bee hunters (Gunda, 1968). For climbing trees: A ladder, Lăpos valley, Romania; B forked stick, Ormansag region. For pacifying bees: C smoker, county Nograd.

9.33 Use of smoke, and treatment of nests

When a honey hunter found a nest, he might estimate the amount of honey in it by drilling small holes through the trunk and inserting a thin stick into each in turn, as a dip-stick. Smoke was by far the most common agent used to pacify the bees while they or their honey combs were taken, or to kill them if that was the intention. Some honey hunters used a purpose-made smoker such as the pottery example in Figure 9.3b(C), which may have been copied from smokers used by beekeepers. The smoker fuel varied widely, according to location and probably also the individual's inclination. Examples included:

- *vegetable origin*: tinder, rotten wood (especially from a nut tree); wet straw; dry grass; leaves and twigs; young fir twigs, fir shavings; tobacco
- *animal origin*: cattle dung; dog hair; dry beef fat; 'foot-clout soaked in urine'.

Smoke was also applied more directly. The flight hole was sealed with clay, then the bottom of the

9.3. Methods in eastern Europe

cavity was located by knocking the axe against the trunk to make soundings, and a new hole bored just above it. This hole might be packed with a ball of mud into which shavings had been pressed; when these had been kindled, the hole was sealed on the outside with clay. Or a tube made from a reed was inserted into the bored hole, and tobacco smoke blown through it until the bees became silent (presumed dead), and the hole was then sealed again. After a short time a larger hole was made in the trunk and the combs removed through it. In the Bükk Mountains, the flight hole itself was enlarged to get the combs out.

Alternatively sulphur was sometimes burned in the flight hole to kill the bees sealed up inside the nest, and in some areas a large hole was then cut in the trunk, as above, through which the combs were taken.

The method of harvesting from the nest depended on the time of year, and probably also on the nest's position, the estimated amounts of honey, wax and bees in it, and which of the three was the primary object of the hunting. Gunda's detailed records (1968) give no impression of any sharp distinction between various levels of operation, which extended all the way from opportunistic honey hunting to hive beekeeping. In the list below, H/W = honey/wax, B = bees; i = instant harvest, f = future harvest.

	H/W	B
bees killed and combs taken	i	-
some combs extracted; colony otherwise undisturbed	i, f	-
tree marked, and honey taken later in the season	f	-
combs taken, bees taken alive	i	i
the part of the tree containing the nest cut off, taken home, and used as a hive	f	i

9.34 Bee hunting

In many regions of Hungary and elsewhere, beekeepers obtained extra colonies for hives by keeping a look-out for bees in the forest and locating their nests.

In the Lapos valley, Hungarian honey hunters took both adult bees and honey combs from a natural nest, and left the tree standing. Combs were removed through a door cut in the trunk, after smoking the bees through a hole made near the bottom of the nest cavity (Section 9.33). Then a wedge-shaped hole was cut near the top of the cavity, and an upright wicker or straw skep hung with its mouth just above the hole. Further smoking at the lower hole drove the

bees up and out of the upper one, whence they walked into the dark interior of the skep.

When removing a log containing a natural nest, the following method was practised in summer or winter by Hungarians, Ukrainians, White Russians and some other peoples. The exact location of the nest was determined by blocking up the flight entrance and then testing the trunk in different places by knocking it with an axe, and listening for sounds from the bees. The required part of the trunk was separated off with an axe and saw, and carried home wrapped in a piece of cloth. It was always set upright, the top or bottom being closed off with a board if necessary.

Beekeepers also watched for swarms from hives and collected them, but this seems to have been less important.

9.4 Western Europe

9.41 The general picture

Advances in honey hunting north of the Mediterranean lands seem to have been initiated in eastern Europe and carried westward from there. Levels of expertise in the west probably never attained those in the east. On the other hand hive beekeeping became important and more skilled in the west, and honey hunting declined earlier and left fewer traces. Section 9.5 considers whether or not honey bees were present in peripheral regions of western Europe – the Scandinavian peninsula and the offshore islands of Britain and Ireland – when early man first reached them.

The earliest identified product from a bees' nest in Europe is beeswax in a Neolithic settlement in Bavaria dated to 3700-3340 BC (Section 49.51). Suggestions of honey harvesting from bees' nests during the Bronze Age, perhaps c. 1500-1000 BC, have been made as a result of several finds of a collection of pollen grains from identifiable flowering plants that yield nectar. These pollen grains were usually in or near a vessel that could have held honey or a honey-based drink; see Section 48.33.

Several authors in the 400s-700s stated that in west Germanic areas nests in hollow trees and rock crevices were hunted for their honey, and from the 1300s onwards there are a great many records about tree beekeeping (Section 16.2). It is likely that in the Middle Ages honey was obtained from both natural nests and hives, since hives dated to the first few centuries AD have been excavated.

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Care and Management

If the colony is queenless, the bees will enlarge some of the cells into queen cells.

If that happens, place a small nucleus with a mated queen (see page 34) into the hive. (You should always have such a nucleus in reserve.) The comb with the eggs and the started queen cells must be removed first.

There are two more methods to prevent swarming: forming an artificial swarm and forming a brood nucleus. Since both methods require mated queens, however, I describe them in connection with rearing queens (see the next column) rather than here.

How to Deal with a Swarm

In spite of all the precautions you take, a colony will inevitably swarm now and then (see page 7). Once you have found the swarm—usually it has attached itself to the branch of a nearby tree—and want to determine which hive it has come from, you dust the cluster with some flour. Some of these "white" bees will fly back to their original hive, which you now move to another location.

Wet the swarm on all sides by spraying it with water from a fine nozzle. Be careful: If the swarm is too high to reach from the ground, make sure the ladder you use is on firm footing.

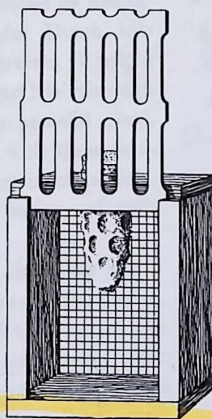
Now hold the swarm-catching box or basket (get the proper kind from a bee supply house)—if it is not raining even a sturdy cardboard box will do—and shake the branch from which the bees are hanging. If the branch is too big to shake, you can dislodge most of the cluster with a brush. Leave the box or basket with the bees in it on a stand or step-ladder underneath the branch from which the cluster was hanging.

By evening all the bees will have moved into the catching container, and you will be able to transfer them into a new hive by giving the box or basket a good shake. With a movable-frame hive, you take out some of the combs, shake the bees in from the

top (see page 22), and then replace the frames. With a leaf hive you work from behind. Attach the tray in back, and move the bees onto it by turning the catching box upside down and whacking it once or twice. The bees will immediately start crawling into the new hive. Then move the hive with the swarm to the spot where the old colony from which the swarm took off was located.

Rearing Queens

When you want to form an artificial swarm (see page 33) or a brood nucleus (see page 34), or if you want to requeen an old colony (see page 34), you need young queens. This is why you should rear some in June and July. You will need a box for an artificial swarm (a wooden box with a slot in the top



Hatching cage with a queen cell in it. One wall of the cage has a grate that can be pulled up. Nurse bees can pass through the slots to feed the hatched queen. The queen is too big, however, and cannot escape. The queen cage can also be used to store a queen temporarily (protective confinement).

* The last time
Also has left swarms & he found it in
the trees

From Pg. order

WV-21

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On the Threshold of the Hive

twelve domes of straw, some of which he
had painted a bright pink, and some a
clear yellow, but most of all a tender
blue; having noticed, long before Sir
John Lubbock's demonstrations, the bees'
fondness for this colour.

These hives stood against the wall of
the house, in the angle formed by one of
those pleasant and graceful Dutch kit-
chens whose earthenware dresser, all bright
with copper and tin, reflected itself through
the open door on to the peaceful canal.
And the water, burdened with these fami-
liar images beneath its curtain of poplars,
led one's eyes to a calm horizon of mills
and of meadows.

Here, as in all places, the hives lent a
new meaning to the flowers and the silence,
the balm of the air and the rays of the
sun. One seemed to have drawn very
near to the festive spirit of nature. One
was content to rest at this radiant cross-

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like
your
eyes
Adi!
Angela

Klara's sense

It's not a real
spring who bees.
Her first spring
to them

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VV-6

A Short Introduction to Bees

very well, the more workers a colony has, the more honey there will be to harvest. In order to reproduce (see below), however, the bees must also build brood cells for drones and queen cells.

Drone cells are used not only for rearing male bees but also for the storage of honey. A queen cell, which is $\frac{3}{4}$ -1 $\frac{1}{4}$ inches long (20-30 mm) and is shaped like a peanut or a short, blunt, icicle (see photo on page 5), is built for the exclusive purpose of rearing a new queen. After being used once as a brood cell it is demolished by the bees and carried out of the hive. Brood cells for worker bees and drones, on the other hand, are reused a number of times for raising worker and drone brood.

Reproduction

A queen lays both fertilized eggs, which develop into workers or queens, and unfertilized ones, which turn into drones. After three days, the larvae emerge from the eggs and lie curled up in their cells (see photo on page 38). Young worker bees develop brood-food glands whose secretions (brood food) are fed to the young larvae. To produce food for the larvae, the hive bees need water, which the field workers carry back to the hive in their honey stomachs and pass on to the nurse bees.

Larvae destined to become workers and drones are fed brood food only for $3\frac{1}{2}$ days; after that they get a mixture of honey and pollen (see page 8). The future queen bees, however, keep getting fed secretions from the nurse bees' brood-food glands, which is why this food is called royal jelly.

The organization of the brood nest within the hive follows a pattern that makes it easy for the nurse bees to work efficiently. The queen does not fill every last cell of the comb with eggs but leaves 1 or 2 inches of empty cells at the top for the storage of honey and pollen. This way the supplies for feeding the brood are handy and the nurse bees don't have to waste much time running back and forth. When the larvae are 5 days old they start straighten-

ing out, and the nurse bees cap their cells with a wax cover. The larvae turn into nymphs, which pupate and finally develop into complete insects. The development from egg to worker bee takes 21 days. A queen takes only 16 or 17 days to develop, and drones emerge 23 or 24 days after they start life as an egg.

A crucial factor in the development of the brood is a constant temperature of 95°F (35°C) in the brood nest. Bees are heterothermic, which means that they can regulate their body temperature. If it becomes cooler outside, the bees raise the temperature inside the hive by eating more honey and converting the energy of the extra carbohydrates into increased body temperature. If the outside temperature is too warm, the bees fan the warmer air out of the hive through the entrance by rapidly beating their wings (ventilation).

A worker bee starts cleaning cells as soon as she has hatched. Her next task is to feed honey and pollen to the older larvae for a few days. She then feeds brood food to young larvae (see photo on page 38). By this time her brood-food glands, which started developing on the third day, are fully functional. Next she is assigned to relieving the field bees of their nectar, and she also cleans the hive builds honeycomb, and guards the entrance to the hive. From day 20 until her death (at about 40 days she is a field worker, collecting nectar and pollen (See the chart Development and Tasks of a Worker Bee on page 12).

Ordinarily the various tasks a worker bee performs are determined by her age, but it is also possible for a field worker to take over nursing duties if there is a shortage of young hive bees. In this case her brood-food glands, which usually atrophy in field workers that have finished their nursing duties, are reactivated.

When all the cells in the hive are filled with brood and honey or pollen and there is no more comb area for the queen to lay her eggs, the worker bees suspend producing brood food. This triggers the impulse to swarm. When the bees start building queen cells, the beekeeper must initiate measures to

Queen can't lay eggs
→ the reason of royal jelly

May '96

→ EE-1 Return of Alo. see note at foot of page
Main devoted to preventing swarming.

LE-25 - pollen baskets.
Swarming possibility - Infed larvae
124 see in a tight cage

EE-10 precedence if not
already done

→ EE* Alo Jr's doubts about bee-keeping
M-1A

E-43 Alo takes a lesson from [A] on

Queen mounting
H-203 the frenetic activity of bees
during a few hot days

→ J-31 (Mar) Alo Jr. scolded in evening
of Alo Jr.

M-1A
M-4

E-25 a honey drawing (contest)
Angela & Alo Jr. & Adi all water.

E-31 Advanced course in dealing
w/ swarming.

E-37 Clara taking bee-keeping class

M-1
M-3

A-5 Alo Jr. humming & singing
with the different
sounds of the bees.

Remembers [A]'s words in October

→ LE-22 Alo Jr. leaves a hint in the room,
I thought you said we had
to keep them warm.

M-1A, M-4

F-23

→ Alo Jr. prepares a swarm calendar
in May

K-2ka - fear of swarming

EE-1

5/96

What Needs to Be Done in May

By early May the colony has reached its full strength; 80% of the combs in the brood nest are filled with brood. The bees are at the height of their activity, and they are likely to want to swarm. It's your job to try to prevent the swarming impulse from arising or, if it does arise, to keep the bees from acting on it.

- Open up the honey chamber (see page 26).
- If the building frame in a leaf hive shows no sign yet of queen cells being constructed or queens being reared, you can shrink the colony (see page 29).

• As soon as workers start building queen cells, you must try to prevent swarming either by relocating the colony (see page 30) or by creating a nucleus with a queen (see page 30).

• If the bees swarm in spite of all your efforts, you must try to catch the swarm as quickly as possible (see page 31).

• If the bees have stored a lot of pollen, you may be able to remove a few combs filled with pollen and store them until fall, when they can be given back to the bees to build up their condition for winter.

- Check the hive's weight every week.
- Make appropriate entries on the record cards.

Swarm danger

Play
for girls

Bee dance
class
also
dearly *

Seasonal
height of
activity

Bee

Bee
dance

26
29
30
31

Also in returns
Also, in women over
also in + Angela
Also in broken egg
on Ad's hand.
First be string

④ He wishes he had time
to teach the young
figure out the dance.

Feeding in Little Sifts

LE - lower voltage

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Care and Management

5/96

• A spur embedder is a small, movable cogwheel with grooved teeth (see drawing on page 21). Lay a sheet of foundation on the small wooden board, and then place a wired frame on top of the foundation. Heat the embedding tool over a small flame, and then run it along the wire in the frame. The heat of the tool warms the wire, which melts the wax of the foundation and becomes embedded in it.

• If you have more than ten colonies, it makes sense to invest in a small electric transformer (about \$50). With this device you can use low-voltage electricity to fasten the foundation. For this procedure you place the wired frame on the wooden board and the foundation on top of the frame. Then, touch the two ends of the electric cable to the heads of the tacks so that the electric circuit is closed. The wire and the wax on top of it are warmed by the current, and the foundation's own weight causes it to combine with the wire. When the wire cools, frame and foundation are securely connected. The entire process takes no more than a few seconds.

combs partially occupied by bees, and about two-thirds of the cells capped. This is the equivalent of approximately 20–25 pounds (10–12 kg) of food. If there are fewer-filled combs, you can take out empty combs close to the brood nest and replace them with filled ones that you remove from a colony that has a plentiful store of food.

You can also give the bees a boost by feeding them Candy for Bees, Hard Candy for Winter (or "sugar boards," as thin slabs of this prepared material are usually called), or sugar syrup. Once you have established how much food the bees need, you give them the appropriate amount (for amounts and feeders, see pages 40–42).

Feeding bees in the spring also has another purpose, namely, to stimulate brood rearing. For this purpose, however, bee candy or sugar syrup alone is not enough. The bees also need pollen. This is why you should offer your bees a pollen substitute (brewer's yeast or soy flour) in the spring in a pollen feeder ("birdhouse" feeder). Set up the pollen feeder in a sunny spot near the hives, making sure that the distance between the feeding surface and the roof of the feeder is at least 8–10 inches (20–25 cm). The bees need room to hover while they are packing the food into their pollen baskets (see page 8).

Insulating Hives and Spring Feeding

also working hard in May '96

During spells of cold weather it is especially hard for the bees to maintain an even brood temperature of 95°F (35°C). Think of it this way: The more heat the bees must generate themselves, the shorter their life span. This is why you should wrap the hives with thick cloth and cover them with a tarpaulin. You should also angle a board 4–8 inches (10–20 cm) wide from the entrance to the ground. This ramp makes it easier for the bees to make their way back into the hive when it rains.

When it is cold and rainy, bees cannot go out foraging. Thus it can happen that there is not enough food for the brood. To prevent this most dire situation, observe the following rule of thumb: In the spring, there should be at least four or five filled combs in the outer frames of every hive, the

It is important not to start a feeding intended to stimulate brood rearing too early. Wait until after the gooseberry bushes flower. Otherwise the bees build too large a brood nest and will not be able to maintain the necessary temperature during cold weather. If the brood nest becomes too cool, the brood dies, and the overworked bees become susceptible to sickness and may die prematurely.

wonder for Alon

Cutting Out the Building Frame

A strong colony begins to occupy the building frame in April (see page 47). Some building bees attach themselves to the upper frame bar and form a cluster there. These bees proceed to "sweat" the

E-26

5/96

Care and Management

wax (see page 5), with which they build combs. They usually start in several spots all at once, building heart-shaped sections of comb that are later connected into one seamless comb. While the days lengthen (see drawing on page 44), that is, until the summer solstice, bees build primarily drone cells, since drones must be raised in time for a virgin queen's nuptial flight in June or July (see page 7). When the building activity in the building frame lets up and the worker bees start shaping queen cells, the bees may be getting ready to swarm. The building frame thus serves as a kind of mood indicator of the colony. Every time the frame has filled, you should cut out the comb (run a sharp knife along the inside of the frame) so that the bees can start building combs again and you can again assess their mood.

Place combs you have cut out in the garden for a few days. Birds like to pick the grubs out of them. The wax can be melted in a solar wax heater (see drawing on page 41) and bartered in exchange for foundation, or you can keep the wax yourself and perhaps make beeswax candles out of it in the winter.

Methods to Prevent Swarming

Since bees intent on swarming (usually as early as March in the Southern states, and in July in the far north) lose interest in collecting nectar and raising brood and some of the honey harvest is lost if a colony swarms, you will want to try to suppress the swarming impulse or prevent the bees from taking off. The measures that need to be taken for this purpose are some of the most important activities of a beekeeper interested in obtaining maximum honey production.

Colony Expansion

As soon as a colony has filled all the cells in the brood chamber and if there is still room in the hive body, the bees must be given more space. To ac-

complish this, hang a frame with foundation (see page 24) or an empty comb next to the brood nest. From June on you can also hang these expansion frames directly into the brood nest. Keep adding frames until the brood chamber is full. When you add foundation, you should each time move the combs with the oldest brood to the outer edge of the brood nest. Then, when the brood has hatched, the combs can be filled with honey and, at the end of the honey season, they can be cut out (see disease prevention, page 57).

Opening up the Honey Chamber or Adding Supers

In May—in warmer regions as early as April—you should examine each colony carefully and check to see how healthy it is, whether the brood nest is well filled, and if there are any signs of disease (see page 57). In a normally developed colony, a good three-fourths of the combs are filled with brood by early May (or earlier in warmer climates), with the bees hanging below the combs in a cluster. This is the time to open up the honey chamber.

If you are working with a movable-frame hive, the following items should be ready: an empty super, a queen excluder (see drawing on page 16), a queen cage (a small cage made of wood or synthetic material; see drawings on pages 31 and 32), a queen-catching glass (see drawing on page 32), one or two frames with foundation (see page 24), and eight or nine frames with empty combs.

Above: An apiary with leaf hives. The small nucleus boxes (on the right, next to the regular hives) are used for rearing queens.

Below: A temporary hive stand that can be disassembled for transport. The entrances to the hives are marked in different colors to help returning bees find their own colony.

EE-1* May 96

~~Alto Jr~~
~~These are the main points - Jan 96~~

Until 1850 about 80% of the population was occupied in agriculture and life was dominated by social rules based on religion and traditions. Any catastrophe was a sign by God, who punished an individual or the society. A balanced relation between population size and the locally available resources was important and marriage was impossible without an appropriate economic base. A high proportion of woman did not marry at all and the age of marriage was high. The local resources were mainly agricultural land and fuel wood. Warm summers favored the food production, while water was a limiting factor in very few dry Alpine regions. A more equal distribution of population guaranteed that the energy base built up on local available fuel wood was never exceeded. After 1850 an "agricultural revolution" started by implementing potatoes to traditional grains, putting cattle into stables even in summer and gaining fertilizer, doing drainage and melioration by seeding nitrogen fixing clover. The food production base was considerably altered and population could increase and even multiply. During 1780 and 1850 the Alpine population could more than double. This agricultural productivity increase was not a one of technical innovation, because working inputs remained stable in relation to the output. Local forests were the main source of energy. But their productivity could not cope with the increase of productivity in food production. Instead there was a serious danger of deforestation. However, a new innovation, the railway, made it possible to import external energy in form of fuels and the Alpine forests had not to undergo the same process of deforestation like many mountainous areas along the Southern European coasts did in the centuries before. The decades between 1850 and 2000 brought a continuation of the intensification of agricultural production. But not all land was suited for this. In comparison to lowlands mechanization in mountain areas was less successful and is based on small scale machinery. Despite the increases in agricultural yields, food production is no longer the main concern. Agriculture gives comparatively poor income. In the last century tourism developed rapidly and replaced the leading economic role of agriculture. Alpine farmers have an important role in environmental management which is economically most valuable. Cultural landscape provides a main resource for tourism.

Agriculture

Almost all farms of Austria are private owned (98,5%). The number of farms, workers and cultivated land was more or less stable during 1930 and 1951. In times of economic crises between the two world wars there was even a slight increase, because there were no jobs available outside of agriculture. The period during the second world war is not documented. After this period the one of exponential growth started with a very typical development of agriculture, which is known from most other industrialized countries. In general the structure of Alpine agriculture is a small scaled one.

~~Dec 96~~

5/96 Discussion between Alto Jr who is ambulatory about what to do with the farm & Alto's relatives with his bees.

Move to 7/96 after use

E-33

late May

5/96

Care and Management

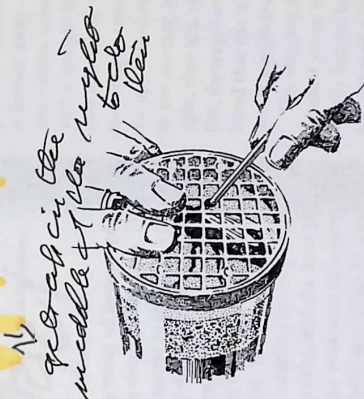
If you practice marking drones, which do not sting and are somewhat larger than bees, you will soon get good enough at it to hold a queen between your fingers for the marking procedure. The colors of the disks conform to international norms and always follow the same order:

1986	1987	1988	1989	1990	1991...
white	yellow	red	green	blue	white...

equal amounts of sugar and water, e.g., 1 quart of water to 2 pounds of sugar). Place the syrup in a glass jar, cover it with a piece of linen, and set it upside down on the bunghole of the box. The linen keeps the sugar solution from dripping into the box but allows the bees to suck it through the cloth.

Clipping a Queen's Wings

As soon as the queens have mated, you should cut back one wing with sharp nail scissors to about half to a third of its original length. This is especially important if you cannot check your bees frequently. This way, if a colony swarms, the queen can fly only a few yards and will then drop to the ground, where a handful of bees will stay and protect her. The rest of the swarm returns home without the queen, and you will be able to find the queen with her attendants even days later. If she is marked, preferably with a numbered disk, you will know which colony she came from.



Device for marking queens. Use the foam rubber plunger to push the queen carefully up to the grate of the device. Push her close enough that she can no longer move. Then dab a little glue on her thorax, and stick a disk with the year's color onto the glue.

Introducing a Queen into an Artificial Swarm

Creating an artificial swarm is also a good method of preventing swarming when the woods are not producing honeydew (see page 9).

What you need for this is a box for an artificial swarm, that is, a box with a lid to which a hatching cage with a queen inside it is attached. Pour about 15,000 bees (3 pounds) from brood and honeycombs with plenty of workers on them—but no queen—into the funnel of the box. The bees will cluster inside the box.

Place the box into the cellar, and feed the bees. You can give them a pint of sugar syrup (mixing

After two days you transfer the artificial swarm into a new hive. Replace the plug of the hatching cage with one of bee candy. Use a piece of Apifonda about the size of a pigeon egg, or make your own bee candy by mixing one part honey with three parts powdered sugar. Then hang the queen cage between two combs. The bees will eat the candy, thus releasing the queen.

If there is no honey flow, the artificial swarm must be fed a pint of sugar syrup (composed as described above) every two or three days or 2 pounds of bee candy per week (see page 41).

F.R.
in
1941

Preparing
for
Russian
Summer
'41 ✓

A-2A

H-203

May
1961

1896

Also
A-2A

When your lunch is good, you must
go with it and go with it and
go with it. SEVENTY-TWO go with it.



5/96

202 • WILLIAM LONGGOLD

wax. If young bees can't produce wax fast enough, the colony takes comb from elsewhere, usually the unused outer frames, leaving huge holes that may or may not be repaired later, or they may chew up foundation to resolve the immediate crisis. Bees always have their priorities in order.

A honeyflow may last a day, several days, a week, or longer, depending on the nature of the blooming plant and on the weather. Here, bees take the pessimistic view, assuming that such prosperity can't last and they must make hay, or honey, while the sun shines. In this way they are philosophers, recognizing that good fortune is not to be trifled with but must be savored to the fullest while it lasts.

Bees, in their passionate pursuit of honey, led scientists to pose a question that baffled them: How is it that the honeybee is able to find nectar in the field, return to her hive, and direct other bees to share her discovery? By what extraordinary power of communication are they able to accomplish this feat? The answer was long in coming, but the mystery finally yielded to two forces: the invention of the observation hive with its glass walls, enabling investigators to watch bees go about their normal pursuits, and the keen perception of Karl von Frisch, a German professor of zoology, who translated the language of the bees into what he called dances, winning for himself in the process the Nobel Prize.

For years it was known that bees had a method of communication, but it was not understood until von Frisch discovered that forager scouts report their finds to the colony through a series of movements which send others scurrying to collect the

Norseta 1941 after
user

1940? D.T. on dancing

THE QUEEN MUST DIE • 203

treasure. This is considered one of the most astonishing achievements in all of nature, speaking an intelligence independent of instinct. The information conveyed in the dances is so precise that foragers are able to fly directly to the food source by the shortest route, even if it involves a detour, as if they had a road map.

The food dances have the same intensity and form as the swarm dances previously described, but are somewhat different. Basically there are two movements. The first, called the round dance, consists of the scout running in a circle over the comb; this lasts about a minute, signifying that nectar is nearby, within a hundred yards of the hive, and foragers have only to look for it. The dancer could be saying, "You can't miss it!"

The second, known as the tail-wagging dance, is more complicated, the directions more involved, because the food source is farther away. Here we have not a single round circle, but two narrow semicircles, as if the two orbs were pushed together with a straight line connecting them in the middle. The dancer runs in a narrow semicircle, suddenly stops, and continues down the straight center line to the starting point; she then runs in the opposite direction (something like following a figure eight) to the starting point. This may continue several times, first right, then left, right, left. As the dancer heads down the straight line, she wags her abdomen, or tail, rapidly. Researchers recently found that the wagging movement is accompanied by a sound but its significance is not known.

The wagging dance signifies the presence of nectar from one hundred yards away up to the two-mile range in which bees usually forage; beyond this distance there are no known dances and the explorer is on her own, such flights involving considerable risk. The most remarkable aspect of the wagging dance is that it tells the bees how far they must go and the direction to travel; the dancer uses the sun as a reference point, traveling straight up the comb if the nectar lies in the direction of the sun, to right or left if it is to be found there.

X
see
the
book
at
Nora
dancing

4 xeroxes

J

attached
to his expression 31

5/96

2/96

195 Also bees like people and
Audi. I will never be weak.

On the Threshold of the Hive

or cold, but of loneliness. From the crowd, from the city, she derives an invisible aliment that is as necessary to her as honey. This craving will help to explain the spirit of the laws of the hive. For in them the individual is nothing, her existence conditional only, and herself, for one indifferent moment, a winged organ of the race. Her whole life is an entire sacrifice to the manifold, everlasting being whereof she forms part. It is strange to note that it was not always so. We find even to-day, among the melliferous hymenoptera, all the stages of progressive civilisation of our own domestic bee. At the bottom of the scale we find her working alone, in wretchedness, often not seeing her offspring (the Prosopis, the Colletes, etc.); sometimes living in the midst of the limited family that she produces annually (as in the case of the humble-bee). Then she

31A

31B

city people
after the
it wages
to eat at his
we - I don't

5/96

Also in
Audi.Yes, like
the bees
we
cannot
be alone.
We go
to the
bees.
210

31C

* (also) I make a super
Bartlett
two hours
195 keeping
the bees
until it dies

E 25

5/96

Spring of '96

On the Threshold of the Hive

which produces a pain so characteristic that one knows not wherewith to compare it; a kind of destroying dryness, a flame of the desert rushing over the wounded limb as though these daughters of the sun had distilled a dazzling poison from their father's angry rays, in order more effectively to defend the treasure they gather from his beneficent hours.

It is true that were some one who neither knows nor respects the customs and character of the bee suddenly to fling open the hive, it would turn at once into a burning bush of heroism and anger; but the slight amount of skill needed to handle it with impunity can be most readily acquired. Let but a little smoke be deftly applied, much coolness and gentleness be shown, and our well-armed workers will suffer themselves to be despoiled without dreaming of drawing their sting. It is not the fact, as some

19 Spring '95 '96

95
also
tall-
tall

very thin
also
tall-
tall

96

also 95
mistaken
also h.

also h. to tall.
He's the one to talk of
gentleness.

XIII
E-37

1896

5/96

J-XIII

8. We have been married for eleven years. No need to call me uncle.
(conceives Paula that night) *Date? 1895*

late?
23. 1896 (or 97) Paula born. Five children in house. Tensions with Alois, Jr. and fight. Tough for Adolf afterward : Alois Sr: "I have wasted time and sacrifice on the older son. That had better not be you."

24. p56a Alois Jr.'s future told by DT also p.48a & p. 74 ?

25. Adolf's room—see Goebbel's account ? NM: no indication of where that account is located—i.e., which file?)

26. p.74. Early Years—Alois ^{Jr.} jeers at his father

32. Hafeld. Alois's experience at farming is 44 years in the past. {ck}
Alois Jr. comments on this.

35. The discovery that his land is not good comes in the months after buying the farm and contributes to Alois Jr. and Sr's fights. It eats at Alois that he, as a peasant, got taken. (One of his strengths with younger officers was that he came from peasant stock and he knew when people were cheating him.) They from middle-class backgrounds knew best

18. p31a Fight. Alois Jr.

Bee stings
Alois Jr. Leaves Hafeld after fight about bee keeping. After the fight, Alois Jr is disinherited and Adolf is near paralyzed by the extent of his father's fury. Alois half enjoys bee stings—klara taking them out—feels like the nearset he's ever been to having a mother. Sees it as a cure for arthritis. Note: The fight with Alois, Jr. : part of it is his tormenting Adolf because Klara always takes his side.

36. Bee stings p. 33A. A note on incest and guilt in Alois.

37.

are the Cudgels around?

I hope
that you
are doing
so far as
your
health is
concerned
that you
will be
able to
be a
spirit

III
Practical
LE-22

Bee Hives, Equipment, and Colonies

LE
for now

If you are clever with tools you can also build a pollen feeder (similar to a small birdhouse) and the worktable for a leaf hive (see drawing on page 20) yourself.

Clothing

Overalls made of a light, white material have proven useful protective clothing for working with bees. To keep the bees from crawling inside the clothes, the suit is equipped with a zipper in front, and the cuffs of the sleeves and pants have elastic bands in the seams. Don't wear dark or woolen clothes; dark colors and wool seem to irritate bees.

To protect your face, head, and hands from being stung wear light-colored gloves and a beekeeper's hat with a veil. Once you feel more comfortable handling bees you can dispense with the gloves, but there is no need to test your courage as a beginner.

Always wear gloves

Choosing the Right Race

I recommend starting out with the Italian *Apis mellifera ligustica*, America's most popular race. My favorite, the carniolan or Austrian bees, *Apis mellifera carnica* (see photo on page 55) are the latter, which are characterized by gray bands on the abdomen but are very similar to the Italian bee, offer a number of advantages:

- They are so gentle that you will be able to work with them soon without wearing gloves.
- They remain on the combs without becoming excited when you work with the hive. This is a particularly useful trait when you are looking for the queen. More excitable bees may retreat to the hive walls or some dark corners soon as you remove a comb.
- Carniolan bees brood quickly, and the colonies therefore grow rapidly.
- Through selective breeding, this race has been

adapted well to existing conditions, such as the size of the hives and the location.

The Right Time to Get Started

The best time to buy bees or take over colonies in their hives is in spring. With this timing you will be able to harvest some honey the first year. Colonies with or without queens (see pages 30 and 34) and swarms (see page 7), that is, bees without hives, can be bought in June or July. If you attend beekeepers' meetings, you can ask around about who is selling new or established colonies, or you can consult beekeepers' magazines.

Transporting the Bees

It doesn't matter whether a novice starts with an established colony, a colony with a queen or a swarm. There are a few rules that must be observed, however, both in transporting bees and in getting them established in their new location. The best time to move bees is in evening. Bees with bees in them must never be left in the full sun. It is essential that the bees get enough oxygen because they panic if the oxygen gets low. In their agitation they use up more oxygen, which in turn excites them more, and gradually the temperature in the hive begins to rise. If it reaches 140°F (60°C), the wax begins to melt, the combs collapse, and the colony perishes.

So if you plan to move a colony in its hive, make sure to replace the inner insulating lid with a ventilation grid (see drawing on page 16). An even better way is to use hives with transport floors, that is, bottom boards with rims about 5 inches (10 cm) apart and with fine wire screening on two opposite sides. During travel, the bees can leave their combs and hang in clusters from the bottom bars of the frames where they get plenty of fresh air through the screening.

May/96

Always wear gloves
a thin in the sun.

Also decide to work
in the woods.

~~6/20~~
~~6/26~~ 5/96
 F-23

7/96

9/96
9/96

Bee Hives, Equipment, and Colonies

The frames inside the hive body should be held together securely with a belt for the trip. The belt is removed when the hive is set up in its new location.

If you transport bees in leaf hives, remove the heating pads and secure the windows of the brood chamber and the honey chamber with small nails or with window locks mounted on the window frame. In many leaf hives, the door at the back has a screen panel that can be covered with a wooden flap (see drawing on page 20). Open this flap for the trip. You should also push up the small wooden board that is attached to the window of the brood chamber so that the bees can escape through a slot into the space between the window and the door, where they can hang in a cluster.

If you buy a colony or a nucleus minus the hive, the bees come on combs that must be—and this is an important point—on frames that fit your hive. If the combs are not the right size for your hive body, they must be trimmed to fit.

A swarm is transported in a swarm catcher, which is simply an oblong box with fine screening on at least two sides so that the bees get plenty of air.

Setting Up a Colony

Colonies and nuclei in hives are set up immediately after they arrive in the location intended for them. The entrances are opened and the screen sections of the bottom boards closed off with solid sections. If you use a leaf hive, the heating pad is turned on once the bees have settled on the combs again.

If you have caught a swarm, let it rest for an hour or two in the swarm catcher in a cool, shady place (a cellar, for instance) before transferring it to the hive. This is best done in the evening. On the cover of the swarm catcher there is usually a piece of burlap from which a cluster of bees will be hanging. Pick up the cover with the cluster, hold it over the open hive or the tray of a leaf hive, and give it a good whack or two. The bees will drop into the hive or onto the tray and immediately move onto the combs. Then you take the swarm-catching box, which still contains bees, turn it upside down over the hive and give it a whack too so that the remaining bees will join the rest of the swarm.

*Alois has helped them -
 The birds watch*

*July or August
 full bran*

*prepares out
 in May*

K-25a 96
~~K-25a 96~~

5/96

9/96

8/95

9/95

Care and Management

wax (see page 5), with which they build combs. They usually start in several spots all at once, building heart-shaped sections of comb that are later connected into one seamless comb. While the days lengthen (see drawing on page 44), that is, until the summer solstice, bees build primarily drone cells, since drones must be raised in time for a virgin queen's nuptial flight in June or July (see page 7). When the building activity in the building frame lets up and the worker bees start shaping queen cells, the bees may be getting ready to swarm. The building frame thus serves as a kind of mood indicator of the colony. Every time the frame has filled, you should cut out the comb (run a sharp knife along the inside of the frame) so that the bees can start building combs again and you can again assess their mood.

Place combs you have cut out in the garden for a few days. Birds like to pick the grubs out of them. The wax can be melted in a solar wax heater (see drawing on page 41) and bartered in exchange for foundation, or you can keep the wax yourself and perhaps make beeswax candles out of it in the winter.

Methods to Prevent Swarming

Since bees intent on swarming (usually as early as March in the Southern states, and in July in the far north) lose interest in collecting nectar and raising brood and some of the honey harvest is lost if a colony swarms, you will want to try to suppress the swarming impulse or prevent the bees from taking off. The measures that need to be taken for this purpose are some of the most important activities of a beekeeper interested in obtaining maximum honey production.

Colony Expansion

As soon as a colony has filled all the cells in the brood chamber and if there is still room in the hive body, the bees must be given more space. To ac-

complish this, hang a frame with foundation (see page 24) or an empty comb next to the brood nest. From June on you can also hang these expansion frames directly into the brood nest. Keep adding frames until the brood chamber is full. When you add foundation, you should each time move the combs with the oldest brood to the outer edge of the brood nest. Then, when the brood has hatched, the combs can be filled with honey and, at the end of the honey season, they can be cut out (see disease prevention, page 57).

Opening up the Honey Chamber or Adding Supers

In May—in warmer regions as early as April—you should examine each colony carefully and check to see how healthy it is, whether the brood nest is well filled, and if there are any signs of disease (see page 57). In a normally developed colony, a good three-fourths of the combs are filled with brood by early May (or earlier in warmer climates), with the bees hanging below the combs in a cluster. This is the time to open up the honey chamber.

If you are working with a movable frame hive, the following items should be ready: an empty super, a queen excluder (see drawing on page 16), a queen cage (a small cage made of wood or synthetic material; see drawings on pages 31 and 32), a queen-catching glass (see drawing on page 32), one or two frames with foundation (see page 24), and eight or nine frames with empty combs.

Above: An apiary with leaf hives. The small nucleus boxes (on the right, next to the regular hives) are used for rearing queens.

Below: A temporary hive stand that can be disassembled for transport. The entrances to the hives are marked in different colors to help returning bees find their own colony.

June 96

F-1 Election of honey extraction
& barling ~~June 2~~

A-16 Adli's steady heart & patience & quality
quite - severely sleep

F-35 F-1 in morning. Relevant to F-1,

F-36 Preface to F-1 (Full treatment
here)

F-83 Sound of rejoicing
In AHC's description to Adli?

WL 106 → visit by Adli.

→ helpfulness of queen

WL 87 → sweet

F-58 was from honey

WL 70 visit to [A] ~~honey~~ perseverance

F-32 Marking the queen?

A-6 spirit of summer

~~July 96~~

~~June 1~~

F-1

6/96

What Needs to Be Done in June

June brings the summer solstice, and the strength of the colony peaks during this month. The brood nest starts to get smaller because the queen is laying fewer eggs. There is still a danger of swarming, however.

The forests—both evergreens and deciduous trees—begin to produce honeydew from early to mid-June. The honeydew flow comes primarily from firs and spruces, but often other trees, such as oaks, maples, and pines, also produce honeydew (see page 9).

You can tell that the honeydew has started flowing when you see small, shiny droplets on the leaves of the underbrush. While the honeydew lasts, colonies can gain as much as 4 or 5 pounds (2 kg) per day (measured in a scale colony).

diary

9.
35?
31.
32
33
26

• In areas with early honey flow you may be able to harvest your first honey in early June (see page 35). If the flow continues to be strong, you may be able to extract honey again two or three weeks later. Where the honey flow is late, the first harvest can be expected at the end of June.

• June is the best month for rearing new queens (see page 31). As soon as the queens have mated, they should be marked (see page 32) and their wings clipped (see page 33).

• Continue to take measures to prevent swarming

great excitement in the family and in the colony.
*

to prevent swarming!

(see page 26). If you are rearing queens, creating an artificial swarm or making a brood nucleus are good ways to forestall swarming.

- Check the colony's weight daily.
- Make appropriate entries in the record cards.

June 2

Also in will afternoon

June 2

* Adi runs around giving sticky kisses

purposefully kissing Angela on her hair

to show her how much he loves her (because she kissed him last week)

First of the season
the queen is laying
eggs and the colony
is growing again
the queen is laying
eggs and the colony
is growing again

he smells good

GA 6/96

Also in ^{calendar} to prevent swarming

lowering
crown

10/99 A

1A-167

Care and Management

If you have a leaf hive, you will need one or two frames with foundation and eight or nine with empty combs, a queen cage, and a queen-catching glass.

While you usually work in the hive, you should blow a little smoke into it now and then to calm the bees (see page 34).

The steps described in the following paragraphs are the same for both a movable-frame hive and a leaf hive.

To make sure that the queen does not get lost or hurt in the process of shifting frames, she should temporarily be isolated for her own protection. Search systematically through the combs to find her. When you have spotted her, invert the bulging end of the queen-catching glass over her. She will then start crawling up the glass tube. Remove the plug from the queen cage, set the bulging end of the queen-catcher over the opening, and blow the queen into the cage, which you then close again with the plug. Experienced beekeepers remove the queen by hand, grasping her wings carefully with two fingers and guiding her into the cage.

Attach the queen cage with some wire to a brood comb from the brood chamber so that it is clearly visible, and return the comb to the brood chamber. Then move two or three other brood combs from the brood chamber into the super (in a movable-frame hive) or into the honey chamber (in a leaf hive).

If you fail to locate the queen, you must brush the bees off the combs that will be moved into the super or the honey chamber. Use a soft broom or a large goose feather, and hold the comb over the brood chamber of a movable-frame hive or the tray of a leaf hive.

Above, left: Removing honeycombs from a movable-comb hive. To calm the bees, a puff of smoke is aimed at them. Right: Lifting the wax covers off the honey cells with an uncapping fork.

Below, left: An extractor with the top opened. Right: The honey flows from the extractor's cock through a double strainer into the honey bucket.

Add one or two frames with foundation and a frame of empty comb next to the combs in the brood chamber. When the brood chamber is again filled with frames, you can release the queen into it. Then lay the queen excluder on top of the hive body housing the brood chamber and put the super with seven or eight frames of empty comb on top of the excluder. This super is now ready to be filled with honey.

If you have a leaf hive, set the empty combs you have gotten ready into the honey chamber, reinstall the windows of the honey chamber and of the brood chamber (the latter with the building frame), and replace the heating pad. Since they now have plenty of space for storing honey again, the bees can go on with their work and the danger of swarming is, for the time being, averted.

Shrinking the Colony

A colony's population increases rapidly in the summer, with 1000-2000 new bees hatching every day. Since congestion is a major factor in swarming, you must take steps to prevent overcrowding. When you examine your colonies, remove one or two sealed brood combs with the bees on them (but without the queen) and replace them with empty combs or with foundation. The brood combs can be added to a weaker but healthy colony, or you can use them to form nuclei (see page 34).

This way you relieve the colony of about 5000-10,000 bees and give the remaining workers enough space to keep brooding activities going. You can repeat this procedure after one or two weeks, but don't remove bees more than three times. This method is about 80% effective in preventing swarming. It only works, however, if it is applied before the bees have started nursing brood in queen cells; that is, before the larvae are being lavishly fed with royal jelly.

As soon as you discover queen cells either in the building frame of a leaf hive or along the edges of the combs in movable-frame hives, you must take swarm-preventive steps by relocating the colony

P-35

6/96

Care and Management

to leave about $\frac{1}{4}$ – $\frac{1}{8}$ inches (6–8 mm) between the screen and the comb. In the piece of comb underneath the screen about two-thirds of the bees should have hatched but no new eggs should have been laid in the empty cells. Some cells must also be filled with honey. The bees that hatch from the remaining larvae will soon look after the new queen, which can then start laying eggs. The bees will chew a hole through the wax comb through which they and the queen can pass. Wait at least 10 days before you check to see if the bees have accepted the queen and if there are eggs and young brood. If there are no eggs or new brood, test to see if the queen is still present (see page 34). This method of requeening is not as reliable as requeening bees that have been left queenless for nine days.

Controlled Breeding and Artificial Insemination

Controlled breeding and artificial insemination are basically of interest only to apiarists who have years of experience and are working on a large scale, but I mention these procedures at least briefly because they are of crucial importance in keeping certain races and strains of bees purebred.

To achieve controlled breeding, bee breeders set up special breeding sites. In a wind-protected location, a clearing in the woods, for instance, a few colonies of drones are set up and fed. Within a radius of 4 miles or so (6–7 km) only bees of the same race are kept. Breeders bring their queens in mating boxes attended by some worker bees.

Artificial insemination is done under the microscope with an instrument that is especially designed for this purpose.

Harvesting Honey

Where the honey flow comes early, the beekeeper can expect to harvest the first honey in early

June. In areas where the flow comes later, honey is ready for harvest two to four weeks later.

late June, early July

Removing the Honey

The best time to remove the honey from the hive is the late morning. Place next to the hive an empty hive body (for a movable-frame hive) or (for a leaf hive) a transport box that can be closed and some cloths or boards for covering exposed honeycombs. Then remove from the hive the combs that are completely or partially capped. Sweep the bees that are on the combs into the open hive or, in a leaf hive, onto the tray in back so that they can return immediately to their colony.

The job is easier if you can get the bees out of the honey chamber through a bee escape (an opening through which bees can move in only one direction). Close off the honey chamber from the brood chamber with a separator board. When the bees find themselves queenless, they seek a way to return to their queen. A bee escape in the separator board allows them to rejoin her but prevents them from getting back into the honey chamber. In two or three hours all the bees will have vacated the honey chamber. Of course, all the brood that was in the combs when you moved them into the honey chamber (see page 26) must have hatched by the time you want to remove the honey or the scheme will not work. This method is not only less arduous for you than sweeping the bees off the combs, but it is also easier on the bees.

If two-thirds of a honeycomb is sealed, it can be placed directly into the transport box that you have made ready. If you leave honeycombs standing around uncovered, foraging bees of the area will be attracted. Particularly at a time without honey flow, bees from other colonies—having learned of this free food source by their scouts—can quickly appear and cause fights around the honeycombs. This not only interferes with your work and upsets the colonies, but it can also be a serious nuisance for nearby neighbors because the bees start looking for food at all the windows, both open and closed.

Klaus' complaint

35 *Along gets stung in one of those fights. First honey day*

Care and Management

If the combs you take out of the honey chamber are only partially capped, you must test the consistency of the honey that is not yet sealed. Take a comb and either hold on to the sides of the frame with both hands, shaking it up and down vigorously, or hold the comb with one hand and knock against the frame with your other hand. If honey comes spurting out of the cells that are still unsealed, the comb must be returned to the honey chamber and you must wait a few days before you extract the honey.

First
honey
cup

Extracting the Honey

The centrifugal extraction of honey is done in a room that can be kept free of bees. In addition to the extractor you need an uncapping tray, an uncapping fork, a double honey strainer, and a honey bucket.

Wear a clean, preferably white coat and head-gear when you extract honey, and don't smoke. Honey is a food of high quality. It should go without saying that no pets are permitted in the extracting room.

First you remove the wax caps of the honey cells over the uncapping tray with the aid of the uncapping fork (see photo on page 28). Once both sides of the comb are uncapped, you place the comb into the basket of the extractor. Check to make sure that the lower edge of the comb always points toward the center of the extractor.

A honeycomb that has sealed honey cells on both sides may contain as much as 4 or 5 pounds of honey and is quite heavy. To prevent the breaking of combs, you should start the extractor basket moving slowly. The extractor can be powered by hand or by electricity. When some of the honey has been extracted, turn the combs around and extract honey from the other side. Start slowly again, and increase the speed of rotation after a few minutes. Keep spinning the combs until no more honey flows from them, and then turn them around once more and spin the other side (the one you started with) empty. This time you can start spinning fast right away.

The honey is pulled out of the cells by centrif-

gal force and spun against the walls of the extractor. It runs down the walls and collects on the conical bottom of the extractor and then flows through a cock into a double strainer. This strainer consists of two steel sieves, one coarse and the other fine. Wax particles and foreign objects are blocked, and the pure honey collects in the honey bucket.

To get rid of the last bits of wax and other small foreign items, the honey should be filtered through a cloth filter (fine cheesecloth, available from bee supply firms) while still liquid, that is, right after having been extracted.

Then let the honey settle for a day or two at room temperature. Tiny air bubbles gradually rise to the surface, where they, along with some remaining wax particles that were not filtered out, form a layer of foam that should be skimmed off with a spoon or, even better, a spatula.

Depending on its composition and the plants from which the nectar was collected, honey crystallizes slowly or more quickly. For the crystallization to be uniform, the honey should be stirred but without mixing air into it. If the honey is not stirred, the crystals that form are uneven in size. This does not affect the quality of the honey in any way, but it changes its appearance and also can cause it to become rock hard. Honey generally crystallizes from the bottom up and from the walls toward the center.

As soon as the honey starts to look opaque—because millions of tiny crystals are forming—you should stir it carefully for about five minutes once a day for several days. Use a three-sided stirrer made of beech or oak wood (about 2 inches in

(Klara)

Above: Passing on food. The scent and the taste of the food source are absorbed by the receiving bee, and the round or wag-tail dance provides further information concerning the location of the food source.

Below, left: Field bee with pollen pellets in the baskets of her hind legs. Right: Fanning bee. The fanning regulates the temperature inside the hive and also spreads the colony's characteristic scent to all the inmates.

the best aspect w. Klara

Q83

F-83 early 6/96

transition - early to middle

6/96

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A-3

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~~7/96~~

June 96

83DA
TA

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not have to build
a bee-hive.

The Swarm

pathetic welcome. They will flock eagerly round her; excited groups will climb over each other in their anxiety to draw near; as she passes among them they will caress her with the long antennae that contain so many organs as yet unexplained; they will present her with honey, and escort her tumultuously back to the royal chamber. And order at once is restored, work resumed, from the central comb of the brood-cells to the furthest annex where the surplus honey is stored; the foragers go forth, in long black files, to return, in less than three minutes sometimes, laden with nectar and pollen; streets are swept, parasites and marauders killed or expelled; and the hive soon resounds with the gentle, monotonous cadence of the strange hymn of rejoicing, which is, it would seem, the hymn of the royal presence.

Calli-asker.

recontact '95

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83DA

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ber of the colony, size being equated with power, and it probably says more about those who made the error than it does about the bees.

The ancients, not understanding the queen's role, had some odd notions about bees and their origins. The *ABC and XYZ of Bee Culture*, an invaluable reference book published by the A. I. Root Company, and known as "the Bible of Beekeepers," states that it was not until 1609 that an English beekeeper named Butler affirmed that the "Kingbee" was really a queen, because he had seen her deposit eggs.

Before that, the ancient Greeks believed that bees came from dead oxen and could be raised by killing an ox and leaving it in a sealed room for thirty-two days; the belief persisted for hundreds of years, and directions for producing bees in this way were published as late as 1842, the last time they appeared.

The *ABC and XYZ of Bee Culture* states that Virgil wrote that bees collected their embryos from leaves and sweet plants. The Greek historian Xenophon compared the work of the queen with that of a housewife and considered her the guiding brain of the hive. The Dutchman Swammerdam thought that queens were fertilized by a seminal exhalation of "odoriferous effluvia" produced from a large number of drones. The Roman scholar Varo thought that diarrhea in bees could be cured by giving them urine to drink and that bees gathered wax from flowers. Pliny the Elder wrote that echoes kill bees. It was widely believed that the sound of clashing symbols causes bees to swarm, a long-disproven idea that still persists.

Aristotle was the first to study bees scientifically. He was the first to drop the notion that bees come from dead oxen, and gradually scholars better understood the nature of bees and the queen's true role in the hive.

The queen is more servant to the hive than sovereign with little, if any, control over her life or destiny, living at the convenience and tolerance of the colony. She cannot perform the simplest survival tasks for herself, even depending on her worker

Loves the thought
of the queen bee

A

daughters to make possible the conditions that enable her to lay eggs. Because she will not sting any bee except another queen, she is virtually defenseless against those who control her with their hive machinations and the threat of their lethal prison or death chamber.

If the queen were smarter, she would probably be hopelessly neurotic. As is, she is shy and skittish, possibly because she never leaves the hive but spends her days confined in darkness, a kind of eternal night, perpetually in labor, experiencing no life other than that which she generates in her own body. When the hive is opened, suddenly dissolving the darkness with blinding sunlight, she is likely to take to her heels, hiding in far corners and making it difficult to find or identify her, risking death or injury as the frames are manipulated.

Her position in the hive is ambiguous at best. Despite her own dependency and perilous position, the colony is dependent upon her for its existence. She is indispensable and yet subject to being killed in panic or by whim, or replaced in what amounts to star chamber proceedings against her. Any figurative crown she wears must rest uneasily on her head. Her true role is less that of queen than mother of the hive, a title often accorded her. And yet, this is something of a mockery because of her lack of maternal instincts or the ability to care for her young. She is, more than anything else, an automated egg-laying machine, a derogatory but descriptive name she must bear.

In appearance, she is a striking insect, larger than her daughters, more slender and longer; if of Italian extraction, she has a tawny, golden hue with the characteristic black bands of her race. She has a regal air and is properly named queen for that alone. With exquisitely tapered wings folded back over her elongated body, she is the picture of insect grace as she glides from cell to cell depositing eggs in mindless dedication to her life's work.

Nature, always expeditious in matters of reproduction, has

Also. She puts us to shame.

Wm 106

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to buck raindrops almost as large as she is, fly against strong headwinds, and carry loads of nectar equal to her own weight. Her wings are stubby, but beat so rapidly that she is able to fly an estimated fifteen to twenty-five miles per hour. The double set of wings hook together in flight, providing power; when not flying they lie flat on the back, making it possible for her to crawl into the small cells of the hive to care for eggs and larvae. For her weight and size, a honeybee is said to fly faster and farther than any other winged creature. She is the opposite of her cousin, the cumbersome bumblebee who, according to aeronautical flight criteria, has been proved incapable of flight:

I like the joke on the bumblebee;
His wings are too small to hold him.
He really can't fly, professors agree
But nobody ever told him.

—Anon.

A honeybee's wings, as noted previously, beat 160 to 220 times per minute, according to the authoritative United States Department of Agriculture 1952 Yearbook, *Insects*, producing the note G sharp below middle C. The publication states that insect wings vary from 350 strokes a second (21,000 per minute) to as few as 6 per minute for the yellow swallowtail butterflies, which seem to float as much as they fly.

The bumblebee manages about 130 beats per minute (D above middle C); June bugs, 46 (F sharp, three octaves below middle C); dragonflies, 20 (E, four octaves below middle C); and the cabbage butterfly, another garden predator, 12, producing a sound inaudible to human ears. A housefly's wings beat only 190 times a minute (G flat below middle C), but with such vigor that she can travel up to 50 miles per hour. A fly's speed and agility are her primary means of defense, while a bee's power enables her to fly long distances with heavy loads of honey, which seems fair enough.

These 2 pages for her talk
(also in a book to her friends)

The third segment of a bee's body is her abdomen, separated from the thorax by a narrow waist. In a bee's abdomen are her honey sac, stomach, and intestines. Many believe that a bee's honey sac and her real stomach are one and the same; the crude and uninformed have called honey "bee vomit," but this is a libel. The honey sac lies directly on top of the stomach proper, separated by a shut-off valve so there is no mixing of the contents of the two. If a bee needs a quick pickup in flight, she has only to open the valve and let a bit of nectar or honey trickle into her stomach. When nectar is regurgitated from the honey sac, it contains enzymes that give honey its unique properties.

At the base of the abdomen, like a tiny tail, is the stinger, which will be dealt with later. On the abdomen are also the wax glands, previously referred to. Recent research has revealed that in the abdomen are cells containing iron, with nerves leading to these cells; they are believed to act as a navigational aid, enabling bees to sense the earth's magnetic field. If verified, this could help explain how bees return unerringly to their hives from distant fields. It has long been known that bees use the earth's magnetic field to sense direction, but it was not understood how it was done. It could also, possibly, yield insights into how birds, butterflies, turtles, and other migrating creatures and wanderers navigate over long distances.

A bee does not breathe like a person, taking in oxygen through the lungs, the blood transporting it throughout the body; rather, bees have tiny openings, like open portholes, along the length of the thorax and abdomen, and attached air-conducting ducts convey oxygen to nearly every nerve. Since hemoglobin is not needed to carry oxygen, a bee's blood is not red. This arrangement is satisfactory enough for most purposes, but nature obviously didn't count on insecticides. When poisons enter the breathing holes bees die of suffocation or destruction of the central nervous system; millions of bees, even whole apiaries, are wiped out every year by great toxic storms, particularly

D.T. I will not make any claims to future condensation but in this case I will.

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P-58
6/96

The Life of the Bee

6/96

[15]

But the hive that we have selected is disturbed in its history by no interference of man; and as the beautiful day advances with radiant and tranquil steps beneath the trees, its ardour, still bathed in dew, makes the appointed hour seem laggard. Over the whole surface of the golden corridors that divide the parallel walls the workers are busily making preparation for the journey. And each one will first of all burden herself with provision of honey sufficient for five or six days. From this honey that they bear within them they will distil, by a chemical process still unexplained, the wax required for the immediate construction of buildings. They will provide themselves also with a certain amount of propolis, a kind of resin with which they will seal all the crevices in the new dwelling, strengthen weak places, varnish the

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WILLIAM LONGGOOD

specks of dust. It would take a single bee six hundred hours to collect one teaspoonful of the tiny grains, according to those who calculate such things. One industrious bee usually requires only about a half-hour to gather as much pollen as she can carry in flight. In adverse weather she may have to visit a hundred or more flowers and take up to two hours to collect a full load, rarely will she return to the hive with her baskets less than full.

The task may be made more difficult because flowers can be temperamental and open only at certain hours of the day, remaining open for varying lengths of time; some demand the right weather conditions before they will produce pollen and make it available, a problem in receptivity encountered by other species in their sexual adventures. Some plants adjust their flowering period to the emergence of the insects that pollinate them.

The honeybee, sexually disfranchised herself, is one of nature's primary pollinating agents, along with rainfall, gravity, the winds, birds, and other insects, as well as mammals, including humans. Bees pollinate about 80 percent of all plants, some one hundred thousand species of plants in all, making the bees invaluable in agriculture. Because of their size, compared to most other insects, bees are especially useful in transferring grains of pollen that are too heavy to be borne on the wind. They are the principal pollinators of plants bearing flowers with colors. A bee's normal visual color range is blue, yellow, green, and ultraviolet. Beekeepers often paint their hives these colors to help homecoming bees identify them. In addition to colors, bees recognize certain flowers by the number of petals and their arrangement.

The honeybee's role in fertilizing plants is inadvertent. As she makes her rounds gathering nectar, scurrying from flower to flower, grains of pollen dust cling to tiny hairs on her body and antennae and are transferred from male to female organ in one of the symbiotic economies in nature: the bee is drawn to

6/96

96

THE QUEEN MUST DIE • 71

the blossom by its seductive fragrance, color, and secretions, and while gathering nectar or pollen for her own sustenance and the reproduction of her kind she makes possible the host plant's survival.

The marvel is not only what takes place but the efficiency and grace with which it is accomplished, almost like a ballet movement. On a bee's upper hindlegs are small hollows ringed by stiff bristle-like hairs; these are aptly named pollen baskets and, as their name suggests, are used for the collection of pollen. While tripping among the flowers, a worker gathers grains of pollen with her mouthparts; simultaneously she adroitly removes pollen which adheres to her antennae with tiny spines, for just that purpose, on her front legs.

In a single effortless motion, while in flight, her mouthparts and all six legs work in unison. She chews pollen grains to dampen them, using forelegs and middle legs to relay the moist ball to her baskets. The compacted pollen resembles small loaves of colored bread, and indeed pollen mixed with honey is known as "bee bread."

Bees generally gather pollen from only one kind of flower at a time, which was long assumed to be nature's way of trying to prevent the cross-pollination of plants and preserve integrity among species. Thus, pollen brought into the hive is usually pure in context and uniform in color, although the same flower may produce pollen of more than one shade.

How nature imposed her will on bees so they tend to collect a single variety of pollen we do not know. But alas for the assumption! More recent research has revealed that bees bring in mixed pollen more often than was formerly believed; in fact, up to 40 percent of the pollen samples brought into a hive under study were variegated. Bumblebees are even less constant than honeybees in sticking to one kind of blossom, and it seems reasonable to assume that other insects and pollinators are at least equally faithless and indifferent to the integrity of plants in serving their own needs and convenience.

6/96
F-32

Care and Management

7/96

into which a funnel is inserted), an empty frame modified with three slats running lengthwise along the center to create a long chamber, and one hatching cage (see drawing on page 31) per queen. You also need a "one-comb mating box,"—a small box made of Styrofoam or wood.

The sealed queen cells are placed in the hatching cages—one per cage—two to three days before the queens are due to emerge (the development period from egg to adult insect is 18 days). Dribble a small emergency ration of honey into the small hollow in the bottom of the cage that is designed for this purpose. Now place the hatching cages in a row in the long chamber of the modified empty frame and place the frame in the honey chamber.

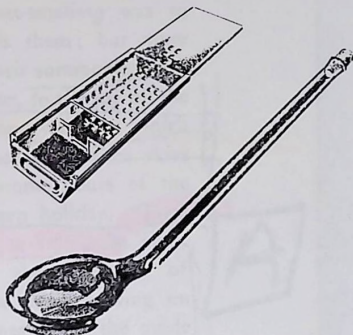
Once the queens have hatched, sweep about as many young bees as will fit into a 1-pound honey jar from fully occupied combs (taken from one or more colonies) into the funnel of the box for the artificial swarm. You must do this slowly so that the older bees have a chance to fly off.

Then take a honey jar full of bees from the box for the artificial swarm and pour them into a mating box. Do this for as many boxes as you are going to use. Then close the lids and the entrances of the mating boxes. After about an hour you can let the queens enter through the entrance holes. Place the mating boxes into a cool, dark, but well-ventilated room (a cellar) for two days. Then, in the evening, move the mating boxes outdoors and open the entrances. Within the next two weeks the young queens will mate and prepare to start laying eggs. They are now ready for use.

If you have a Kirchhainer mating box you can use it over again after two or three days, placing new queen cells or virgin queens in it. This saves you and the bees time. The "one-comb boxes" can be used only once.

Marking the Queen

To make it easier to find a queen and to check her age, queens are marked with five different colors



Queen cage used for mailing and to introduce queen into nucleus (above). Before the queen, is introduced into the hive or nucleus, the perforated section on the narrow side of the cage is broken out. The queen, along with a few bees from her colony, is placed in the larger compartment, and the smaller compartment is filled with bee candy. This way queens can be mailed in regular envelopes. The cages are thin enough to fit between the combs in the hive. A queen-catching glass (below). The bulging end of the glass tube is inverted over the queen on the comb. As soon as the queen has moved into the tube, close off the open end with a foam rubber plug. If the queen is to be isolated, rest the tube on the open queen cage, remove the foam plug, and blow the queen gently into the cage.

* The queen staggers from this and breathes (one for each successive year) as soon as they have mated. You can buy marking sets including all the accessories (tiny, colored, plastic disks, also available numbered from 1 to 99, and glue) from bee supply firms.

As a new beekeeper you should employ a marking tube (available for about \$3 or \$4) to label your queen. Place the queen in this tube, and carefully push her with a movable plunger against the wide mesh at the end of the tube. Dab a tiny drop of glue onto her thorax through a hole in the mesh. Then pick up a colored plastic disk with the moistened end of a matchstick and lightly press it against the queen's thorax (see drawing on page 33).

26

~~10/95~~

~~7/95~~

A-6

Early in visit

6/96

The Life of the Bee

most to hold back their leaves, as a man holds his breath before something very tender but very grave. The bees give their honey and sweet-smelling wax to the man who attends them; but more precious gift still is their summoning him to the gladness of June, to the joy of the beautiful months; for events in which bees take part happen only when skies are pure, at the winsome hours of the year when flowers keep holiday. They are the soul of the summer, the clock whose dial records the moments of plenty; they are the untiring wing on which delicate perfumes float; the guide of the quivering light-ray, the song of the slumberous, languid air; and their flight is the token, the sure and melodious note, of all the myriad fragile joys that are born in the heat and dwell in the sunshine. They teach us to tune our ear to the softest, most intimate whisper of these

72

"They are the soul
of the summer."

"Yes, I know, I
read that in
some place."

~~"It is from the book
Of course."~~

gunlight is
golden and so
are the ~~best~~
Italian beer.

Altois & they are the
spirit of summer
& Do, rather I would
say: "they are the
soul of summer."

Even on the warmest days,
not all of the sweetest spirit
of summer is lost for there
is the spirit of the summer
the soul that vibrates in the sunbaked
place, offensively, luxuriantly,
(it is sweet in diggins potatoes

Alibi: yes but not
He is clean and in good
Alibi but feels up & down

July 26

A-15 length of swarming is only
Also in quibbling, etc.
see note #

~~A-16 spec for starting lower aged~~

~~E** Post fixit - Klara sign Jan left~~
late July, maybe move to August.

F-39. A hard month. Being concerned
at lack of increase of honey

July 31

GFN Summer annoyance. ~~at least~~ ^{at least} is rest

G-31 Swarming (complicated)
only possible in

P48
Swarming
late in visit
Warning in Oct. '95
G1-7/96

6/96

10/95

A-15

Swarm of bees

Also is
Chlorophyll
with
bees

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Also in
is quite
driving
like crazy.
Moss keeps
a wound,
a shogun
& sells
the ~~bees~~
to pay for it,
a profit

What Needs to Be Done in July

After the summer solstice the bees enter their declining phase (see drawing on page 45). By the middle of July the danger of swarming is past. Colonies that have a young, healthy queen drive away the drones (see page 7). From mid-July on you can expect firs (*Abies alba*) to start producing honeydew.

- Continue measures to prevent swarming until the middle of July (see page 26).
- Rear a late crop of queens.
- If necessary, get ready to requeen colonies during the second half of July (see page 34).
- Where the honey flow is late, you may be able to take a second honey harvest in mid to late July.
- If nature doesn't offer enough food, you may have to resort to interim feeding (see page 39).
- Make sure the bees get enough pollen (see page 40), especially if they forage in the forest; put back the combs full of pollen that you removed in the spring.
- Take precautions against robbing (see page 40).
- Check over the combs; rearrange the brood nest and remove unneeded combs (see page 40); store light colored combs in your comb storage cabinet.
- Cut out dark combs and combs with drone cells; melt them down, or exchange them for comb foundation (see page 41).
- Check the weight of the scale colony daily.
- Enter appropriate data on record cards.

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Agriculture

~~Dec + Jan 75~~

~~5/96 Discussion between Colo Jr who
is ambitious about what Colo
wants the farm & also returns
with him here.~~

Mold to 7/96 after use.

F-39

7/96

Care and Management

diameter and 3 feet long: see drawing on page 21). To provide a good grip, the upper third of the stirrer should be rounded.

If you have several buckets of honey to stir, you can use an electric drill equipped with an adapter (available from bee supply firms) and a honey stirrer made of metal. The adapter allows you to gear down the drill's speed to the much slower speed required for stirring honey.

Forest honey and honey from evergreen trees don't start crystallizing until much later, often not for months or even years after harvest. These kinds of honey therefore don't need to be stirred.

Klan

Honey for the Bees' Use and Interim Feeding

Packaging and Storing Honey

You can package honey for sale in large buckets or assorted retail-sized glass, tin, or plastic jars. For consumer-size packages (under 4 pounds or 1 gallon), the label should include the beekeeper's name, the declaration of net quantity of contents in ounces (with identification of weight of fluid measure), followed by the weight in pounds if the contents exceed 1 pound or 1 pint, and the beekeeper's control number.

If the honey has crystallized during storage, it must be liquefied before packaging. Heat the honey, but not above 104°F (40°C) because the quality of the honey suffers if it is overheated. You can melt the honey either in a thermostat-controlled heating cabinet (homemade or available for about \$200 to \$300 from beekeepers' supply firms) or with an electric immersion heater, also equipped

with a thermostat (cost about \$300). The immersion heater can be placed directly on the solidified honey. Since jars and buckets are usually of uniform weight, you need to weigh only one jar and enter the tare in the scale before you fill and weigh all the jars of that size.

The packaged honey should be stored in a cool, dry room at about 60°F (15°C) until it is sold (see Different Kinds of Honey, page 52).

July is often a hard month for bees. In areas with early honey flow the food sources tend to become sparser at this time, and in areas with late honey flow the honeydew (see page 9) from fir and spruce doesn't start flowing until mid-July at the earliest.

If the bees cannot find more food than they need for their immediate use, no honey is stored in the honeycombs, but the queen keeps laying and the colony stays healthy. When you weigh your hives, check to see if there is sufficient food. The hives will show neither a gain nor a loss of weight if the bees gather just what they need to survive.

Habitat

If there is no natural food supply (loss of weight!), you must start interim feeding. Before you do, however, you must remove or close off the supers or honey chambers because:

- Supers or honey chambers are not needed since nature is no longer supplying food.
- Some of the substitute food you offer may be stored in the honey chambers and adulterate the honey that may yet be produced.
- If the hoped-for late honey flow fails to materialize—because of inclement weather—the fall brood nest can be started right now.

Until the honey starts flowing again, give each colony half a pint of sugar water (one part sugar to one part water) every other day or 2–4 pounds of bee candy every two weeks.

Above, left: Bee larvae, about four days old, surrounded by fluid food. Right: A nine-day-old, fully developed larva being fed by a nurse bee.

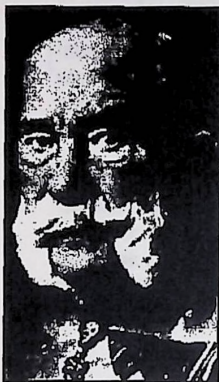
Below, left: A fully developed worker bee is hatching after 21 days. She is chewing through the cell cap and crawling out of her cell. Right: A queen hatching. On her left front leg one can clearly see the hooks that she will later use to hang onto the cell edges when she lowers her abdomen into the cells to lay eggs.

He sells it thru his neighbor, feels cheated.

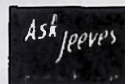
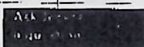
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Franz Josef

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Franz Josef was born in 1830. At the age of eighteen he became Hapsburg Emperor and in 1867, ruler of Austria-Hungary. Over the next few years his army subdued revolts in Hungary and Lombardy. **Franz Josef** suffered several personal tragedies. His brother **Maximilian** was shot by revolutionaries in Mexico and his only son, **Rudolf**, committed suicide in **1889**. Nine years later, his wife, **Elizabeth of Bavaria**, was assassinated by an anarchist in Geneva.

After the death of Crown Prince **Rudolf**, the succession passed to **Franz Josef's** brother, **Carl Ludwig**. When he died in **1896**, his son, **Archduke Franz Ferdinand** became heir to the throne. This created a problem as **Franz**

<http://www.spartacus.schoolnet.co.uk/FWWjosef.htm>

*Birth of
 Carl Ludwig
 died*

*May 19, 1896
 Vienna
 3/31/04*

Ferdinand wanted to marry Sophie Chotek von Chotkova. Although Sophie came from a noble Bohemian family, she was not considered suitable to marry the heir to the throne. To be an eligible partner for a member of the Austro-Hungarian royal family, you had to be descended from the House of Hapsburg or from one of the ruling dynasties of Europe.

Franz Ferdinand insisted he would not marry anyone else. Emperor Wilhelm II of Germany, Tsar Nicholas II of Russia and Pope Leo XIII all made representations to the emperor on Franz Ferdinand's behalf arguing that the disagreement was undermining the stability of the monarchy.

In 1899 the emperor agreed a deal with Franz Ferdinand. He was allowed to marry Sophie but stipulated that her "descendants are not members of the most high Archhouse and possess no right to succeed to the Throne." Sophie was not allowed to accompany her husband in the royal carriage nor could she sit by his side in the royal box. Franz Josef and all of his family, marked their disapproval by refusing to attend the wedding.

On 28th June, 1914, his heir, Archduke Franz Ferdinand, was assassinated in Sarajevo. Josef accepted the advice given by his foreign minister, Leopold von Berchtold, that Austria-Hungary should declare war on Serbia. On the outbreak of the First World War, Josef allowed the military to take over the running of the country. Franz Josef died on 21st November 1916 and was succeeded by his great-nephew Karl I.

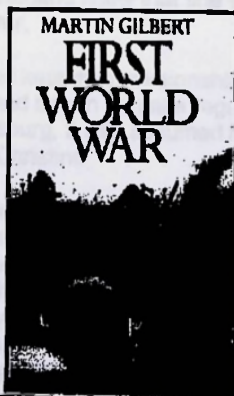
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1916
1848

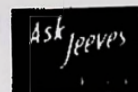
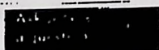
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Sophie von
Chotkova

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France, Slavery, Teaching History, History Lessons Online, Author, Search Website, Email

Sophie Chotek von Chotkova was the daughter of the chief equerry at the Imperial Court in Vienna. When a young woman, Sophie became lady in waiting to the Archduchess Isabella of Pressburg. Archduke Franz Ferdinand, heir to the Austro-Hungarian throne, first met Sophie at a dance in Prague in 1888. The couple fell in love but although Sophie came from a prominent Bohemian family, Franz Ferdinand knew that she would not be accepted as the wife of the future emperor.

Sophie and Franz Ferdinand kept their relationship a secret for over two years. When Franz Ferdinand began to make regular visits to the home of Archduke Friedrich of Pressburg, it was assumed he had fallen in love with his eldest daughter, Marie Christine.

One evening, after Franz Ferdinand had been staying at the home of Archduke Friedrich, a servant found a watch and locket he had left behind. When the Archduchess opened the locket, she found it contained a photograph. She expected it to be a picture of her daughter, Marie Christine, and was shocked and angry to discover it was of Sophie, her lady in waiting. Sophie was immediately dismissed and the knowledge of her relationship with Franz Ferdinand created a public scandal.

Emperor Franz Josef immediately made it clear to Archduke Franz that he would not be allowed to marry Sophie. To be an eligible partner for a member of the Austro-Hungarian royal family, you had to be descended from the House of Hapsburg or from one of the ruling dynasties of Europe.

Franz Ferdinand insisted he would not marry anyone else. Emperor Wilhelm II of Germany, Tsar Nicholas II of Russia and Pope Leo XIII all made representations to Franz Josef on Franz Ferdinand's behalf arguing that the disagreement was undermining the stability of the monarchy.

In 1899 Emperor Franz Josef agreed a deal with Franz Ferdinand. He was allowed to marry Sophie but it was stipulated that her descendants would not be allowed to succeed to the throne. It was also pointed out that Sophie would not be allowed to accompany her husband in the royal carriage nor could she sit by his side in the royal box.

Franz Josef did not attend the wedding. Nor did his brothers or their families. The only people of the royal family who went to the ceremony was Franz Ferdinand's stepmother, Maria Theresa, and her two daughters. Over the next few years the couple had three children: Sophie (1901), Maximilian (1902) and Ernst (1904).

In 1914 General Oskar Potiorek, Governor of the Austrian provinces of Bosnia-Herzegovina, invited Archduke Franz Ferdinand and Sophie to watch his troops on maneuvers in June, 1914. Franz Ferdinand knew that the visit would be dangerous. A large number of people living in Bosnia-Herzegovina were unhappy with Austrian rule and favoured union with Serbia.

Just before 10 o'clock on Sunday, 28th June, 1914, the royal couple arrived in Sarajevo by train. General Oskar Potiorek, Governor of the Austrian provinces of Bosnia-Herzegovina, was waiting to take the royal party to the City Hall for the official reception. In the front car was Fehim Curcic, the Mayor of Sarajevo and Dr. Gerde, the city's Commissioner of Police. Franz Ferdinand and Sophie were in the second car with Oskar Potiorek and Count von Harrach. The car's top was rolled back in order to allow the crowds a good view of its occupants.

At 10.10, when the six car procession passed the central police station, Nedjelko Cabrinovic hurled a hand grenade at the archduke's car. The driver accelerated when he saw the object flying towards him and the grenade exploded under the wheel of the next car. Two of the occupants, Eric von Merizzi and Count Boos-Waldeck were seriously wounded. About a dozen spectators were also hit by bomb splinters.

Franz Ferdinand's driver, Franz Urban, drove on extremely fast and other members of the Black Hand group on the route, Cvijetko Popovic, Gavrilo Princip, Danilo Ilic and Trifko Grabez, decided that it was useless to try and kill the archduke when the car was going at this speed.

After attending the official reception at the City Hall, Franz Ferdinand asked about the members of his party that had been wounded by the bomb. When the archduke was told they were badly injured in hospital, he insisted on being taken to see them. A member of the archduke's staff, Baron Morsey, suggested this might be dangerous, but Oskar Potiorek, who was responsible for the safety of the royal party, replied, "Do you think Sarajevo is full of assassins?" However, Potiorek did accept it would be better if Sophie remained behind in the City Hall. When Baron Morsey told Sophie about the revised plans, she refused to stay arguing: "As long as the Archduke shows himself in public today I will not leave him."

In order to avoid the city centre, General Oskar Potiorek decided that the royal car should travel straight along the Appel Quay to the Sarajevo Hospital. However, Potiorek forgot to tell the driver, Franz Urban, about this decision. On the way to the hospital, Urban took a right turn into Franz Joseph Street. One of the conspirators, Gavrilo Princip, happened to be standing on the corner at the time. Oskar Potiorek immediately realised the driver had taken the wrong route and shouted "What is this? This is the wrong way! We're supposed to take the Appel Quay!".

The driver put his foot on the brake, and began to back up. In doing so he moved slowly past the waiting Gavrilo Princip. The assassin stepped forward, drew his gun, and at a distance of about five feet, fired several times into the car. Franz Ferdinand was hit in the neck and Sophie in the abdomen. Princip's bullet had pierced the archduke's jugular vein but before losing consciousness, he pleaded "Sophie dear! Sophie dear! Don't die! Stay alive for our children!" Franz Urban drove the royal couple to Konak, the governor's residence, but although both were still alive when they arrived, they died from their wounds soon afterwards.

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(1) Written oath taken by Archduke Franz Ferdinand in front of the Secret Council Chamber of the Vienna Hofburg before being granted permission to marry Sophie Chotek von Chotkova (28th June, 1900)

Our marriage with the Countess Chotek is not an eligible but a morganatic marriage, and is to be considered as such for now and all time; in consequence whereof neither our wife nor the issue to be hoped for with

God's blessing from this our marriage, nor their descendants, will possess or be entitled to claim those rights, titles, armorial bearings, privileges, etc., that belong to the eligible wives and to the issue of Archdukes for eligible marriages. And in particular we again recognize and declare that inasmuch as the issue from our aforesaid marriage and their descendants are not members of the most high Archhouse, they possess no right to succeed to the Throne.

(2) Archduke Franz Ferdinand, letter to his stepmother Maria Theresia a week after his marriage to Sophie Chotek von Chotkova (July, 1900)

Soph is a treasure, I am indescribably happy. She looks after me so much, I am doing wonderfully. I am so healthy and much less nervous. I feel as though I had been born again.

(3) Archduke Franz Ferdinand, letter to Maria Theresia (1904)

The most intelligent thing I've ever done in my life has been the marriage to my Soph. She is everything to me: my wife, my adviser, my doctor, my warner, in a word: my entire happiness. Now, after four years, we love each other as on our first year of marriage, and our happiness has not been marred for a single second.

(4) Count von Harrach was in Archduke's car when he was killed.

As I was drawing out my handkerchief to wipe away the blood from the Archduke's lips, her Highness cried out: "For God's sake! What happened to you?" Then she sank down from her seat with her face between the Archduke's knees. I had no idea that she had been hit and thought that she had fainted from shock. His Royal Highness said "Sophie, Sophie, don't die. Live for my children." I seized the Archduke by the coat collar to prevent his head from sinking forward and asking him: "Is your highness in great pain?" To which he clearly answered: "It is nothing." His face was slightly distorted, and he repeated six or seven times, every time losing more consciousness and with a fading voice: "It is nothing." Then came a brief pause followed by a convulsive rattle in his throat, caused by a loss of blood. This ceased on arrival at the governor's residence. The two unconscious bodies were carried into the building where their death was soon established.

(5) Manchester Guardian (29th June, 1914)

The Archduke Francis Ferdinand of Austria, nephew of the aged Emperor and
<http://www.spartacus.schoolnet.co.uk/FWWsophie.htm>

heir to the throne, was assassinated in the streets of Sarajevo, the Bosnian capital, yesterday afternoon. His wife, the Duchess of Hohenberg, was killed by the same assassin. Some reports say the Duchess was deliberately shielding her husband from the second shot when she was killed. One victim was struck in the body and the other in the face; the telegrams are contradictory about which wound the Archduke suffered and which his wife.

Two attempts were made on the Archduke's life during the day. He was in Bosnia inspecting the manoeuvres of the Austrian Army Corps stationed in the province, and had devoted yesterday to a procession through the capital. During the morning a bomb was thrown at the Imperial motor car, but its occupants escaped unhurt. In the afternoon in another part of the town a Serb student fired a revolver at the car, killing both the Archduke and the Duchess.

(6) Nedjelko Gabrinovic, statement in court (23rd October, 1914)

We thought that only people of noble character were capable of committing political assassinations. We heard it said that he (Archduke Franz Ferdinand) was an enemy of the Slavs. Nobody directly told us "kill him"; but in this environment, we arrived at the idea ourselves.

I would like to add something else. Although Princip is playing the hero, and although we all wanted to appear as heroes, we still have profound regrets. In the first place, we did not know that they late Franz Ferdinand was a father. We were greatly touched by the words he addressed to his wife: "Sophie, stay alive for our children."

We are anything you want, except criminals. In my name and in the name of my comrades, I ask the children of the late successor to the throne to forgive us. As for you, punish us according to your understanding. We are not criminals. We are honest people, animated by noble sentiments; we are idealists; we wanted to do good; we have loved our people; and we shall die for our ideals.



sptimes.com

 Paul I, Emperor Of All Russia 1796-1801

 Alexander I, Emperor Of All Russia 1801-1825

 Nicholas I, Emperor Of All Russia 1825-1855

 Alexander II, Emperor Of All Russia 1855-1881

 Alexander III, Emperor Of All Russia 1881-1894

 Nicholas II, Emperor Of All Russia 1894-1917

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Text compiled by Alexei K. Levykin

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Black Plague (and Jews.)

There have been three great pandemics of bubonic plague in history:

- The first was Justinian's Plague that began in 542 and lasted until 662.
- • The second was the Black Death that began in 1347 and lasted until 1665. 38-39 million people died between 1347-1351. *10 million a year*
- The third began in Yunnan, China in 1892 and spread to India by 1896, killing approximately 6 million people in India alone. *epidemic*

There are three related diseases that make up the Black Death. *+ the story of Li Hung Chang*

- Bubonic plague is the most common, and, without antibiotics, is fatal 50-60% of the time.
- Pneumonic plague is less common, is extremely contagious, and is fatal 95% of the time.
- Septicaemic plague, which is fortunately very rare, attacks the bloodstream and is always fatal.

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* inexhaustibility of the D.K.'s creation
all of existence has been a sleeked down
crucifixion. In this case the victory of
Justinian's Plague *disseminates in rats & its effects can be seen*

About 500-542 AD plague starts first in Ethiopia and then rapidly spread through Egypt, Palestine, and Constantinople and then on to Eastern Europe and parts of Persia. *had not been calculated in advance*

In 532 AD Justinian's sets out to rebuild the Old Roman Empire, but the new empire will be centered on Constantinople instead of Rome.

At this time much of the old empire is occupied by barbarians, Franks, Goths, Vandals, Visigoth's, Celts, etc Through a series of military victories Justinian's forces are able to recapture much of Italy and his quest to build a new empire seems successful. However, in 542 the plague spreads to Constantinople and terrorizes the population

Historians estimate that from 542 to 543 somewhere between 25 and 50% of the Eastern Roman Empire's population dies from the plague. ||||

The plague was most probably bubonic and was spread by rats hidden in the holds of shipping traffic. In heavily populated areas the plague mutated into pneumonic and septicemic plague increasing the numbers of deaths in unexposed populations. *understand **

As the plague spreads throughout Eastern Europe historians estimate as much as 1/3 of the population dies. The effects of the plague in Eastern Europe are the beginning of the Dark Ages. Much of Eastern Europe is left desolate by the collapse of the Eastern Roman Empire and unpopulated as a result of the plague. The depopulation caused by the plague paves the way for the spread of Islam in Eastern Europe in 632 AD.

Additionally, the plague has a tremendous effect on the religious beliefs of Islam and Christianity. In Christianity the plague is seen as divine retribution from God and as a punishment. As a result the Christian Church's belief system begins to emphasis guilt, sin and a wrathful God. In Islam, the plague is also seen as divine retribution for God. However, in Islam the emphasis is not on a wrathful God. The emphasis is placed instead on there is no escaping the will of God.

The plague is seen as God's way of sending infidels to hell and rewarding Moslems with eternal paradise. The effects of the plague in the 5th and 6th Century radically alter religious beliefs and give birth to two important tents of modern religion. In Islam, there is no escaping the will of God and in Christianity guilt, sin and a wrathful God.

The changes in religious thought and beliefs the long-term effects of Justinian's Plague was the final collapse of the Eastern Roman Empire, the beginning of the Dark Ages in Eastern Europe and

D.K. Don't know this can be seen from the D.K. war. Carrying for himself I fear it can be seen from as D.K.'s motivation

** our coping of world of the population*

also don't know God's share

of reduction of religious like reduction of punishment

new phase

Apr. 04 2004 12:21PM P3

Faxed by Dwyer
4/5/04ultimately the successful invasion of Islamic forces in 632 AD
throughout the Near East and

FAXING pp 3, 3A, + 1 of 6A, 2 of 6A, 7

~~Extended note~~3 of 6A,
4 of 6A

P3

and p 3A

The D.K. was searching for a viable religion, however all through evolution he paid his greatest attention to the most vocal animals, (which is why there are the ~~hottest~~ trillion-fold numbers of insects in a billion-fold of species. (The O.O. often remarks — It seems to have gotten a little away from him, hasn't it? The balance between giving a new species a deep enough desire to prevail as a species and the subsequent ~~loss~~ of over-motivation for too little are ~~so~~ all too evident in insect life."

In any event we have the D.K.'s experiments in the two main branches of Christianity — still hasn't decided between the Catholics and the Protestants, the Orthodox Jews, and the modern Jews, the Islam, Buddhism, Confucianism, and the rich paganism of the ancient Egyptians to name but a few examples of his long searching — ~~epitomized~~

(over) to p 3A

xerox for
faxing

302

D.T. comments on a charge in the
D.O. through the ~~past~~ history in
which he has served, the D.O. remains
a critic of the follies, dafter thinking,
errors, ~~and~~ miscalculations, and
sheer blunders of the D.K. in evolution
and in history, but always his
spirit was critical. We ~~reacted~~
reacted in response to the D.K.'s
efforts. We looked to corrupt his
~~bad~~ human reasons. We
counted on increasing the ~~discontent~~
dissatisfaction of humans on the
our hand and poisoning their
minds on the other. How? By
~~so~~ intense religiosity which
would serve to warp the brains of
many good humans. Corrupt enough
of humankind & one could take
over the remains. So at least was
the premise I had understood and
served. Now it might not be enough
I had to wonder if the D.O. was
preparing a future in which a
religion he designed might be
ready to prevent.

Xerox for F.H. & W.B.

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Jewish History Sourcebook: The Black Death and the Jews 1348-1349 CE

In 1348 there appeared in Europe a devastating plague which is reported to have killed off ultimately twenty-five million people. By the fall of that year the rumor was current that these deaths were due to an international conspiracy of Jewry to poison Christendom. It was reported that the leaders in the Jewish metropolis of Toledo had initiated the plot and that one of the chief conspirators was a Rabbi Peyret who had his headquarters in Chambéry, Savoy, whence he dispatched his poisoners to France, Switzerland, and Italy.

By authority of Amadeus VI, Count of Savoy, a number of the Jews who lived on the shores of Lake Geneva, having been arrested and put to the torture, naturally confessed anything their inquisitors suggested. These Jews, under torture, incriminated others. Records of their confessions were sent from one town to another in Switzerland and down the Rhine River into Germany, and as a result, thousands of Jews, in at least two hundred towns and hamlets, were butchered and burnt. The sheer loss of numbers, the disappearance of their wealth, and the growing hatred of the Christians brought German Jewry to a catastrophic downfall. It now began to decline and did not again play an important part in German life till the seventeenth century.

The first account that follows is a translation from the Latin of a confession made under torture by Agimet, a Jew, who was arrested at Chatel, on Lake Geneva. It is typical of the confessions extorted and forwarded to other towns.

The second account describes the Black Death in general and treats specifically of the destruction of the Jewish community in Strasbourg. In this city the authorities, who attempted to save the Jews, were overthrown by a fear-stricken mob led by the butchers' and tanners' guilds and by the nobles who were determined to do away with the Jews who were their economic competitors and to whom they were indebted for loans. Thus in this city, at least, it was not merely religious bigotry and fear of the plague, but economic resentment that fired the craftsmen and the nobles to their work of extermination. Those people of Strasbourg, who had thus far escaped the plague and who thought that by killing off the Jews they would insure themselves against it in the future, were doomed to disappointment, for the pest soon struck the city and, it is said, took a toll of sixteen thousand lives.

The confession of Agimet is found in the Appendix to Johann S. Schiller's 1698 edition of the Middle High German chronicle of the Strasbourg historian, Jacob von Königshofen (1346-1420). The second selection is taken from the body of Königshofen's history. This account merits credence, not only because Königshofen was an archivist and lived close to the events of which he writes, but also because he incorporated considerable material from his Strasbourg predecessor, the historian F. Closener, who was probably an

(Dated)

D. T. One of our greatest victims Confusion disaster and leading unadmitted remorse. Of these three, the unadmitted remorse is most dangerous

~~The~~

1 of 6 A

The undeveloped power of perception,
the animal recidivism of unfocused
rage, and a tendency towards
free-floating ill-will, which
~~to~~ this last a by-product of
another miscalculation by the
D.K. in developing his creation of
the human. Given the need for these
new upstart animal (to survive under
queer and often incalculable
conditions, the D.K. had to endow
him (and her, most certainly!) with
a sense of self-importance, crucial to
their survival. Once again, the
balance was askew and the sense
of certainty, self-righteousness, and
its concomitant, envy, for the self-
righteous can not look with
equanimity upon the success or good
fortune of others) proved out-of-balance.
The D.K.'s power, in aesthetic and
in varieties of creation were immense,
but this strength as a cosmic engineer
could not judge as accurately. Biology
was first, then human history itself
is replete with his blunders, imperfect
creations, and living misproportions.

Go to p 2 of 6 (over)

in a hurry. Asked if any of the Jews of those places were guilty in the above mentioned matter, he answered that he did not know. And now by all that which is contained in the five books of Moses and the scroll of the Jews, he declared that this was true, and that he was in no wise lying, no matter what might happen to him. [This Jew does not seem to know that the books of Moses and the scroll of the Jews are identical!]

II. The Cremation of Strasbourg Jewry St. Valentine's Day, February 14, 1349 - About The Great Plague And The Burning Of The Jews

In the year 1349 there occurred the greatest epidemic that ever happened. Death went from one end of the earth to the other, on that side and this side of the sea, and it was greater among the Saracens than among the Christians. In some lands everyone died so that no one was left. Ships were also found on the sea laden with wares; the crew had all died and no one guided the ship. The Bishop of Marseilles and priests and monks and more than half of all the people there died with them. In other kingdoms and cities so many people perished that it would be horrible to describe. The pope at Avignon stopped all sessions of court, locked himself in a room, allowed no one to approach him and had a fire burning before him all the time. [This last was probably intended as some sort of disinfectant.] And from what this epidemic came, all wise teachers and physicians could only say that it was God's will. And as the plague was now here, so was it in other places, and lasted more than a whole year. This epidemic also came to Strasbourg in the summer of the above mentioned year, and it is estimated that about sixteen thousand people died.

In the matter of this plague the Jews throughout the world were reviled and accused in all lands of having caused it through the poison which they are said to have put into the water and the wells—that is what they were accused of—and for this reason the Jews were burnt all the way from the Mediterranean into Germany, but not in Avignon, for the pope protected them there.

Nevertheless they tortured a number of Jews in Berne and Zofingen [Switzerland] who then admitted that they had put poison into many wells, and they also found the poison in the wells. Thereupon they burnt the Jews in many towns and wrote of this affair to Strasbourg, Freiburg, and Basel in order that they too should burn their Jews. But the leaders in these three cities in whose hands the government lay did not believe that anything ought to be done to the Jews. However in Basel the citizens marched to the city-hall and compelled the council to take an oath that they would burn the Jews, and that they would allow no Jew to enter the city for the next two hundred years. Thereupon the Jews were arrested in all these places and a conference was arranged to meet at Benfeld rAlsace, February 8, 1349. The Bishop of Strasbourg [Berthold II], all the feudal lords of Alsace, and representatives of the three above mentioned cities came there. The deputies of the city of Strasbourg were asked what they were going to do with their Jews. They answered and said that they knew no evil of them. Then they asked the Strasbourgers why they had closed the wells and put away the buckets, and there was a great indignation and clamor against the deputies from Strasbourg. So finally the Bishop and the lords and the Imperial Cities agreed to do away with the Jews. The result was that they were burnt in many cities, and wherever they were expelled they were caught by the peasants and stabbed to death or drowned. . . .

[The town-council of Strasbourg which wanted to save the Jews was deposed on the 9th-

<http://www.fordham.edu/halsall/jewish/1348-jewsblackdeath.html>

*more
torture,
"let it
go. He
was
given
us
enough"*

** hoping
to
discover
the
oath
by the
revelation*

3076 A

What followed was an event we do not discuss, nor endeavor to think about. It was the D.K.'s ability on that occasion to ~~take~~ ^{bring} ~~out~~ ^{out} some species of victory, or, at least, of continuation, out from the greatest defeat he had ever suffered vis-a-vis the Master. Yes, the D.K. actually conceived, (out of the depths of his partial understanding of his creating humankind) that a sentimental concert was viable. The word could be disseminated through his credos and his human agents that Christ had died for all the sins of men and women - a beautifully effective means, ~~perhaps~~ of subverting the darker confidences we had insinuated into human nature. In fact, was a species of victory seized. Our projects ~~had~~ ^{had}

from
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eyewitness of the tragedy. The third selection is an epitaph of an otherwise unknown Jew who died a victim of the plague in 1349. Obviously, Jews, too, were not spared by this dread disease. The epitaph in the original Hebrew is in poetical form.

I. The Confession of Agimet of Geneva, Châtel, October 20, 1348

The year of our Lord 1348.

On Friday, the 10th of the month of October, at Châtel, in the castle thereof, there occurred the judicial inquiry which was made by order of the court of the illustrious Prince, our lord, Amadeus, Count of Savoy, and his subjects against the Jews of both sexes who were there imprisoned, each one separately. [Jews were sometimes imprisoned separately to prevent suicide.] This was done after public rumor had become current and a strong clamor had arisen because of the poison put by them into the wells, springs, and other things which the Christians use-demanding that they die, that they are able to be found guilty and, therefore, that they should be punished. Hence this their confession made in the presence of a great many trustworthy persons. — *half ours, at least,*

Agimet the Jew, who lived at Geneva and was arrested at Châtel, was there put to the torture a little and then he was released from it. And after a long time, having been subjected again to torture a little, he confessed in the presence of a great many trustworthy persons, who are later mentioned. To begin with it is clear that at the Lent just passed Pultus Clesis de Ranz had sent this very Jew to Venice to buy silks and other things for him. When this came to the notice of Rabbi Peyret, a Jew of Chambéry who was a teacher of their law, he sent for this Agimet, for whom he had searched, and when he had come before him he said: "We have been informed that you are going to Venice to buy silk and other wares. Here I am giving you a little package of half a span in size which contains some prepared poison and venom in a thin, sewed leather-bag. Distribute it among the wells, cisterns, and springs about Venice and the other places to which you go, in order to poison the people who use the water of the aforesaid wells that will have been poisoned by you, namely, the wells in which the poison will have been placed."

Agimet took this package full of poison and carried it with him to Venice, and when he came there he threw and scattered a portion of it into the well or cistern of fresh water which was there near the German House, in order to poison the people who use the water of that cistern. And he says that this is the only cistern of sweet water in the city. He also says that the mentioned Rabbi Peyret promised to give him whatever he wanted for his troubles in this business. Of his own accord Agimet confessed further that after this had been done he left at once in order that he should not be captured by the citizens or others, and that he went personally to Calabria and Apulia and threw the above mentioned poison into many wells. He confesses also that he put some of this same poison in the well of the streets of the city of Ballet.

He confesses further that he put some of this poison into the public fountain of the city of Toulouse and in the wells that are near the [Mediterranean] sea. Asked if at the time that he scattered the venom and poisoned the wells, above mentioned, any people had died, he said that he did not know inasmuch as he had left everyone of the above mentioned places

for the Jews. One of the
exceptional misanthropes,
he gave so much of himself to
them. His dream, vanity, set with
~~then that~~ ^{after the war} ~~prayed for a few centuries,~~
~~and in their constant days~~ visited
His disappointment and rage ~~on~~
on them when they failed to meet
the variety of his hopes — to be
brilliant, rich, war-like and
more intelligent ~~than~~ ^{than} other
other people, ~~he had~~ ^{he} ~~had~~ ^{at the time} ~~been~~
~~ambitious~~ ^{creation} ~~creation~~.

Given the execution of each of the
Jews by the Romans (with whom we
found considerable traction) the
D.O. withdrew much of its
allegiance, but then, according to
the D.O., it could hardly forgive the
Jews for failing in such large part
to recognize the dramatic gift it
had given them. ~~Could~~ ^{Could} so many of
them not perceive that he had chosen
the Jews, yes, ^{to} ~~for~~ his half-son, half-human
to advance, to swell, to expedite the
immense Vision ~~that~~ ^{that} he had
for mankind. The D.O. constantly

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10th of February, and the new council gave in to the mob, who then arrested the Jews on Friday, the 13th.]

THE JEWS ARE BURNT

On Saturday - that was St. Valentine's Day - they burnt the Jews on a wooden platform in their cemetery. There were about two thousand people of them. Those who wanted to baptize themselves were spared. [Some say that about a thousand accepted baptism.] Many small children were taken out of the fire and baptized against the will of their fathers and mothers. And everything that was owed to the Jews was cancelled, and the Jews had to surrender all pledges and notes that they had taken for debts. The council, however, took the cash that the Jews possessed and divided it among the working-men proportionately. The money was indeed the thing that killed the Jews. If they had been poor and if the feudal lords had not been in debt to them, they would not have been burnt. After this wealth was divided among the artisans some gave their share to the Cathedral or to the Church on the advice of their confessors.

D.T. - who then spent it as he wished

Thus were the Jews burnt at Strasbourg, and in the same year in all the cities of the Rhine, whether Free Cities or Imperial Cities or cities belonging to the lords. In some towns they burnt the Jews after a trial, in others, without a trial. In some cities the Jews themselves set fire to their houses and cremated themselves.

THE JEWS RETURN TO STRASBOURG

It was decided in Strasbourg that no Jew should enter the city for a hundred years, but before twenty years had passed, the council and magistrates agreed that they ought to admit the Jews again into the city for twenty years. And so the Jews came back again to Strasbourg in the year 1368 after the birth of our Lord.

III. The Epitaph of Asher aben Turiel, Toledo, Spain, 1349

This stone is a memorial
That a later generation may know
That 'neath it lies hidden a pleasant bud,
A cherished child,
Perfect in knowledge,
A reader of the Bible,
A student of the Mishnah and Gemara.
Had learned from his father
What his father learned from his teachers:
The statutes of God and his laws.
Though only fifteen years in age,
He was like a man of eighty in knowledge.
More blessed than all sons: Asher - may he rest in Paradise -
The son of Joseph ben Turiel - may God comfort him,
He died of the plague, in the month of Tam muz, in the year 109 [June or July, 1349].
But a few days before his death
He established his home;

part of rest of this letter for Asher the young Jew.

never been able to eradicate 4 of 6 A
their notion from any (3 many) of the
Christians we have captured. I think
the D.O. chose the concept of calling
God the Damm Koff (sp.) friendly to
~~that~~ steel his own servants against
the reluctant admiration we do feel
for the D.K.'s cleverness on this occasion.

As a corollary, it can be said that
the Lord never forgave the Jews altogether.
They were despised, then wounded,
and for the most part were segregated
~~that~~ for centuries. He kept them poor
and off the land. They became a species
of human not respected by those who
worked the fields. He took so much
away from them, but not their intelligence.
No, not that intelligence he had been
at such pains to develop. He could
not bring Himself to rage that part
of the human construction. He allowed
them to develop their Tolmud, their
superstition of dogmatic nuance.
If a poor man, praying for the allocation
~~of his children~~ of his children, gave
them brought his but animal to
the temple for sacrifice, and the poor
wretched beast full of all the

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The Thirty-Years-War

Europe had expected that the struggle between Catholic and Protestant would be renewed in 1621, when the truce between Spain and the northern provinces of the Netherlands came to an end. But it began in the Empire several years earlier and gradually most of Europe became involved. Since Charles V, backed by the power of Spain, had been unable either to strengthen his authority at the expense of the territorial princes or to wipe out Protestantism, it was natural that his immediate successors preferred to leave the constitutional and religious issues alone. Ferdinand I (1556-1564) and Maximilian II (1564-1576) devoted most of their energy to fighting the Turks, while Rudolf II (1576-1612) preferred to dabble in astrology and to search for the philosopher's stone to turn base metals into gold. During their reigns, however, the Catholic revival was gathering momentum, and it remained only for Ferdinand II (1619-1637) to put the new Catholic fervor into action.

I. FERDINAND II

The red-haired, red-faced, good-natured Ferdinand was not a great man, but he possessed more virtues than most kings. He was both a devoted husband and father and a conscientious ruler interested in the welfare of his people. It was said with exaggeration no doubt that when he was Duke of Styria, he knew the names of all his subjects and that he provided free legal service for the poorest of their number. Above all else, however, he was a Habsburg: he was dedicated to the twofold task of restoring the authority of the emperor in the Empire and of re-establishing Catholicism in central Europe.

In his desire to restore the authority of the emperor, he could count on the support of Spain. Spain was only awaiting the end of a twelve-year truce made in 1609 to renew its efforts to reconquer the rebellious provinces in the Netherlands. Because of Dutch naval strength, the Spanish would have to send their troops to the Netherlands by way of Italy, the Alpine passes, and the Rhine River Valley. A strong emperor meant greater imperial authority in the Rhineland and with it more ease in moving troops. Indeed, Ferdinand had

already promised Alsace to his Spanish cousins in return for supporting his candidacy to the imperial throne, and he was to promise more in return for military assistance.

Ferdinand could rely on the forces of the Catholic Reformation in his efforts to roll back the tide of Protestantism. The Catholic revival had already recouped a few losses in southern Germany, and Ferdinand himself had stamped out Protestantism in his duchies. Unfortunately, his allies were at cross purposes. The Spanish emphasized the need to increase imperial authority because it was essential to their reconquest of the Netherlands, but the German Catholic princes were only willing to help Ferdinand against the Protestants and strongly opposed any increase in imperial power that might curb their own independence.

More serious still was the interest of foreign powers in Germany. Would France permit Spain to take Alsace, the rest of the Rhineland, and the Netherlands, thereby drawing a tight net around its borders? Would Denmark and Sweden sit quietly by while the Habsburgs extended their power to the Baltic Sea and suppressed their fellow Lutherans? Or would they intervene to maintain their security and, perhaps, to add to their lands in northern Germany? Germany was in central Europe, and the German problem could not be settled without the intervention of surrounding states. It was not enough for Ferdinand to win the allies necessary to defeat the German Protestant princes. He ought to have been less ambitious or else prepared to fight both France and the leading Protestant states. It was not, however, left to him to decide to break the peace. The first step was taken by his rebellious subjects in Bohemia. Gradually and inevitably, the struggle spread to the rest of Germany and then to Europe.

The majority of the inhabitants of Bohemia were Lutheran, Calvinist, or members of one of the Hussite sects, although the Catholic minority supported by the Habsburgs was growing in strength. In addition, the Bohemian nobles were opposed to the encroachment by Habsburg officials on their power. This dissatisfaction with the religious and political policies of the Habsburgs, taken with the certainty that Ferdinand would push them further when he came to power, led to the revolt. On May 23, 1618, a year before Ferdinand was named emperor, the Bohemian leaders unceremoniously threw two imperial officials out of a window in the palace at Prague. They fell seventy feet, but escaped with their lives, either because of the intercession of the Virgin Mary, as Catholic propagandists confidently asserted, or because they landed in a dung hill, as Protestants claimed. In any case, civil war was now inevitable and a European conflict almost certain.

The rebels quickly seized control of Bohemia, won assistance from Transylvania, elected as king the Calvinist Elector Frederick of the Palatinate, and marched on Vienna. Ferdinand had neither money nor troops, but he had to regain Bohemia. That wealthy country furnished half the imperial revenue, and its king held one of the seven electoral votes that determined who would be emperor. Since three votes already belonged to Protestant princes, the loss of Bohemia might mean the choice of a Protestant instead of a Catholic Habsburg in an imperial election.

Ferdinand turned to Maximilian (1597-1651) of Bavaria and Spain for assistance. Maximilian was an able prince who had consolidated his hold over his duchy and had organized a Catholic League. Furthermore, he had the rare good fortune to have an army under an able, loyal commander. To him, Ferdinand promised the upper Palatinate and Frederick's title of elector. To Spain, he offered the control of Frederick's Rhineland possessions. With these allies, Ferdinand quickly reconquered Bohemia. Catholicism and imperial authority were ruthlessly restored. The once elective monarchy was made an hereditary Habsburg dominion. By 1623, Ferdinand and his Catholic allies had also occupied Frederick's hereditary lands. Southern Germany was theirs, but the Protestant princes in northern Germany had become alarmed, and foreign powers determined to intervene before the Habsburgs could consolidate their position. France took steps to cut the Spanish supply route through the Alps, and the Danes, financed in part by the English, the Dutch, and the French, marched into Germany with 30,000 men.

II. WALLENSTEIN

However, Ferdinand had come to realize that he could not achieve his objectives if he had to depend solely on allies. He therefore accepted the offer of a Bohemian nobleman named Albrecht von Wallenstein (1583-1634) to raise an imperial army. Born a Lutheran, Wallenstein had become a Catholic to qualify for imperial favor. Certainly religion was not the motivating force in this tall, thin, forbidding man. It was to the stars that he turned for guidance when he doubted the conclusions reached by his own brilliant but undisciplined mind. He was born under the conjunction of Saturn and Jupiter. The great astronomer Kepler informed him when he cast his horoscope that he had "a restless, exacting mind, impatient of old methods and forever striving for the new and the untried, secretive, melancholy, suspicious, contemptuous of his fellow men and their conventions. He would be avaricious, deceitful, greedy for power, loving no one and by no one beloved, changeable in his humours, quarrelsome, friendless and cruel." Seldom have the stars spoken more truly.

The first step the wily Wallenstein took toward greatness was to marry a wealthy widow who conveniently died soon thereafter, leaving him her estates and the freedom to espouse the daughter of one of Ferdinand's councillors. To wealth and influence he added a businessman's instinct for organization and profit. He managed his estates so well that he came to control a quarter of the land in Bohemia and was able to offer to raise, quarter, and provision 50,000 men at his own expense, leaving to Ferdinand only the responsibility of their pay. The emperor recognized the danger of giving too much power to this powerful subject but the alternative was continued dependence on the Spanish and Bavarians. He therefore accepted Wallenstein's offer and was rewarded with quick victories by the Bavarian and imperial forces over the Danes. Much of northern Germany was occupied, and the ascendant Wallenstein was given Mecklenburg as a reward for his services, the former ruler of this Baltic duchy having made the mistake of siding with the Danes. Internal developments caused France and England to withdraw, and by the end of

1626 it looked as though the war might come to an end.

The fate of Germany rested upon Ferdinand's next step. He could accept Wallenstein's advice and use his great power to create a more centralized Germany, or he could satisfy the Catholic Reformation's demand for the restoration of the Church lands seized by the Protestants since the Peace of Augsburg in 1555. To choose the former course would alienate Maximilian and other Catholic princes who were opposed to any increase in imperial power. To choose the latter would frighten the remaining Protestant princes, some of whom had thus far been neutral. Ferdinand lacked the strength to take both courses simultaneously. He hesitated but finally chose Catholicism and political disunity. By the Edict of Restitution in 1629, he ordered the restoration of the former ecclesiastical territories to the Catholics, and to placate Maximilian, he dismissed Wallenstein. By placing his reliance on Maximilian and the Catholic League, Ferdinand had condemned Germany to more than two centuries of political disunity.

III. THE SWEDISH INTERVENTION

The folly of his choice was soon revealed. On July 4, 1630, Gustavus Adolphus (1611-1632) landed in Germany with a well-trained, well-disciplined army. The Swedish king was a tall, broad-shouldered man with a big appetite but simple tastes. From childhood he had been trained to be a king. When he was six, he began to accompany the army on campaigns; when he was ten, he began to sit at the council table and give his opinions; and when he was in his teens, he received ambassadors unaided. Now thirty-six, Gustavus had already given evidence of being one of the greatest men of his age. In his nineteen years as king, he had proved himself to be as able an administrator as Maximilian of Bavaria and as careful a military organizer as Wallenstein. He was now about to show that he was a gifted diplomat, a devout Protestant, and at the same time one of the greatest field commanders of his age.

His tactics deserve special comment. He abandoned the current emphasis on mass battle formations in order to achieve greater mobility and firepower. Cavalry and infantry were deployed in a series of alternating small squares so that they could turn easily in any direction. Light artillery was substituted for heavy artillery because it could be advanced rapidly, fired from the front lines in battle, and withdraw quickly if necessary. Musketeers were organized in files five deep. The first file was taught to fire and step back to reload. Then the second file fired and stepped back to reload, and then the third and the fourth and the fifth, by which time the first file was ready to fire again. Thus, continuous fire emerged from the Swedish lines.

The one important advantage that Gustavus Adolphus lacked was money, for Sweden was a poor country. When the French offered financial assistance, he therefore accepted but was careful never to let French wishes interfere with his policy. During his brief, glorious career in Germany, he was clearly his own master.

Many considerations led Gustavus Adolphus to enter the war. First, he dared not permit the Habsburgs to consolidate their hold on the southern shores of the Baltic Sea. Sooner or later, they were sure to use the ports of this area as a jumping place to attack Sweden. Their ally, the Catholic Sigismund of Poland, had a good claim to the Swedish throne. All he needed was imperial assistance to seek to depose Gustavus Adolphus and re-establish Catholicism in the northern kingdom. But if Sweden seized the southern shores of the Baltic, no invasion was possible. "It is better," the Swedish estates declared when they learned of the situation, "that we tether our horses to the enemy's fence, than he to ours." Second, the Swedes had long desired to turn the Baltic into a Swedish lake, and northern Germany would have to become theirs to make this dream a reality. Already a large part of the royal revenue came from Baltic commerce. Third, Gustavus Adolphus, a sincere Lutheran, was genuinely distressed to see the plight of his coreligionists in Germany.

The Swedish invasion completely altered the situation in the Empire. After a great victory in the battle of Breitenfeld, Gustavus Adolphus was free to march where he pleased. Ferdinand had no choice but to recall Wallenstein. The two generals fought an indecisive battle at Nuremberg, and Gustavus Adolphus withdrew to the north. Once more they clashed at Lützen, and this time the Swedes were victorious, but at the cost of their king's life.

The death of Gustavus Adolphus gave the Catholics new hope, but the rivalry between Maximilian and Wallenstein weakened their cause. The Bohemian, who had never forgiven Maximilian and Ferdinand for his first dismissal, plotted with the Swedes and French. Some think that he wanted to create a great middle European empire in which Catholic and Protestant could live in peace. Others see him as a Czech patriot who sought to re-vive the Bohemian state with himself as king. More probably he was motivated only by his selfish, restless ambition. Whatever Wallenstein's plans, Ferdinand knew that he could not be trusted. He was declared guilty of treason and was murdered, defenseless in his bedroom, by a disloyal contingent of his own troops.

Ferdinand was freed from one peril, and in September, 1634, six months later, he was relieved of another. The imperial forces defeated the Swedes at Nördlingen. The northern kingdom was no longer a serious threat, and one by one the German Protestant princes made peace in return for the abandonment of the Edict of Restitution. Ferdinand kept the gains he had made before 1627, and he now had the united support of the German princes. Their support was an important asset, because nine days before the terms of the peace were published, France had declared war in order to check the power of Spain.

IV. THE FRENCH INTERVENTION AND THE TREATY OF WESTPHALIA

The conflict entered a new phase. Spain, Austria, and the other German states were pitted against the French, the Dutch, and what was left of the Swedes. Religion had become a secondary issue, and the old struggle between the Habsburgs and the French, now ruled by the Bourbons rather than the Valois, held the center of the stage. There were no decisive

battles, with the possible exception of Rocroi in 1643 where the young Duke of Enghein-later Prince of Conde-won a victory over the Spanish.

Peace negotiations were begun in 1643, but they proceeded slowly. Not until 1648 was the Treaty of Westphalia signed by most of the conflicting powers, France and Spain alone continuing the struggle. Finally, with the Treaty of Pyrenees in 1659, even this conflict was brought to an end. The Habsburgs had lost the first round of their struggle with the Bourbons.

The results of the war and the two peace treaties were highly significant. France replaced Spain as the greatest power in Europe. With Sweden, France had blocked the Habsburg efforts to strengthen their authority in the Empire. At Westphalia, the right of the individual states within the Empire to make war and conclude alliances was recognized. In theory as well as in fact, the most important of these states became virtually autonomous, and German unity was postponed for more than two centuries. The Empire was further dismembered by the recognition of the independence of Switzerland and the seven northern provinces of the Netherlands. Two new powers emerged in northern Germany. Sweden received part of Pomerania and the bishoprics of Bremen and Verden; Brandenburg-Prussia added the rest of Pomerania and several secularized bishoprics to its possessions. In southern Germany, the Bavarian rulers were permitted to keep the upper Palatinate and the title of elector, but the Lower Palatinate was restored to Frederick's son and an eighth electorate was created for him. France received most of Alsace by the Treaty of Westphalia, and by the Treaty of Pyrenees parts of Flanders and Artois in the Spanish Netherlands and lands in the Pyrenees.

The religious settlement at Westphalia confirmed the predominance of Catholicism in southern Germany and of Protestantism in northern Germany. The principle accepted by the Peace of Augsburg of 1555 that Catholic and Lutheran princes could determine the religion practiced in their territory was maintained, and this privilege was extended to include the Calvinists as well.

The Austrian Habsburgs had failed in their efforts to increase their authority in the Empire and to eradicate Protestantism, but they emerged from the war stronger than before. In Bohemia, they had stamped out Protestantism, broken the power of the old nobility, and declared the crown hereditary in the male line of their family. With Bohemia now firmly in their grasp and with their large group of adjoining territories, they were ready to expand to the east in the Balkans, to the south in Italy, or to interfere once more in the Empire.

The real losers in the war were the German people. Over 300,000 had been killed in battle. Millions of civilians had died of malnutrition and disease, and wandering, undisciplined troops had robbed, burned, and looted almost at will. Most authorities believe that the population of the Empire dropped from about 21,000,000 to 13,500,000 between 1618 and 1648. Even if they exaggerate, the Thirty Years War remains one of the most terrible in history.

100 Years' War

Timeline

1328 - Charles IV dies, ending the Capetian dynasty. Philip of Valois succeeds him as Philip VI.

1329 - Edward III of England does simple homage for Aquitaine (Guienne), but refuses to do liege homage.

1336 - Edward places an embargo on English exports of wool to Flanders.

1337 - Philip declares Edward's fiefs forfeit and begins harassing the frontiers of Aquitaine.

1338 - Edward III formally claims the French crown.

1346 - Battle of Crécy

1356 - Battle of Poitiers

1358 - The Jacquerie

1360 - Peace of Brétigny

1369 - Renewed fighting in France.

1370 - French troops commanded by Bertrand du Guesclin.

1381 - Peasants' Revolt in England

1392 - Charles VI of France suffers his first attack of insanity. Conflict between the Armagnacs and the Burgundians begins.

1399 - Henry of Lancaster seizes English throne, becoming Henry IV.

1415 - Henry V wins a great victory over the French at Agincourt.

1420 - Treaty of Troyes

1429 - Joan of Arc relieves the siege at Orléans.

1431 - Joan burned at the stake at Rouen.

1435 - Peace of Arras; Burgundy abandons the English.

1436 - Charles VII captures Paris.

1453 - Bordeaux falls to the French. The war ends without a treaty.**SYNOPSIS****REFERENCES TO TEXTBOOKS**

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See "Third Reich"; "Stalinism."

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Source

Israel Hershkov, *The Jews in the Middle East: A Handbook*, 315-379, (New York, 1972), 42-43.

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But yesternight the joyous voice of the bride and groom
Was turned to the voice of wailing.
[Apparently he had just been married.]
And the father is left, sad and aching.
May the God of heaven
Grant him comfort.
And send another child
To restore his soul.

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Source

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The Columbia Encyclopedia, Sixth Edition. 2001.

Li Hung-chang

(lǐ hūng-chāng) (KEY), 1823–1901, Chinese statesman and general. His first success was as a commander of forces fighting the Taiping Rebellion. As viceroy of the capital province of Zhili (1870–95), he controlled Chinese foreign affairs for the Empress Dowager Tz'u Hsi. Li was the chief negotiator of the Treaty of Shimonoseki (1895), which ended the First Sino-Japanese War. In 1896 he negotiated the treaty that granted Russia the right to build the Trans-Siberian RR across N Manchuria. He protected foreigners when he was viceroy of Guangzhou during the Boxer Uprising (1900), and he was able to reduce the demands of the foreign powers for reparations. His moderately progressive internal policy included modernization of the army and railroad building.

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LI HUNG CHANG

LI HUNG CHANG (1823-1901), Chinese statesman, was born on the 16th of February 1823 at Hafei, in Ngan-hui. From his, earliest youth he showed marked ability, and when quite young he took his bachelor degree in 1847 he became a Tsin-shi, or graduate of the highest order, and two years later was admitted into the imperial Hanlin college. Shortly after this the central provinces of the empire were invaded by the Taiping rebels, and in defence of his native district he raised a regiment of militia, with which he did such good service to the imperial cause that he attracted the attention of Tshng Kuo-fan, the generalissimo in command. In 1859 he was transferred to the province of Fu-kien, where he was given the rank of taotai, or intendant of circuit. But Tsng had not forgotten him, and at his request Li was recalled to take part against the rebels. He found his cause supported by the Ever Victorious Army, which, after having been raised by an American named Ward, was finally placed under the command of Charles George Gordon. With this support Li gained numerous victories leading to the surrender of Suchow and the capture of Nanking. For these exploits he was made governor of Kiangsu, was decorated with a yellow jacket, and was created an earl. An incident connected with the surrender of Suchow, however, left a lasting stain upon his character. By an arrangement with Gordon, the rebel wangs, or princes, yielded Nanking on condition that their lives should be spared. In spite of the assurance given them by Gordon, Li ordered their instant execution. This breach of faith so aroused Gordons indignation that he seized a rifle, intending to shoot the falsifier of his word, and would have done so had not Li saved himself by flight. On the suppression of the rebellion (1864) Li took up his duties as governor,

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but was not long allowed to remain in civil life. On the outbreak of the rebellion of the Nienfei, a remnant of the Taipings, in Ho-nan and Shan-tung (1866) he was ordered again to take the field, and after some misadventures he succeeded in suppressing the movement. A year later he was appointed~ viceroy of Hukwang, where he remained until 1870, when the Tientsin massacre necessitated his transfer to the scene of the outrage. He was, as a natural consequence, appointed to the viceroyalty of the metropolitan province of Chihli, and justified his appointment by the energy with which he suppressed all attempts to keep alive the anti-foreign sentiment among the people. For his services he was made imperial tutor and member of the grand council of the empire, and was decorated with many-eyed peacocks~ feathers.

To his duties as viceroy were added those of the superintendent of trade, and from that time until his death, with a few intervals of retirement, he practically conducted the foreign policy of China. He concluded the Chifu convention with Sir Thomas Wade (1876), and thus ended the difficulty caused by the murder of Mr Margary in Yunnan; he arranged treaties with Peru and Japan, and he actively directed the Chinese policy in Korea. On the death of the emperor Tungchi in 1875 he, by suddenly introducing, a large armed force into the capital, effected a coup d'etat by which the emperor Kwang Sti was put on the throne under the tutelage, of the two dowager empresses; and in 1886, on the conclusion of the Franco-Chinese war, he arranged a treaty with France. Li was always strongly impressed with the necessity of strengthening the empire, and when viceroy of Chihli he raised a large well-drilled and well-armed force, and spent vast sums both in fortifying Port Arthur and the Taku forts and in increasing the navy. For years he had watched the successful reforms effected in Japan and had a well-founded dread of coming into conflict with that empire. But in 1894 events forced his hand, and in consequence of a dispute as to the relative influence of China and Japan in Korea, war broke out. The result proved the wisdom of Li's fears. Both on land and at sea the Chinese forces were ignominiously routed, and in 1895, on the fall of Wei-hai-wei, the emperor sued for peace. With characteristic subterfuge his advisers suggested as peace envoys persons whom the mikado very properly and promptly refused to accept, and finally Li was sent to represent his imperial master at the council assembled at Shimonoseki. With great diplomatic skill Li pleaded the cause of his country, but finally had to agree to the cession of Formosa, the

Pescadores, and the Liaotung peninsula to the conquerors, and to the payment of an indemnity of 200,000,000 taels. By a subsequent arrangement the Liaotung peninsula was restored to China, in exchange for an increased indemnity. During the peace discussions at Shimonoseki, as Li was being borne through the narrow streets of the town, a would-be assassin fired a pistol point-blank in his face. The wound inflicted was not serious, and after a few days rest Li was able to take up again the suspended negotiations. In 1898 he represented the emperor at the coronation of the tsar, and visited Germany, Belgium, France, England, and the United States of America. For some time after his return to China his services were demanded at Peking, where he was virtually constituted minister for foreign affairs; but in 1900 he was transferred to Canton as viceroy of the two Kwangs. The Boxer movement, however, induced the emperor to recall him to the capital, and it was mainly owing to his exertions that, at the conclusion of the outbreak, a protocol of peace was signed in September 1901. For many months his health had been failing, and he died on the 7th of November 1901. He left three sons and one daughter. (R. K. D.)

LILAC, or PIPE TREE (*Syringa vulgaris*), a tree of the olive family, Oleaceae. The genus contains about ten species of ornamental hardy deciduous shrubs native in eastern Europe and temperate Asia. They have opposite, generally entire leaves and large panicles of small regular flowers, with a bell-shaped calyx and a 4-lobed cylindrical corolla, with the two stamens characteristic of the order attached at the mouth of the tube. The common lilac is said to have come from Persia in the 16th century, but is doubtfully indigenous in Hungary, the borders of Moldavia, &c. Two kinds of *Syringa*, viz. *alba* and *caerulea*, are figured and described by Gerard (Herball, 1597), which he calls the white and the blue pipe privets. The former is the common privet, *Ligustrum vulgare*, which, and the ash tree, *Fraxinus excelsior*, are the only members of the family native in Great Britain. The latter is the lilac, as both figure and description agree accurately with it. It was carried by the European colonists to north-east America, and is still grown in gardens of the northern and middle states.

There are many fine varieties of lilac, both with single and double flowers; they are among the commonest and most beautiful of spring-flowering shrubs. The so-called Persian lilac of gardens (*S. dubia*, *S. chinensis* var. *Rothomagensis*), also known as the Chinese or