More than Honey

a documentary by Markus Imhoof

Thelma Film AG
Felsenstraße 12a
CH-8008 Zürich
T +41 44 932 25 51
F +41 44 420 16 48
meier@thelmafilm.ch

Ormenis Film AG
Felsenstraße 12a
CH-8008 Zürich
T +41 44 932 25 51
F +41 44 420 16 48
info@markus-imhoof.ch

zero one film GmbH
Lehrter Straße 57
D-10557 Berlin
T +49 30 390 66 30
F +49 30 394 58 34
office@zeroone.de

Allegro Film Produktions GesmbH
Krummgasse 1A/9
A-1030 Wien
T +43 1 712 50 36
F + 43 1 712 50 36-20
office@allegrofilm.at

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INTRODUCTION

Millions and millions of bees have disappeared in 2007 and 2008. Seemingly unmotivated, without any prior symptoms of illness or infection they have disappeared from a hive saturated with honey – never to reappear at any other place, but also without leaving any dead bodies behind. Helpless the queen and the young stay behind and die the slow and painful death of starvation.

Just to get the picture: 80% of the population of Manhattan, Zurich and Berlin has disappeared, including the entire administration, the police, houses and flats deserted, the cupboards are filled with money yet there is no one left to steal it. In the cribs and nurseries there are babies and toddlers, whining, starving.

Despite intensive research science has not managed to come up with an explanation. This is worrying because there is more at stake than honey: Today the bee is one of the most important farm animal within the modern, globalised agricultural industry. Without pollination services provided by billions of honeybees, a large part of our fruit and vegetables – even meat - would never end up on our plates. The dependency is mutual. It is not just humans profiting from the bees – but vice versa. The bee followed in man's footsteps in its worldwide expansion.

But now the balance of power seems to shift in the contract between man and bee. Is it just a momentary fluke or are we facing the early stages of total system collapse? Life and survival depends upon a mutual respect between parasite and host. A successful parasite allows the host to live – it is not the survival of the fittest, it is the most adaptable, who survives. Now our collaboration with our most important farm animal does not work as smoothly any more. Is it the bees? Or is it us?

Even Albert Einstein predicted: If bees are extinct, man will surely follow within four years.
He may, or may not be right. But maybe we should not tempt fate trying to find out for certain .

The extinction of species is neither new nor unusual. 90% of species that ever walked the earth are now extinct. But the death of the bees should worry us, not because they are indispensable but because they're so similar to us: aggressive, greedy and diligent until they drop dead. If sufficient resources are available they exhaust themselves collecting pollen and nectar. In cases of overpopulation, when resources are scarce, they get rid of redundant eaters and steal from their neighbours.

For millions of years this strategy has ensured the bee's survival. Meteorites, ice ages, sun storms, volcanic ashes and dinosaurs couldn't harm them. The more urgent question should be: How will we as people survive?

Once resources are scarce, how will mankind deal with overpopulation?

Until now unlimited growth was the human motto even though futurologists proved that we have already exceeded the ecological capacities of our planet by 30%.

INTRODUCTION

A bee colony is among the most complex structures on earth – next to the human brain. In certain areas its swarm intelligence is superior to human intelligence.

But its success rests upon the total lack of individual freedom.

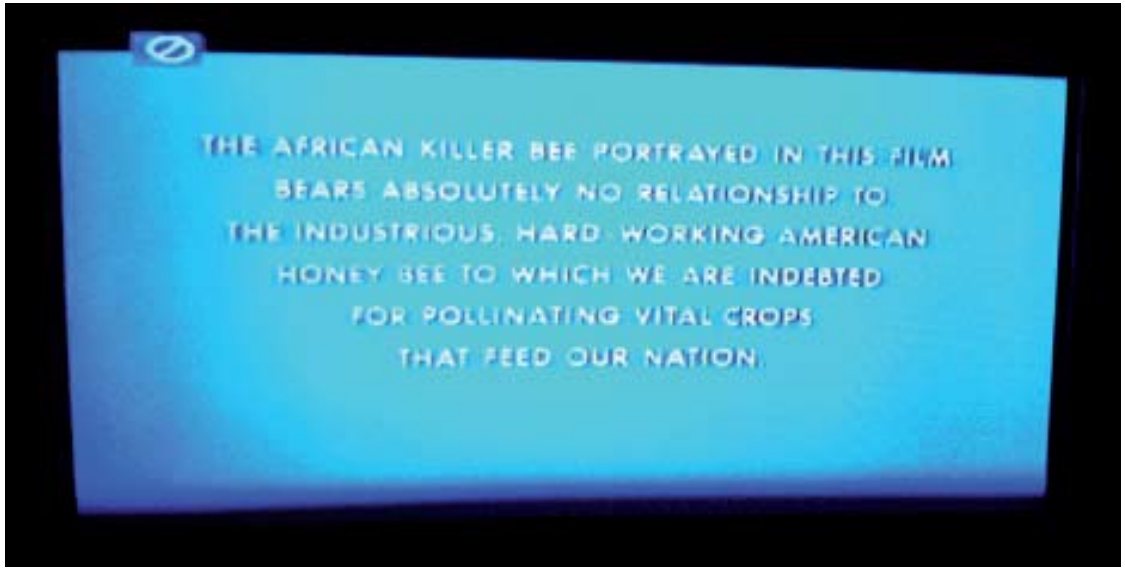
We worship our individual freedom, which is restricted by ethics and morale setting the ground rules for social interaction. We care for our sick and the elderly. Nobody will be thrown out of the nest if resources are scarce. At least not officially.

Our relationship to nature is marked by contradictions. And just like the whole world in a drop of water those contradictions are reflected in our dealings with bees.

The relationships between man and honeybee tells us a lot about ourselves, about nature and our future. It is certain that stagnation and stability is just about as unhealthy as unlimited growth. It is crisis and catastrophe that drives evolution. And the means of rescue are often surprising and unexpected. Maybe we yearn so much for stability and the same old that we cannot recognise the new, the possible salvation: They move about in large swarms. They look just like normal bees. But wherever they occur they cause fear and horror, killing man and animal.

In 1956 they escaped from a laboratory in South America. A cross between African and Brazilian bees. In just a few years they have spread all over the continent. And just these so-called “killer bees”, as the media have named them, could save mankind. They’re resistant to all the usual diseases and parasites threatening “our” honeybee. Efficiently they pollinate all known cultivated plant. Wherever they appear they eliminate the honeybees, who cannot defend themselves. They’re the product of an accident in a laboratory. Unstoppable they’re migrating northbound. People try to extinguish them by all means at hand. Maybe instead we should allow them to save our lives

Everybody talks about the dying of the bees.
“More than Honey” talks about their lives.
And about ours.



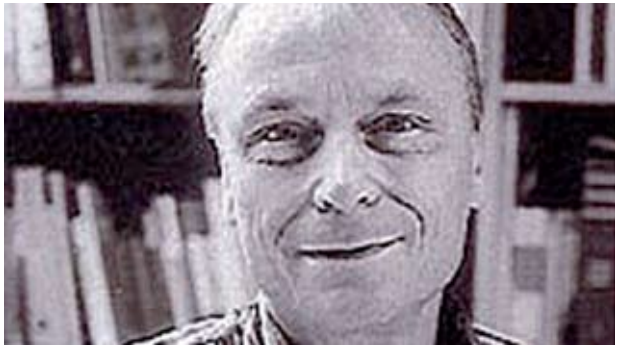
From the horrormovie “The Swarm”, USA, 1979

PROTAGONISTS

Bees spend their lives flying – from blossom to blossom. And on aeroplanes from one continent to another. And on trucks from almond plantation to plum, apple and rape. From fungicide to herbicide. To survive the stress the keepers feed them with antibiotics against infection, poison against parasites, sugar against lack of nutrition. Dead colonies are replaced by imports from Australia, no time for sentiment, the next customer expects services. Life in a beehive resembles that of a manager: globalised and efficient, from meeting to meeting, through eternal spring – into total collapse.

Austrian **Heidrun Singer** is a third generation beekeeper – for her honey production is a sideline business, however. Her main source of income is the queen. After the copulation she cuts the wing of the queens and sends them via FedEx bee-keepers all over the world.

In the mountains we meet Swiss beekeeper **Fred Jaggi** who insists on keeping in line with tradition and preserve purebred black bees.



Professor Dr. Dr. hc Randolf Menzel at the Free University of Berlin represents the bees in the dispute between the two concepts of individualism versus swarm intelligence. As a neurobiologist he has researched bees inside out for most of his life.

John Miller keeps bees on a large scale. As a marathon runner he equals happiness with success and achievement.

Chinese **Zhang Zao** has turned to some kind of a bee herself: By plane she commutes between the Northern and Southern Provinces, dealing with pollen for manual pollination performed by migrant workers. A model for the future?

Fred Terry appears if killer bees attack. But instead of killing the imperishable creatures, he takes them home to produce honey – much to the horror of his neighbours. But there is a price tag attached to it.

SYNOPSIS

The film begins with a gaze into the beehive. A strange, somewhat alien world. Macro images and slight slow motion effects bring out the beauty and the fascinating behaviour of the animals, helping the audience to connect with them as protagonists. They will not be anthropomorphised or trivialised.

"The Bee Whisperer" **Prof. Menzel** works as a neurobiologist at the Free University of Berlin and knows bees inside out. The deeper he leads us into the super-organism that is the swarm, the more alien and unreal the life of humans appears to us.

SYNOPSIS

Man is the antagonist. Most beekeepers love their animals but caught in economic necessity they have to demand peak performance. That applies for the charming Austrian **queen breeder Heidrun Singer** as well as to the American beekeeper **John Miller**, who sends his 15.000 colonies all over the continent, following the bloom of economic plants.
Beebroker John Traynor pulls the strings. He negotiates between farmers, beekeepers and the global market – which rules over plant, men, animal and machine alike. In a frightening similarity they all succumbed to its all embracing power.

The bees are confronted with new challenges all the time, having to take on new burdens. What we mistake for nature turns out to be a contaminated agricultural wasteland. But even the paradise of the Alps offers no respite: **Fred Jaggi** kills bees that are not purebred – whilst the pure races die from centuries of inbreeding.

The longer the film observes man and bee, the more likely it seems that this live, determined by outside forces, must end in a catastrophe.

Why do man and bee collaborate and how long, until the united republic of bees or on strike or retaliate?

And indeed – bees have already gone on strike: they disappear and die. And they strike back in their mutant form of “killer bees”. This lab accident, a hybrid of African and Brazilian bees, has conquered half of South America, by now they have crossed the US border. This is a turning point.

In Arizona **beebuster Fred Terry** has accepted the challenge: instead of killing the “killer bees”, which are resistant to most known bee diseases, he learns to handle them. Much to the horror of his neighbours and the media he produces killer bee honey.

In many places in China bees have all but disappeared due to the excessive use of pesticides. Now **Zhang Zao** and many others have become bees themselves, climbing into the trees to manually pollinate the blossoms.

SYNOPSIS

Most people however do not want to change direction, want to march further down the path that was meant to lead to happiness. In Australia the disposable bee is invented. And in the greenhouses winter is turned into spring, the bees brought in from the cold to pollinate the Christmas strawberries in artificial utopian worlds. When the job is done and no more food to be found they hit the glass and die.

Just the “killer bees” don’t mind. They don’t collaborate. They will survive us.

More than Honey

DRAFT TREATMENT

The film begins with the birth of the queen bee. A narrow golden pyramid against dim light. Slowly it parts at the top, two large eyes become visible, followed by carefully feeling antennae. Step by step the queen hatches from her golden sarcophagus, spreads her wings – life is about to begin.

The tunnel leads out into the light. She rises, high into the sun, followed by a swarm of drones. It is her maiden flight – the only flight to freedom nature has in store for her.

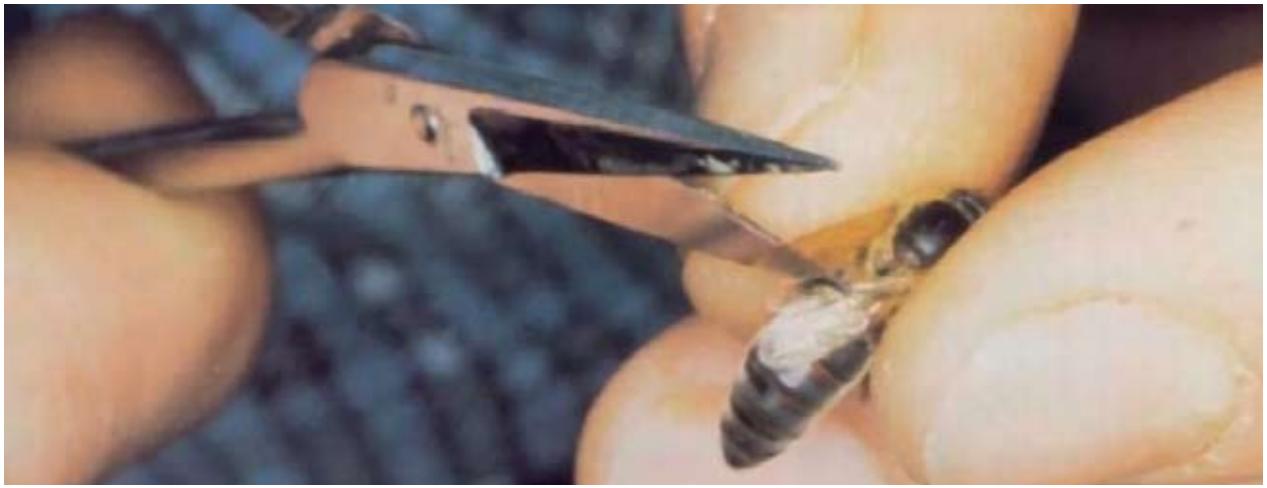
On a video monitor we see the copulation ritual, high up in the air, in an abstract representation of a thermal camera. After copulation, the drone drops dead from the sky. A haunting danse macabre. A voice tells us about the queen: “Back in the hive she will be cleaned and fed. It is her golden cage.”

It is the voice of **Prof. Randolf Menzel**, neurobiologist at the Free University, Berlin. For many years now he's researching bees and claims to have learned a lot from them. "The bee doesn't have an EGO, it only know the WE – which is always stronger", he explains to us. And yet he is restlessly trying to trace the Ego and the consciousness of the single bee.

The camera follows the queen back into the hive, into the warm dim light, surrounded by the monotonous humming of the worker bees. But before she can begin laying her eggs, bright light floods the hive. A huge female hand lifts up the queen. She is dragged back into daylight and with a small pair of scissors one of the transparent wings is cut off with one quick move. "A fertilised queen is worth about 200 Euros", Austrian **beekeeper Heidrun Singer** explains. "The market for purebred queens is huge: I sell into 58 countries all over the world."

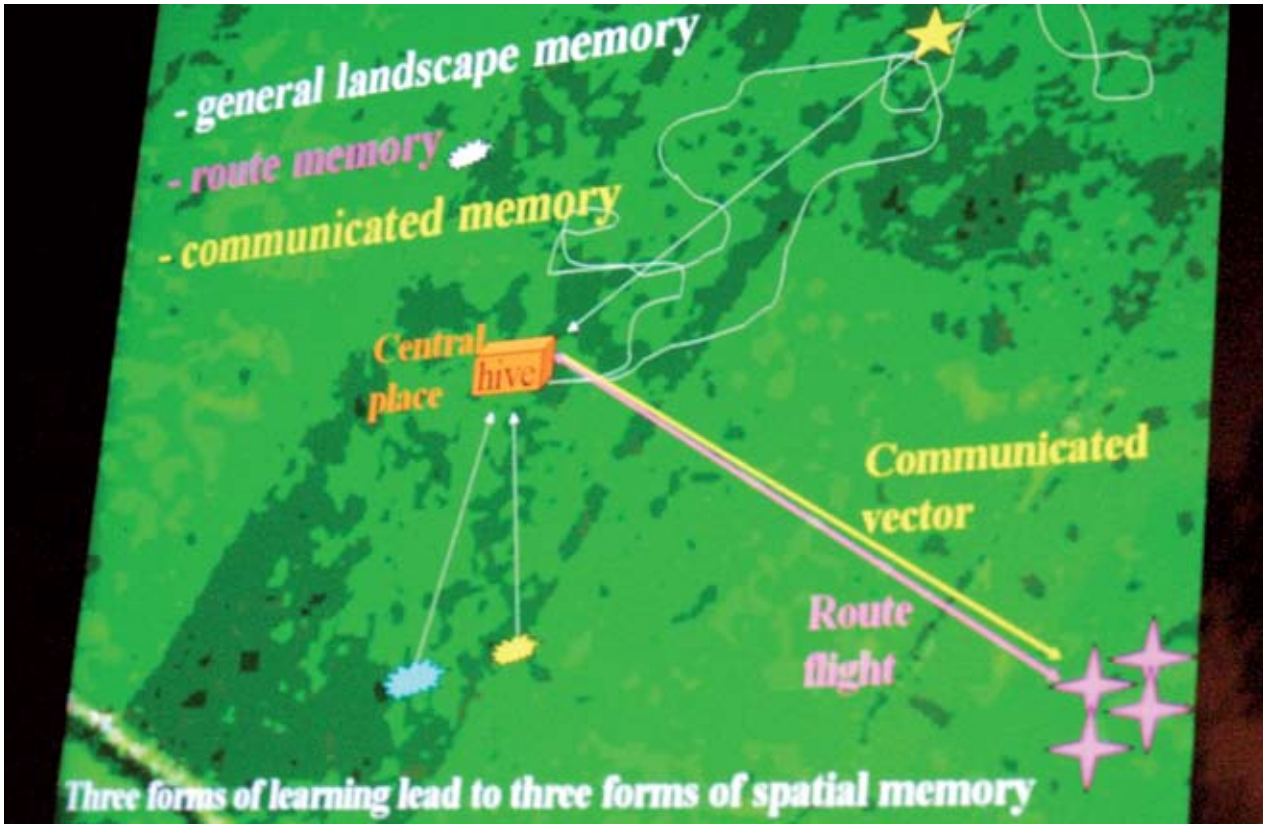
With routinely studied movements she puts the queen into a small plastic cage and locks it with sugar. The cage is put into a padded envelope. "She will be sent to the US. They always need replacements, they cannot produce enough colonies themselves any more."

The mutilated queen sits put in her cage of sugar. Light in the cell is grey. Heidrun Singer waits in line at the post office. Finally the



envelope is handed over and stamped. With every movement the queen is whirled about, falls helplessly on her back, immobilised by her cut wing. The envelope is thrown into a pipe which leads to a conveyer belt and finally to the air cargo compartment. At night it will be at Vienna airport. From there the journey goes via London Heathrow and Chicago to San Francisco where it's unloaded onto a huge truck. 72 hours after her birth the queen reaches her new destination.

The queen is not the only air cargo bee, though. In a clearing in the Australian brushland hooded men in white suits funnel masses of bees into cargo boxes, which are subsequently weighted, piled up on pallets to be loaded on board a Jumbo 757.



We can trace the route of the cargo plane on a monitor. From Australia to the West coast of the US. The images resemble those of the copulation dance of the queen. **Professor Menzel:** "The bees are gathered from all over the world, from different time zones and seasons. When they reach their new work places they are totally disoriented."

The image on the monitor morphs into the scan depiction of a bee brain. Through radar images Menzel demonstrates the trajectories and how bees find their way. With their small radar antennae the lab bees resemble alien creatures. "They are jetlagged, adjusted to autumn and there are hundreds of foreign bees in the hive, whom they don't know. But bees are smart, they learn. And they can adapt. That's part of their success."

In California the bees have finally reached their destination and life seems to take on a turn for the better: A paradise of blossom in pale purple.

Immediately upon their arrival the bees set off for work. The golden, furry bee lands on the almond blossom. Her long tongue licks the nectar from the inner calyx. Pollen sparkles in the backlight when the bee takes off again. She flies high into the sea of blossoms – it appears endless: trees in bloom, standing in straight lines up to the horizon – the largest almond plantation of the world. And what appears to be a paradise in soft shades of purple is in fact an agricultural wasteland, contaminated with pesticides, surrounded by satellite towns: thousands of boxes, colour coded, the beehives of the travelling beekeepers. One of the boxes contains **Heidrun Singer's** queen bee, already at work, laying one egg after the next, more worker bees for the plantation. The boxes are cared for by men in white suits, walking from hive to hive, adding sugared water, checking if everything is in order. The humming among the thousands of hives is ear-splitting. What had appeared to be good fortune turns out to be the fate of Sisyphus.

In a similar settlement of blocks of prefab houses, in a small office in nearby Bakersfield an elderly man busily walks up and down. His handsfree firm on his head he appears agitated, gesturing wildly as he tries to coordinate three customers at the same time. What becomes apparent from the conversation: **Joe Traynor** is a bee-broker. It is his job to negotiate pollination services for plantation owners and beekeepers. “160 US$ per colony for four weeks for almonds. Just think about it for a moment: When I started this job in 1973 they paid 10 US$ per hive. The price is determined by the market, it’s just like any other industry sector.”

He explains the connection between the sex of the plants and the stock market: “Flowers and bees – that remained unchanged for 100 million years: the flower lures the bee to visit the blossom, the bee get’s the nectar, the plant is pollinated – both make a profit: It’s a win win situation. It is different at the stock market. Here you can also make a profit from losses. Do you know the profit margin if you bet on loss of harvest through drought? The highest margin you make with clover because you cannot breed meat- or milk cattle without it.

The bees just continue to work. One blossom at the time through a land of plenty, which in reality resembles a huge industrial plant. The blooming weeds at the foot of the trees are treated with herbicides regularly and turn (in time lapse) into brown, foul mud. “We want the bees to pollinate what we pay them for, not the weeds” a **foreman** laughs. In just 22 days 600.000 acres have to be pollinated, that’s 80% of global almond production, with an annual turnover of over one billion dollars. 40 billion bees are brought here year after year. They’re accompanied by migrant workers, those men and women in the white suits and masks. They come from everywhere, as far as South Africa, live in mobile homes and accompany the animals on their journey through the plantations, from March until August, from California to Florida.

Carefully **Professor Menzel** attaches a small radar antenna to a bee. “What we are interested in is the role of the individual within the super organism. What does individual freedom mean to the single bee? Do single achievements count for anything? Not all of them are diligent, some are lazy. But if you reward a bee for a specific behaviour, it will remember this for a week. If you reward it three times, it will not forget for the rest of its life ”

He sets the radar bee on the windowsill to fly. With childlike fascination he follows the trajectory on the monitor.

Joe Traynor checks up on his bees – he has a reputation to protect. Once a week he visits the plantation and personally inspects the boxes. If there are not enough bees in a hive (at least 9 fully populated frames) he deducts money. He’s had bad experiences with beekeepers delivering empty boxes and still cashing in. And because so many bees don’t survive the winter these days, he orders fresh supplies from Australia. 100 US$ for four pounds of bees, which will be poured into the deserted boxes. It doesn’t make a profit, but it guarantees customer loyalty.

It could be much worse, however: if only the queen and the larvae are left in the hive, there is cause for alarm: **Colony Collapse Disorder!**

The queen has to be put down, all boxes have to be disposed of, so the mysterious symptom is not passed on to other hives. Nobody wants to make a great fuss over it, because nobody wants to be blamed.

“Many colonies don’t survive the job in the almond plantations so before they pollinate apple or plum beekeepers need fresh supplies.” In Austria **Heidrun Singer** packages new queens. Heidrun is a third generation beekeeper and she’s teaching her daughter to take over the trade. Since honey prices have tumbled she has sidelined her business and now focuses on breeding and selling queens. And if a few years ago she cursed the global market flooded with cheap Chinese honey – now she herself profits from globalisation since her queens are in demand all over the world. “This early in the year most are sent to the US. Europeans won’t place their orders until April/May. These will not go to California but to Idaho and Washington.” The next wing is cut, the next envelope filled.

Joe Traynor stands in front of a map of the US, his handsfree firm on his head (looking a little bit like the radar bee Professor Menzel set free) “Apple in Washington then directly to the plum-trees, if that works out ” He places small plastic bees on nails on the map, resembling a general moving his platoons in the field. “I still don’t know where to find enough colonies for the rape. I will have to order more from Australia.”

Daily routine in the hive. Cleaner bees clean, the larvae are fed, the queen lays eggs. Traffic is busy at the entrance. From outside, **Professor Menzel** gazes into the hive, chooses single animals and attaches marker numbers to their backs. While he’s working he explains:

“The single bees are like cards in a deck: Workers, drones, queen.

The queen ensures the future. She’s the head of the family, the first servant of the state, laying about 1.500 eggs every day. Every bee in the hive is her daughter, her son. All bees in the hive are related, they’re one family. Each has a specific task, yet none of it makes sense without the others. You can, however, push the analogy further: The entire swarm is ONE organism and within this system every animal has its place, its destiny.

Heidrun Singer wears a magnifying device while she's fishing for the tiny larvae in the comb with a small spoon. "We kind of support nature a little, here" she laughs. "You can deceive the bees and 'reprogram' them, just like a computer hacker." Those larvae were destined to become normal worker bees but if you reallocate them to an artificial queen cell the workers will feed them with royal jelly and thus create the queens! My bees are the result of centuries of breeding efforts: non aggressive and diligent in the production of honey. That's why there is such a demand for my bees all over the world."

Beekeeper **John Miller** supervises the South African migrant workers who accompany his bees during the pollination season: “Billions of bees in one place is a feast for parasites and germs. That’s why we reconstruct the colonies, building a strong one from three weaker hives. Only the strongest colonies are allocated for the next job, a kind of natural selection, if you like.”
The boxes are gathered and put on conveyer belts in a large tent. Masked men and women in suits open the boxes, blow smoke inside, take out the combs and sort them into iron grids in order of condition. Without any consideration for the inner organisation or family lines the colonies are reconstructed in wilful order.

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After his inspection Miller changes from the protective gear into his running suit. His passion is the marathon. Breathing regularly, once step in, three steps out, one step in, three steps out. He looks at his blood pressure metre and increases his speed.

In the clearing next to the almond plantation in California the “selection” has been completed successfully. At dusk fork lifters load the boxes onto a huge truck. Smoke is used to hush the bees back into the hives. Inside the hive they escape from the smoke to their honey storage to protect it from imminent danger. The cargo is covered with protective netting, belts are tightened. The driver wears an orange bee suit with fluorescent strips. He talks with Miller about the route and the last possible petrol station in the dark. Then the “slave ship” sets off onto the highway into the night.

Beams from the truck’s headlamps move along the dark highway. The camera takes us inside the boxes where the bees try to regulate the temperature in the hive through beating their wings. Looking closer we see black dots on the back of the animals. The image turns into a microscopic view and we recognise huge hairy mites sucking blood from the bee, sometimes three to four on one animal.

Professor Menzel is looking through the microscope at the mites. “For us those bloodsuckers would have the size of rabbits! One could consider man to be a parasite of the bees if you like. All life is based on the relationship between parasite and host. But if a parasite wants to be successful in the long term it has to keep the host alive.” Again Menzel looks down his microscope. The newly hatched bee already carries three mites on the back. “The bite also invites viruses. And of course the stress makes the bees more susceptible to infection.”

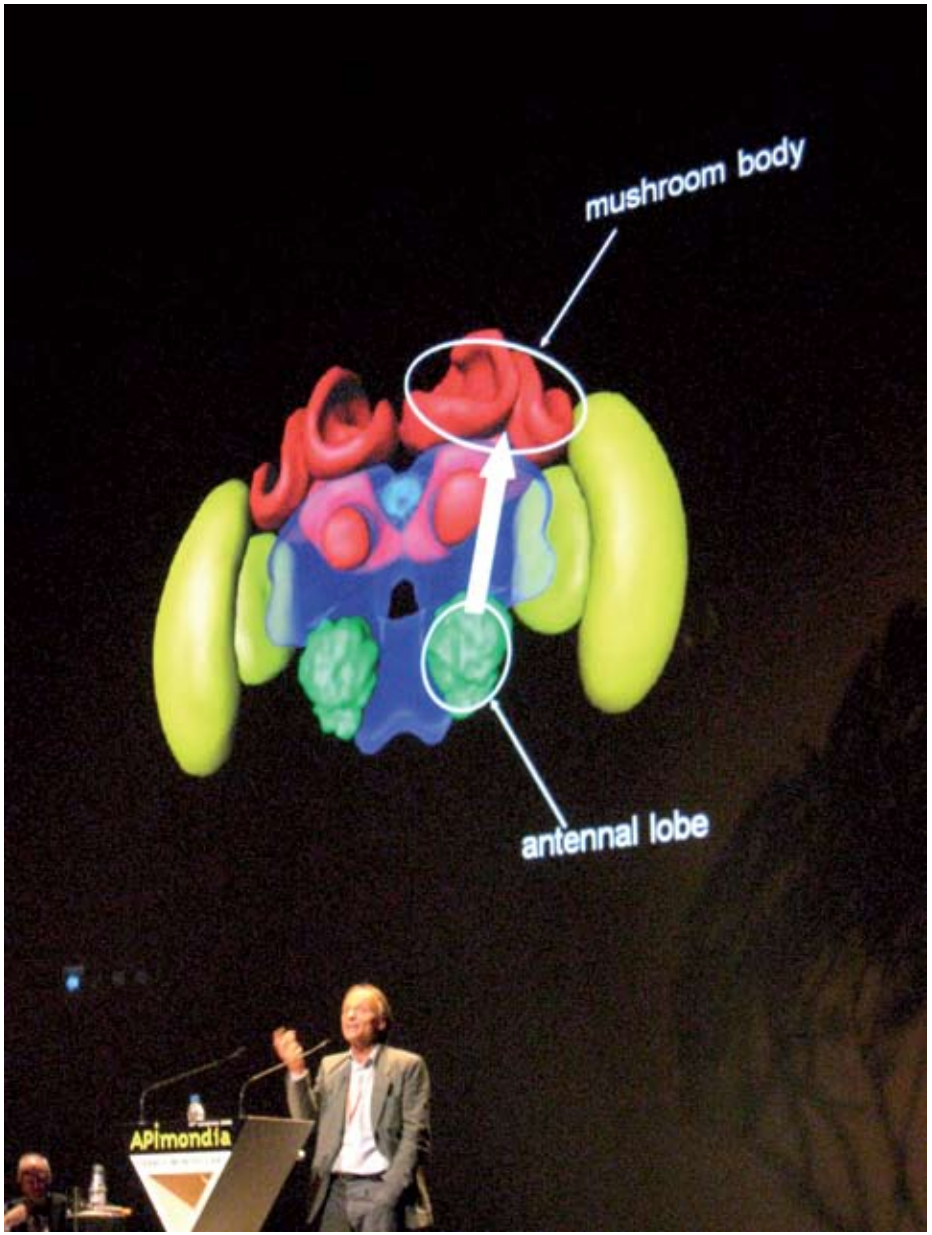
And pollination assignments are stressful. Permanent change of location, malnutrition through monocultures, continuous restructuring of the hives, the use of chemical pesticides and herbicides, all the time the beekeepers and the chemists conduct experiments with new potions and medication against the mites. The heat on the truck threatens to melt the combs. The noise of the truck is rising again. The bees live on the fast lane and risk to loose control at the next bend. And yet, they insist on keeping up routine: The larvae are fed, the hive is cleaned, worker bees desperately flap their wings to reduce the temperature. The truck moves on through the night, along the coastline.

There are different options. If one wants to witness happy bees, one needs to visit **Fred Jaggi**. Sitting on a rock formation next to a meadow high up in the Swiss Alps he observes his bees circling around gentian and alpine roses. “Everything is 100% organic. There is nothing better than to just sit here listening to my bees at work. Wild flower honey! My customers pay good money for it, imported honey is no competition for me. Pollination travelling is not my style. That’s no life for these animals.

John Millers Truck has reached the rape fields in North Dakota. The local partner of the bee broker leads the driver to his allocated place. The colonies are placed alongside the field and immediately the bees swarm into the yellow sea of blooming rape to drink from the open blossoms. Further up in the sky we see a small aircraft spraying the field. Through a black and white areal camera one sees fields, farm-houses, children playing until they notice the plane and rush into the houses.

The bees that are hit by the spray fall off the plants. Some try to rise again, others stay put, the leg movement slows down. Those worker bees that survived return to the hive, and pass on the nectar to the hive bee, which chews it up and places it into the cells.

At a scientific congress **Professor Menzel** gives a lecture. He looks small in front of a huge screen where we see two bees passing on nectar. Menzel: “No bee can survive on its own, be it queen, worker or drone. That’s why today we talk of a “super organism”. It means we consider a bee colony as one large animal, with the worker bees as the “body” the queen and the drones the male and female “genitals”. This enables us to draw new and fascinating conclusions reaching into mathematics and the artificial intelligence of machines. If we observe the super organism we understand how intelligent behaviour is created. Collective intelligence. There are up to 50.000 bees in one colony and each has around 950.000 neurons. If they connect them in a smart manner they have around 500 billion neurons processing power at their disposal. A human brain comes up with just about 100 billion neurons...”



Fred Jaggi in Switzerland also philosophises about his bees. He is a firm believer in tradition. To him this is the secret of his success. So he only keeps Black Landrace. It was bred during the 1920ies and is famous for not swarming easily and renowned as a diligent honey collector. This is where they belong, into the mountains and this is how it should be.

But beekeepers from a neighbouring valley, whose bees sometimes find their way onto his mountain plateau are a source of great anger for Jaggi. Only recently one of his queens has mated with a yellow drone and now she produces bastards. Jaggi opens the bee box number 15. With one movement he extracts the renegade queen, tells her off for being unfaithful and then snips off her head with his thumbnail.

“I’ve already ordered a new queen, hope it will arrive soon.”

Heidrun Singer cuts the wings of her queens.

In the Australian bushes **masked men** in suits shovel bees into cargo boxes.

John Miller’s bees are back on the road, through industrial landscapes in the blazing sun.

The longer we observe this daily life of the bees the more we have to ask: Why do bees collaborate in the self-destructive programme devised by man. How long until the united colonies of bees cease to collaborate or strike back? And this leads to the next question:

Why do we collaborate? Why did we happily exchange life with nature for one without it?

The sun is blazing down on the driver's cabin of **Miller's** truck. The co-pilot looks at the thermostat: "37° - soon the wax will be melting!"

The truck leaves the highway at the next exit, but comes to a stop again at a red traffic light. The breaks hiss. Inside the boxes bees flap their wings frantically but in some places the wax is softening. At a petrol station the truck comes to a halt. Behind the green protection net thousands of bees try to fan cooler air to the offspring.
The co-pilot in his protective suit climbs up on the cargo, the driver in his orange suit throws him a hosepipe. Together they splash water onto the cargo. The bees on the nets are hosed down and washed into the gutter in a stream of oil- and dust streaked water. Many bees have escaped the net and swarm around the cargo.

DRAFT TREATMENT

Other drivers at the petrol station complain and flap their arms like windmills to protect their faces. In panic they flee to the coffee shop. Some bees crawl across the windscreen of a private car. The bee, large, as seen from the inside of the car.

(Fiction) Film extract: A family picnic is brutally interrupted, the parents attacked and killed by a swarm of bees. The little son can escape into the car, he removes the aggressive bees with the windscreen wiper then puts his foot on the gas to speed off.

Fred Terry comes to the rescue. On his pick up truck a sign reads: “Bee Buster Pest Control”. He drives through the desert of Arizona, passing brown hills with cactus forests. “Killer bees,” explains Fred “are the result of an accident in a laboratory, a cross between African and Brazilian bees. It happened in Brazil in the 50ies, at a research station in the jungle. By now they have conquered the North of South America and are currently entering the United States. When they appear people call me for help. They sometimes attack man or animal, but only if they feel threatened.”

Next to a detached bungalow Fred Terry’s car stops. The frightened inhabitants have retreated into their car, from where they direct Fred to the right place through their mobile phone. The bees have settled inside a wall. Fred attacks them with smoke while the inhabitants and their neighbours are watching from a safe distance.

And while **Fred Terry** lures the swarm into a specially constructed box and disappears into

the desert, **Fred Jaggi** in the Swiss Alpes is also on the road in his jeep. He visits the neighbouring valley where about 50 small mating boxes are arranged, all inhabited by yellow virgin princesses. “This,” he says “is a huge problem. I can’t protect my black bees this way.” He argues with the caretaker of the breeding station. Every day the drones gather high up in the rock formations to wait for the princesses. Some must have crossed over into Jaggi’s valley. The argument between the men becomes heated. Jaggi would like to bring a can of petrol to just burn the whole alien breed.

High above the men a mating dance takes place. The princess is followed by a number of drones. During copulation the drone looses his penis, he dies and falls down from the sky. The next drone has to remove the penis of his predecessor until he can enjoy his deathly happiness.

Fred Terry in Arizona unloads his recent catch of killer bees on a field near his farm. But instead of killing them he arranges them in a proper spot and feeds them with sugared water. Greedily the bees drink it. “These are no poodles, like the “normal”, inbred bees. These are wolves. That’s why they don’t catch diseases. They are ideal honeybees. One just mustn’t provoke them...”

Professor Menzel tries very carefully to find the right words. “So do you want to blame science for the so-called “killer bees”? Yes they originate from a laboratory accident. Somebody did some breeding experiment during the 50ies to increase resistance. Somebody else wasn’t careful and left a door ajar. The new race is indistinguishable from “normal” honeybees and is equipped with identical skills. But it is stronger than its fellow species and immune to most diseases. Now is this a success or an ecological disaster?”

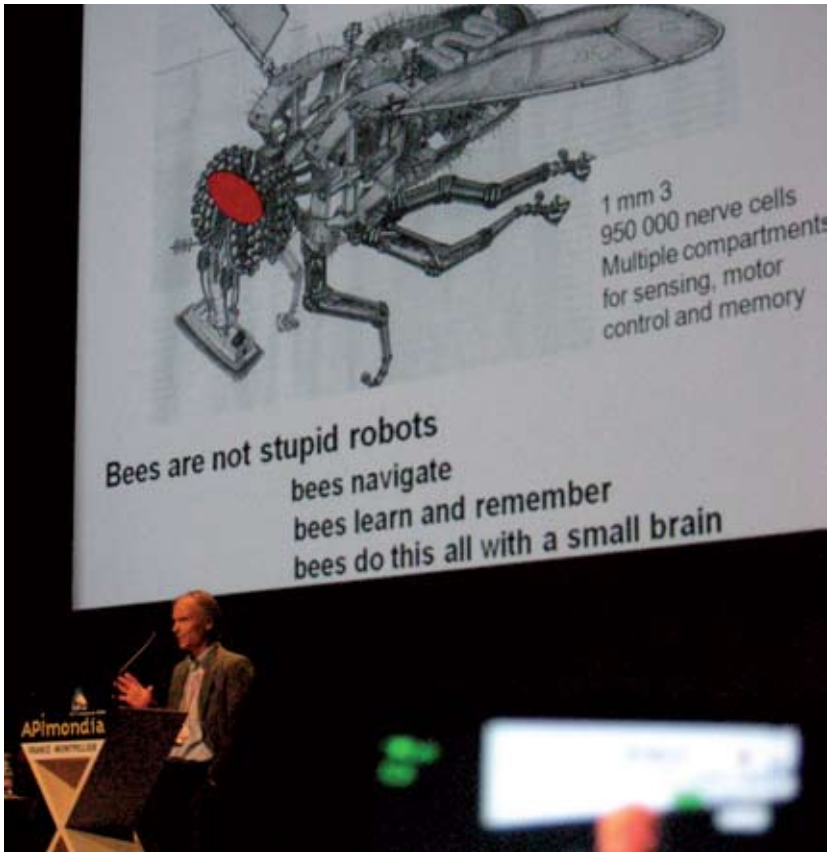
“Sooner or later this would have happened in any case. Just like the mites. They were introduced by a bee institute in Frankfurt, together with Asian bees and a few years later they would have entered the EU anyhow Globalisation is not restricted to the free exchange of products. Everything is in motion. Nature isn’t any different and nature knows how to respond to this. Stagnation is doom.”

The postman delivers an express parcel to **Fred Jaggi** – a purebred black queen from the breeding farm, sent carriage forward. In the bee house Jaggi opens box No 15. He talks to the queen while he puts the plastic cage with the sugar plug between the combs. “The bees will eat the sugar and free the queen. In those two days they adapt to her scent and accept her gratefully as the new mother. And then finally I’ll have purebred black bees again.”

With air pressure and smoke **John Miller** drives the bees from their hives. Then he extracts the honey-combs and installs them in the centrifugal. Honey is just a side product for American beekeepers but still it is a feast. Golden yellow it flows out. “My honey is clean”, he claims. “Pesticides remain in the body of the bees. They are the filter and sacrifice their health for the best of the offspring and the entire colony – and for us. This is why we try as hard as we can to use as little toxins as possible. But not all beekeepers do the responsible thing to delay mite-treatement until after the honey harvest, so traces of chemicals could end up in the honey.“

Smoke arises from the snow-covered alps. **Fred Jaggi** tosses another stack of combs into the fire. Wax flickers. The tears in Jaggi's eyes are not just caused by smoke. The bees have caught foulbrood, one of the most common bacterial bee infections. Most likely the new queen has introduced this highly contagious pest infected the weak inbred colonies. Inside the bee-house the health inspector **Elizabeth Schild** destroys another colony with gas. She shoves the bees into a bin liner and pours them into the fire outside. Fed Jaggi watches the bees jump in the fire like popcorn.

The deserted boxes are then loaded onto a small track, wrapped in plastic foil and brought down to the valley to the nuclear power plant, where the infectious germs are eradicated through gamma rays. The nuclear fuel rods glow cobalt blue in the coolant. The beekeeper has to stay outside, while his hand-crafted bee-boxes slowly disappear into the impermeable concrete chamber.



TV newscasters from all over the world report on the decline of bees and an ever increasing mortality rate (Archive-Montage). **“Colony Collapse Disorder”** is the new catch phrase and: **“AIDS in the beehive”**. Reasons remain yet unknown.

During the International Congress for Apiculture, the Apimondia, scientists, beekeepers and the pharmaceutical industry blame each other for the dramatic decline. Maybe the reason for the high rate in bee-mortality lies in the sum of all causes: the inbred animals’ weakened immune system cannot resist the overall pressure any longer: the stress of constant travel, the viruses, the mites and the medication used against it, the pesticides and genetically altered plants and other environmental factors.
A speaker addresses the audience: “It is nonsense to talk of a new disease. We are the disease.” In the twilight of the cabins the interpreters translate every word that is being said. Everyone who wants to hear it, can understand.

Outside there is a large bazaar of bee-gadgets. Young Chinese women dressed up as bees sell flashing bee-toys attracting many customers.

A world without bees – man has become a bee himself.

Alongside a fruit plantation in the South of China **Zhang Zao** is haggling with a man in a suit, in front of them a table covered with numerous small sachets. A brief moment one is reminded of the scene of a large drug deal in the making yet, the powder in the sachets is far more valuable – it is pollen.

On the floor the workers rub the blossom to harvest the pollen. It is collected on a large wax sheet to dry out in the sun before it is packaged. Zhang Zao and the man have reached an agreement. The pollen dealer pays cash in hand and places the sachets into a brightly coloured cool box before she heads off to the airport.

On the airplane northbound she explains her work as a pollen dealer and why so many decades ago the Great Party Leader had decided that the Chinese agricultural workers should pollinate the fruit manually to guarantee the vitamin supply for the population.
Now in many places in China bees have all but disappeared due to the excessive use of pesticides. So she and many others have become bees themselves. She's just a little worried that the x-ray at the airport could have reduced the fertility of the pollen.

Back home up North, Zhang Zao portions the pollen in different sachets with a red apple printed on the cover. She sells them for 5 Yuan a piece. The sachets with the green apple are cheaper, they are diluted wit cornflower.

When the time has come hundreds of people climb the trees to pollinate the blossoms with cotton sticks or a bamboo branch with chicken feathers attached to the end. The workers carry the pollen in small vials around their necks. Many young women are among them, they are not as heavy so they can climb the young branches without causing too much damage. The workers are focused and efficient: blossom for blossom. They have to hurry, the bloom lasts only four to five days and they're expecting rain.

There is an easier solution, as long as there are bees. **Rob Manning** from the Australian Ministry of Agriculture has won a Gold Cup for his invention of the disposable bee: Cardboard tubes are filled with 250 grams of bees each before they are partially locked by a gate, which is impenetrable for the queen. Subsequently the tubes are mailed to their destination, where they are hung up in the trees.

Instead of transporting the cardboard hives to and from far away plantations they are collected and burned on site. “Tough for the bees, but efficient”, the inventor explains, “and you avoid trouble with the spread of diseases.”

Fred Terry is in a very bad mood. When he visited his beehives this morning five were ransacked, toppled over, with all the bees gone. Traces of bear all over. If he could do what he yearns doing, no bear in the country . Alas, living in a protected nature reserve also has disadvantages. He installs a new electrical fence, a new paddock for the hives, keeping a safe distance to the boxes while hammering the poles into the ground. He really has to be careful with this work, as his bees really (REALLY) dislike noise and vibration and react accordingly. That's why they cannot adapt to the industrial form of bee-keeping. Never would they cooperate with the kind of noise and stress that comes with cross country truck trips.

Finally Fred carries the boxes carefully over to the new site and powers up the fence.

Fred swears. "Not again!" One colony doesn't accept the move and sets off to swarm: bees stream out of the box and disappear – queen included – into the distance. The fence cannot stop them. A new generation of strong, healthy bees set off into the wild.

The bees are part of his livelihood, he cannot just let them go. Love of nature, all fine and well, but it's his income that's at stake. He jumps into his car and chases the swarm through the desert.

But the bees are faster. Fred has to resign to the fact that this colony is lost.

"You cannot tame them. Some cut off the queen's

wing, so she falls to the ground when she wants to leave, so all bees stay put. Smart, but nasty. Maybe I have to start doing that as well. I know what's going to happen: The bees will attack some cow or horse or something, a person would be the worst-case scenario. I will get into trouble, people will rally to the administration again demanding that I quit my business.

Huge tractor based tree shakers move through the plantation. They resemble robot insects, along the straight rows of trees, shaking down the almonds. **Joe Traynor** is looking on as the harvest is brought in. Hoovers collect the almonds from the ground, seasonal migrant workers sort them on the spot on a conveyer belt: large almonds for snacks, small ones for marzipan. Joe is happy. Despite all the prophecies of doom about the decline of the bees he made certain that the harvest was secure. In fact it is another record high: 1,4 billion dollars in turn over. Farmers are content, beekeepers are content, the large confectionary corporations as well. Joe rather not tells the beekeepers that he is in fact a shareholder of the plantation, so his interest in high pollination fees is ambiguous to say the least. "Those almonds are pollinated by bees from Australia, they grew in the US, now they will be brought to Spain to be peeled and roasted. Then they're taken to Japan, to be part of the traditional cake. It took four continents to produce one cake. A huge collective effort, if you like."

But even his sense of self-irony doesn't cover up his doubts. He had quit beekeeping when the production of honey didn't generate enough income to feed his family. Now he is part of a machinery that turns over billions, but everyone who can do his math knows that this system is destined to break down within the near future.

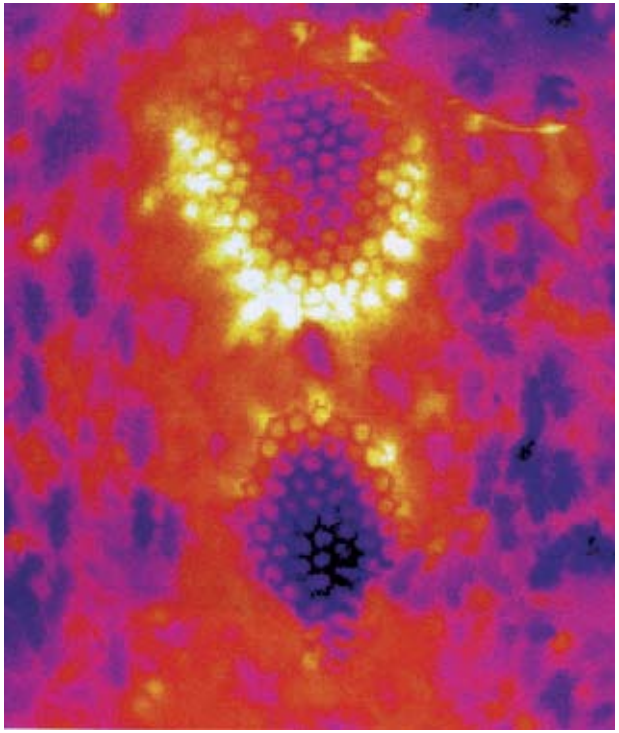
John Millers stores his bees in a huge underground facility for potato storage. Not many have survived the season. Every second box he opens is half empty. He and his workers spray medication on the combs. For two years now he experiments with new products, with no success so far. It seems as if the mite is always a step ahead. Hardly any of the potions work, there are always new, resistant mite strains. And the bees seem to have lost all incentive whatsoever to put up a decent fight. John himself appears discouraged. Even a long distance runner needs success, a goal, he needs to see that all the effort was worth it and that the fear of failure is eventually conquered.

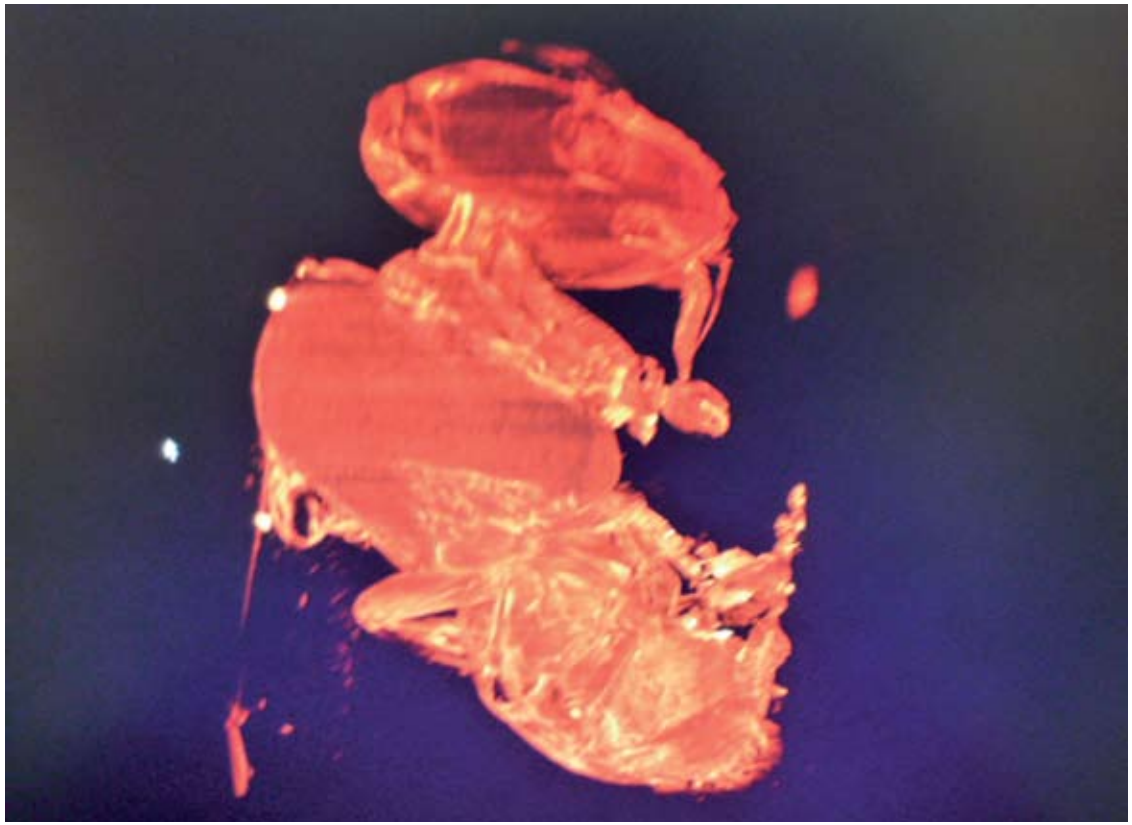
He shuts the last boxes, turns on the air condition of the huge basement to 15° C and hands over the keys to the foreman, who will visit daily all through the winter to check on temperature and humidity – the treasure keeper.

He admits that he invests 400.000,- US$ to feed his 15.000 bees all through winter. Sugar, Chinese pollen, wages and medication. Until recently this led many beekeepers to burning the colonies in late autumn. It just wasn't worth the investment. In spring they simply bought new bees in Australia. Today this method is unaffordable. Not with the certain losses they will face, caused by infestation, stress and chemicals. The profit margins are smaller, with no alternative. The agricultural industry needs the bees. And he needs the business.

Behind the heavy iron doors, inside the boxes, the colonies gather for the winter cluster. In August they have stopped producing offspring to decrease the size of the colony in time for the winter season. Useless eaters were chased from the hive, the sick and the weak left and died. The small colony gathers to a ball surrounding the honey storage.

The thermal camera visualises the process: Through intensive muscular shivers the inside of the cluster is kept warm, only the outside cools down. After a while they take turns: The outer bees are allowed inside to warm up. “This way the colony survives the winter. And because the size of the population is reduced, there is a good chance that the provision will be enough to feed them all.” **Professor Menzel** turns off the camera. His bees don’t have to travel next year. All they have to do





is to participate in his research, going about their daily routines, share their secrets, bare their souls – in case they have one. He will not tire searching for it.

Fred Terry has found his swarm in the desert. He scowls at the entrance to the cave, where they have settled in a comfortable height of 7 meters – safe from bears and adverse weather – and out of his reach. The workers have already started to establish a new structure for the nest, not in the square wooden frame but in round lamella, just as they did for millions of years. They measure space through hooking up to one another, until they form chains. Between the rings of their bodies the workers cut out the wax, chew it and build their delicate, nearly translucent palace.

It will be a test in patience for Fred, to lure his bees home, to win this battle of wills against the renegade colony.

Golden honey floods into the industrial sized bowls of dough inside the gingerbread factory. Almonds are added. On a conveyer belt they are cut into the shape of Santa Clause. Snow falls, covering the fields with a white blanket.

Winter in Austria, too – but no rest for the bees. Armed with a snow shovel **Heidrun Singer** marches through the deep snow. The landscape is hardly recognisable under the thick blanket of snow. She starts to dig until she has uncovered five hives. They are loaded onto a small truck and delivered to a greenhouse in the neighbouring valley. “Winter pollination,” Heidrun explains merrily, “is a truly profitable business. Since it is custom to serve strawberries with the gingerbread around Christmas my annual turnover has doubled.

And what’s good for business, is good for the bees. Bee-keeping has to adapt to the new markets.”

Behind endless rows of glass houses an artificial nature blooms in tungsten light – it all seems strangely unreal. Through monotonous rows of vegetables the bees search for blossoms. The bees live in boxes, with electronic controls. Water drips from the sprinkler system, the plants, rooted in glass wool, are fertilized through an extra drip. Christmas music on the tannoy system.

The bees fly against the glass, again and again until they drop dead on the ground. Others escape through air shafts. Outside they die in the snow.
The red strawberries glow in the neon light – just like in paradise.

Not a single person, anywhere.