

Two New Hives to Help the Bee Industry

by MICHAEL JOHNSTON
29354 Westmore Road
Shingletown, California 96088

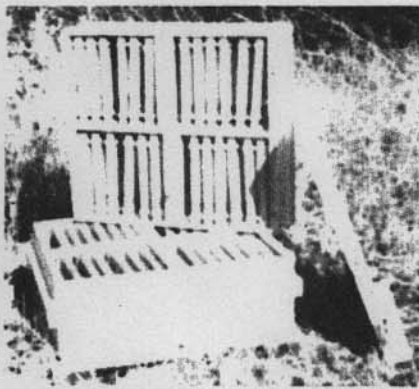
THIS article is about two new bee hives which I have developed. Both use divider boards which separate the hive bodies into different compartments, each with its own entrance. This is a fairly common practice among commercial beekeepers in the Sacramento Valley of California. My hives have departed from those in the area by continuing the divisions into an unlimited number of hive bodies stacked upon the first. This is accomplished by using fairly thick divider boards built in a specific manner. Using these methods, it's possible to build many different beehives. I have settled on two distinctly different models which serve different purposes. I believe that each one offers the optimum productivity for the particular frame which is used in it.

The vertical partition two-colony hive is a hive which contains two distinct clusters of bees both of which can be given an unlimited amount of space to occupy. A hive body which is slightly wider than standard is used because two sets of five standard frames as well as the three quarter inch divider board which separates them occupy the inside of the box. There are two entrances on opposite sides of the hive and the two clusters of bees never mix.

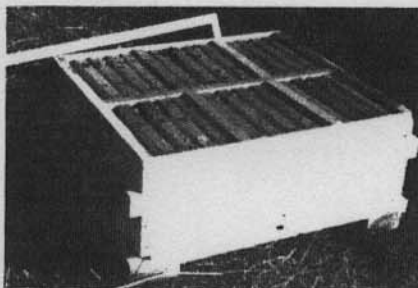
The main advantage of the two-colony hive is increased productivity. At this time I am unable to state quantitatively how much more productive it is than a standard hive. I have been constrained by the fact that Northern California is not a honey producing area. Still, while others have been forced to feed sugar to avoid starvation, I have been able to extract some honey and keep much of my surplus in the frame to be fed later.

The second most important advantage of this hive is the production of standard frame nucs to be sold to other beekeepers in the spring. Two nucs can be produced annually per hive, while still allowing the production of a honey crop.

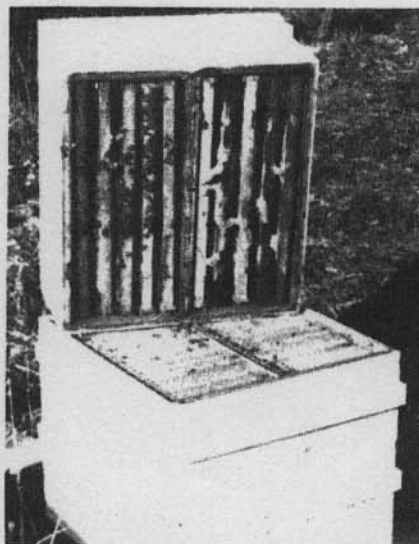
The two-colony hive would probably do well in terms of overwintering. Oftentimes an overwintered cluster of bees will die of starvation, while there is still honey present. This is due to the fact that the bees move away from the honey and are too tightly clustered to reach it. With only five frames, the bees are not going to get out of reach



Combination hive as it would be used for overwintering.



Combination hive as it would be used for raising queens. Usually, plastic curtains would be used over the separate compartments to avoid fighting and robbing while caging queens.



A two-colony hive being used to draw out combs for the combination hive.

of any honey. Another point in favor of overwintering the two colony hive is the fact that each cluster has a relatively small space to keep warm. In addition to this, a certain amount of heat will be provided by the cluster on the other side of the divider board. Under the worst of conditions, this hive may have to be overwintered in three stories, but at least the bees will be alive the following spring.

There are more points in favor of the two-colony hive. It is a good pollinator for early flowering crops such as almonds, apples, cherries, and pears. A single story hive with two frames per side can be used for raising queens. Queen cells can be produced with a hive that is queenless on one side and queenright on the other.

At this time, I am aware of only two disadvantages. The two-colony hive would not work well in a palletized operation, and because of the width of the hive body, today's queen excluders have to be adjusted before they'll fit.

The combination queen rearing nucleus and comb honey hive takes a novel approach. It is a common practice among queen producers in California to use a small comb for queen production in small nucs or divided hive bodies. In the off season, these combs are either stored in a warehouse or "stacked up" in a single queen hive. The combination hive also uses small combs. In the queen season it is a single story hive with six compartments. During the off season it is converted into a four compartment hive, supers are added for expansion of the brood nest and surplus honey. At that time comb honey is produced above the second story.

Besides the production of comb honey, there are other advantages in using this hive. Because four queens are overwintered, the beekeeper using it can effectively cage his first round of queens while others are only putting cells out. These queens are still relatively young and vigorous since they have been kept on small combs and have not expended much of their supply of eggs and sperm. This is a distinct advantage for those hoping to raise queens in a northern climate.

A person who does not want to raise queen cells can still produce queens with this hive if he is willing to settle for naturals. By simply caging the

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queens during a honey flow, the bees will raise their own queens. This might not be bad for the hobbyist, but would be a poor method for the commercial beekeeper since better quality queens are produced at an earlier date through the use of cells.

I sincerely believe that both of these hives represent significant advances in apiculture and are practical for both the hobbyist and the commercial op-

erator. One way or another, it's possible while using them to perform every operation I am aware of, ranging from queen and package production to honey production. Furthermore, they offer a ray of hope against the threat facing the industry from parasitic mites and the Africanized bee. With the use of these hives, we may be able to make up for the losses caused by these threats and possibly even increase production.

Season's Greetings

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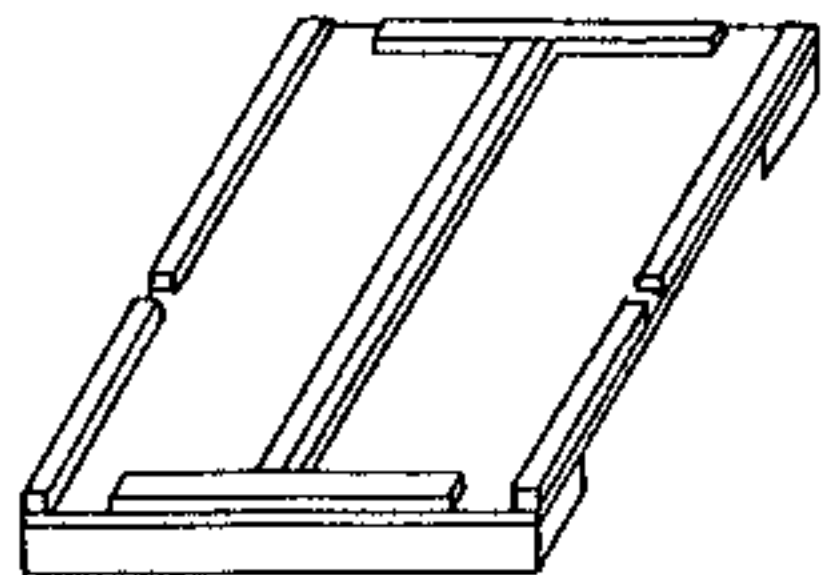
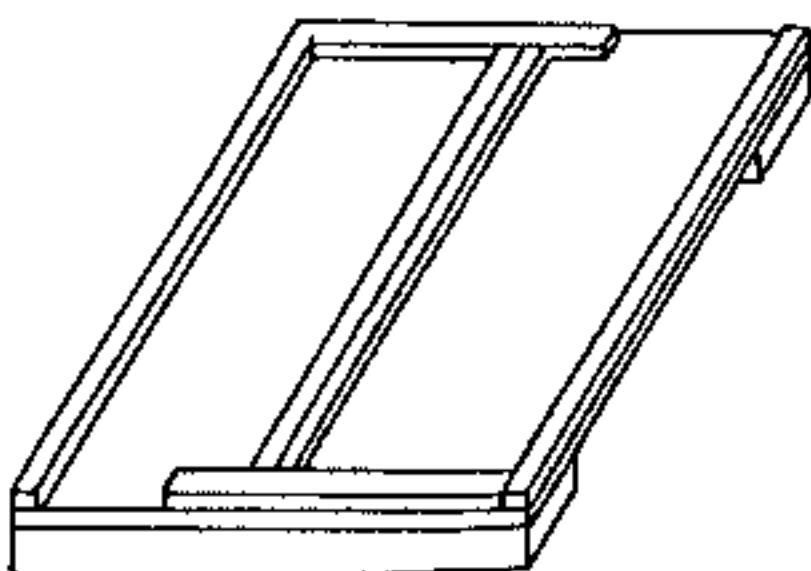
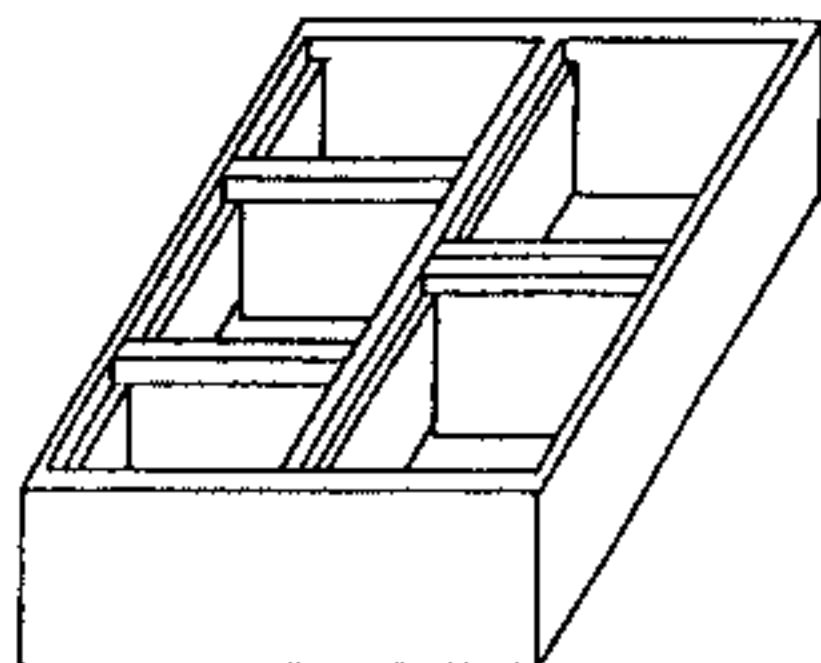
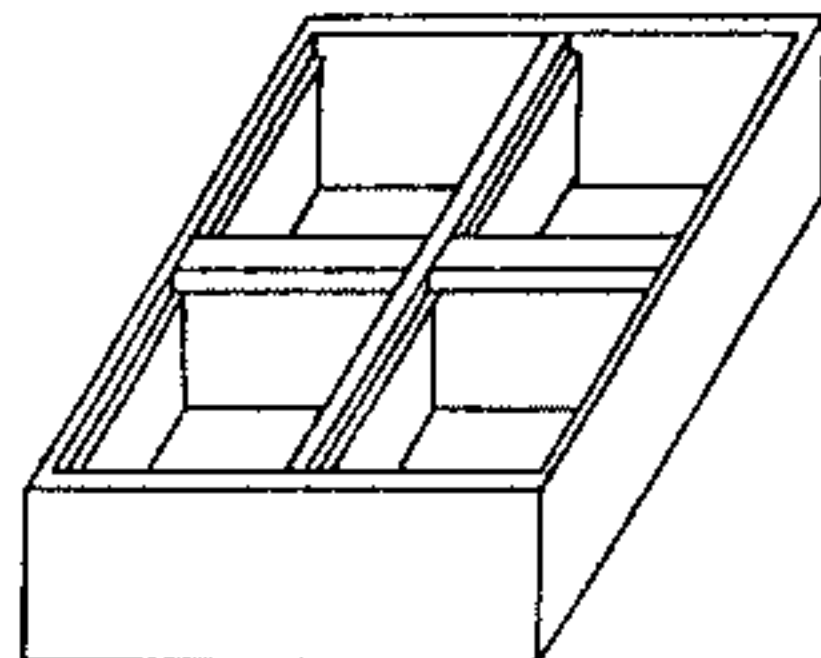
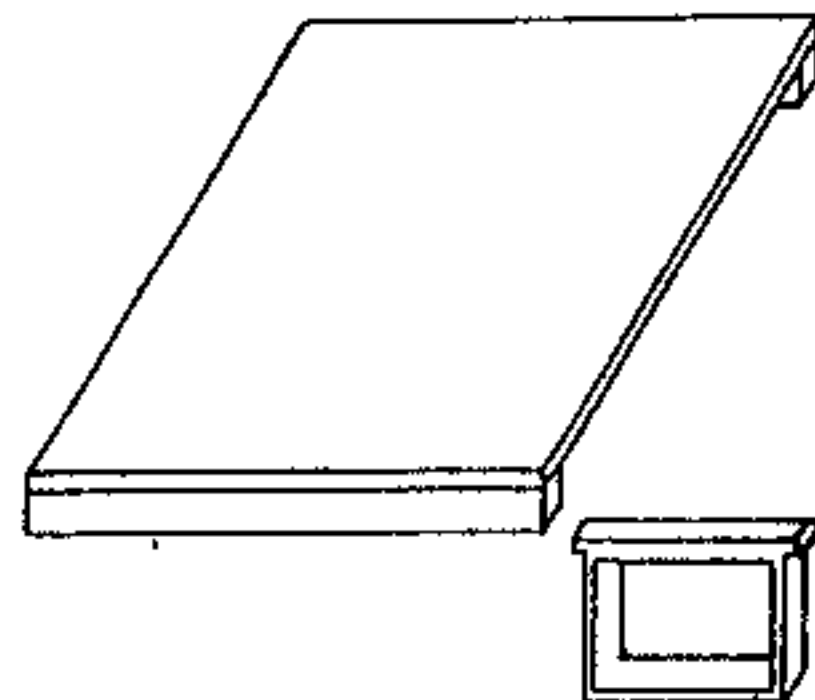
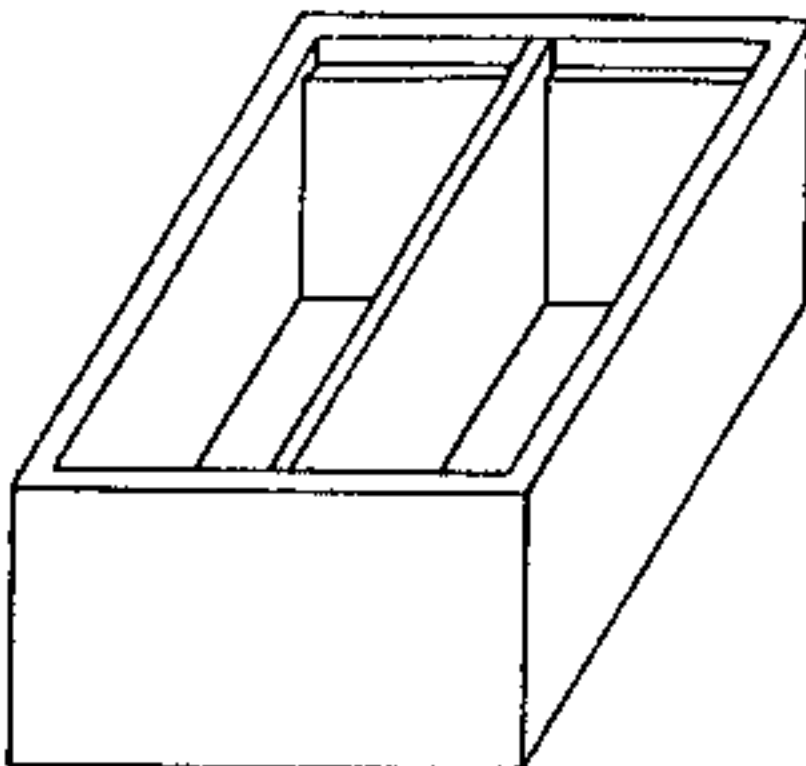
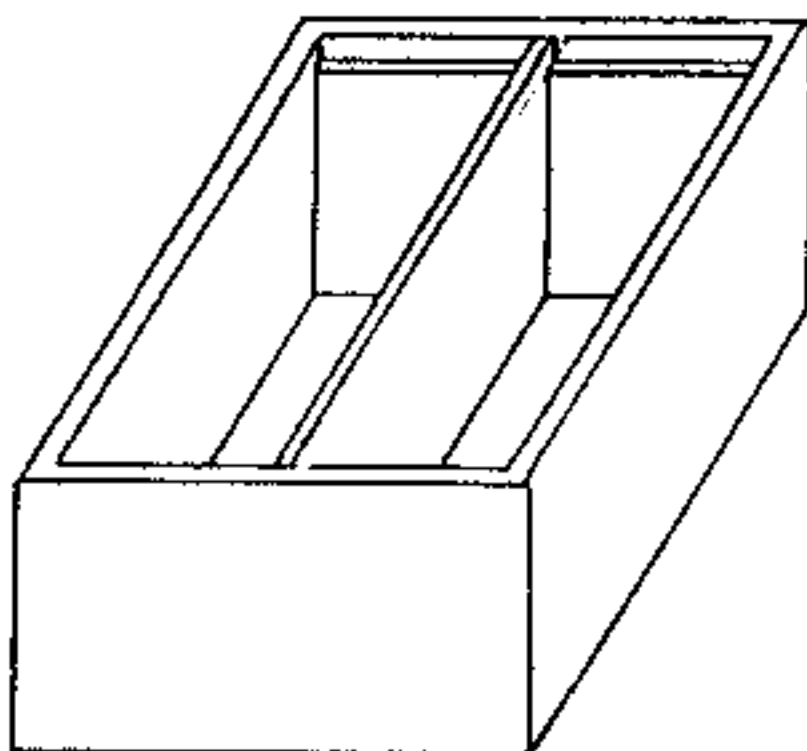
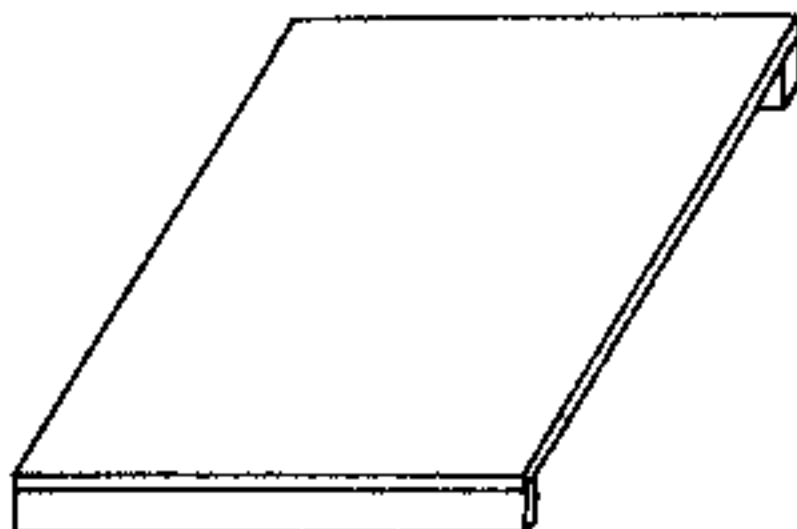
BEEKEEPING HISTORY —

(Continued from Page 828)

simple, and as it can be produced cheaper than the natural product can be sent from California, the latter is unmarketable.

What is the remedy? Undoubtedly co-operation and organization. If every skilled beekeeper were a member of the district association, every district association affiliated to its State association and every state association connected with a national association, such organization could control the honey market, arbitrate the price of honey, and see to its being evenly distributed. This could be done by holding regular "grange" sort of meetings, paying small lodge dues, having representatives, agents, correspondents, and a perfect ramification throughout the whole country. Such a society would be a perfect barometer of the honey trade, and would be its safeguard, or could be made so.

I am afraid we think too much of managing our bees, and too little of managing our market. If we are to be successful, we must give as much thought to the latter as the former. Honey will not sell itself, but if left to do so, it will sell us. (R. J. Randall, Austin, Texas)



The vertical partition two-colony hive

The combination queen rearing nucleus and comb honey hive. The frame pictured above has a wider end bar than is currently used.

ween field bees, nurse bees and brood basically remains the same. Though the cluster in a hive with short frames is smaller, the proportion between its size and the space it occupies in a hive body is the same as for longer frames. At this time, the Combination Hive uses shallow frames arranged six across for comb honey production. Whereas the optimum number for a standard depth frame is five, the optimum for a shallow frame could be as high as seven. It is my belief that I may be able to achieve higher production by using a three quarter depth frame in the brood chamber of this hive while continuing to use shallow depth frames in the honey supers. The only means for determining this is by trial and error; at this time further experimentation is required.

As of now, my experience with this hive is far more limited than with the Two Colony Hive. It is my hope that it turns out to be a more efficient means of producing comb honey. Presently, it is relatively difficult to produce comb honey with standard equipment and the risk of swarming is increased. In the Combination Hive, production should be increased by the use of more than one cluster, and the bees should readily occupy the honey supers since these combs are similar to their brood combs. Swarming should not be any more of a risk since each cluster would be about the right size for the space it occupies. The comb honey which is produced is larger than today's squares, it could be produced in the form of a small frame or removeable ears could be employed. A decided advantage of this hive is that completed squares of comb honey could be removed without disturbing pieces which are not finished.

In its use as a queen rearing nuc, the Combination Hive offers a great deal of promise. Oftentimes when a beekeeper discovers that one of his hives is queenless, there is not enough time to order a queen delivered before the hive is lost completely. As a queen nuc, it offers a ready supply of queens available when the beekeeper needs them. If a queen is removed during a honey flow, in most cases the bees will produce another queen on their own. Better queens are produced with cells and the use of cells is recommended with this hive, but a natural queen is better than no queen at all. Another point in favor of this hive is that it provides a means of overwintering young queens from the previous season. This will be a great aid to beekeepers in more northerly latitudes.


At this time the beekeeping industry in North America is threatened by new diseases and the invasion of the Africanized bee. Though beekeepers can do a lot to avoid having their bees contaminated

our beekeepers in the South have much defense against the Africanized bee. For this reason it may become difficult to obtain good queens from the South during the 1990's. The Combination Queen Rearing Nuc and Comb Honey Hive offers the Northern beekeeper an efficient means of raising his own queens and gives him a harvest of comb honey during the honey flow. With the use of this hive and the Vertical Partition Two Colony Hive (see last month's GLEANINGS) we may be able to at least put up a good fight against the problems threatening the bee industry and possibly even increase population. □

On Patents, Royalties, and the Future of these Hives

As of January, 1984 I applied for patents on both the Combination Queen Nuc and Comb Honey Hive as well as the Vertical Partition Two Colony Hive. Though I don't know whether I will receive these patents I will continue to work in that direction. In the meantime, I am powerless to stop others from building and using these hives, but as they say, "imitation is the sincerest form of flattery!" If others do build similar hives, I would be interested in seeing if their results are the same as mine and particularly how these hives perform in a real honeyflow.

Eventually, if I do receive the patents on these hives, they will not be used to prevent others from building these hives. Any royalties will be used toward starting a company which builds and sells this type of equipment and not towards enriching myself personally. The Patent System was originally started to help small companies compete successfully against larger companies and it works best if it is used in this manner. Until then, I will continue to work with these hives and improve them if possible.



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Book Review

By Roger A. Morse
Department of Entomology
Cornell University
Ithaca, NY 14853

New Zealand is one of the world's six most important honey exporting countries. Still, the first bees were introduced into New Zealand from England only in 1839. By the 1860's it was reported that wild colonies were common in the bush in some provinces. In 1982 over 6,000 beekeepers owned a more than 250,000 colonies. Average production per colony is said to be 31 kilograms (68 pounds) per colony. About 1/4 of the honey is exported.

As in the case of many of the world's major honey producing areas, nectar is gathered both from cultivated and wild plants. White clover (*Trifolium repens*) is New Zealand's principle source of honey. The honey is said to be white and delicately flavored. New Zealand honey has always had an excellent reputation on the international market.

Practical Beekeeping In New Zealand is a new bulletin designed to replace the old *Beekeeping In New Zealand Bulletin 267*, published by the Ministry of Agriculture and Fisheries. The book is designed as an aide to New Zealand beekeepers, but also to give information about beekeeping in the country to those abroad. The 185-page, 21-chapter book, covers a wide range of subjects including chapters on managing bees under the special conditions found in New Zealand. The first chapter describes the history, growth, and present status of the industry in New Zealand. Chapter 20 is concerned with laws affecting the beekeepers of New Zealand, who have obviously designed legislation to fit their special circumstances. Also included is a useful chapter on further sources of information.

The author is a native New Zealand beekeeper who has been keeping bees since he was a student. In addition to holding B.S. and M.S. degrees, he has a National Diploma in Apiculture from the Royal New Zealand Institute of Horticulture. He has served abroad as a consultant to the Food and Agriculture Organization of the United Nations. The text will be useful to New Zealand beekeepers and gives those abroad an insight into the industry.

Practical Beekeeping in New Zealand is available from the New Zealand Government Printing Office, Private Bag, Wellington 1, New Zealand for \$17.95 (New Zealand currency). □

The Vertical Partition, Two Colony Hive, the first of two new and completely different beehives

by MICHAEL JOHNSTON 29354 Westmore Rd. Shingletown, CA

The Vertical Partition Two Colony Hive is the first of two new beehives which I will attempt to describe in this bee journal. It, as well as another hive, The Combination Queen Rearing Nucleus and Comb Honey Hive, were developed using the same principles. Both represent new approaches to beehives commonly used in the industry. This article will focus on the Two Colony Hive, the principles behind it, its development, and my experiences with it so far. I will also discuss what I believe is the best way to manage this hive.

The Two Colony Hive and The Combination Hive both utilize vertical partitions (a.k.a. divider boards) which separate the hive bodies into different compartments, each of which has its own entrance. By using relatively thick divider boards and building them in the correct manner the separate compartments can occupy an unlimited number of hive bodies. With The Two Colony Hive, two different clusters of bees live in as many hive bodies as are necessary but are completely independent of each other and never mix. For this reason, it is not only a two queen hive but a two colony hive.

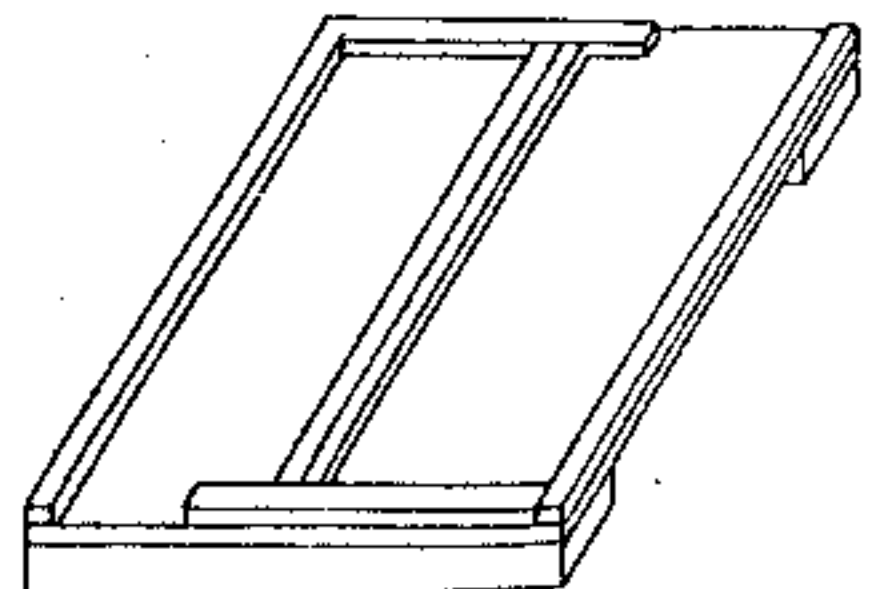
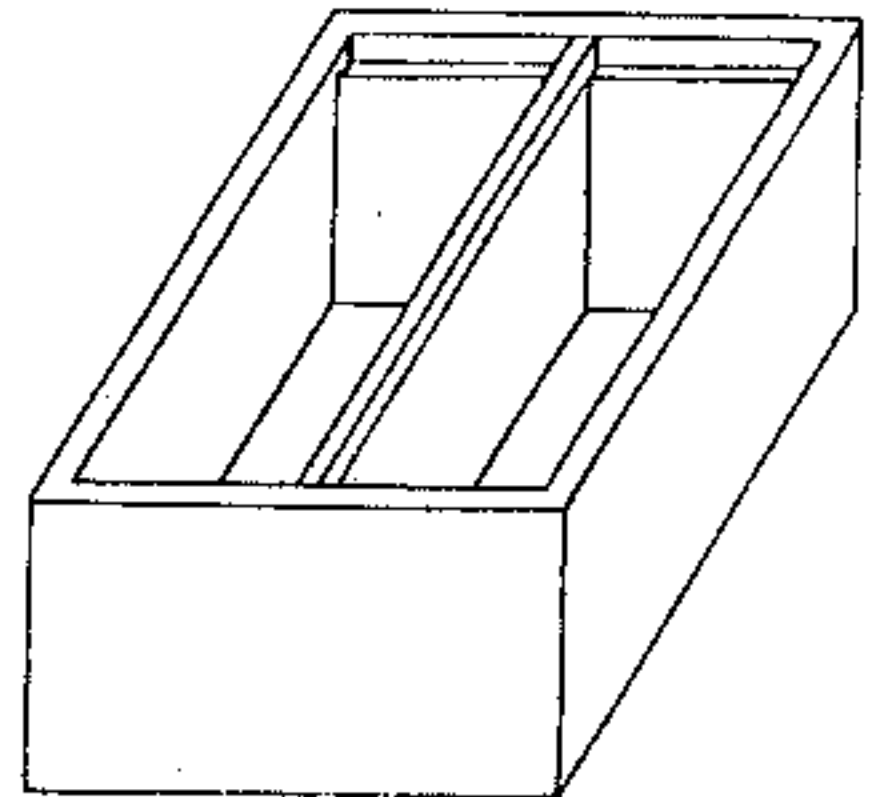
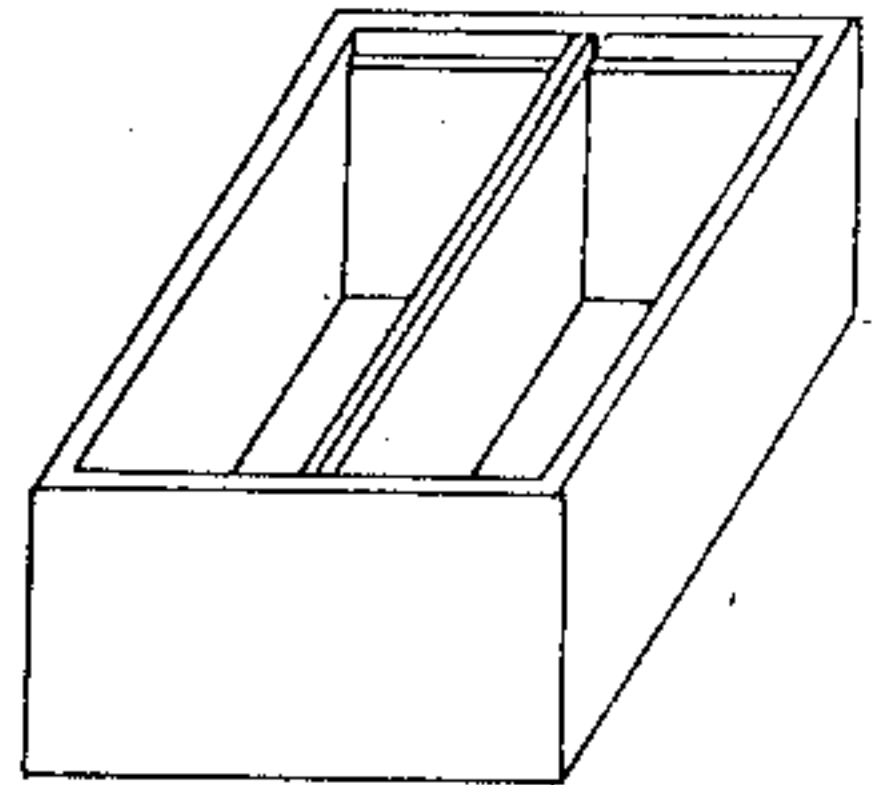
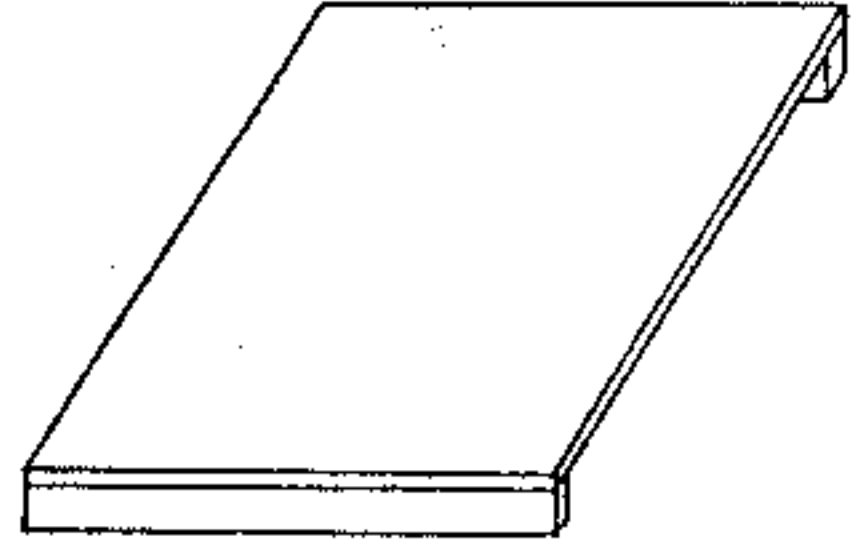
Using this system, there is an endless number of beehives which can be built. The question which I have tried to answer is "What is the optimum configuration for the particular frame which is being used?" In the case of the standard frame, I have consistently observed that a cluster of bees will do better occupying five frames across rather than four frames across. This was counter to my expectations since I thought that the more a cluster was compressed, the quicker it would move upward. At this point I believe five is the optimum number for a standard frame even though I have not systematically compared five versus six standard frames. I have come to my conclusion based on observing swarms as well as spring buildup in standard hives. In any case, a two colony hive with six frames per side would be impractical since it would be too large and cumbersome.

As recently as January, '84, I thought that five frames across was a magic number for the honeybee. In the wild, bees have evolved in hollow trees; a space which very often would accommodate approximately five combs across. For this reason, the honeybee would probably exhibit a strong preference for this number of frames. I believe, though, that in the case

of the movable frame hive, certain departures from this general rule are possible. Unlike the wild hive, the brood combs in a movable frame are not continuous; the bees are limited by the size of the frame. It is my belief that the optimum number of frames depends upon the depth of the frame or the ratio between square inches of brood and cubic inches of space in the compartment. For a deeper frame, the optimum number is less. This is because the same amount of brood would occupy fewer frames. Ultimately, optimum population size with its correct proportions between field bees, house bees, and brood is the determining factor.

My experiences with the two colony hive have been limited by the locality in which I live. So far these hives have always been kept in the Sacramento Valley or foothills surrounding it. This area is not a honey producing region. Beekeepers make their money through the sale of queens and packages as well as pollination. Since '79, I have worked three queen and package seasons for Wenner Honey Farm of Glenn, California as well as three for Shannon Wooten of Palo Cedro. Both of these firms attempt to produce honey in the months following package season. Shannon does make a decent crop of manzanita honey at high elevations every other year, but in the off years it would not be unusual for both companies to make only a ten pound surplus of star thistle honey in the summer months. Because of the warm climate, both would feed approximately forty pounds of sugar to each hive during the rest of the year. This might sound bad to some but under these circumstances it takes a lot of skilled beekeeping to maintain the strong hives necessary for a successful package season. In judging my own two colony hives, I have not been able to use honey production as a standard for comparison so far. Using these hives has helped me to maintain good strong hives, skim enough honey for yard rent, and almost eliminate feeding sugar.

The one area in which I am able to compare the two colony hive with the standard hive is in the production of package bees. In the spring of '81, I was still experimenting with a version of the two colony hive which had four frames on one side and five frames on the other side of the partition. I had three of these hives and shook all of them on one occasion in May of '81. I was impressed that one of these hives was able



Continued on next page

to produce ten pounds. In contrast, Wenner's usually produces an average of ten pounds of bees per hive by shaking their hives three times. They also feed their hives a great deal of sugar syrup and pollen supplement; my hives were fed very little. Since June of '83, I have had 20 of the two colony hives with five frames on both sides of the divider. This past March I made a bet with Shannon Woolen that three of my best hives could outproduce three of his best hives. Though I did lose a bottle of whiskey in the process, my hives made a fair showing. Without the benefit of any feeding at all, these hives produced an average of 12 pounds of bees per hive by shaking them on two occasions. Shannon's best three hives averaged 16 pounds but the yard average was eight pounds and all had benefited from being fed sugar. He also admitted that the hives that yielded 16 pounds caught a certain amount of drift. Without drifting I might have lost anyway, but I think it would have been closer.

In the course of my experimenting I have found that it is best to stock these hives with calm bees such as Carniolans or good italians. In January of '82 I stocked three of my two colony hives with Curneen Blacks which I had obtained from Clarence Wenner the previous spring. This particular bee is a descendant of the original German Black and still occurs naturally in wild hives in the coastal redwood country near Eureka, California. Though these three hives did make it through almond pollination, I moved all of the clusters back into standard equipment afterwards. I found that it was too difficult to work these bees in two colony hives since they tended to run and it was sometimes hard to keep the queens apart.

In the management of the two colony hive I believe it is best to use two hive bodies for a brood chamber with a queen excluder above them. It is also important to continue the divider boards above the excluder. Otherwise, the bees tend to plug out the bottom with honey before filling the supers. This will eventually lead to a reduction in the field force and a loss of honey. It is best to have plenty of supers on hand to bottom super these hives just above the brood chamber.

Though the space afforded to each queen by using two hive bodies as a brood chamber might be below their egg laying capacity I do not consider this a disadvantage. I have observed my boss, Shannon Woolen, and his in laws, Homer, Jack, and Steve Park, use a single standard hive body as a brood chamber and obtain excellent results. In this situation, the queens tend to fill the frames with eggs soon after the bees hatch. The result is solid broods, less honey blocking the progress of the queen, and a steady growth in hive

population.

Many of the ideas expressed in this article have yet to be conclusively proven and for this reason may or may not be true. I do believe, though, that I have arrived at the best means of constructing and managing the two colony hive. During the

development of this hive, I benefited from working with some excellent beekeepers. Much of what I learned from them was applied in this hive and I owe them all a great deal of gratitude...

Next Month: The Combination Queen Rearing Nucleus and Comb Honey Hive.

THE OBSERVATION HIVE

Continued from page 669

In the event the hive becomes overpopulated, some of the sealed brood can be removed and placed in a regular hive. Care must be taken not to allow it to be chilled. Be certain that the queen is not removed. Some beekeepers add sections to their observation hive in order to provide more space. Allowing the hive to swarm may be the most effective manner in which to deal with overpopulation.

Loose bees in a building can be distracting to the observers. Turning off the lights and opening the windows will remove most of the bees. The stragglers can be vacuumed.

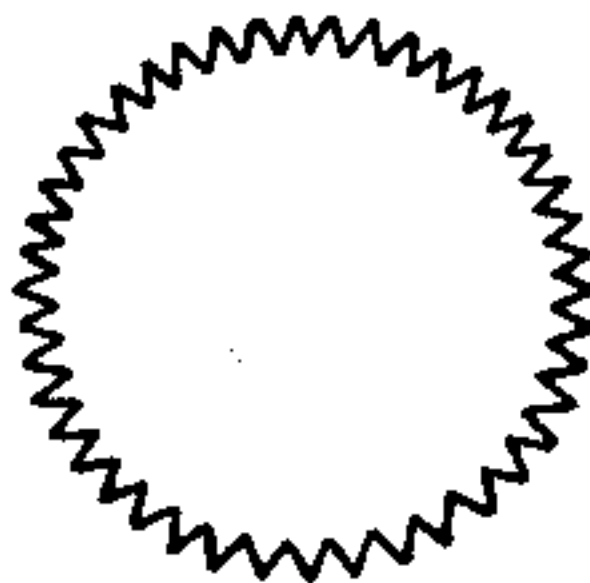
Diseases

The treatment and discernment of diseases are beyond the scope of this article. All hives, including observation hives, can pick up a disease. Make sure that your frames and bees are initially free of adult or brood diseases. There are a number of excellent resource materials that deal extensively with bee diseases and their treatment. Also, beekeepers in your area would be more than happy to assist you in diagnosis and treatment.

The observation hive is an exciting way of introducing students to an extremely valuable insect. In addition, through the utilization of local beekeepers and related reading materials, much practical information can be gained. Also, students are exposed to new career opportunities.

**James Van Dyk is the
Director of Instruction for
South Lyon Community Schools.**

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A Hive For All Seasons: The Combination Queen Rearing Nucleus and Comb Honey Hive

by MICHAEL JOHNSTON 29354 Westmore Rd. Shingletown, California 96088

The Combination Queen Rearing Nucleus and Comb Honey Hive uses similar principles as are employed in the Two Colony Hive. In the Combination Hive, though, smaller frames and more complicated divider boards are used. As is implied in the name, this hive serves two functions. Normally, in the spring it is a single story hive with six compartments and is used for queen rearing. In the summer, it becomes a four compartment hive; more hive bodies are stacked upon the first, and it is used for comb honey production. In this manner, maximum production of queens is produced at one time of the year, while maximum comb honey production is achieved at another.

Though I am actually a native of New York State, this hive has been developed while I have been living and working in the Sacramento Valley of California. Generally, queen rearing nucs are of two types in this area. Either a small "baby nuc" with a single cluster of bees is employed or divided hive body with two or four clusters is used. During the off season, the combs can either be stored in a warehouse or "stacked-up" in a single queen hive; in some cases, a queen excluder is placed above the divided hive body type, and the different clusters work together in the same honey super. The Combination Hive departs from the other divided hive body types of nucs by continuing the divisions into more hive bodies stacked upon the first and by using the hive for comb honey production. Attention is also paid to the optimum configuration for the frame being used.

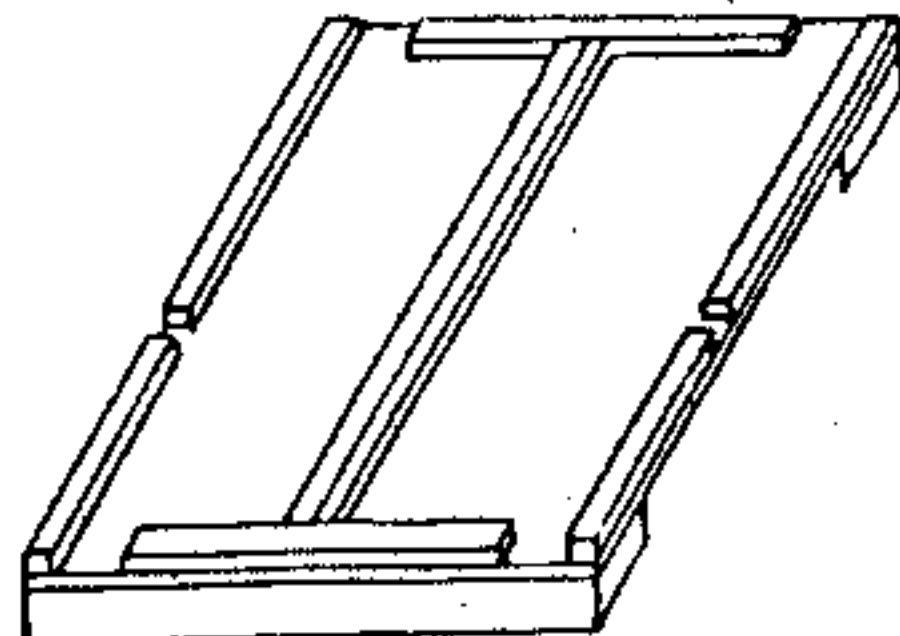
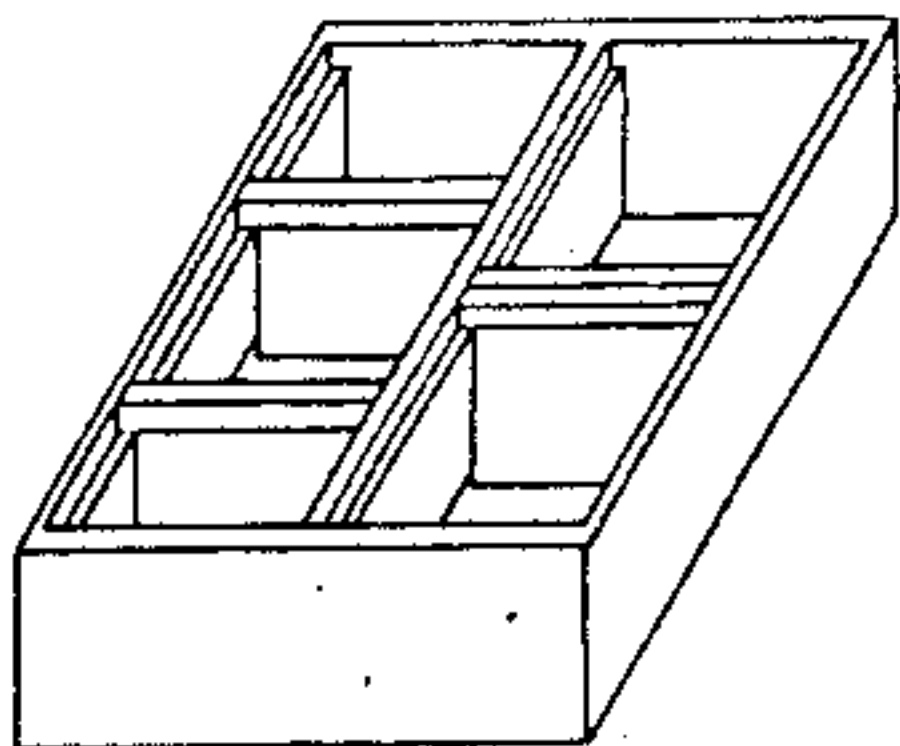
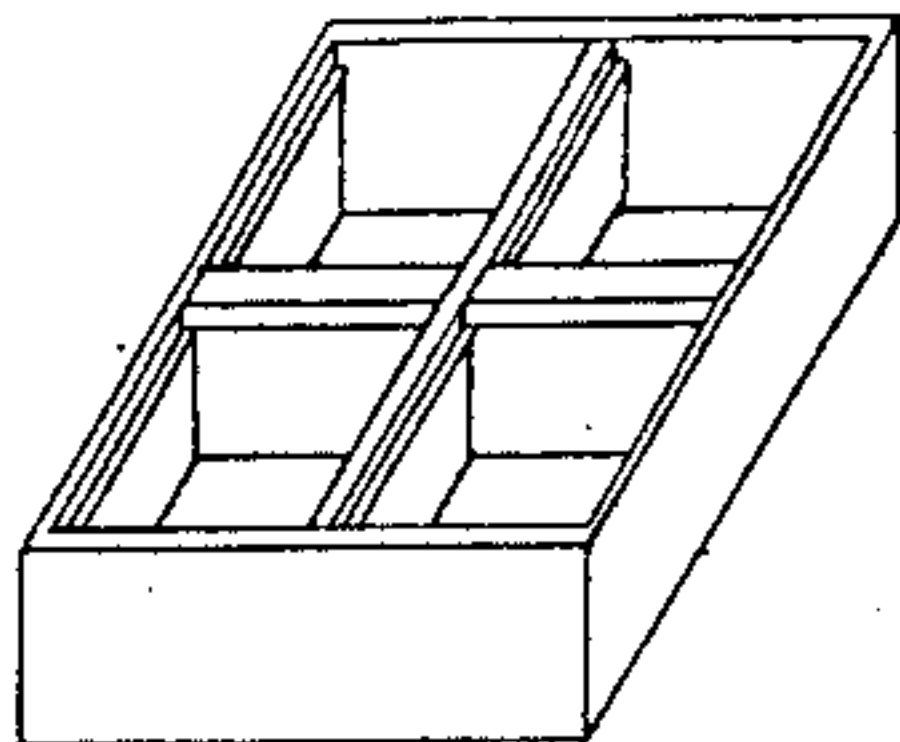
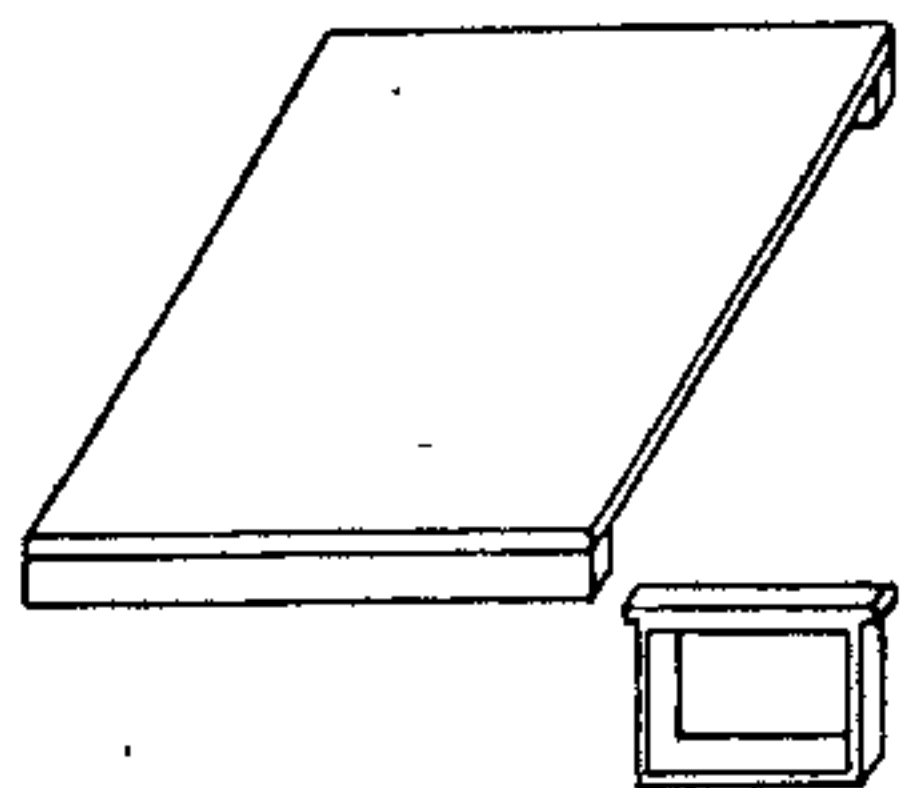
The design of the Combination Hive has been influenced by other types of nucs, but it actually was influenced more by a small special purpose hive which was not a queen rearing nuc. During my first three years in California, I worked the spring package and queen season at Wenner Honey Farm in Glenn, California. At that time Clarence Wenner was experimenting with a hive that contained a dozen small, almost square frames and which was used for the production of grafting larvae. Because of the small size of the comb, the queen would fill the comb with eggs which would vary in age by only a few hours. Three days later, when the larvae are grafted, the person grafting would no longer have to pick and choose grafting larvae; this sped up the process and avoid-

ed any accidents caused by grafting a larvae of the wrong age. Clarence has single gone to a different system which still uses the same size comb but through the use of removable ears, special frames, and queen excluders; they fit in a standard hive body.

I was quite impressed with Clarence's original grafting larvae hive and felt that with a few changes, it could be used for a queen rearing nuc. While at Wenner's I built a three compartment nuc which was half the width of standard equipment. It was built in this manner so that in the off-season two of these boxes could be pushed together, covered with a queen excluder, and the different clusters would work in the same honey super. This hive was the precursor of the Combination Queen Rearing Nucleus and Comb Honey Hive. A lot of the changes which have since occurred are basically due to the knowledge I have gained from the development of the Two Colony Hive.

Currently the Combination Hive uses a shallow depth hive body which is 18¼ inches wide. This particular hive body is wider than standard and can be used as a comb honey super on the two colony hive. The frames which are used are almost square. They feature an endbar which is not as wide as in a normal frame so that it is possible to fit more frames in a given space; this is a trick which is used in Homer Park's four-way nucs. When the Combination Hive is used as a queen rearing nuc there are six compartments with four frames in each. In its comb honey mode, there are four compartments each containing six frames per compartment per hive body. At that time the brood chamber is expanded to two hive bodies and are covered with a queen excluder. Comb honey supers are placed above the brood chamber and all of the divisions are continued.

As in the Two Colony Hive, it is important to consider what is the optimum configuration for the particular frame which is used. In the Combination Hive a frame is used which is shorter in length than frames used in standard equipment. It is my belief that the length of the frame does not affect what is the optimum number across for a frame but that depth is the determining factor. For two frames of different length but the same depth, the distribution of brood,



CONTINUED ON NEXT PAGE