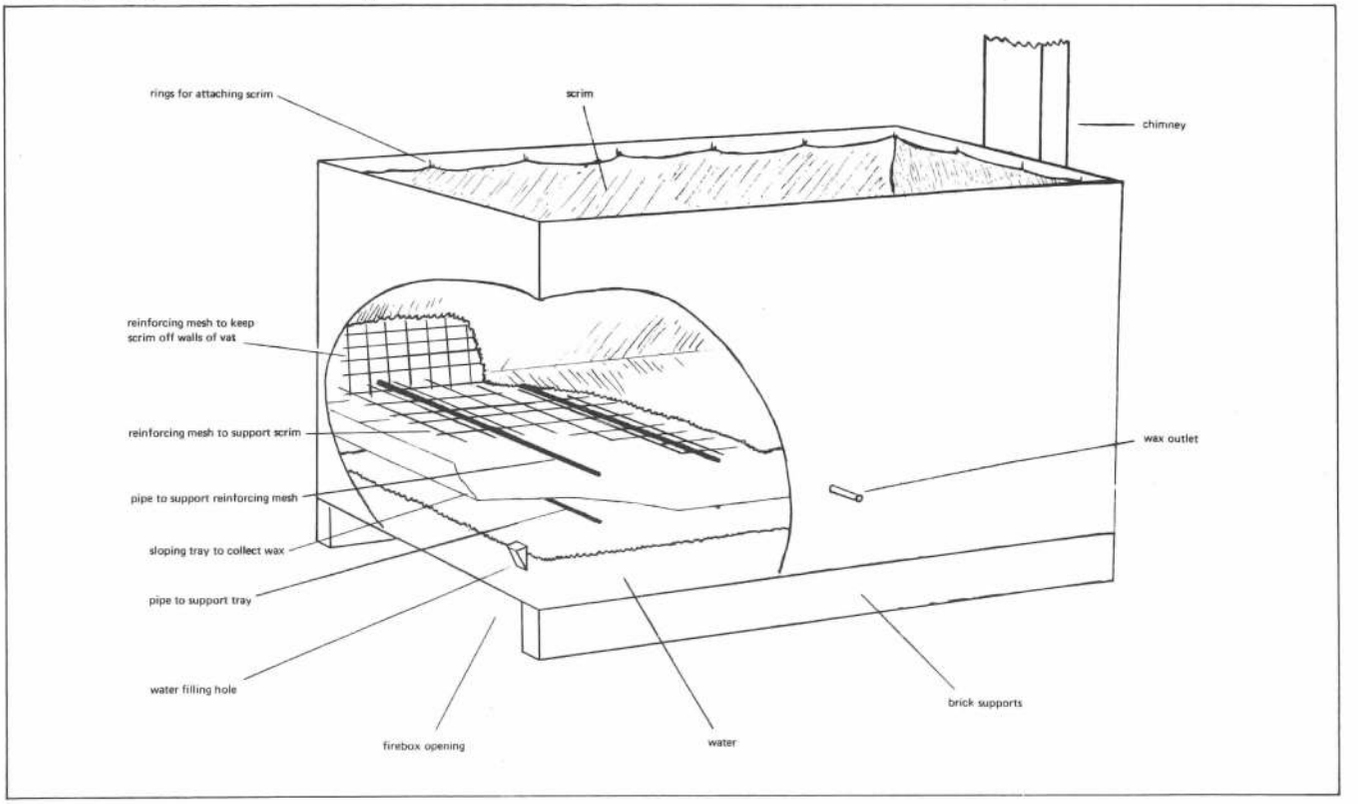
Cut-away diagram of wax rendering unit built by Sandy Richardson.



Simple wax rendering without boiler or press

by Andrew Matheson, apicultural advisory officer, MAF, Nelson.

I DON'T know many beekeepers who can honestly say that they enjoy wax processing. Sure, it's nice to have those blocks of golden wax at the end of the day, but the difficulties in getting there!

Wax rendering is often hot and dirty work made extra troublesome by the lack of adequate equipment. Yet in most cases it's just not worth investing in expensive plant which will be used for only a small part of the year. This article describes one piece of equipment which renders cappings, scrapings, and comb wax, and yet requires neither a boiler nor a press.

It was built by Mr Sandy Richardson of Ahaura, Westland, who got the idea from similar units he had seen in Canada while working for a beekeeper there some years ago. It is the basic principle which is important, not the specific design, and the idea could well be adapted to make a unit of any size.

This particular model, which is illustrated in the diagram, is 2.4 x 1.2 x 1.2 metres in size – quite a large piece of equipment. It was not originally intended to be that big, but the local engineering works had a tank made of eight gauge plate steel which had been designed to hold eels, but never used for that purpose. After having it lie around for a couple of years, they were pleased to sell it off at cost.

The tank or vat sits on bricks so that a fire can be built underneath. It is fitted with a small opening in the side so that the bottom 100 mm can be filled with water. Heating this water provides the steam for rendering wax.

About 100 to 500 mm above the water is a sloping tray made of heavy gauge galvanised iron, which is supported by five 25 mm pipes running shortways across the tank. Wax collects in the tray, and leaves by way of the outlet pipe in the side of the tank. It is obviously important that the steam rising off the water is not prevented from entering the rest of the tank, so there is a 50 mm gap between the edge of the tray and the sides of the tank.

Wax to be rendered – whether spun cappings or old combs – is held in a large piece of scrim attached to hooks around the top of the tank. Scrim is sufficiently permeable for the steam to rise through it and the molten wax to run out. Slumgum is left behind inside the scrim.

The scrim bag is supported by 100 x 50 mm reinforcing mesh which sits on another series of five 25 mm pipes running across the tank. The size of the space between the scrim and the wax-collecting tray happens to be 200 mm in this instance, although that is not critical.

Remember that the wax-collecting tray is 50 mm shy of the sides of the tank, so to prevent wax from falling down this gap into the water, the scrim bag is held out from the wall by some lengths of reinforcing mesh – about 500 mm high – placed up the sides of the tank.

A lid was made of galvanised iron attached to a wooden frame, and this is lifted up by a rope and pully arrangement when the vat is to be loaded or unloaded. There is a high fire risk associated with any wax rendering system, so this unit is located in a small shed (open on one side) which is a safe distance from any other building.

Operating this device is very simple. In the case of cappings, these are spun in a home-made spinner (see last September's N.Z. Beekeeper) and loaded into the scrim bag. When the vat is full – a process which takes some days – it

continued overleaf

is fired up. Cull combs are simply stacked in, this unit taking two layers of full-depth combs totalling about 30 boxes. It would take three layers of ¾-depth – the final dimensions of any vat should be calculated according to the type of combs used.

The firebox has a grate in the bottom, and the fire is made on this at the front of the vat. Steam is produced about three quarters of an hour after the fire is first lit. It takes little firewood to keep the system operating, and anyway, what beekeeping outfit doesn't have an abundance of old supers and frames, just crying out to be disposed of?

A load of cull combs is melted out completely in three to four hours, during which time the sides of the scrim bag are jerked occasionally to agitate the slumgum.

Wax is run out through a conventional honey/wax separator and into moulds made from kerosene tins cut in half. Any remaining honey is not salvagable. Up to 14 of these can be filled from one load of cappings. Slumgum resulting from cappings or old combs is added to the compost heap – any remaining wax simply can't be recovered economically.

After three or four years of use the only signs of wear are in the galvanised iron tray used for collecting the wax – it might eventually be replaced with a stainless steel one. This wax rendering unit cost very little and deals effectively with all the wax from 300 hives – and sometimes more from other beekeepers. The desire to build it came from many frustrating hours spent pressing congealing slumgum in a hopelessly inadequate system, and a keenness to do away with boilers (and boiler inspectors).

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BEE EDUCATED

The World's largest honey bee

by E.R. Jaycox, New Mexico State University, Las Cruces, New Mexico

YOU HAVE probably heard that a bee sting is only 1/8-inch long – the other eight inches is your imagination. On that basis, the largest honey bee is probably the first one that stings you.

Now we have a new contender for the title of the world's largest honey bee. It is a species called *Apis laboriosa*, and it lives in the mountainous areas of northern India, Nepal, and China – the exact areas are not well known.

This large honey bee was described and named in 1871, but it has remained unstudied and generally unaccepted as a separate species until 1980 when Dr S.F. Sakagami and two colleagues examined specimens and compared them with the large honey bee of India, *Apis dorsata.* They published the results of their study in "Insecta Matsumurana". The paper includes a colour plate showing the relative sizes of five of the species of honey bee recognised by the authors.

This large honey bee builds a single, large comb, often sheltered beneath an over-hanging cliff. Its nest and its ill temper are much like those of the large honey bee of India, *Apis dorsata.* However, *A. laboriosa* is about 10 per cent larger than *A. dorsata.* This size difference is similar to that between our European bee, *Apis mellifera,* and the Asian hive bee, *Apis cerana.*

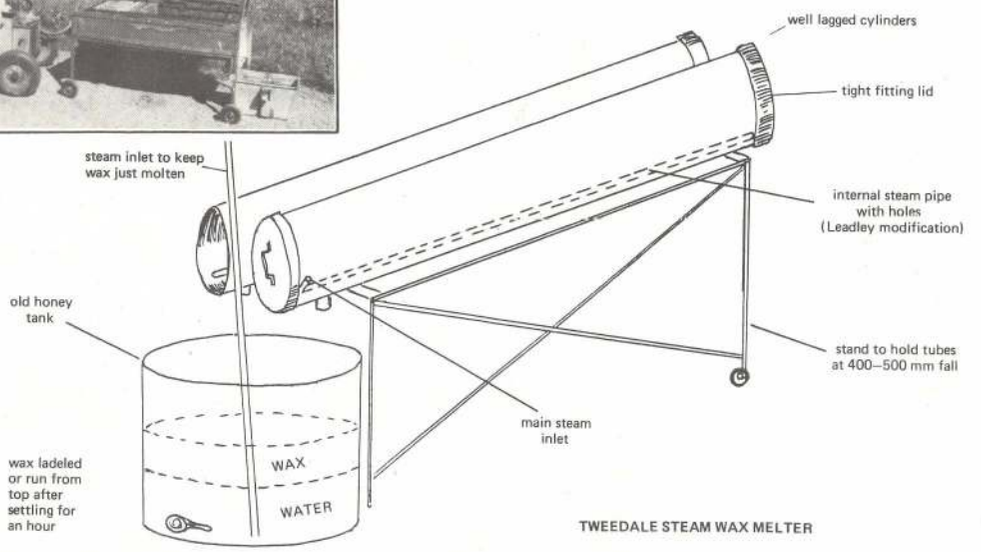
The bees studied by Dr Sakagami appear to be well adapted for life in the high mountains, and have been collected from flowers growing at about 4 100 m elevation. Only bumble bees are usually found at such heights. The bees may not nest at extreme elevations but, instead, may forage above and below their nesting area to take advantage of differences in the availability of flowers at the different elevations. It seems likely also that the bees can fly at temperatures that would prevent flight by other species of honey bees. Biological observations on the bees are very scarce and nothing is known about the behaviour and appearance of the drones and queens.

The report by Dr Sakagami reveals a general reluctance by scientists and non-scientists to believe that there are several more species of honey bees than we now recognise. By "species" I mean groups that do not interbreed and are separated geographically or behaviourally. For a long time the European and Asian hive bees were believed to be one species. Now we know they are distinct species that do not cross.

When careful studies have been made, we will no doubt find, as Dr Sakagami is suggesting, that there are different species of honey bees also in the Phillipines (*Apis breviligula*), the Celebes Islands (*Apis binghami*), and in Borneo (*Apis andreniformis*). The former two species closely resemble the large bees of India. The latter species is a close relative of the Asian honey bee called *Apis florea.* However, it occurs at higher elevations and not in the same areas as *florea.* Both *florea* and *andreniformis* build a single, small comb in sheltered locations.

Our problems in deciding on the number of species of honey bees in the world are related to the lack of studies of the honey bees in Asia and Africa, and to the opposing ideas of the people who have considered them. Most of us have been convinced there are only four species of honey bees. However, in a report in 1953, T.C. Maa concluded that there were more than 20 species around the world. At the same time, he noted that the job of reclassifying the honey bees was made very difficult by the lack of specimens and poor descriptions of them scattered widely in the literature. Biological information is also unavailable.

Mr Maa's attempt to gain acceptance for the existence of more species of honey bees may have had the opposite effect. Now, the work of Dr Sakagami and his colleagues could lead to the recognition of at least eight distinct species of honey bee in the world. Their publication about the world's largest honey bee contains strong evidence for the existence of seven species. Another publication dealing with the small honey bees will follow.



TWEEDALE STEAM WAX MELTER

One stage wax processing

by Kerry Simpson, M.A.F., Oamaru.

WHEN BASED in Palmerston North I was fortunate enough to visit Stuart and Don Tweedale at Taihape. Among some interesting items of plant was a one stage wax melter that they use to process spun out cappings, and for old comb rendering. The system they use is not new but is one of the cleanest and most efficient of this type I have yet seen. They are able to handle all their year's cappings and comb in under two weeks work.

Keith Leadley of Hastings, also visited this plant during a Flock House course and took plenty of notes on the Tweedale melter. Back at home he then made his own version to use with his Bosca boiler. The best features of both units are summarised in the diagram.

The basic mode of operation involves loading the wax cappings or old combs still in frames into old supers with metal rimmed excluders nailed on the bottom; excluders with wooden rims do not slide easily down the angle iron guides which support the supers in the tube. The boxes can be fed in from the bottom end and are stopped from sliding out by a steel stop welded onto the end of the angle iron rails.

The end is securely closed and steam is jetted into each super through 6 mm holes in an internal steam pipe. This pipe is a Leadley modification of the original and overcomes the problem of cool spots which can occur if the steam is not evenly distributed. The time taken to process each load depends on the efficiency of the lagging, (which should be a generous wrapping of batts or similar) and the steam input. Keith reports that each charge of nine supers of comb took about an hour to process and one leisurely working day yielded over 50 kg of wax. Two tubes side by side as used by the Tweedales obviously have a greater capacity, as one is in use while the other is being loaded.

Peter and Keith Pegram of Wairoa have also designed their own version, but instead of cylinders they have two rectangular tunnels side by side enclosed in a common layer of lagging. This represents sound design as it economises on heat as well as lagging material.

When no more wax comes out of the outlet along with the condensed steam, the unit can be unloaded. But here an important safety note. The lid must not be removed until the steam has been turned off, and even then the face and body should not be in front of the entrance to avoid any chance of steam scalds.

The wax and water runs straight out of an outlet at the lower end so the wax does not become soapy from overheating. An old honey tank, one third filled with hot water, collects the wax, which is kept just above setting temperature by means of a steam inlet. An hour or two allows the dross to settle before the wax is either ladeled into moulds or run off the top using a goose neck set in the side of the tank.

Slumgum is retrieved by dislodging from the frames and emptying out the accumulation in the supers. The great advantage of this system is that the slumgum does not need pressing. Stuart tells an amusing tale of a Palmerston North beekeeper who collected two truckloads of slumgum from Taihape to take back to Palmerston North to press out the 'wasted' wax. Stuart willingly gave him the slumgum and after eight hours driving the two loads were in town. After a morning's pressing for half a tin of wax, the slumgum was reloaded and disposed of at the tip. Not so amusing for the beekeeper concerned but it shows how

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effective steam rendering can be.

If you have a steam generator or boiler and a bit of metal working skill, this system could be worth a try. The size of the unit can be adjusted to the volume of wax to be processed, and it compares well in efficiency, and is much less messy than traditional pressing systems.

To emphasise this last point, I must mention George Winslade of Oamaru. George has built a very neat diesel powered steam generator on wheels and has a small mobile steam chamber for melting out combs. Instead of slaving away ankle deep in a filthy wax room, George waits for a nice winter's day, and wheels the unit out into the yard. The process is so clean he could wear his best suit and shoes and go straight out to dinner after a day's work.

Should we let colonies rear their own queens?

by Elbert Jaycox, "Bees and Honey", University of Illinois.

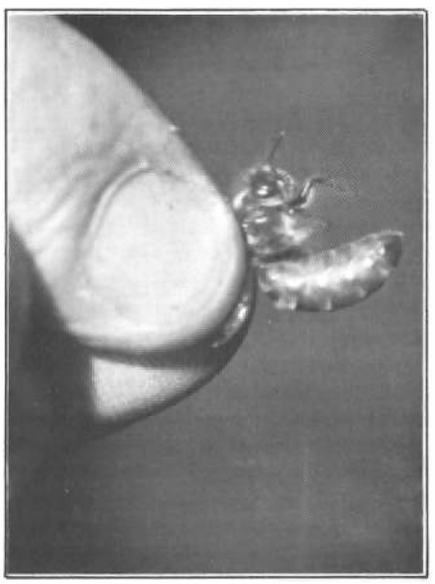
IT IS COMMON practice among beekeepers to remove a queen or make up a queenless new colony and let the bees rear a new queen. In doing this, the beekeeper assumes that he is saving money, the price of a new breeder-reared queen, and that the bees can be trusted to make a good queen for themselves. After all, if bees can communicate, use a compass, determine the time of day, and select the best food source, why can't they be expected to make a good queen?

There are several reasons why you should not allow the bees to make their own queen if you want the best colony possible and one that is capable of producing a large crop of honey. In the first place, many colonies, even large ones, are not in the best condition for rearing queens. If the colony had a poor or failing queen, it may have more old bees than young ones, a poor condition for raising a queen.

When new, small colonies are made up from larger ones, their population of bees may not have the best mixture of young and old bees to rear good queens. Such colonies may also be handicapped by having too few bees overall or too few bees for the amount of brood they must care for. The amount of stored pollen and honey and the amounts coming into the hive may also be important limiting factors in producing a good queen.

If the bees are successful in rearing a queen after being dequeened or split from their original home, how good will she be? This depends on some of those factors already mentioned, but also on the age of the larva from which she was raised. You might think that the bees always pick the ideal larva from which to rear a queen, but they do not. R.D. Fell studied the production of queen cells by bees and found that bees without queens began building emergency queen cells over worker larvae in 12 to 48 hours. They usually selected larvae less than two days old, but also selected larvae three and four days old. Thirty-five per cent, over one third, of the larvae selected were three or four days old. If queen cells are started at the same time on larvae of different ages, the oldest one will emerge first and become the new queen of the colony.

This brings up the question of whether there is a difference in the quality of queens raised from female larvae of different ages. The evidence, especially from studies made many years ago, is conflicting – the results were inconsistent. In older studies, control of rearing conditions may have been less stringent and the techniques of instrumental insemination were not available.



In 1971, Dr J. Woyke of Warsaw, Poland, published the results of a thorough study of queens reared from larvae of different ages and from eggs. He compared the physical characteristics of the queens including their weight, number of egg tubules in their ovaries, and the size of the spermatheca, the storage organ for the spermatozoa. Woyke also compared the number of spermatozoa received by queens that mated naturally and those inseminated instrumentally with different amounts of semen.

Woyke had difficulty rearing queens from eggs and from four-day-old larvae. The bees did not always accept eggs transferred to queen cups. Queens reared from four-day larvae were small. Many such queens were lost during their mating flights and it was difficult to inseminate them instrumentally.

Each day's increase in the age of larvae used for queen rearing decreased the weight of the resulting queen. This is a serious loss because large, heavy queens are the best performers in a colony. The smaller queens had a smaller number of egg tubes (ovarioles) in their ovaries, reducing their egg laying capacity. The number of ovarioles varied from 177 to 340. In some cases, queens reared from older larvae also had spermathecae only one-fourth as large as the largest queens. Although there was pleny of room for a normal number of spermatozoa in the smaller spermathecae, they contained much less than did the organs of larger queens, whether mated naturally or instrumentally.

Woyke concluded that each increase of one day in the age of larvae used to rear queens further reduced the queens' weight, number of ovarioles, volume of the spermatheca, and the number of sperm received at insemination. His results show how important it is to raise queens from the youngest possible larvae, which can be done, when a person selects the larvae. Fell found that at least 35 per cent of the time a dequeened colony of bees selects larvae that are too old to produce the best queens possible. Other conditions in the colony, mentioned earlier, may help to further reduce the quality of emergency queens.

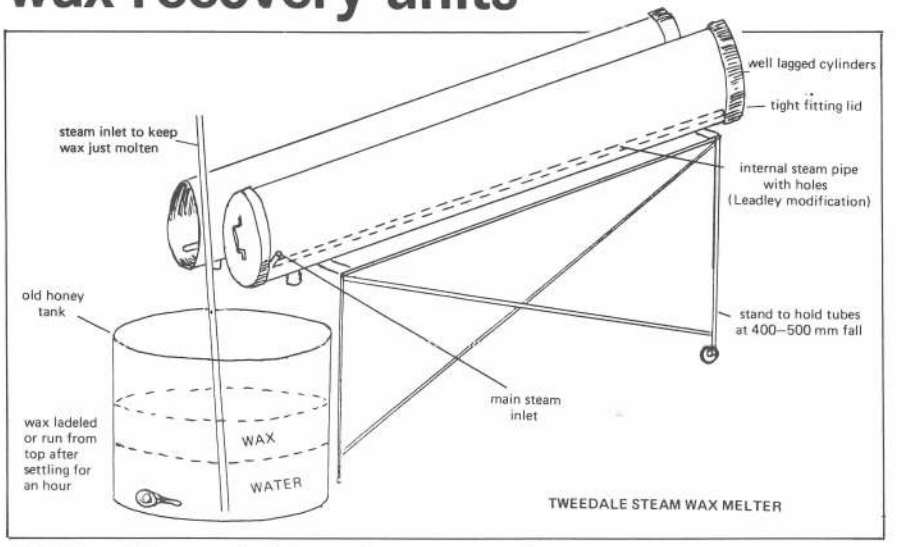
When you let bees rear their own queens after making them queenless, the chances are good that you will get a small queen with less capacity for egg laying than a queen reared under optimum conditions. The queen also may fail sooner than a larger queen. If you are interested in the best performance and maximum honey production from your colonies, provide them with the best possible queens – don't force the bees to rear their own queens.

No place for Heath Robinson wax recovery units

For some time Timaru apiarist Harry Cloake has intended to write an article for publication in the NZ Beekeeper. Following the publication of two articles in our March issue extolling the virtues of certain types of wax recovery units, he has put pen to paper.

"The articles give no indication of the efficiency or otherwise of the units", he writes. "Indeed, both can be classed as 'Heath Robinson', totally useless wax recovery units which would cost those who use them a lot of money."

For the September issue of NZ Beekeeper, we have asked a correspondent to evaluate a wax recovery unit which Mr Cloake claims is both efficient and cost-effective.



The Tweedale unit which Harry Cloake discussed

OVER THE years there have been articles published in the "New Zealand Beekeeper" on ways of recovering wax from old combs, slumgum etc. The March 1982 issue contained two such articles accompanied by drawings which would enable anyone to construct these units if they wished to do so.

Unfortunately, the writers of the articles have not given any indication of the real efficiency of these units and this is why I write this.

Sandy Richardson's unit was the first wax recovery unit described. It is simplicity itself and probably for the purpose he devised this unit, to melt out spun cappings, serves his purpose. However, as a unit to recover wax from any other material such as old combs and slumgum, its efficiency beggars description. Anyone considering constructing such a unit would be far better bundling up all his old combs and so on – and send them to the experts.

The Tweedale unit is specifically designed to cover the whole range of wax recovery. It appears it takes nine supers of combs at a time, taking about one hour to complete the recovery cycle and from this one must presume will process about 50 supers of combs a day, giving a wax recovery of 50 kilograms of wax or about 1 kilogram per super of combs. This is what one would expect from such a unit.

I would like to compare this with a wax press operated by Steve Robins at Pleasant Point, a press his late father, Len Robins designed many years ago.

Steve can process about 50 supers of combs a day, but recovers on average 2.04 kilograms of wax per super. He would use about the same volume of steam, same labour, very little greater capital investment and I am sure better quality wax. The Tweedale unit would recover (say) wax to the value of about $250 each day while Steve Robins $500.

Let us take this a little further; a small commercial beekeeping business of say 500 to 600 hives would have about 2 500 supers of combs in use. Giving a 20-year life to each super of combs, he would or should process about 125 supers of combs each year.

At a wax recovery rate of 1 kilogram per super would recover wax to the value of $625 while an efficient press would recover $1 250 and this just from the old combs.

Therefore, taking into account scrapings, other slumgum etc., the difference between the two methods could well be in the order of $800 or more and, with no more time involved. Of course, a large beekeeping business could well find the difference around $2 000. I know this actually does happen.

In my early days of beekeeping I used a press, a copy of the one Steve Robins now uses, and I obtained the same results as he. In fact, I actually recovered as much as 2.26 kg of wax from some very heavy old combs.

To further prove my point, some years ago a well-known North Island beekeeper found it difficult to believe the results obtained by efficient pressing, so he decided to put it to the test. He sent to me 23.1 kg of very dry slumgum, from which he extracted all the wax possible by his method.

I pressed this and recovered 7.7 kg of wax, exactly one-third of the weight of the slumgum. That convinced him. (Stuart, next time you know where there is a couple of loads of slumgum, please let me know.)

It is a pity articles such as these last two appear from time to time without giving the full details of the performance of the units described. Also, while suggesting to beekeepers how inexpensive they are to construct and operate, they neglect to advise that they could be one of the most costly pieces of plant a beekeeper could install.

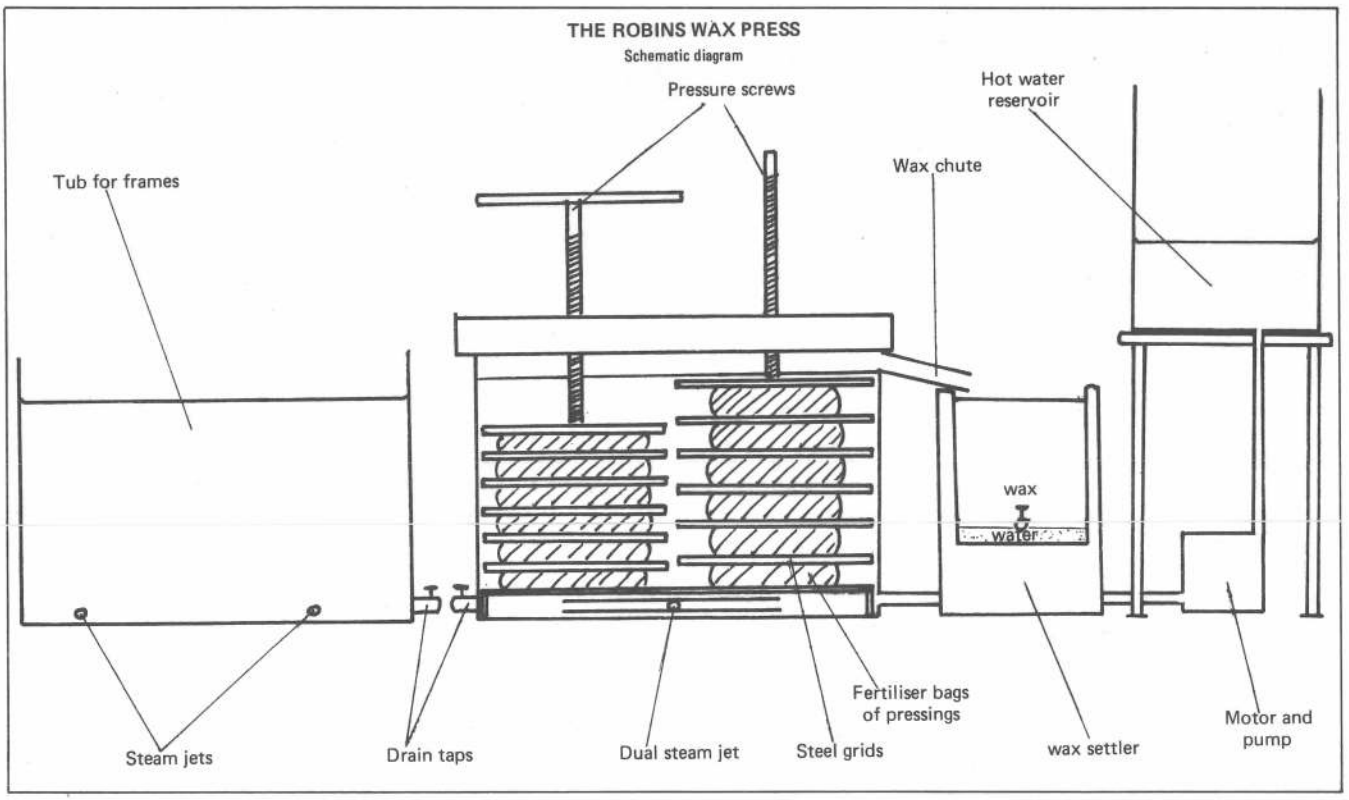
There are many very efficient wax recovery units in the country, all using efficient presses, but I am sure for pure efficiency and comparatively low capital investment Steve Robins' press beats the lot.

Several large beekeeping businesses are now using air-operated presses. These are extremely efficient, but as a large air compressor is required, would be costly for a one-man operation to install. Nevertheless, a co-operative plant owned by several beekeepers would be a sound investment.

The day when beekeepers spend their time poking about with 'Heath Robinson' affairs has long gone, and the day of efficient modern plant has arrived.

One day's wax recovery in a good press would go a long way to paying for it.

As promised in our last issue, Kerry Simpson, MAF Oamaru apicultural adviser, has looked at the Robins wax processing system described in an article by Harry Cloake.



The Robins wax processing system

THE WAX SYSTEM used by Steve Robins of Pleasant Point has a long and involved history. The original press made by his father was described in the Journal of Agriculture, January 1955, by Ivor Forster, then apiary instructor in Oamaru. This same press is still in use but forms only part of a complete wax processing system that Steve is still working on to improve.

The original press took only four large bags of wax/slumgum mixture and had the wax goose necked off the top of the press. The hot water of each pressing was run to waste and the next load had to be heated from cold.

The present system is much more sophisticated, retrieves more wax and is quicker to use, but Steve is still working on a project to produce an even better process.

The system in use today has five main parts:

- A large water tub used to melt out the combs. Two live steam jets heat this tub. One corner is partitioned off to provide a wax/slum free area to wash the frames.
- The original press fitted with removable steel grids which enable twelve smaller bags of wax to be pressed (which enhances the wax recovery of the original four bag system). A dual steam jet heats the press, one under each pile of bags and grids. The wax is floated off the top by raising the water level.
- A heated and lagged wax settling tank with a tap from which the wax is run off into moulds.
- A raised hot water reservoir. Water from the press can be rapidly pumped out of the press and held while the press is emptied. Water can gravitate back into the press as required by opening a valve.
- A boiler fired by a diesel gun burner that uses about a gallon of fuel per hour.

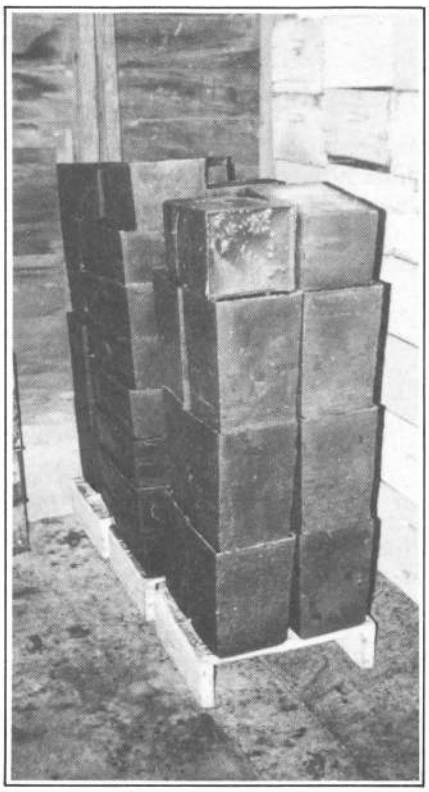
This set up is not only used for processing Steve's own wax, several other beekeepers bring boxes of old combs, scrapings, and slumgum for processing. This gives several weeks work over the winter months. The charges too, are very reasonable and are nowhere near the level of about half the wax recovered that most other processors charge.

The method of use for old comb rendering starts with the tub being filled with old frames of black comb and the steam turned on to heat the water. When the combs loosen they are broken out and the frame washed in the clear water in the corner partition. The frames come out in good condition with clean grooves. Good frames are put back in boxes for reuse, broken ones are dumped. When all the frames are removed a mixture of wax and slumgum is left floating on the surface of the tub water.

Synthetic fertiliser bags are charged with two buckets (three gallons) of this mixture and put in the empty press alternately with steel grid separators. The hot water from the reservoir runs back into the press during the filling operation.

When loaded and full, the steam is turned on under the press. Live steam has been found by experience to be the most effective source of heat.

The Steve Robins wax press, settling tank and reservoir. On right, the end result, blocks of beeswax, one man can manage two boxes in an eight hour day, a total of 50 boxes of comb.



▷ The press is left about half an hour to heat and then the screws are wound down until firm resistance is felt. Too much pressure must not be used at once to avoid burst bags (a rare occurrence with skilled operators). As the wax oozes out the pressure can be increased over about the next hour.

From load to load the pressing takes about two hours. One man can manage two presses in an eight hour day, a total of 50 boxes of comb.

After pressing, the steam is turned off to allow the wax to settle on the top. More hot water is then allowed in from the reservoir to float the wax over the chute into the settling tank. The press water is then rapidly pumped into the reservoir.

Residual wax and slumgum is left with a bit of water under the bottom grid. This is emptied at the end of each day. Two buckets of hot water are used to rinse any good wax left on the bags and grids before they are removed from the press.

The settling tank is primed with hot water to just below the tap. One pressing just about fills the tank which is left warmed by a steam jacket until the operator has time to run the wax into moulds.

Several factors combine to determine the amount of wax recovered, the type of comb being the most important. On average 2.04 kg wax per box of dark combs is recovered. Steve notes that the grade of foundation used has a marked effect on the yield, which can be higher than the average for some heavy combs.

The present Robins system is a very good unit of its type, and could be considered by larger beekeepers or a group of beekeepers who want to co-operate with a high yielding plant.

However, it will be interesting to see if Steve's ideas on a continuous wax processing system supercede his current plant and provide the basis for an article by a future apiary officer. One thing is sure, only continual experimentation by innovative beekeepers will lead to better, more efficient plant.

Harry Cloake's description of some wax processors as being "Heath Robinson", draws a response . . .

"We haven't been taking half our wax to the dump"

An open letter to Harry Cloake from Stuart Tweeddale, Taihape

Congratulations, Harry on having such an efficient method of wax recovery. Any system that can recover over two kilograms of wax per super has to be good.

Over the years there have been many excellent articles and illustrations of interest in our journal, but I cannot remember any that have received such harsh criticism as this recovery unit of ours. I know you are a straight talker Harry, but there are limits, especially when you haven't all the facts.

When an article appeared above your name in the journal some years ago, telling of the mighty great pit you were digging to accommodate the huge crops you get down there, I could not see it working, but did not start jumping up and down, and rushing off into print about it. If it was a success, I hope you have had it fenced in since then.

Since the more prosperous times of the post 'Kimpton era', when much needed replacement and repair work has been carried out, we have put through this system of ours fifty or sixty thousand old frames and we can assure you that we have not been taking half our wax to the dump.

Perhaps we could come to some sort of compromise, with us reducing 120 frames down to about one third of a drum of scalding slum-gum in one and a half hours, and then you could move in with your big powerful press and squeeze out the last few grams.

Somehow I think you might be wasting your time, as two other experienced beekeepers up here, have already done this, and both have admitted that they didn't get pay dirt.

Also some of us take the view, that you can no longer put a man into the wax room just to get him out of sight and out of mind as they used to, or you may find all the profit going down the road on pay-day.

Anyway, we do hope to see you up this way sometime Harry, and perhaps we could show you how a reasonably efficient North Island unit is run.

Steam rendering of wax - some actual figures

by K.W. Simpson, AAO, Ministry of Agriculture & Fisheries, Oamaru, and A.G. Matheson, AAO, Ministry of Agriculture & Fisheries, Nelson.

TWO BRIEF articles on simple wax processing without pressing were criticised in the June 1982 issue of the NZ Beekeeper. The articles did not pretend to be a full economic analysis of wax rendering systems, but neither is Mr Cloake's critique. It is easy to show that slumgum contains wax, but more care needs to be taken in deciding whether its recovery is economic.

For those interested in pursuing this subject further, there are two interesting articles available. Kevin Ecroyd spoke on "The efficient salvaging and handling of beeswax" at the 1969 Ruakura beekeepers' seminar, and this talk was reported in the November 1970 "New Zealand Beekeeper". Vince Cook conducted a small survey on the economics of comb replacement, which was written up in the proceedings of the 1970 apiary staff conference.

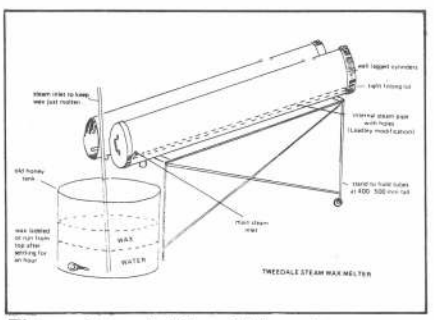
Their figures need adjusting for inflation, but they do provide a starting point for detailed analysis. It must also be remembered that wax prices to beekeepers have not moved in line with inflation, no doubt a reflection of the overseas market. Costs such as power, wages and capital have increased with inflation while the dollar returns for wax have stagnated, and this will also alter the economic analysis.

Sandy Richardson's unit was the first to be discussed in the articles. Mr Cloake claims that its efficiency on old comb and slumgum "beggars description", and that a potential user would be better off sending his old combs "to the experts". He also says that air-operated presses are extremely efficient and would be a sound investment.

To see how true this claim was, one of us tested 19.1 kg of slumgum that was left over from the rendering of old combs in this vat. A modern air-operated press was used. After the equipment was cleaned and set up, two people spent two hours very carefully pressing the slumgum, and recovering every last piece of wax.

The result? 1.2 kg of the lowest grade wax (worth $5.64 at today's prices), and a heap of good, garden-grade slumgum. Most people won't take long to decide whether the 6 per cent of wax that the slumgum contains is worth recovering, or spreading on the garden.

The figures given in Mr Cloake's article for wax recovery with the Robins press were the high, not the average figures, and were from combs fitted with extra heavy foundation (which gives 0.2 kg advantage over medium brood per box). Figures from V.A. Cook's survey on seven pressing systems yielded 1.6 to 2.0 kg with an average 1.7 kg per box of 10 combs. These figures may be taken as nearer to real average values actually obtained in the normal running of wax presses.



The controversial Tweeddale melter.

Of the systems surveyed, the most economic was a copper and hatch press. The big presses returned more wax, but were not more efficient economically (when capital, running costs, etc were considered). Since Vince Cook's survey, the beekeeper with the most efficient system has changed to a steam rendering set up, as it is easier and less messy. People do not make decisions on economic grounds alone.

Mr Cloake's analysis of *the Tweeddale system* should be corrected with the actual figures from this winter's usage at the Tweeddales':

☐ The unit holds 120 frames, and steam out time is one and a half hours.

☐ Over 700 frames are processed a day, (many light simplicity type with little wax are culled because the frame type is no longer wanted).

☐ Wax recovery is 1.6 kg/10 combs (fitted with medium brood).

☐ Boiler uses half a gallon of diesel an hour.

☐ Spun dry cappings from 70 tonnes of honey were processed in three and a half days.

Stuart Tweeddale also asks the valid question "When does it become uneconomic to extract the last few grams of wax, given the cost of wages and high capital cost of presses?"

It is worth concluding with a quote from V.A. Cook's survey: "Costly, complex wax salvaging plants are only worthwhile if they are more efficient than simple, cheap plants." And to work out efficiency, actual data, accurate costings and thoughtful planning are required. Dismissing alternative plant as totally useless is not helpful. There are few problems in beekeeping, or in life, that have only one right answer.

Acknowledgements.

Grateful thanks are due to several beekeepers who supplied information for this article and made their equipment available for tests, especially Stuart Tweeddale and John Bush.

The Robinson/Tweeddale/Jansen melter

IT APPEARS that the controversial wax processor described in the NZ Beekeeper as the "Tweeddale unit" was misnamed. Taupo Honey Centre managing director Robyn Jansen tells us that the unit described in the article in the March NZ Beekeeper and criticised by Harry Cloake in the June NZ Beekeeper was in fact developed by him in the late 1960s.

"Unless Mr Tweeddale has developed a new model, the unit described was one he purchased from me in the late 1970s. We never, in fact, used it as we subsequently went on to develop a far more efficient unit based on the same system. This newer unit will render a 44 gallon drum of cappings to a dry slumgum stage in 10 minutes."

While Robyn has no objection to his obsolete unit being the topic of debate, he would like it acknowledged that it was originally a Jansen development which has long ago been superseded by a more efficient model.

Robyn also informs us that he doesn't know the Mr Robinson described in Harry Cloake's article, but he certainly acknowledges his bees gather honey and wax from heath bushes.

CORRESPONDENTS

NOSEMA WARNING

Dear Sir,

" 'Methiolate' or 'Nosemack' definitely suppresses infection, but shortens the lives of bees when fed at the necessary concentrations".

The above quote has been taken from the chemotherapy notes on the treatment of Nosema disease, "Notes on bees and bee diseases", Department of Agriculture and Fisheries, South Australia, Bulletin No. 22/77, p 25.

As this product is being advertised in The NZ Beekeeper for Nosema control, would you please let people know what they are buying.

Yours,
R. Hargreaves,
Palmerston North.

On asking Ceracell Foundation Ltd to comment on the Nosemack claims we received the following reply:

Research done on Nosema apis shows some doubt as to the effectiveness of Nosemack at dosage rates recommended by the manufacturers. Because of this, we are no longer supplying Nosemack – please note the Nosemack deletion in our advertisement.

A LOW FORM OF WIT

Dear Sir,

It was not my intention to take any further part in the discussion on the wax recovery units but unfortunately, as it was seen fit to use sarcasm, a low form of wit, as counter criticism I must reply.

To those who endeavoured to defend themselves may I say, I criticised written articles, not people.

I quoted results known to be correct and obtained from a properly operated manually operated press; a press well within the purchasing ability of any commercial beekeeper not an expensive air operated press.

I am not concerned with results obtained from presses I know nothing about nor about how they were operated.

The criticism of the two units was based on my own experience. No matter the size, shape or the angle the unit lies at, no steam box will efficiently recover wax from frames of old combs. If it did, why do all commercial wax recoverers I know of use presses?

A calculation of the results obtained from the "Tweeddale" unit would show after rendering the wax from the 60 000 frames of combs at the rate quoted, 9 600 kg of wax would be recovered. If put through the Steve Robins press 12 240 kg would have been recovered; 2 640 kg more. In terms of money at present day values as quoted $5.64 for 1.2 kg of wax, then someone has lost out on the equivalent of $12 408, and as the years pass on this amount grows larger, according to the number of combs melted down.

Let us all hope that in future when pieces of equipment are written about the efficiency of that unit is included.

Yours,
Harry Cloake,
Timaru.

This correspondence is now closed – Editor.

BIBLIO BUNGLE

Dear Sir,

While doing some bibliographic work with the "NZ Beekeeper" recently, I came across the following oddity. Probably you have noticed it, but maybe you haven't.

The issues are numbered as follows:

1975	vol 37, nos 1 – 4
1976	vol 38, nos 1 – 4
1977	March 39 (1)
	June 39 (2)
	Sept. no number
	Dec. 38 (4)
1978	vol 39, nos 1 – 4
1979	vol 40, nos 1 – 4
	and so on.

The "NZ Farmer" recently had a lot of explaining to do when they published vol 103 in their centennial year. Perhaps you're trying to go the other way and have vol 99 in the hundredth year!

Bibliographic work is made a little confusing – e.g. 39 (2) could be June 1977 or June 1978. Any ideas on how to resolve that?

Yours,
Andrew Matheson,
Nelson.

Our errors return to haunt us! Perhaps since Andrew is the first to notice, we should just start numbering issues in order of publication. Readers, let us know your objections, if any – Editor.

WILD BEAUTY

Dear Sir,

Re Highway Beautification Bees – NZ Beekeeper December.

If this beautification bee food planting really gets underway, isn't it going to improve living conditions for the feral bees to the possible detriment to that of our bees, who unlike the ferals, have to work for their keep?

If this is the case, one can only hope for hard winters to take the sting out of the beeggars and keep profits capped.

Yours,
Victoria Whittle,
Napier.

NODDING THISTLES DYING

Dear Sir,

Recently, while camping in the Hakataramea Valley, I noted that a large percentage of the nodding thistle flowers were dying and, on investigation, found them heavily infested with a "bug" – in some cases as many as 15 to 20 a flower. The heavily infested ones appear to die before they reach the nectar secreting stage. For the beekeeper who relies on them for his crop (and at a guess there would be many hundreds of tonnes of honey produced from them) it will spell disaster.

I understand this "bug" or parasite in the form of a beetle was released by the DSIR a few years ago and is spreading rapidly at over 20 kilometres a year.

Could we be informed whether the National Beekeepers' Association was consulted and was an economic survey made before its release?

Would the DSIR care to comment?

Yours,

J.K. Bray,
Airborne Honey Ltd,
Leeston.

Mr Bray's letter was referred to entomology division, DSIR, for comment as follows:

The crux of the matter is that nodding thistle is a gazetted Noxious Plant and the relevant legislation *requires* that ▶