

Abbé Warré's 'People's Hive' as reconceived and used by Roger Delon who renamed it the

Stable-Climate Hive – 'Nature's Method'

*Translated by David Heaf from the web pages at
<http://ruche-warre.levillage.org/La%20Climatstable%20de%20Roger%20Delon.htm>
which were written by Jean-François Dardenne on the basis of articles by Roger Delon*

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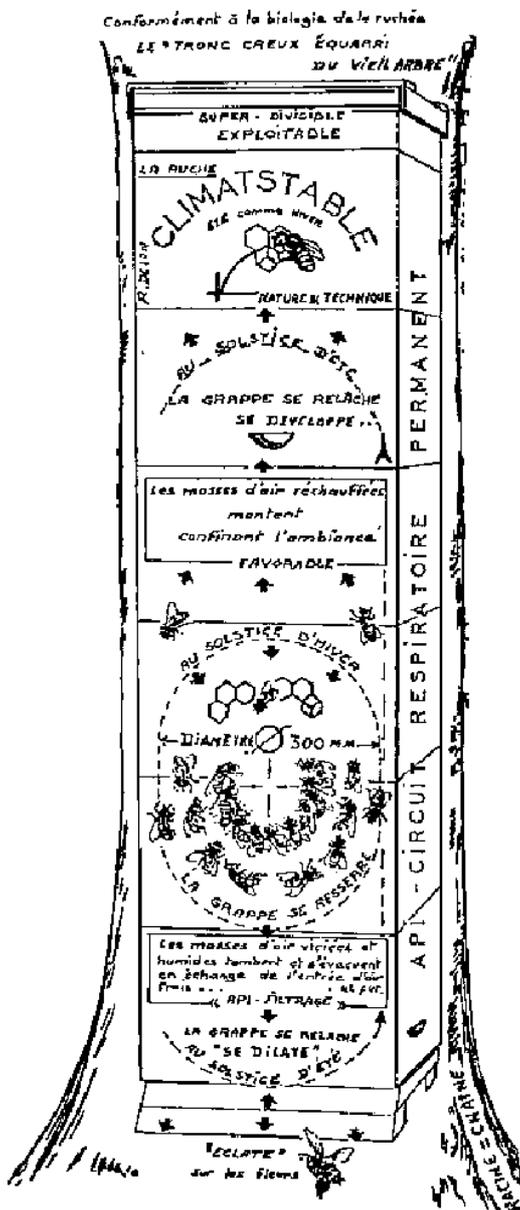
Roger Delon – The Stable-Climate Hive

The stable-climate hive was inspired by Abbe Warré's *People's Hive* which Roger Delon revised and applied with great success.

About Roger Delon (1919-2007)

Professional beekeeper specialising in bee health; manufacturer specialising in apicultural technology; inventor in 1945 of apicultural electronics used for monitoring apiaries and for research; several times prize-winner at international inventors' competitions; winner of prizes from the Ministry of Agriculture and at Apimondia; gold medal winner at the Chamber of Inventors. International recognition: First International Apicultural Exhibition and Fair at Bucharest in 1965, on the occasion of the 20th International Jubilee Congress of Apiculture; Diploma Se acordà medalia 1965; Prima Expositie-Tirg International de Apicultura. Author of: 'The Integral Stable-Climate Hive'. The following French and foreign patents, *Certificats d'auteur*: France no. 1.112.037, Switzerland no. 325.750, Italy no. 531.152, Luxemburg no. 33.631, Belgium no. 539.357.

Roger Delon had some 600 hives distributed over a range of 120 km in width in the Vosges and Jura region of France and Switzerland. He also practised migratory beekeeping (transumance). With internal dimensions of 300 x 300 x 215 mm his hive-body box was almost identical to Warré's. Some of his main departures from Warré's approach include the use of a special type of metal frame with foundation instead of no frame at all, and a synthetically insulated vapour-impermeable crown board instead of Warré's moisture absorbing quilt.



Left:

Roger Delon's sketch of the hollow tree idea on which his Stable-climate Hive is based

Translation of inscriptions in the sketch:

- conforms to the biology of the colony
- hollowed out trunk of old tree
- multiply divisible, profitable
- the stable-climate hive in summer just as in winter
- towards the summer solstice the cluster expands, develops
- warmed air rises, retaining a beneficial atmosphere
- towards the winter solstice the cluster contracts
- 300 mm internal diameter
- stale, humid air falls and is discharged, exchanged at the entrance with fresh, clean air
- foragers 'bursting' with energy
- (side) permanent respiratory circuit for the colony

With eyes wide open

Let us discover bee colony climate stability in the hive...

Let us observe in nature the artist 'Apis mellifera', generously sharing her wisdom for millions of years

A bee colony needs shelter. It finds a crack in a rock or in the hollow trunk of a tree. It is a habitable space providing good insulation that gives best possible support for the life of the cluster whose normal diameter is about 30 centimetres. It is a moving mass that is very contracted in winter, but whose volume can quadruple according to the laying capacity of its queen.

Let us observe the colony in its shelter. It instinctively creates in its cavity a bee colony climate stability that is necessary for its survival ...

Its combs always have a hermetic attachment at the top of the honeycomb cluster.

The vertical edges of the combs in the chosen cavity are always fixed to its walls. This sticking of the combs to the walls is greater at the top by the honey than it is lower down by the brood nest.

The combs are always extended freely downwards.

Beekeepers who are mindful of what nature teaches, and who want to respect the bee's intentions, will choose 30 cm wide combs. We thereby allow them to extend as the colony develops and descend for as

much as 150 cm from the top, sometimes more. Such combs help the bee to easily maintain stability in the climate of the hive.

Swarming is essential. It may take place in the second year. It assures the continuity of the bee race (requeening) and satisfies complementary hygiene requirements through construction of new comb.



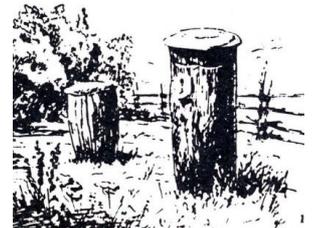
Left:

A 5-box stable-climate hive display entitled 'The stable-climate half-frame'

(Note that the number of boxes exceeds 3,000.)

Bee colony climatic stability

- Perfectly healthy wintering
- An early and vigorous start
- A high productivity for the beekeeper



Why does a colony constantly maintain climatic stability? ...

... in order to survive.

As it pushes into its food reserves, the colony, through its mass of bees, instinctively establishes climatic stability. It maintains an almost constant temperature (34, 35°C for the central part of the cluster) while economising in the use of energy by the bees in their physiological and biological processes.

The warmed air, being lighter, ascends and spreads out at the top of the colony where there is constant and precise stabilisation of the optimal climate, while the heavy gas (stale; carbon dioxide laden) falls together with excess water vapour, condensing as it descends, especially near the entrance. A very well insulated crown board prevents condensation at the top.

The colony constantly takes care of the regulation of its climate and controls the ascending and descending currents of air.

Heating this microclimate is achieved by muscular heat production (buzzing).

The rate of expulsion of stale air and excess humidity, replaced by the incoming fresh, clean air that is soon warmed up is proportional to the ventilation activity of the cluster, for example, at times of strong nectar flow and the arrival of moist forage.

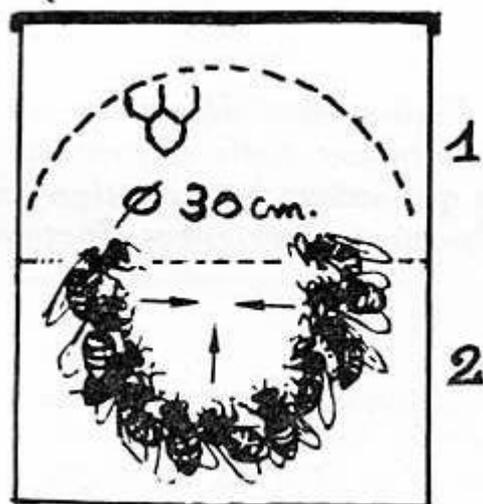
In winter, when the colony has no brood, the bees pack themselves closely together to avoid the cold. In doing so they form a cluster that contracts and expands according to the outside temperature.

In summer, when the temperature is higher and has reached an ideal level, the bees have to cool the atmosphere by evaporating water (vapour diffusion caused by ventilation).

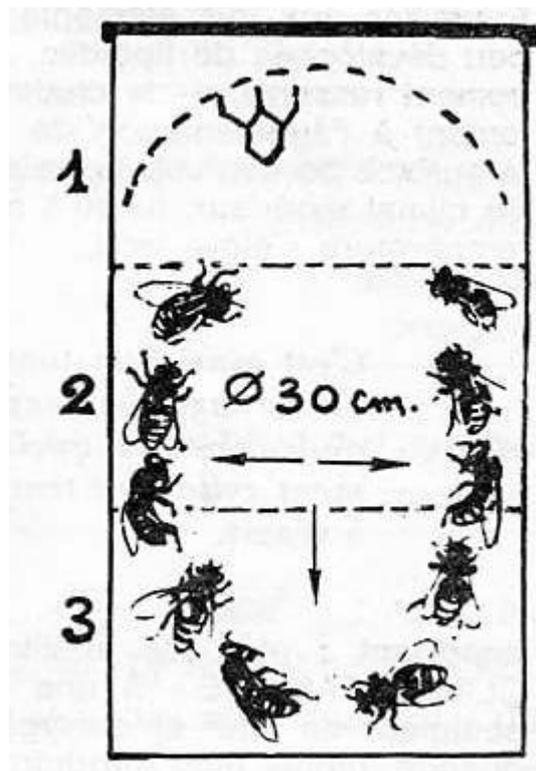
The air-conditioning of the hive applies to the relative humidity too, because the brood cannot tolerate desiccation. In this case the action of clustering of the bees and the evaporation of water allows them to maintain a satisfactory humidity.

Stability of the climate inside the hive at the same time ensures the economy of physiological and biological energy production of the colony, which is fundamental and essential to its survival.

Perfect wintering and an enthusiastic spring start depends on the quality of climatic stability in the colony. It is this which creates and holds the favourable conditions necessary for the construction of the beginnings of combs, for brood development and for ripening the honey.



When it is cold the cluster contracts



When it is warm it expands and develops

The more the bees can save the energy spent on stabilising the climate, the less they consume of honey and oxygen for caloric combustion, and, as a result, the less they produce asphyxiating gas and water vapour.

However, the bees need droplets of water and they store and collect them even in winter, and, in summer, as much as for rearing brood as for humidifying.

Tolerating a certain amount of carbon dioxide in the hive only slows the biological activity of the colony in winter.



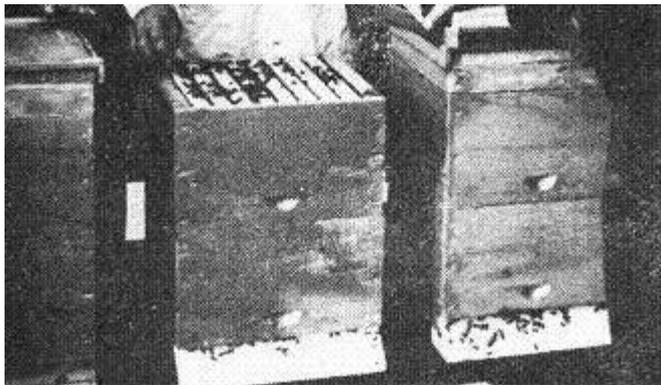
All our research involves observing the nature of the bee and reconciling its way of life with a natural hive – to the great benefit of the bee, yet profitable for the beekeeper – and with a beekeeping technique which favours stabilisation of the climate of the cluster.

The kind of beekeeping we support is simple, practical, standardised, healthy and productive. We propose:

- a single type of mobile frame for 'auto fixation' (for the bees themselves to fix the comb to the hive sides),
- a single type of hive-body that becomes brood box or honey box, which together constitute the hive in which the stabilisation of the climate is respected,
- a natural method of high productivity, simple, practical, certain, which resolves the problem of swarming, its cause being understood.

How can we help a bee colony to find its optimum temperature?

Above all the beekeeper should try to give his bees a home whose design impedes the formation of condensation.



In our design of stable-climate hive, a small amount of condensation forms only at the bottom, because of the ventilation at the entrance, and it is discharged as a result of the floor being slightly inclined towards the front. This takes place without cooling the colony and without causing the development of moulds or favouring the presence of pathogenic micro-organisms.

The bees control the entire volume of their home and, so to speak, all the combs.

In hives without stable-climates, however more popular they may be, condensation appears at the top and sides of the colony and cools it, making the combs mouldy, and the bees occupy only a part of the combs, generally two-thirds.

Note that a well insulated hive that does not have climate stabilisation, a polystyrene (styrofoam) one for example, or better still, one built with double walls enclosing sealed cavities of air and under a plastic covering, also suffers condensation, even in temperate climates.

What future for the bee?

One may regret that ignorant humans invert, upset and violate the permanent air-conditioning, for both heat and water vapour, harmoniously stabilised through the essential nature of the bee.

The cluster always seeks a reduced volume to fix, weld and adhere its combs. It thus establishes its thermo-climatic reserve supply at the top in the dome of honey, and seeks to evacuate via the bottom the heavy stale gas and the excess condensing humidity (water vapour is driven downwards).

Hives of sizes chosen by rule-of-thumb methods (Dadant etc.) have existed for 150 years, violate the misunderstood biology of the colony. They stress it, diminish it, give it a cold, ill-suited shelter that is not heat-retaining, that is equipped with frames which are not fixed and are too long, allowing air currents that the cluster cannot control, especially in winter.

The presence in the hive of voids that the cluster cannot control causes a dispersion and dissipation of heat. In winter this cools the hive and often makes it dangerously humid. To compensate for these phenomena, the bee is obliged to expend considerable energy.

Without being fully aware of this, some beekeepers create something even more disastrous: a 'humidity condensation chamber'. These shelters of inappropriate sizes favour the development of microbes and dangerous parasites that cause diseases to appear, and which force the colony to react by consuming kilos of stores from which more humidity results.



Thus, to complete this heresy, some make a hole in the crown board that is used in winter, letting kilos of honey out as heat, which reduces vitality and can gradually make the colony die out.

Believing they are doing good, to compensate for this deterioration, some have found nothing better than to feed with industrially produced sugar. In fact they are again compounding this double degeneration by artificial food that is harmful and useless, because it provokes a vicious cycle of premature attrition.

People must admit that choosing hives whose volume is inadequate causes:

- a bad placement of winter stores, situated at the extremities and sides of the frame rather than above the cluster,
- the need to enlarge the hive in spring whether at the top or side which disturbs the stability of the colony climate,
- the non-regeneration of the combs and the difficulty of systematically renewing old comb,
- the non-renewal of queens and absence of selection,
- inopportune manipulation in cold, wet weather based on methods that go against nature and are illusory or hazardous.

All this unfortunately brings to the colony a serious predisposition to epizootic disease and exhaustion.

Only those who have hives situated in hot or temperate climates with mild and short winters, and at places where there is plenty of nectar, can find relative prosperity. Nature, always benevolent and indulgent, moves to balance a little the error of the novice beekeeper, which is committed to the detriment of the prosperity of beekeeping and which makes the productivity of apiculture recede.

Certainly it happens that the bees left to themselves, for want of anything better (formerly having nothing more at their disposal than hollow trees), use a less suitable (even horizontal) cavity, but it is always at the cost of the energy used in stabilising the climate of the cluster.

Materials absorbing humidity are not insulating.

In the integral, stable-climate hive, the insulated crown board and the insulating vertical walls of the hive must not absorb humidity, neither internally nor externally. The whole thing should be water repellent.

The wood is immersed in creosote (*carbonyle*), then, several months later, dipped a second time in linseed oil. After drying it should be given an exterior water repellent coating.

Do not forget to hot impregnate the interior of the hive with wax or propolis with the help of a flat-iron.

In winter and spring, it is a good idea to add a plastic cover, black or transparent, warming in the sunshine, thick, hermetic, enclosing a 'cushion' of dry air between it and the sides of the hive. It should be sealed at the bottom with a strap or belt. Such a covering has a strong heat retaining capacity superior to one of thick, fragile and inconvenient polystyrene.

The Stable-Climate Hive

It is an amazing hive that lets the clusters explode with vigour onto the spring and summer flowers.

This hive, divided into identical boxes, has many qualities. It is adapted to the bee, natural, manageable, dismantlable and robust. It is at the same time the most perfect, simplest and most practical. The most modern and the furthest evolved. Moreover, it is the all-purpose hive.

Its principle has been created by the bees.

It encourages: integral stabilisation of the colony climate without heat dissipation; the spring build up and the construction of new comb, a sign of a good state of health. It is a hive always suited to the size of the cluster: small for nuclei-swarms, large for production. This hive is a well-fitting garment for its occupants. It fits the cluster from wintering to foraging. It satisfies the wellbeing of the bee and makes beekeeping procedures easier. It can be tall with many removable boxes containing short, shallow, mobile frames and is initially extended at the bottom.

The productivity of a colony housed in a stable-climate hive is increased because the bees do not have to exhaust themselves by wastefully reacting to the discomfort of their habitation. Their energy is used to advantage and redirected to the harvest. Finally, they are more resistant to diseases.

Also, they find themselves stimulated naturally once again with a prolific queen in the middle of a vigorous family, abundantly supplied with provisions in a comfortable, natural, but profitable hive. The stabilisation of the hive climate in winter and spring resembles that established by nature.

The hive can be installed singly or grouped with up to five on a special stand which forms a pavilion that withstands strong winds; a wall of highly melodious sounds, chained and padlocked in order to prevent theft. Moreover, this stand is very useful for the storage of equipment in the open.

The stable-climate hive can become a very large hive. Composed of several small elements or hive-body boxes, it can be divided and separately made into stable-climate nuclei. Thus, one box becomes a nucleus hive.

Characteristics of the stable-climate hive

Inside dimensions: 300 x 300 mm; exterior 360 x 360 mm. Height 215 mm (1).

Thickness: 30 mm.

Assembly: unopenable vertical halved-joints (lap joints), 7 nails in each direction.

Built-in castellated spacers for 8 combs.

Materials: top quality pine, planed on both faces, immersed in creosote (*carbonyle*), followed months later with a second immersion in linseed oil prior to assembly, painted outside with two coats of aluminium thermopaint, heat impregnated on the inside with beeswax.

Average weight finished, without frames: 4.15 kg.

(1) *The height of the Abbé E. Warré's People's Hive is 21 cm.*



Advantages of the floor used by Roger Delon (source 1965):

- Entrance sloping at an angle of 45° with a minimum entrance height 7 mm, on which neither rain nor snow can accumulate. The cleaning of the entrance is continuous.
- The entrance can be enlarged or reduced by sliding the hive-body, that is directly seated on the floor forwards or backwards; the air flow is regulated by the bees and propolis. It receives light by reflection.
- Heating through reflection in spring, except from the midsummer sun (shade).
- Easy passage of adhesive tape, elastic bands or straps, or even hoop iron, whether for binding or for tension.
- Bulkiness reduced in transport, although flight area retained. Impossibility of suffocating the colony.

Colours: red, yellow, blue, white, green.

Material: 30 mm thick pine, including its two feet, all immersed in creosote, then in linseed oil before nailing, assembly and painting.

Sides: see illustration above (its parts are standardised in length and thickness with those of the body).

Average final weight of floor: 2.8 kg.

Faced with living with Varroa, it is nowadays useful to adapt the floor and fit it with a mesh screen.

Below are two views, top and reverse, to help you construct it.



Cover cloth, 360 x 360 mm: when it has served its time it can be used as fuel for the smoker, or for harvesting propolis. The water resistant (impermeable) insulating cover (360 x 360 mm), total thickness 30 mm, a chamber of dry air trapped in a frame covered with two sheets of hard *Isorel* nailed together with eight nails.

Roof: frame for air spaces, enclosing 362 x 362 mm.

Cover (optional): flexible plastic, transparent, thick and bound at the bottom to form trapped air spaces; it protects from rain, humid cold and heats up in the spring sun.



Roof: rigid steel, for covering between two and five hives, 2 m long, boxed and having a notch at either end for chaining; it is numbered front and back (stand number).

A padlock and its plastic cover.

It is unfortunate to have to speak of anti-theft in work dedicated to the bee! Without wishing to make a pun of the term 'anti-theft' [the French word '*antivol*' means anti-theft but also could mean anti-flight, *Tr.*], unfortunately speaking of such a thing is sometimes necessary. The notches at the two ends of the roofing sheet allows the passage of the chain which is inserted under the stand and fixed with a padlock.

Secondary accessories (that do not change anything about the hive):

- special and simplified pollen trap for the entrance,
- small box for producing royal jelly,
- entrance grille, especially for daytime transport,
- special feeder (optional),

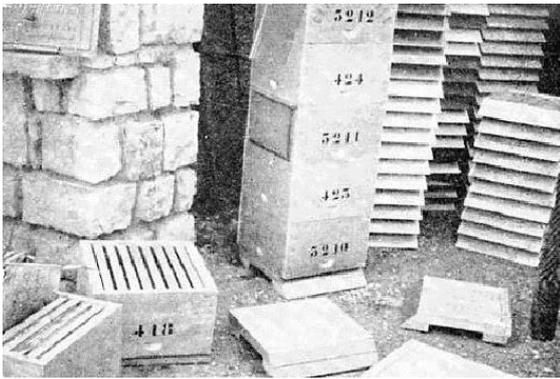
Useful accessories

Two studs of 15 x 40 x 20 cm; cement aggregate each fixing a tarred 11 mm chain 3.5 metres long (folding into a hollow in the stud for transport).

A stand of 180 x 36 cm, fitted with slots for chaining between two and five hives.

A 2 m long apron of tarred sheet steel, with spurred hooks inserted in the studs before placement of the stand (this sloping surface impedes vegetation growth, keeps out the humidity of the ground and allows the hive 'cleanings' to be viewed).

- transport straps.



Left:

The beekeeper has to set out his stocks: not only his standard materials but also his reserves of combs of honey.

The frames of the stable-climate hive

Let us build a hive that is adapted to the bee and at the same time profitable for the beekeeper.



Beekeepers wishing to work with the classic 'Warré' hive may use this system of quick fixing



of the wax foundation.

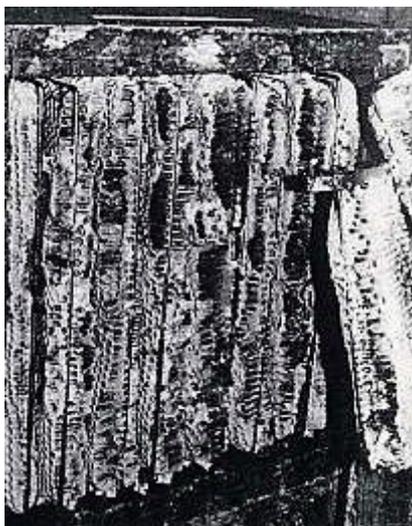
The frames of the stable-climate hive are quick to assemble.



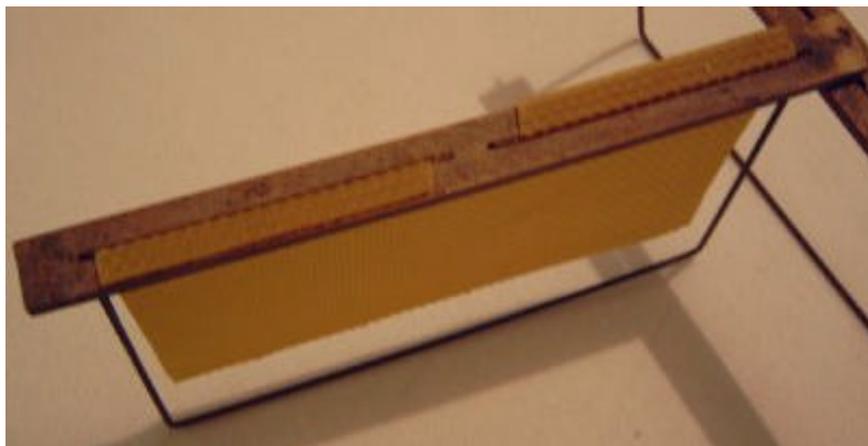
The two parts of the frame, wooden top-bar and metal rod are rapidly fixed together. It is sufficient to introduce the two bent ends of the rod in the holes at the ends of the top-bar.



A piece of foundation of a chosen size is quickly inserted into the grooves of the top-bar. The bees hasten to reinforce the fixing with propolis then draw the first cells at the top, welding them to the top-bar.



Above left: Once constructed, the frames are no more than reinforcements embedded in the insulating wax. Left: bottom view of combs; right: end view of frame with comb



Above right: The sheet of foundation is folded on one side to the right and on the other to the left.

The work of preparing the frames is really simplified:

- 'lightening' insertion of the foundation and rapid fixation,
- gets rid of the irksome little wires of tinned steel,
- gets rid of nailing, sticking, etc.,
- assembling, mounting, removing and reinserting a frame is practically instantaneous,
- equipment less cumbersome.

In the frames of the stable-climate hive, wiring is unnecessary because the surface area is small. Also, for extracting certain honeys in a professional radial extractor, the addition of wire cages, once and for all, is easy and quicker.

The frames of the stable-climate hive play a part as partitions, especially during the formation of a nucleus. There are as many double walls as there are combs near the wintering cluster.

The frames permit, facilitate, and stimulate the continuation of the comb and laying towards the bottom, as well as the passage of bees from comb to comb. They facilitate the ascending and descending 'respiration' of the hive.

They become the most beautiful combs, with the foundation being well secured at the top and the rest hanging free. They form between one and six sections of honey (or more).



The rapidity of construction of comb in the stable-climate hive, allows the beekeeper to replace them regularly. This regularity is a health factor.

When the hive is opened, the frames of the stable-climate hive are fixed and detached with ease. The wax of the comb attachments to the sides of the hive is soft. The irregularities of the circumference of the comb project slightly and more noticeably towards the top.

The combs in the hive are well

supported and secure. Here is a personal experience: a transhumance in France with the addition of crossing Europe twice in a small truck for the first international apicultural exhibition in Bucharest in 1965, there and back, was made with no problems regarding damaged combs. As the bees are given well secured combs, there is no risk of crushing them or the queen.

Everything is easy: uncapping, extraction (small surface), cutting (honey and pollen in sections), transference of frames and movement of hives at transhumance. Sterilisation with boiling water is possible.

The stable-climate hive allows use of frames which offer a real economy:

- economy of honey for the bees (by their stabilisation of the colony climate),
- economy of time for the beekeeper: automation of construction and assembly,
- economy of durability: one need only procure frames once.

In summary, these frames of the stable-climate hive remain the cheapest in use. Add to that the receipt of greater profits seeing that one harvests a lot more honey.

The frames seem short but are tall in superposition and continuity. They are best arranged cold-way.



Above left: bending the rod serially: Taken from an exhibition panel by Roger Delon, the photo of a 4-angle bender made by a friend of Delon.



The 2-angle bender used by Roger Delon.

Recovering wax

For home recycling the wax scented by your bees.....

To avoid buying wax of doubtful provenance, Roger Delon, a self-sufficient beekeeper, recycled his wax.

He constructed and marketed the *Ciromatic*, a simple cranked apparatus equipped with cylinders for embossing dry beeswax, without using soapy water.



Left: dry embossing with the *Ciromatic M.A.T. 37*

Method

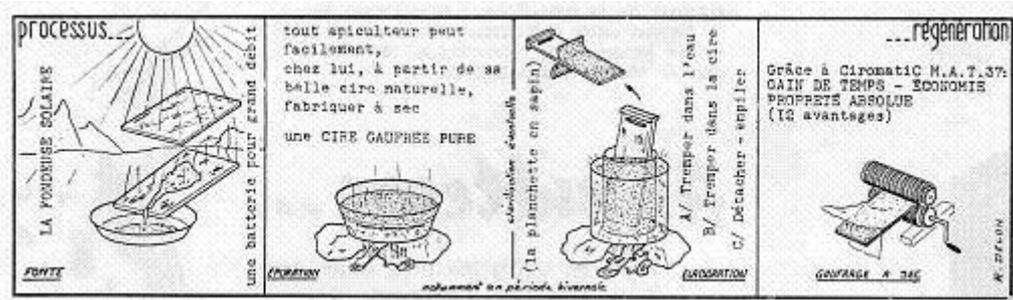
1. Melt the combs (not chemically treated) and cappings wax in a solar extractor (see diagram below, panel 1).

2. Purification: any beekeeper can dry manufacture pure foundation at home, especially in winter, by using their own beautiful natural wax (sterilisation possible). (panel 2)

3. Making sheets: a pine board is dipped in water and then in melted wax. After cooling the new wax sheet is detached and

stacked (see diagram below, panel 3).

4. Embossing: flattening and embossing are done simultaneously without adding soapy water or any other liquid pollutant to the cylinders. The wax sheet is placed between two thin sheets of plastic before being passed through the *Ciromatique* which gives them cells with a good relief (see diagram below, panel 4).



Processing wax: Gains time – Economical – Absolute cleanliness (Roger Delon)

Preparing for harvest

We describe a natural, simple and practical method which solves the problem of swarming and guarantees increased productivity. It is a method which reconciles the nature of the bee with beekeeping techniques.

Experience shows that perfect climatic stability in a bee colony assures maximum productivity from a young queen of good lineage. It follows from this that the number of active healthy bees increases, depending on their food supply. The hive becomes populous and productive.

The particular dimensions of Abbé Warré's People's Hive, revised by Roger Delon and renamed the 'Stable-climate Hive', help the colony to make itself perfectly comfortable. The latter has to respond only a little to maintain its climatic stability, and thus a good number of bees, now set free, foragers included, no longer have to be assigned to this occupation.

The renewal of combs becomes rapid and regular. A colony hived in a stable-climate hive enjoys a high standard of hygiene. For the standard of hygiene of a hive is the most important thing. Let us not overlook that the construction of new comb inhibits swarming.

The technique for creating a population surplus by uniting several hives, by various devices, is no longer justifiable. It is no longer of any interest or use for us! On the contrary, the technique brings complications and inconvenience as well as causing difficulties.

On the other hand, grouping hives side by side gives each colony the opportunity of emulation, because of the buzzing and the trophobiotic traffic on the alighting boards. That creates a supplementary factor for productivity.

The stable-climate hive allows application of a pleasing method of management according to the nectar flow situation, favourable anticyclones, pollens and nectars (honey and honeydew) which incline to foraging. This kind of beekeeping will as a result considerably increase apicultural productivity.

100	5	90	88	100
20	117	150	95	92
30	97	175	101	100

Some simple and reliable principles

In what conditions should we place stable-climate hives to maximise apicultural production, whilst always avoiding spontaneous swarming?

There follow seven fundamental beekeeping principles:

1. Try to obtain a large number of bees

A nucleus can overwinter in a single stable-climate hive box. For a normal colony at least two superimposed boxes are needed for overwintering. But for a very strong colony (excellent queen), three superimposed boxes are needed in winter.

Colonies always overwinter under a top hive-body box totally filled with honey by autumn. If it has filled with honeydew, it needs replacing with floral honey.

Each element or hive-body box of the stable-climate hive, with internal dimensions of 30 x 30 x 21.5 cm (1), includes 8 frames that allow the continuation of combs above to those below.

(1) Other references: Warré 21 cm high; Gatineau 21 cm; Guillaume 21 cm.

The queen should be young (1–2 years), vigorous and selected.

At the start of intense foraging in spring, the hive is extended by one box underneath at the bottom containing built comb. In this way there is no cooling. This lower box can contain extracted comb and be placed even in the autumn.

Note: The best stimulus in spring is climatic stability of the colony. Another is partially scraping honeycomb. But in this case it is necessary to open the hive and the colony will have to work for two or three days to restore its climate. Stimulatory feeding, with maize pollen for example, also helps.

2. Factors giving populous hives for strong foraging

To ensure strong foraging, laying should never be stopped or prevented. But possibly, for variation, at the start of an intense and short main nectar flow, one could simply remove all the frames with the young and new brood, without bees, except one comb. The frames removed are replaced with ones with fresh foundation. These frames of brood are used to reinforce very strong colonies intended for breeding, or to prepare other hives for second nectar flows or for transhumance.

3. Biennial requeening all hives at the main nectar flow should be effected systematically

It is known that a young, selected queen in her first year has a high rate of laying and a very weak tendency to swarming.

Given that the stable-climate hive offers a standard of physical conditions that allows easy application of a technique for breeding and selection of queens, biennial selective requeening can become automatic.

Be organised: keeping record cards of colony yields is essential.

4. Principles of good selection

- First principle: only keep strong, vigorous and healthy colonies. Never tolerate those that are valueless or in precarious states of health.
- Second principle: raise queens that only come from good quality lines (acclimatised race, of selected qualities, non-swarmy).
- Third principle: mate with good quality males coming from selected lines, so as to avoid inbreeding.

What fate is reserved for the weak colonies? With the intention of later adding a new selected swarm, after smoking them as usual, the weak colonies are united one with another, if possible three kilometres away.

Looking for all the bad queens is thus avoided. After a while these colonies are united by superposition and smoking as usual. A swarm is immediately added below. The new and young queen is more agile and automatically replaces the worn out, exhausted or poor queen.

Little by little, with this procedure, the males of poor lines and the eggs of poor queens are replaced.

All these operations are best done at the time of transhumance, or later, in the autumn.

5. How do we recognise a colony that is to be selected?

Read the previous records on genetics: all the few colonies, lines and swarms that despite normal management have swarmed, are immediately considered 'bad'. All are dispersed for strengthening purposes, therefore discontinued.

Deduce which is the best colony according to the records. Take into consideration:

- the maximum production of honey in the preceding year,
- a strong population at all times,
- the foraging activity,
- a locally adapted race that has proved itself.

6. Natural swarm versus nucleus:

Let us compare the evolution of a spontaneous natural swarm and that of a nucleus colony comprising brood of all ages and a queen cell obtained by the method of splitting (see below our method of raising queens). A spontaneous natural swarm seems at first more vigorous than a simple split. But soon the so-called split, having been selected (nucleus colony made of brood and a queen cell, obtained by splitting) catches up with and overtakes the natural swarm. It is superior to it, unless, only as a last resort, one has grafted in or introduced a new selected queen, after queenlessness.

But take care! This split colony is absolutely nothing like an artificial swarm composed of bees 'prefabricated on sugar', shaken out of several colonies, without brood, and had a queen imposed on it who is likewise 'forced' on sugar. Everything fed sugar is often put in 'cold and damp' close confinement.

7. Transhumance

The stability of the colony climate plays its full beneficial part, especially during motorised transport. The hive entrances are left open or fitted with mesh. On arrival, if there is anything to be done, it is possible that one must lightly smoke them to make the bee-beards go back in.



The stable-climate hive during transhumance in the Vosges (1976)

Note: One can leave a few hives at the centre of the departure site, because there are always some bees still to come in, even when the hives are removed at night.

Might we possibly suppose that, in summer, bees on certain flowers at dusk sleep until dawn?

Swarming

Swarming is vital for bee colonies. It answers an instinctive necessity and requirement for development and reproduction. Indeed, it is a natural regeneration process which instantly rebalances the vitality of a colony with the object of survival.

Other harmful factors can intervene to reduce vitality and push the colony to swarming. For example, shortage of food, drought or bad weather during the main nectar flow.

Having regard for a number of factors against swarming, there are means to reduce, prevent or stop disastrous spontaneous swarming and to substitute artificial swarming that is within reason, productive and prosperous for the apiary.

How is swarming avoided?

Obtain young queens with peak vitality, selected and of a non-swarmy line.

Gradually enlarge the hive anticipating the expansion of the colony, underneath at first in spring. To encourage rapid expansion of the brood nest, enlarge in its centre, if, of course, the conditions are favourable. At the main nectar flow, in warm weather, for accumulating honey, enlarge the hive at the top, for example by adding a box of frames with foundation.

Increasing the level of vitality to the highest degree, by selected mating avoiding inbreeding, solves the problem of natural swarming. Finally, it is having regard to several stated factors that stops swarming and frees the beekeeper from obsessional surveillance.

Rare natural swarms are always hived on a comb of honey and a comb of brood of all ages. Later, its health is checked. Its frames are dispersed in other hives and a queen of a suspect swarmy line is killed.

Well managed hives ... profitable production

To produce, it is necessary to classify, select and breed.

Good apiary management requires that the beekeeper classify his colonies while taking account of the age of the queens. It helps to distinguish colonies with old queens from those with young ones. Colonies with queens older than one or two years, are dispersed to reinforce the breeding colonies. Those with young queens remain destined for production.



We advise recording all selection actions with old or young queens. In spring, in order to check brood development, it is sufficient to look under the combs by lifting each hive-body box of the stable-climate hive without removing the combs.

Do not hesitate to make an annual plan before launching into raising a select line for requeening, or if you are contemplating enlargement.

Nuclei colonies are to be made at the first main flow.

1. Induced queenlessness

Two colonies are divided by a board, by sharing

between both parts some brood of all ages as well as stores. Under each part a lower box is inserted with drawn comb.

Move the old colony three kilometres (mating station for selected hives) and place each part of the split at opposite ends of a new stand.

2. Making splits

Remove the queen from a colony. After 10 days, divide it. Share and balance the splits and the queen cells (graft if necessary) among 10 nuclei (each a single box). Reinforce the nuclei with frames of brood verified to be healthy. Then shake out the colonies to disperse them. All the old queens disappear at the same time. Make up the nuclei if necessary with combs of honey or foundation.

In cases where you find a queen cell hanging, immediately place it in a hive-body under a nucleus. Transport the remainder, the same evening, a minimum of three kilometres, to another mating station.

Place all the nuclei colonies on one stand in fours, with the entrances alternately facing in opposite directions. After mating, give all the hives the same orientation.

The brood of the elite queen-line reinforces, immediately and subsequently in hatching, these nuclei colonies. A little while later, enlarge the hives, at first at the bottom.

These new colonies will have become strong for a second nectar flow or for transhumance. In the following year they will become production hives.

3. Strengthening colonies: following different variants but with health checks

Disperse the frames of colonies with mothers that are old, and do this once or several times during the course of the season.

To bring them to an end, so as to avoid looking for queens, reunite these colonies by dispersing them in superposed groups amongst those to be kept according to their needs.

Then, finally one adds underneath each remaining, although regrouped, colony, a nucleus colony with a young queen.

All unitings of bees receive the usual smoking.

Prosperity in beekeeping is the art of enlargement.

Finally – a harvest

For all apicultural production, colonies, honey and all other products of the apiary, always work with colonies that have young, vigorous queens. At the same time you will reduce the risk of swarming.

Enlargement: in spring put a box at the bottom with drawn comb.

With this method, old wax automatically rises in the hive until the moment when remelting arrives. This satisfies the demands of hygiene. The colour of the comb is the deciding factor.



Expanding the brood to its maximum.

Three boxes of the stable-climate hive are equal to one 12-frame Dadant brood box.

At times, one obtains five boxes of brood. This one enlarges again, either at the bottom, or in the middle taking into account the climate and local weather, but never on top before the main flow.

Enlarging by putting a box in the middle is done for a very strong colony during a nectar flow.

Adding a new box on the top when the main flow

starts: at this time there is no longer a risk of cooling the stabilised climate of the colony. A second box is soon necessary underneath the new top box and a little while later it is necessary to harvest the top box so it can be replaced after extraction.

This hive in the form of a hollow tree trunk, or a chimney, helps the harvest. After capping the top box, the bees go down a storey. Boxes can be returned after extraction for harvests to come in the case of secondary flows, and for transhumance.

And in winter: for wintering, normally two or three boxes remain according to the size of the colony. See that there is always the dome of honey, the thermal shield, above the cluster of bees.

In summary:

Breeding: Old queens are culled at the end of the second year, most simply by dispersing the combs. They are replaced by new selected colonies with a new queen and reinforcing brood.

Production: Young, first-year queens are destined for all apicultural production.



References

Some articles by Roger Delon were published in the following:

1. *L'Abeille de France*, December 1978, pages 465, 466, 467.
2. *Ouest Apiculture*, July/August 1986, pages 8 and 9.
3. *Ouest Apiculture*, January 1985, pages 8 and 9.

Book by Roger Delon:

L'Apiculture productive – Le semi cadre 'climatstable'. La ruche 'climatstable'. La méthode de la nature.

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