The pleasure of beekeeping with the Warré hive

Translation by David Heaf of pages compiled by Jean-François Dardenne at http://ruche-warre.levillage.org/Ruche%20ronde.htm.

Contents

I. Making a round hive whose elements are the same volume as Warré elements

Though very comfortable for the bees, round hives are hardly used. I think that is because they are difficult to construct. Let us remember that during the course of earlier centuries, people have always made their hives in the shape of a cylinder. It is only with the arrival of modern beekeeping in about 1850 that the bees were systematically housed in the square or rectangular boxes that are familiar to us.

These few pages show you techniques (among other things) for helping you to make round wooden hives, taking care to conserve the volume of the Warré hive.

Fundamentally the wooden hives we describe tend towards a circle, but have is a polygonal shape. The greater the number of sides of the polygon, the closer it comes to a circle. The volume of an element of the Warré hive is 189 dm^3 or 18.9 litres (210 x 300 x 300 mm). Ideally we should try to obtain a cylindrical element which tends towards this volume.

The round hive with the volume of a Warré only takes up the essential part of the volume of a Dadant (see above). A perfectly healthy state!

Ia. First choice: using a router to make a polygonal element with the same volume as that of a Warré hive box

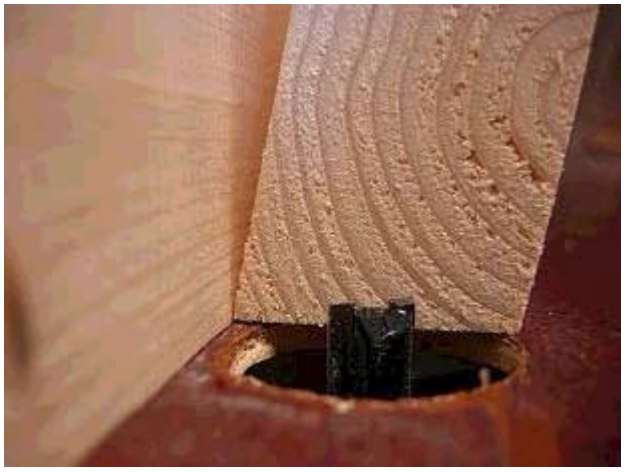
Tooling up is more economical with this method. In contrast to assembly using a spindle moulder (see below), assembly, after routing the edges, needs a false tongue and groove joint. On the other hand, the spindle moulder does not allow accurate cutting of the angle of 11.25° (for a hexadecagonal hive body).

Tools: Planer, circular saw, jig-saw, router, bevelling bits (11.25° for 16 sides, 15° for 12 sides, 22.5° for 8 sides), rebating bit, router bit.

Example: making a hexadecagonal (16-sided) hive element

To approximate to the volume of the Warré hive the wood needs to be 33 mm thick and 81 mm wide. I prefer to use my rebater mounted under a table following the techniques described by Bruno Meyer in *La défonceuse monté en fixe* (The fixed mounted rebater). Here is a home-made rebating table (see below).

The bit's roller is not actuated because the boards are pressed against the guide instead. The boards are fixed together with false tongue and groove joints. The grooves are made with a 10 mm router bit.



Positioning the false tongues (10 x 10 mm).

A circular rebate is made with a rebating bit mounted in a router. Its depth is 10 mm and the guide roller gives a rebate width of 9.5 mm.

The end grain is rubbed down with sandpaper to improve paint adhesion.

Ib. Second choice (for professionals): using a spindle moulder to make a polygonal element with the same volume as that of a Warré hive box

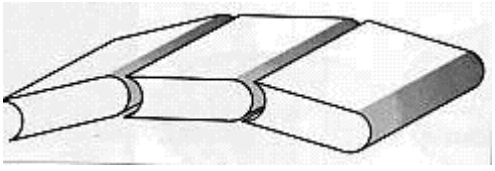
Tools: Planer, circular saw, jig-saw, router, spindle moulder (either tilting-shaft or non-tilting shaft with a tilting attachment), rebating bit mounted in a router.

There is a choice of blades:

1) Tongue and groove (11.25° for 16 sides, 15° for 12 sides, 22.5° for 8 sides)

2) Curved blades (here 15 mm diameter)

Note that the angle of the joint is adjustable, so any diameter of round hive is possible and it saves having to calculate the angle of the assembly.



Example of an octagonal hive

Board thickness (mm)	**External wall width (mm)**
24	158
25	159
27	161

The inclination of the spindle moulder shaft is 22.5°. Calculation of the angle: 360°/8=45°. There are two boards meeting this for each the angle is 22.5°.

A strap is used during glueing.

Example of a dodecagonal hive

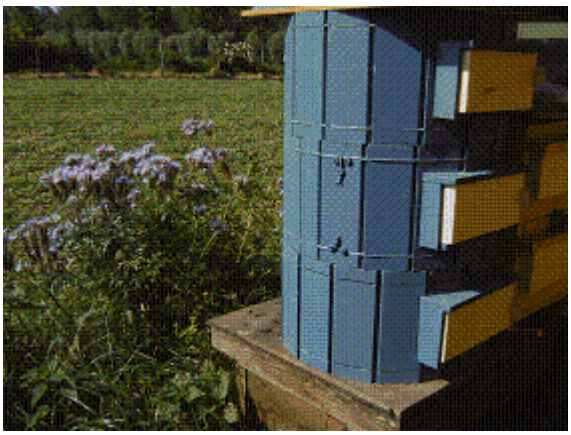
The base of this volume is formed by 12 isoceles triangles. The height of each is 170 mm and their base 8.9 mm. That is also the width of the interior of each board. 12 x the area of the triangle (17 x 8.9 / 2) gives us an internal base area of 907.8 cm^2. The height of 210 mm is retained. The angle of inclination of the shaft of the spindle moulder is 15°. Calculation of the angle: 360° / 12 = 15°. If the thickness of the wood is 35 mm, the width of the board (i.e. its outside width) should be 108 mm. A thickness of 35 mm allows the insertion of a larger window.

For gluing the assembly is pushed into a right angle to avoid possible deformation (see left picture below). During glueing the two window sides are clamped as shown above (see right picture below).

The dodecagonal combination hive of Stéphane Morant (Comines, France)

Example of a hexadecagonal hive

The volume of a Warré hive-body element is 18.9 litres. The height has been kept at 210 mm. As J-M Frères and J-C Grullaume demonstrated in their experiments, this 210 mm chosen by Abbé Warré was not as a result of chance. The unknown is thus the diamete of the cylinder. Dividing the volume (18,900 cm^3) by 21 we get an internal base area of 900 cm^2. Thus applying the formula for the area of a circle (pi x r^2) the diameter of the cylinder is 338 mm.



9 top-bars are used in this cylindrical, on this case hexadecagonal, configuration.

IV. Making the observation window in a polygonal hive body with the same volume as that of a Warré hive

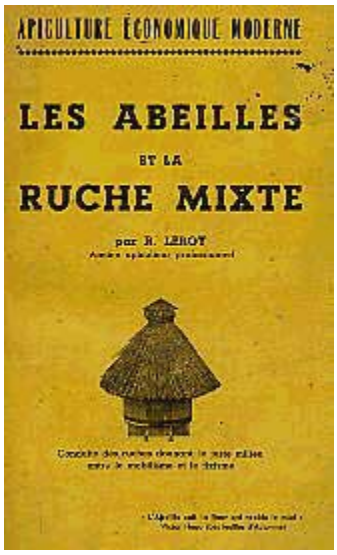
Adding an observation window is inspired by *L'apiculture écologique de A à Z* by J-M Frères & J-C Guillaume (Bastogne, Belgium, 1997)). One can check the development of the colony without interfering with the stability of the internal climate of the hive. Here are some examples. The first is prefabricated and embedded.

The one below is made of four pieces of wood applied to the outside.

In spring, an adapter is used to superpose the Warré 'supers', if the management method of R. Leroy (see below) is used.

II. A brief summary of *L'abeilles et la ruche mixte* by R. Leroy

Some beekeepers have already recognised the value of round hives.



Above: R Leroy's book *L'abeilles et la ruche mixte* (The bees and the combination hive; Publisher: Apiculture économique moderne. 1946) Interior diameter of body: 400 mm; height: 330 mm. Addition of an 8-frame box: 310 x 185 or 310 x 13.5 mm.

This book comprises a foreword, a glossary, 26 chapters and a conclusion.

Foreword: R. Leroy is a beekeeper's son and has lived amongst his bees for 60 years. His father who died in 1937 at the age of 79 introduced him to beekeeping when he was a child. His father was a frame-hive enthusiast from 1900 onwards and they both abandoned fixed comb hives.

During the 1914-18 war, at the front in the Marne, he met an old beekeeper who still had 300 skeps. Having a long enough stay in this region he was able to study in depth his methods with this old hive. Thus his ideas evolved somewhat and he came to realise that the progress brought about at a single stroke by frame hives was possibly exaggerated.

R Leroy did not misunderstand the frames approach. Far from it. He realised that this new practice in beekeeping had given us some undeniable advantages. He had no intention of criticising them. He appreciated the practical aspect of frames which manifests especially at harvest time. There, the system is perfect: a frame super removed every year, extracted, cleaned and returned the following spring gives the bees a considerable start the following year and allows them to move immediately to storing honey, instead of using up the most precious of their resources building new comb.

But for the brood chamber his advice is completely different. In his view, human hands should never disturb the perfection of this structure.

What were the conclusions of his observations? He thought that the shape of a frame hive, which can only be square or rectangular, is totally unnatural.

He wrote: "We have the proof that the healthiest living environment is the skep of our forefathers in which the bees have lived and prospered for centuries. All the beekeeping authors are unanimous in recognising that the old straw skep is the ideal habitation for bees."

And he adds: "Thumbing the old beekeeping books one rediscovers the traces of the skeps with ekes and with domes (conical top chambers for honey only, not to be confused with the hackle) which had already

been used by wise beekeepers a century earlier." He was disappointed that these hive types had not been developed any further after the arrival of frame hives.

And thus he tried hard to remedy this in creating his 'combination hive'. He retained the comfort given by the round shape that had always been used and included for the harvest the advantages presented by the use of the extractor. In fact, why should the tradition and custom of housing bees in round skeps be lost if the frame hive's only merit is the possibility of using an extractor.

He also regretted that it is only possible to make frame hives in wood. He thus looked for better materials in order once again to make the life of the bees in the round hive more comfortable.

His concern to preserve the stable bee climate in the hive in the face of variations in ambient temperature justified his preference for the cylindrical and isothermal shape of the old skep which he constructed in straw with a wooden frame to make it sturdier. This straw-wood structure supported the weight of the supers. There was no fear of sagging of the sides of the hive body under the weight of honey.

Leroy simply had the courage to break with the general thrall with the modern frame hive in his time. Without being at that time faced with the ecological necessities that we are aware of nowadays, Leroy was already looking for 'the best'.

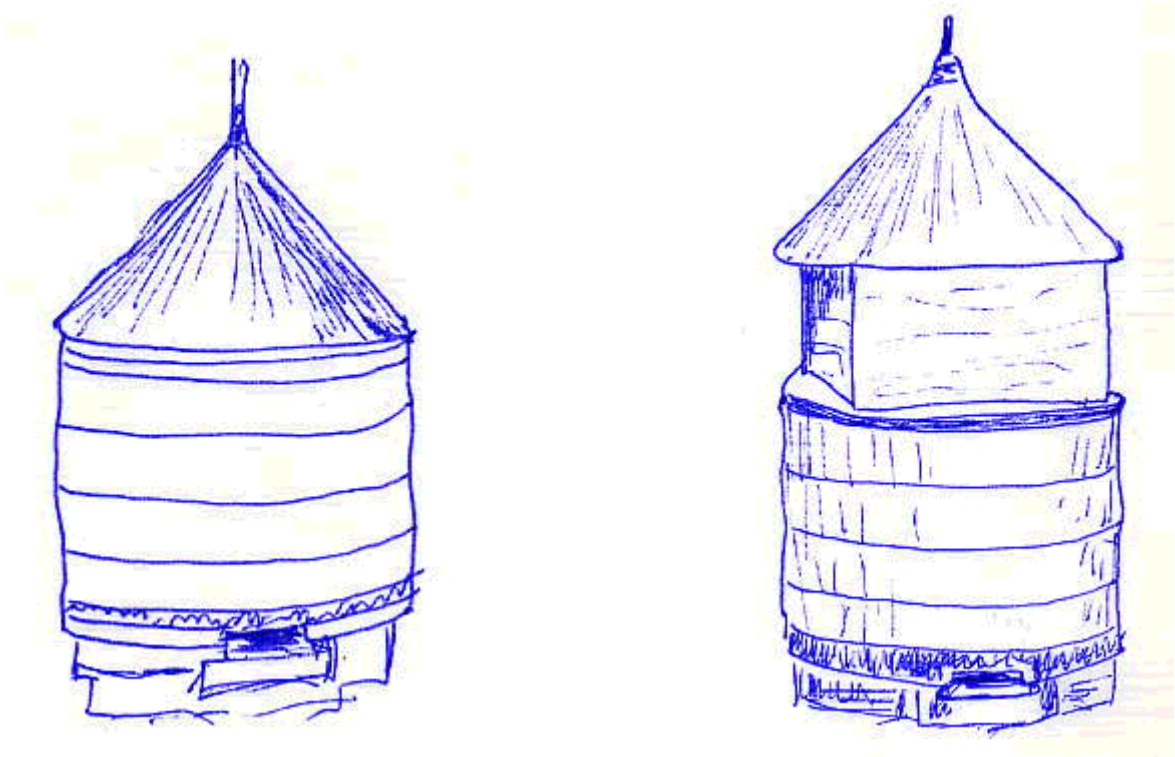
In adding the dome, he had wanted his hive body to come as close as possible to the old skep regarding its bell shape and the indisputable advantages of its essential material, namely straw. He combined it with sawn wood to form the skeleton and 'unrolled wood' (3-mm thick single-ply wood wafer cut from poplar) for the envelope which gave comfort and solidity.

In his glossary, he defined 'fixed comb beekeeping' as the traditional practice of beekeeping leaving the bees free to build and organise themselves in their own way, following their own instinct. He regarded 'frame beekeeping' as a new theory forcing the bees to make their combs in mobile frames that can be moved in the hive for inspections, changes and harvesting etc. 'Combination hive beekeeping' he saw as an approach that keeps to the middle way between the other two, with moveable frames only involved in everything concerning the harvest. The dome is a kind of supplementary hive-body box intended for regulating the stores.

In chapter 4 Leroy describes the characteristics and dimensions of his combination hive. The brood chamber is a cylinder of exterior diameter 500 mm; internal diameter 400 mm; height 330 mm; wall thickness 50 mm comprising pressed straw that has not been bent but arranged vertically and surrounded by wafers of *déroulé* poplar; thickness of déroulé poplar 3 mm. Poplar was chosen especially for its porosity. Capacity: hive body 40 litres; dome 10 litres; super 15 or 20 litres.

Four internal lattices arranged in two opposing crosses are fixed, the first to the upper third and the second to the lower third. They are for preventing the collapse of the combs. On top of the cylinder is a circular ceiling in which is made a cut-out according to the size of the super. The top-bars are fixed to this ceiling. A similar circular piece forms the base of the dome.

The upper conical part or dome generally contains only honey. The dome is the conical top of the hive. It is constructed in the same way as the hive-body and together with it comprises the hive. Its purpose is to provide a reserve of honey which at all times functions as emergency reserves. And in winter the hive is covered with this cone and the beekeeper never takes the honey it contains (5 kg maximum).

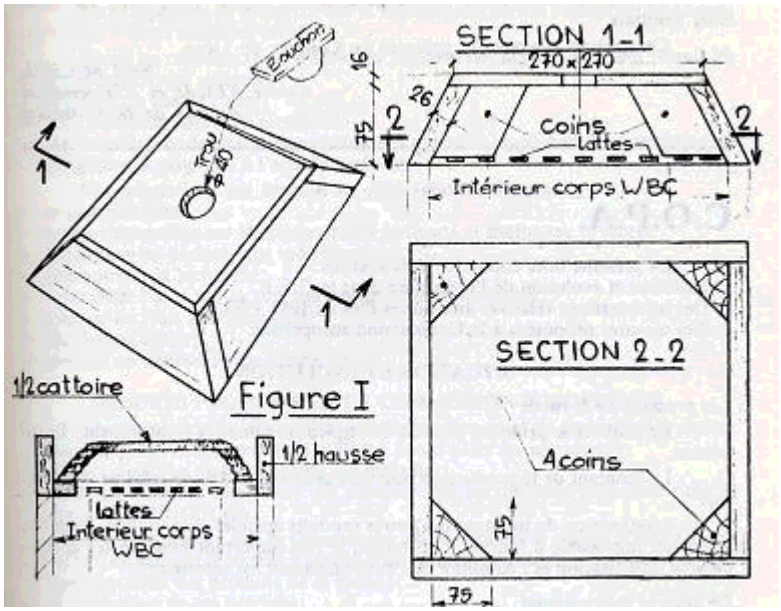


Sketches of Leroy's hive: left: the dome always covers the hive; right: the super is inserted between the hive body and the dome.

The dome idea has been revived by Noël Michel, member of the Centre d'Etude et d'Information Apicole de Mons-Jurbise (Hainaut Wallonie, Belgium). He explains in *La Belgique apicole* (April 1985, p. 61) that the basket with hemispherical form is, and remains, the ideal habitat for bees because it allows them to winter in conditions of perfect hygiene and consumption of stores.

But he regards it as convenient to modify the frame hive because beekeepers will not return to old hives any day soon. He advises getting rid of the crown board of the frame hive and replacing it with a wooden dome.

The capacity of the dome varies between 5 and 7 kg depending on whether it is adapted to a W. B. Carr or a Dadant Blatt hive. The dome contains the winter stores. The bees do not make a start on these capped stores in the 'good season' except in times of prolonged famine. The dome is not taken away from the hive and the supers are inserted between the dome and the brood chamber. The dome is replaced on the brood chamber after removing the supers and the hive is then ready for winter.



Two articles by Noël Michel:
http://ruche-warre.levillage.org/RR%20Article%20de%20No%EBl%20Michel.htm

Leroy's supers for nectar-rich regions contain 8 Layens half-frames (310 x 185 mm). Its capacity is 18-20 kg honey. In less productive regions a shallower super is used (frames: 310 x 135 mm) with a capacity of 13-15 kg. However, any kind of super can be used. Supering is done in mid-April (Ch. 7). The hive is covered with a straw hackle (conical thatched roof).

Leroy's 5th chapter discusses populating a new hive in six different ways. The first two are with swarms either taken or lured to the hive. The third is with an artificial swarm from a colony selected for its qualities and prepared by driving using the traditional method if tapping (see for example http://www.apiservices.com/rfa/articles/essaim_artificiel.htm). The fourth involves transferring comb from another hive: the bees are driven into a holding basket; the brood combs are tied into frames specially made to fit the top-bars of the round hive and the waiting bees returned to their combs. Any stores are fed to the re-housed colony and the rest of the comb destroyed. The fifth method is transfer by superposition: the source hive is placed on the round hive and the bees, now forced to use the round hive's entrance, start making comb on its top bars which are prepared with wax starter strips. The sixth method is driving bees from a skep after the main flow.

Leroy renewed his comb every 6-8 years. To do this he transferred the bees by superposition combined with driving after the main flow. It is preferable not to super hives destined for comb renewal so as to obtain brood boxes full of honey and correspondingly less brood. It is possible to do the transfer by superposition alone in which case there is an 80% chance of avoiding swarming and the aim is fully achieved. The dome is of course replaced on the transferred colony. As it never had brood in there is no need to renew its comb. (Note: There is a similarity between this operation and the total transfer described in *L'apiculture écologique de A à Z* by J-M Frèrès & J-C Guillaume (Bastogne, Belgium, 1997)).

Leroy did not use divisible round hives. However, he was aware of the method – identical to that of Abbé Emile Warré – and recognised its advantages (Ch. 11).

Leroy re-queens a colony with a failing queen by driving the bees out by tapping and then running them back in up a board while watching for the queen. She is caught and destroyed. Alternatively, the artificial swarm is put in a super over a queen excluder on top of the brood chamber. The queen is recovered from amongst the remaining bees in the super. The cage with the new queen can be put between the brood box and the dome or in the gap between two combs.

In chapter 15 Leroy explains why he is against feeding, especially stimulatory feeding. The remaining chapters cover things common to many beekeeping books with a few unusual items such as making a hackle and a discussion of intensive beekeeping.

III. Gilbert Veuille's divisible round hive made of plaster and straw

The following is an article by Gilbert Veuille in the *Bulletin de Permaculture et d'Agriculture Naturelle* (No. 5, Spring 1996).

 Photo Michel Sagaert

Fifty years ago I read in a work by Dr. Mathis, a keen beekeeper, the following key phrase: "the square hive with mobile frames was created for the ease of the beekeeper but it does not correspond to the characteristics of the cluster of bees which should live and develop in a space with a rounded shape".

This observation remains engraved on my memory and in 1989, after the destruction of my apiary by Varroa, I decided to make and experiment on a divisible round hive from a single module with a cylindrical shape that I call the '*rucheton*'. The rucheton is made from a mixture of chopped straw and plaster of the following dimensions: interior diameter 360 mm; height 180 mm; wall thickness 30 mm; weight circa 5 kg. It is made with a very simple mould.

In a space of 360 mm diameter the bees make 8 combs. These are supported by 8 very light top-bars installed in notches cut in the top rim of the rucheton. The hive is constructed by stacking ruchetons. Three of them are the minimum for forming the brood chamber and then up to a maximum of 8 according to the strength of the nectar flow.

After six years of observation, here are the conclusions I can draw from this experiment:

1) The quality of the cylindrical shape for the life of the bees:

The complete absence of corners eliminates air currents and allows a higher and more uniform temperature to be maintained that favours the incubation of the brood and the work of the wax makers.

Not being subject to the constraints of frames (encumbering mass of wood and artificially created gaps) the bees have total control of their living space which gives rise to the following:

- the 8 combs are built without interruption through the entire height of the hive according to the number of ruchetons and they rarely contain holes for transverse passages
- the combs are only fixed to the walls at spaced out anchorage points; the interior traffic of the hive largely occurs via this peripheral clearance
- with the absence of internal corners there are no spaces prone to condensation, mould, development of pathogens, or invasion by parasites or predators.

The visible results show good colony health as evidenced by the total disappearance of mycoses and a remarkably early development of the colonies with the first fine days in March.

2) Renewing the combs in the brood nest.

This is an easy operation. Each spring it suffices to slide a rucheton with wax starter strips on top-bars under the brood chamber. This is filled with comb and occupied in the following weeks with the brood installed on the new comb.

3) Materials used

The chopped straw and plaster mix has excellent insulating qualities against external heat and cold alike and its porosity avoids condensation or excess humidity. It is also very resistant to weathering. Ruchetons in service for 6 years have suffered no deterioration and could easily last 15 years.

The round shape of the hive also augments the insulating qualities because it avoids the exposure of flat surfaces to the heat of the sun in summer and cold winds in winter.

4) Making the ruchetons

Ruchetons are easily made on a do-it-yourself basis from a mould that is cheap to make. The outlay on ruchetons is modest. With a little practice it is possible to make 8 or 9 ruchetons with 40 kg builder's plaster.

Something other than plaster could be used, building lime or raw clay. The straw could be replaced by various dried plants with hollow or porous stems, such as *Phragmites* reeds, nettles, tansies, *Artemesias*, sunflowers etc ... or indeed by wood shavings (resinous untreated wood).

Nota bene: using ruchetons of raw clay requires particular mixing precautions and the necessity of placing the hives under a roof that protects it completely from the rain.

The management of the hive during the course of the seasons is very simple. The honey is harvested without an extractor which is the best way of conserving all its natural qualities.

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