I started beekeeping in 1931 with the purchase of eight hives in petrol cases at a cost of a dollar each and sold the first honey for five cents a pound.

I was a carpenter and as work was not plentiful in the depression the hive numbers were gradually increased, much against the wishes of my parents.

I joined the Canterbury Branch of the N.B.A. and when the Secretary, Mr. James Foster of Washdye retired and the South Canterbury members decided to form a branch of their own, I became secretary of Canterbury with its headquarters in Christchurch.

By R. R. Bushby

LET'S PUT THE SQUEEZE ON OUR BEES

For over a hundred years since Langstroth invented the movable frame hive, beekeepers the world over have striven to increase the yield of honey from their hives. Many like myself have spent a lifetime trying to breed more productive queens. Two queen hives, hybrid queens and all manner of systems of management have been used to try and boost production, most of them with limited success. At our 1975 Conference Mr I. Forster stated in his address that no significant break-through had been made in the beekeeping industry. We may be nearer to it than you think.

About 1967 we found that colonies in which the Queen was restricted to one brood box with TEN frames produce more honey than those whose queens had the run of two supers. We thought at this stage we were making some progress.

In 1971 in the course of a world tour I attended the 23rd Apicultural Congress in Moscow. About a year later I received the report of this meeting which gave in full all papers submitted. Only about a quarter of these papers were actually read at the Congress as their writers were not present. An article by M. A. Alber of Italy entitled A CENTURY OF WRONG SPACING interested me. Alber wrote "That Hoffman relied on natural combs built by German Blacks before adopting 35 mm or 1 3/8" spacing for Langstroth bodies. Quinby suggested 1½" spacing and Dadants adopted it and this was followed by some British and German researchers. While the right cell size caused endless discussion for long years with the only exception of the Soviet Union nobody seemed to be interested in right comb spacing. More than 20 years ago Livenets described the reduction of space as a current trick for better spring built up. Later Soviet reasearch revealed that a narrow space of only 30 to 31 mm. 1 3/16" to 1 1/4" gave about 25% more brood surface as compared to that of wider spaced colonies (see "Pchelovodstvo 1951/1").

Much research was done by Alber on measuring combs built with swarms of various races of bees which are available in Europe and the spacing varied from 30-35 mm; Italians preferring the narrower and Carniolians the wider space. In June 1970 Alber & Compagna revealed excessive spacing as the main cause of violent Nosema and therefore decided to study the natural spacings of various races of bees. From this it was found most swarms remained more or less below the narrower 35 mm Langstroth hives. Italians of the universally known PIANA stock had a scarce 31 mm (1 3/16") spacing, (exactly what Soviet scientists had found best for their smaller bees of the south).

M. A. Alber made no mention of the resultant honey crop, possibly he had not got round to it, never the less his findings aroused my interest and my son James and I decided to make our next batch of frames with 1 1/4" end bars. On assembling them we found that eleven frames would go in a super and give about 1/4" clearance. There didn't seem any point in using only 10 frames when eleven would go in even though most apiary instructors tell us to use nine, as it makes manipulations easier.

In the November 1974 N.Z. Beekeeper, G. M. Walton, on metric measurements for Langstroth hives goes into great detail on bee space but nothing is said on comb spacing only in the list of frame sizes, he gives the size of Hoffman end bars as 33 mm. Only ten such frames will go in a super with 7/8" sides. By reducing it to 32 mm, then eleven frames would go in.

It took some time to get supplies of drawn combs to try out as a brood nest and with only one swarm the first year, nothing significant was noted. However, last season we made considerable increase in colonies and with a reasonable honey flow and a number of colonies dispersed through the outfit with eleven frame brood chambers the results were apparent to even a casual observer, as myself, who is physically limited to removing lids and hive mats and doing the lighter jobs involved in apiary management.

A conservative estimate, was at least 25% more honey surplus, this, was not counting the top brood box or food chamber, which is left on over winter with the excluder removed. This "food" super contains ten frames and the queen is put down in the bottom box in the spring and the excluder replaced between the brood supers. The bees then proceed to fill the food chamber as any brood in it hatches and this honey is left for winter stores. Only supers above the second box being harvested.

On shifting the hives to their wintering sites (it is too cold and wet to leave them on some of their summer sites on the West Coast) it was noticed that those hives with eleven frame brood boxes were much heavier than the rest. It therefore, appears that they could have stored some honey in the bottom box as well. These hives produced one super more than the others which were four storey, and it appears that they could have produced more had we had the supers to put on them so that an increase of nearer 50% could be possible.

Now let us examine the situation and see how this is achieved. We all know that bees will not tolerate open spaces in the brood nest and proceed to fill it

with comb. With eleven frames per box with 1 1/4" end bars we find that we have 3/8" between the top bars which are 7/8", the same thickness as a brood comb, (Australian type top bars of 1" are useless here) we have two layers of bees one on each face of the comb. With 1 3/8" end bars we have 1/2" between combs, so we get three layers of bees, and the result is we squeeze out this extra layer. These bees which were serving no useful purpose other than maintaining the micro climate, to the outside of the cluster therefore enabling the queen to lay in these outer combs which would otherwise, be unattended. Hence the faster build-up with 25% more brood, as found by the Soviet researchers 25 years ago, or should it be nearer 33%? When the brood chamber becomes full of bees the overflow moves into the supers and out into the fields to work so we have 25% more workers, as there are no "hangers-on" in this eleven frame set up, except under the bottom bars. However, this area could be built up with drone comb, as there is no space for drone comb with 1 1/4" spacing. Drone comb, according to Alber requires 1 1/2" or 40 mm spacing.

With this system we get straight flat combs provided the foundation has not been stretched or buckled. There is no need for brace comb or bridging pieces or lumps of wax on the sides of the top bars or supers. It is these pieces of wax on the sides of the supers which make the removal of the first comb difficult, even in nine frame units. A hive tool with a hook on one end is a help especially if you have thick fingers.

How is the space in a super used?

In a super containing nine frames we have 8" taken up with comb and 6 1/4" space for bees. With eleven frames, we have 9 5/8" for combs and 4 5/8" for bees and therefore we have approximately 25% less bees and two more frames of brood. It takes 25% more bees to fill a nine frame brood box and we have 20% less comb area. It is this comb area, per cubic foot, that is the vital factor. To spread the brood combs out through more supers only accentuates the problem of idle bees and perhaps it could be these bees which get the swarming impulse.

I know that some will say that with an up tight brood nest there will be no freeway for the hordes of returning honey gatherers. We know that pollen collectors deposit their loads directly in the cells but most honey gatherers disgorge their load just inside the hive. Perhaps a top entrance made by sliding back the super on the queen excluder could be to the bees' advantage when the honey flow starts.

There is still a lot more to learn on this and our Apiculturists are limited in their work by the lack of basic materials. It is up to us as beekeepers to try and test any methods which can help us with our crops and to pass on what we have learnt through our Journal.

In conclusion, my thanks go to Mr M. A. Alber of Italy for making his research available to beekeepers through Apimondia. My only regret is that we hadn't the information on Soviet Union research 25 years ago.