Life Is with Creatures

The greatness of a nation and its moral progress can be judged by the way its animals are treated.

—Mahatma Gandhi

A human being is part of the whole universe... We experience ourselves, our thoughts and feelings as something separate from the rest, a kind of optical delusion of consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty.

—Albert Einstein

Human/animal relationships are ancient stories of companionship and compatibility, and have evolved since the beginning of human agricultural practice. There are two contemporary stories about human/animal relationships: One is called "Capture and Enslave," and it's the story of industrial animal husbandry. The more we hear this story, the less we want to eat. The other story is called "Mutual Benefit," in which animals get shelter, food, health care, and love and in exchange offer healthy food for humans, fertilizer, and friendship. This story's way more fun, and way more delicious.

Animals turn a backyard garden into a farm. They bring a deeper level of complexity and relationship to our homesteads, along with their unique and incredible animal natures. Any animals you have will make a major contribution to the fertility of your garden. They swiftly turn backyard garden scraps into compost, and provide your homestead with some of the most nitrogen-rich fertilizer you won't ever have to buy again. And if you add rabbit and
Walking a goat in the neighborhood. Good for the goat, good for the girl.

chicken meat and eggs to the vegetables and fruits you produce, you are surely moving in the direction of greater self-sufficiency, while providing yourself with a familiar and varied diet. Many fear that animals will tie them down—no vacations or going away for the weekend. But if you keep animals cooperatively with neighbors, or agree to take turns caring for each other's livestock, these daily tasks are easily managed.

This chapter is the lowdown on the animals we live with and how to best house them, care for them, and forge reciprocal beneficial relationships with them. There are a few obvious choices for small animal husbandry in the city. Bees, chickens, ducks, rabbits, quail, and the occasional goat rise to the top of the list. This chapter also includes information on how to butcher animals. We weren't too keen at first on killing the animals we cared for.

Now that we've tried it, we can safely say that if everyone looked their dinner in the eye before they ate it, this would be a different kind of world.

Considerations for Animal Care

When you're thinking about taking on any animal at your homestead, you'll first want to consider a few important things, since all animals require a certain quality of care, and it's not advisable to take them on if you can't offer it to them. Most barnyard animals need one another to thrive, so make sure you have space for more than one when you are planning to take them on.

Shelter/housing/protection. All backyard animals need predator-proof homes that are dry, clean, and spacious enough to meet their needs. Chickens need more space than quail or rabbits, and goats will need more than chickens. If you are breeding animals for food, you may have to provide separate housing for differently sexed animals until you bring them together to breed. Most animals prefer to have their houses out of direct sunlight, in close proximity to places where they can roam freely for part of the day, and lifted off the ground to provide protection from predators and rain.

Nutritional needs and food sources. On most urban homesteads, it will be unrealistic to imagine that you could produce all the food your animals will need, though some of them, like ducks and chickens, supplement their food with snails and slugs and bugs from the garden. Other animals, like goats, chickens, and rabbits, will eat kitchen and garden scraps and convert them into fertilizer for the garden, but this won't be enough nutrition for them overall. Some urban farmers feed their animals by dumpster diving. This may be a fine short-term solution for feeding an animal you are going to butcher at the end of a season, but maybe not the best choice for a long-term relationship. Make sure you have access to the proper kind of feed at a price you can afford before you take on an animal that's going to eat every day. Different animals have different nutritional needs—providing the animals the food they need to keep them healthy and productive is key.

Composting. With any animal, you're going to have to figure out what to do with their waste. Fortunately, the waste of many backyard animals provides excellent fertilizer for the garden. Chicken poop needs to be composted for some time before being added to the garden; rabbit poop can be integrated into the garden without a stint on the compost pile, and goat manure is also excellent for the garden as is. Ducks poop in their watery habitats; when the pond needs to be cleaned, this water can be added to the compost pile to add to its fertility.
The ease of mucking out your animal’s home should be considered. A rabbit hutch with a wire bottom is simple: just let the poop drop on the ground underneath the hutch, rake it up, and put it in the garden. A chicken coop can also be designed with wire flooring to serve the same function. You will be glad to limit the number of times per year that you have to walk into your chicken coop to clean it out. Pre-built structures can also be adapted to make cleaning and composting an easier task.

**Legality** Before you start keeping farm animals in the city, get familiar with city ordinances regarding small livestock in your area. Some places allow chickens, but not roosters; some places forbid bees. Many urban centers balk at goats or pigs but are happy enough to house the rabbit, inside or outside the house. Check with your local municipality to find out what’s allowed in your area. Use your best judgment coupled with local ordinances to make decisions about how many animals to keep. More important than the law, though, are the needs of the animals themselves. Too many animals shoved into a small space makes for unhealthy conditions and unhappy animals, the exact opposite of kind of quality living we want to provide.

**Neighbors.** Keep your neighbors in mind when getting backyard animals. If your yard is small, chances are that a rooster under a neighbor’s window won’t go over too well. Animals that emit a strong smell aren’t usually much appreciated either. But for the most part, neighbors are excited and interested in animals, and they are a great way to make good relations. Very few people say no to a fresh egg, or a jar of honey or even the chance to watch a chicken do her thing.

**Alliances with other community members.** Keeping animals is a pleasure, but it is also a daily chore. Some animals, like goats, require more care, and sometimes the best way to provide it is to share the work with others. To meet this need, in Oakland, California goat-sharing cooperatives are springing up and providing the people who own goats some help, while giving members the opportunity to learn how to take care of goats and enjoy their milk products.

**Time and attention the animals will need.** Once an animal’s home is established, its care doesn’t take much more than minutes a day. Make sure you assess your own time limitations before you commit to a new animal on your homestead. If you travel a lot, a good way to manage your animals is to share their care, feeding, and produce with neighbors and friends. Three rabbits really don’t take much more time than one rabbit, but breeding rabbits and taking care of the babies takes extra time. The same with chickens—the size of flock doesn’t add time to your day, but if you are taking care of small chicks that need more attention to survive, factor that in when you start your animal-keeping project.

**Predators and pets.** Some city neighborhoods have an abundance of predators that can be dangerous for your animals. A large gathering of feral cats will threaten small chickens, ducks, or other fowl. Dogs can also be a problem for smaller barnyard animals and some are wired to grab a chicken by the neck and shake it, even when they know you love the chicken too. As mentioned before, the design of the animal’s shelter should reflect an awareness of opportunistic predators like raccoons and possums, as should your habits for bringing your animals in and securing them at night.

**ON THE GROUND: GREEN FAERIE FARM**

When Jim Montgomery and his roommates went looking for a home, they focused on houses with large lots because they planned to do a lot of growing. They bought Green Faerie Farm in 1995, a 50-by-200-foot lot, where they raise much of their own food, eggs, and meat. The collective household shares gardening tasks, but Jim is at the center of the animal husbandry at Green Faerie Farm, and he’s been one of the inspirations for small animal husbandry in Berkeley and Oakland.
GREEN FAERIE FARM
50' x 200' ~ 10,000 sq. ft. ~ just under 1/4 of an acre

STREET

fruit trees along fence line
moveable "rabbit tractor" on wheels
giant compost heap often planted with squash or other sprawling plants
- outdoor sink
huge raised bed for annual vegetables
the Green Faerie folks have built over 3 feet of top soil in their 15 years working with animals
berries on fence
animal pens enclosed with a thin strip of electric tape to protect animals
modular moveable walls for maximum flexibility
prickly pear
herbs
oranges
apples
porch
greywater system
bicycle shed
rain catchment runs from roof to pond made from recycled hottub
milking parlour made from cob and recycled building materials
older fruit trees beehives vegetable beds
vegetable beds mushroom beds berries on fence
rabbitry & hay storage
extra pen goat pen

chicken coop
goat shed
Jim Montgomery (and baby goat). "Living with goats is about having a dialogue with them, a negotiation. You have to check in about what the goats need in a way you don't with a chicken or a rabbit. They are very smart and loving and funny."

Jim has lived and worked with animals since he was a teenager. "I've always had urban livestock and learned pretty quickly how to both raise and kill them. This gave me an early understanding of death as a part of the cycle of life, how no one lives without other things dying. There is a balance in nature, and it can be cruel or it can be kind. I prefer to make it as kind as possible." In addition to raising urban livestock, Jim also instructs other homesteaders in the art of conscientious animal harvesting. As a teacher, "I'm really into creating space where the animal is respected, so that's one of the things I teach to the interns, and my students—respect for life."

His attention is always primarily focused on the animals and what they need, "If you're going to raise animals in the city, you can do it in a small space. You can raise quail in a 3-by-3 closet with a good lamp. If you are growing sprouts in the window and sharing them with the quail and maybe even giving them some window time, that would be ideal. Chickens need more space than quail, and goats need more than chickens. It's important to make sure the animals have what they need."

Green Faerie Farm currently houses five humans, three adult and six baby goats, 28 chickens, and over 20 rabbits. Even so, "raising animals doesn't feel like a lot of work," Jim said. "Going to an office and earning someone else's profit for them, that's work. I get a lot of pleasure and restorative and mental health in working with the animals. Being in this yard, in a place where there's food growing, where there are happy animals, where we have all the things we need to live well, feels empowering and restorative to me. There's so much pleasure in it."

"Sometimes I say my garden is my altar," Jim says. "If I'm going to swoon, it's going to be with the earth, and the regenerative healing energy of the earth. My garden and my animals are a place where I commune and build relationships and understanding and independence."

The closed-loop system created by animals on a small urban homestead is working at Green Faerie Farm. The yard is lush and abundant, filled with food for people and animals. The animals, in addition to making compost for the garden, are also involved in balancing its ecosystem. "We find snails and put them in the pens with the chickens, and they eat them right up. Our excess food goes to the animals, and the animals provide richness for the soil, and the extra carbon materials—like straw bedding that we take from the waste stream and use and then recycle into the garden with animal poop in it—also help the garden. The animals bring efficiency to our site; we don't need to fertilize our gardens beyond what we get from them. They are part of rebuilding topsoil and making a really healthy garden."

No isolated plant or animal systems prosper the way they do in a closed system. Healthy plants need to be married to some sort of animal system. "A lot of people would turn those fava beans into green manure, but we will actually eat them. The crop residue provides nitrogen to our animals, so we derive benefits from growing the plants—for the animals, for our bodies, and for the garden." The animals also support productivity in the garden. "Tomatoes are hard to grow in this microclimate. One year we placed a cold frame over our tomato bed with rabbit cages integrated into this mini greenhouse. We gave the rabbits an escape hatch so they could get out if it got too hot in there. The rabbits provided heat and extra carbon dioxide for the plants. We harvested our first tomatoes in April, and our last ones in January that year. We were proud of those tomatoes!"

Is this sustainable living? "Sustainability has to do with a whole society closing the loops of waste and consumerism. There's no sustainability for one without sustainability for all. I think we are modeling more sustainable living, but sustainable means that you don't have any waste and all your actions are going toward building healthier, stronger, more resilient systems. Some people fantasize that you are only taking out what you put in, but I think you have to err on the side of building the system rather than just breaking even. You have to design toward increasing the resources in the system because if you try for an exact balance, we're still running a deficit. This is one way the animals are so important—they give back so much to the system. Green Faerie Farm is a step in the right direction. But in the end, it comes down to changing the culture."
Bee Kind

Beekeeping is thrilling—the opportunity to have contact with a hive, to catch a swarm, to gather honey and beeswax, and to engage with the wild busy entity of the hive mind is awesome. Standing in the middle of a bee yard or in the middle of a swarm of bees, you can feel the electric energy of the hive as it moves from place to place. Bees are important to us because of their pollination activities, but they are also an amazing life force we are privileged to encounter when we put on the veil and become beekeepers.

Bees are a true addition to the homestead because they offer pollination for plants and food for humans; in exchange, beekeepers and gardeners can offer healthy opportunities for home and forage to an endangered and essential pollinator. Bees forage within a three-mile radius of their hive, so they pollinate your neighbor’s gardens as well. Bees are feral and untamed; they bring wilderness into the garden. Bee venom has healing properties for people with autoimmune illnesses including arthritis, multiple sclerosis, Crohn’s, lupus, and rheumatoid arthritis, and local honey can offer some relief from pollen allergies.

The hive is a complex, integrated entity that includes a queen bee, worker bees, and drone bees, each with its own specific task. In keeping with the principle of designing from patterns to details, every hive organizes around a certain set of tasks, but each hive develops in its own way. Every time my beekeeping partner comes back from a visit to a hive, he has a different story to tell about what’s going on inside. As we try to puzzle it out, he invariably quotes one of his beekeeping mentors, “The bees just don’t read the same books we do!”

While beekeeping is relatively easy to get started on, it is also an art and a lifelong practice. Next to humans, bees are the most studied and talked about creatures on earth. There is a lot of information out there, so we recommend that you read books and seek community to support you, as countless questions about what’s going on in the hive will come up along the way. Beekeepers are a garrulous and opinionated lot who like sharing resources, swarms, information, and bee plants. Many places have local beekeeping associations that are well worth joining and that will hook you up with resources, information, and community. As with anything, learning from someone who knows is the best practice.

SITE, SUN, AND WATER

Beehives can be sited in a backyard, on a roof, or in an empty lot. Bees use the sun to direct their flights into and out of the hive and thrive in a place with morning sun and afternoon shade. The entrance to the hive should be south facing, and set in such a way that the bees’ flight path into and out of the hive is not in the middle of human pathways through the garden. Bees forage for pollen from a variety of plants and are happiest with patches of plants they prefer, rather than single plants. They appreciate a water source during the hot season, especially if you live in a region with long dry spells. If you place a bucket in the shade with some water in it, make sure you place a stick or some sort of ledge in the water where they can stand and drink without falling in. Bees don’t present any kind of composting issues, though you will undoubtedly find yourself with some residue of beeswax once you start harvesting it from the hive.

31 Uses for Beeswax
(Besides making candles, of course!)
1. Unstick a drawer. A thick coat of beeswax on wooden rails makes the wood drawers slide smoothly.
2. Lubricate window sashes.
3. Free up rusted or stuck nuts by lubricating the bolt’s threads with melted wax.
4. Wax wood. For structural elements that need to look good but take no wear (such as exposed ceiling beams), heat equal parts beeswax, linseed oil, and turpentine. Apply with a burlap rag while the mixture is still warm.
5. Preserve bronze. To ward against oxidation caused by moist air, brush on a solution of 1/3 pound beeswax melted in 1 quart turpentine. Buff it with a towel to create a thin, hard coat.
6. “Whip” frayed rope. Wrap a waxed length of string tightly around the rope’s tip about a dozen times. Tie off the loose end and trim the excess.
7. Lubricate nails or screws to make them drive smoothly and resist corrosion.
8. Condition a wooden cutting board. Add half-teaspoon beeswax to a cup of mineral oil, heat on stove or microwave, and apply the mixture to the board with a soft cloth.
9. Polish concrete counters. Rub melted beeswax over the surface with a chamois cloth. Let it dry and then wipe.
10. Preserve a patina. Seal a copper sink by rubbing it with softened beeswax and polishing off the excess with a lint-free rag.
11. Waterproof leather. Combine equal parts beeswax, tallow, and neat’s-foot oil. Warm the mixture and use a rag to rub it on your work boots or gloves.
12. Use as a resist for batik.
13. Use as sealing wax.
15. Grafting wax. Melt equal portions of plant resin and beeswax in a double boiler. Allow the mixture to cool and roll it out into sticks. Wrap in wax paper and store in a cool, dry place.
16. Salve. Infuse olive oil with calendula or comfrey and combine by heating with beeswax, 1 part beeswax to 8 parts oil. Add a few drops of essential oil such as lavender.
17. Wax thread for easy threading of a needle.
18. Use as a resist for dying fancy Easter eggs.
19. Make oilcloth (see waterproofing leather above).
20. Finish and protect ironwork. Mix 1 part mineral spirits and 1 part linseed oil, then melt in beeswax. Add enough beeswax to give the mixture a consistency of motor oil.
21. Mix together equal parts of melted beeswax and honey for a good home remedy for the cracked hooves of animals. Clean and dry the crack before applying the mixture.
22. Make crayons. Melt equal parts grated soap and beeswax in a double boiler. Color with dry artist pigment or food coloring paste. Pour into molds.
23. Dental Floss. Coat thread or string with a mixture of beeswax, jojoba wax, carnauba wax, myrrh, and propolis.
24. Mouthpiece for didgeridoos.
25. To start and care for dreadlocks. Melt and work into dreads before the wax hardens.
27. Cheese wax. Mix with a small amount of olive oil so wax stays flexible when cold.
28. Moustache wax. Heat and mix equal parts beeswax and Vaseline. You can adjust the stiffness by increasing or decreasing the amount of Vaseline. Add essential oil such as wintergreen.
30. Lost wax casting process for jewelry or sculpture.
31. Fire starters. Dip small pieces of wood, pinecones, cloth, or cotton balls into beeswax.
THE LAW AND THE NEIGHBOR

In most places, it is perfectly legal to keep bees, though in others, an absence of laws about beekeeping can be taken for consent. When people are concerned about bees, it is usually because they think of them as stinging hazards, and do not understand the benefits they provide. You do the bees a service by educating people about the gentle, non-aggressive nature of the bee, who only stings in defense of her babies and her food. All female bees have the capacity to sting, but no male bees can sting, and most bees, when left alone and unthreatened, will not sting. If a bee approaches you, it is possible that you smell good to her, like a flower. If you walk away calmly and avoid making abrupt movements, you are also unlikely to be stung.

If you have a neighbor who is truly allergic to bees, some caution may be warranted. When placing your hive, but otherwise education and the sharing of local honey is often enough to help the neighbors relax and enjoy the hive. Bees have few predators, unless you live in a city with bears, and dogs and cats tend to stay away, especially if they’ve been stung once.

EQUIPMENT

A beekeeper needs a few pieces of equipment to maintain the hive successfully—a bee veil, a hive tool, a bee suit, gloves, a brush or a feather, and a smoker. Some beekeepers work without the gloves or the smoker; some eschew the veil. In the beginning of beekeeping practice, before you’re really accustomed to the hive, do what makes you feel comfortable and unafraid of the bees. Your sense of confidence with the bees will help the bees feel confident of you.

Beekeeping Gear
A. Full-body bee suit
B. Gloves
C. Half jacket & veil
D. Smoker
E. Top bar hive tool
F. Langstroth hive tool
G. Bee brush

Make Your Own Bee Veil
A. Hat
B. Bee veil layout
C. Finished veil with elastic at top.
How to Make a Bee Veil

A bee veil is an important piece of beekeeping equipment. A veil will protect you and help you feel calmer around the bees. The bees will respond to your state of mind, so it's good to be as calm as you can when you approach the hive. You can buy a veil through a beekeeping supply store, but here's a simple way to make one yourself. (Please see illustrations on previous page.)

1. Start with a sturdy, breathable straw hat with a medium sized brim.
2. Measure and cut your cloth and mesh (see drawings for measurements). Cloth can be any light colored cloth or canvas. Mesh can be light plastic screen door mesh, available at a hardware store.
3. Sew section a & b on either side of the mesh to make center panel.
4. Sew side panels c1 & c2 to middle panel.
5. Sew together ends to make tube.
6. Fold over top and bottom edges twice and sew to make a tube approximately 1/2 to 3/4 inch wide, leaving a gap in your hem to feed in your string or elastic.
7. Feed string or elastic into the top and secure to fit tightly around brim of hat.
8. Feed string into bottom tube.
9. To wear, pull string tight around back. Pull under arms and tie around chest in front.

The Hive Box: Langstroth or Top Bar?

People have kept bees in different kinds of vessels for many thousands of years. About a hundred and fifty years ago, the discovery of "beespace" led to the development of hives with moveable frames. Even in nature bees leave a measurable and consistent amount of space between each paddle of comb. Moveable combs meant that the beekeeper no longer had to destroy the bee's work inside the vessel to manage the bees and gather the honey. Previous to this, harvesting honey or beeswax meant destroying all or part of the work of the hive.

While there are many types of beehives, the two most common ones are the Langstroth—those inimitable white boxes we are all familiar with—and the Top Bar Hive, which can be made in a variety of shapes, but is generally long and narrow. Both hives work with beespace. The Langstroth boxes are the dominant style in the U.S. and can be easily purchased from any beekeeping supply. In this system, the bees build their comb inside rectangular frames on a pressed wax or plastic foundation that shows the bees where to build their six-sided cells. Because it is the dominant system in the U.S. it is well understood and there is a lot of support available.

Langstroth hives meander down a San Francisco hillside. Photo by Philip Gerrie

A Top Bar Hive apiary in an urban backyard.
The Top Bar Hive, developed by the Peace Corps as a low start-up-cost cottage industry for African villagers, is gaining popularity among natural beekeepers in the U.S. Not readily available yet commercially, they are inexpensive and easy to construct with minimal carpentry skills. In this system, the bees build free-formed comb off bars that sit across the top of the opening of the box.

As we have already said, beekeepers are an opinionated lot and there are strong opinions about which system is better, both for the beekeeper and for the bees. The Langstroth set-up is more traditional and familiar to the western beekeeper. Advocates insist that bees prefer building vertically and like being able to recycle the honeycomb on the frames when they harvest their honey (in the Top Bar system whole combs are crushed, in the Langstroth system just the caps are cut off and the honey is expelled with a centrifuge). Top Bar beekeepers like the low-tech, DIY nature of their system and believe it is healthier for the bees to manage things more naturally. Only the bees know for sure what feels best and they’re too busy gathering pollen and turning it into honey to be bothered to report.

Whichever style you choose we recommend finding other beekeepers keeping bees in this style as there are some differences in managing the two systems. A good beekeeper in either system hones their awareness of the season and the cycles of the bees and ultimately this will determine your success in beekeeping more than the shape of the box. Hives more often die due to inappropriate human interference than to lack of human contact. The bees already know the way.

**HOW TO GET SOME BEES**

There are three main ways to get bees: buy them, split them from an existing colony, or catch a swarm. Many apiaries sell “packages” available in the early spring. A package is a queen bee along with three or four pounds of worker bees. Do your research ahead of time to find a supplier in your area and order ahead of time as well, as many apiaries sell out by the time bee season begins. The cost to purchase bees is currently between $50 and $100 per package. If you are in contact with other beekeepers, it is also possible to get a “split” from an existing colony. A split is a quantity of fresh brood and nurse bees along with some pollen and honey in combs. The bees will raise a new queen when isolated from the old queen. Once you become more experienced at beekeeping, you can catch a swarm of bees if you find them clumped somewhere as they search for a new home.

**MANAGING YOUR HIVE**

The bee colony has a natural ebb and flow through the seasons, and managing the hive should both reflect and support this flow. During the summer the beehive can have as many as 50,000 individual bees, and in the winter, when food resources are scarce, they downsize to about 15,000. Ninety-nine percent of the bees are female worker bees. In the summer there may be about 1,500 male drone bees, and generally speaking, there is just one queen.

Pulling frame out of Top Bar hive to check the brood, honey, and health of the hive.
How to Build a Top Bar Hive

One of the appeals of the Top Bar Hive is its affordability and the fact that with some basic carpentry skills, you can build one yourself. The Langstroth hive has more pieces, some of which are a bit challenging to build without some evolved carpentry skills. Here's a description of how to build the TBH yourself at home. The total cost of building a Top Bar Hive should be less than $100. Design by K. Ruby Blume.

Kenyan Top Bar Hive
East Bay Basic
courtesy of www.sparkybeegirl.com

Dimensions in inches based on 3/4" plywood for a box with 26 bars cut all pieces. Assemble four sides of box upside down with wood screws, attach bottom of box with overhang on entrance side. Attach 1" stop bar to front end.

LID (optional)
18 x 43
If you don't ever need to transport your hive, a sheet of plywood will suffice to keep rain off. Otherwise add a 1 x 2 lip around the edge that will sit down around the top bars. Add a tie down strap and the bars will be fixed into place and ready for transport.

SIDE
12 x 39-1/4

105° angle

BACK
14.5
8.5
11.5

BOTTOM
10 x 40-1/4

FRONT
8.5
11.5
14.5

cut 1/2" off the bottom of the front end piece for the entrance

SIDE
12 x 39-1/4

for extra clean assembly cut 15° off bottom edge of side pieces with table saw

Cut top bars from solid wood. They should be 16° long, at least 3/4" thick and between 1-3/4" and 1-1/2" wide. Use a 1/8 inch wide saw blade to cut a groove 1/8" wide and 3/8" deep down the middle on one side. Cut guide bars from 1/8" plywood 1" x 13.5". Affix guide bar into groove with a few drops of wood glue.

assembled top bar - side view
end view

bottom board
15° angle cut
To harvest honey from a TBH, comb is cut from the frame and mashed. The mashed-up comb is then strained to separate wax from honey. Traditional harvesting of Langstroth hive requires cutting the caps off the comb, then using a centrifugal force extractor, which “spins” the honey from the comb.

Your hive should be managed every two to six weeks during the warm season. For top bar hives, every three weeks is a good idea. For Langstroth boxes, every four to six weeks will suffice. Manage your hive on a warm sunny day in the middle of the day. Bees return to the hive at night and they should not be disturbed at night or during inclement weather. When looking though your hive, assess the strength and quality of the hive. Does it feel active, full of bees, and full of honey? Make sure there is a queen or evidence of a queen (eggs, larvae, or capped larvae, collectively called “brood”).

In the spring you will be checking for the possibility of reproductive swarming and trying to prevent this, so as not to lose your entire population right when the nectar begins to flow. A swarm happens when the bees decide the conditions are right to send out the old queen with a good percentage of the hive population to form a new colony. The bees gorge on honey so that they can barely fly. Following the old queen, they leave the hive and land on an intermediate location, sometimes the branch of a tree, or a telephone pole, or a hole in a tree. When they are clumped in this intermediate location, you can catch the swarm by brushing them or knocking them into a box (either a transport box or the actual hive you want them to move into). When catching the swarm, the most important thing is to make sure the queen is in the new location—the rest of the hive will always follow its queen. If they are not captured in this way, the bees send out scouts to find a new home. With luck, this usually occurs within 24 to 48 hours.

One way to prevent swarms is to take a split before the bees create swarm cells (queen cells that look like peanuts built on the edge of the combs). To do this, take the old queen, along with a few frames or bars of honey and pollen, brood in different stages, and some extra worker bees and put them in a new box. The original colony will raise a new queen from a fresh egg. This most closely resembles their natural behavior.

Another vital time in the beekeeping year is at the end of the season (early fall) when you harvest. At this time it is important to judge how much honey your bees will need to make it through the winter (this varies greatly from California, where there is forage all winter long, to Iowa, with long, cold snowy winters). Be sure to talk to local beekeepers to find out the best practice in your area, since the loss of bees through winter starvation is devastating.

Beekeeping is a truly glorious undertaking, and offers a lifetime of learning. If you are interested in pursuing this as a path, there are many resources available, including books, online forums, and local beekeeping associations that offer classes for you to get hands-on learning before you start. Bees are amazing and mysterious and generous. Nothing is sweeter than honey from the hive, a cozy beeswax candle in the middle of winter, or the feeling you get when you interact with the hive. If you aren’t up to beekeeping yourself, find someone who is, and get a chance to peer into the hive. It will teach you about cooperation, purpose, and love.

**Chickens Are the New Black**

The backyard chicken revolution is well under way, and for good reason. Chickens fit in small spaces, offer delicious, nutritious eggs and meat, make nitrogen-rich poop that is great for the compost pile, and are far more entertaining to watch than television. They can also be helpful in turning over the soil and making your garden
Making friends with the chicken. *Photo by Daniel Miller*Spiral Garden

A moveable chicken coop made from scraps of recycled lumber.

Coop constructed from recycled materials fits small space in urban backyard. *Photo by Dana Yares*

This narrow alleyway between two houses provides a safe home for coop and small chicken run. Covering the area with chicken wire prevents visits from predators and pigeons.

beds ready for planting. They don't take much work once you've got their home established, and most hens will lay an egg almost every day for at least three years before they make a really good soup.

**COOP AND FORAGING SPACE**

Figure out the size of your coop and flock by assessing how much space you have to house the birds in relation to how much space they need to live healthy, comfortable lives. Most breeds allowed to forage outside their coop require at least four square feet of space once they are full-grown. Eighteen chickens are too much for the average backyard lot, but three or four may be just right. The size of your flock will also depend on the size of your family and your appetite for eggs. Make sure your coop and chicken run will get both sun and shade during the day.
Hens prefer to lay their eggs in nesting boxes. Build one for every 4-5 chickens. A highly recommended design feature: make a hinged door outside the nesting boxes so you can reach in to get the eggs and avoid walking into the coop each day.

Chickens need room to forage during the day. You probably won’t give your chickens free range in your whole garden (unless you want them to decimate any plant under 12 inches high, and you don’t mind stepping on chicken poop whenever you go outside), but creating an exclusive enclosure gives them room to move and the ability to peck, scratch, perch, and roll in the dust, all of which keep them happy and healthy and satisfied.

A coop is essentially a simple box with a door on one side to let the chickens exit, and a hatch on another side where you can pick up the eggs. Make it out of recycled wood from the dump, or wood pallets, or an old packing crate. We built ours from the recycled wood from a fence we didn’t want anymore. If you’re lucky, you can find a used coop online, or trade your homegrown produce with someone who loves to build. Make it small and make it beautiful.

**Food and Water**

Chickens need lay pellets, crumble, and calcium (often in the form of oyster shells). We recommend organic feed, but it costs twice that of nonorganic. You can grow certain plants that supplement the store-bought feed and bring good nutrition to your birds. Any of the brassica family will be well loved by the chickens. Grow an extra row of broccoli each season, or a perennial tree collard will feed them for many seasons. They also enjoy purslane and comfrey, two very easy to grow herbaceous plants that provide good nutritional supplements. They love insects, slugs, snails, and your kitchen compost as well. In addition to the proper balance of nutrients in their food, chickens need water at all times. A waterer can be hung inside the coop, or outside under a tree, and is easy to source at a feed store.

**Chicken Breeds**

There are many breeds of chickens to choose from. Things to consider in choosing your flock include: level of aggression, good laying (even in winter), ease of handling, ease of flocking with different breeds, lack of desire to fly away, and aesthetics. Some breeds you might enjoy are Rhode Island Reds (prolific layers of good-size brown eggs), Ameraucanas (beautiful, social birds that lay blue eggs), Buff Orpingtons (for the name alone, their beautiful shape and color, and the excellent eggs), Brahman (white eggs, beautiful feathers, easy to handle), and Australorps (brown eggs, and nice-looking birds).¹¹

If you’re raising chickens with an eye to eating them, Cornish, Buckeyes, Rhode Island Whites,
Orpingtons, and Plymouth Rocks are excellent. If you have the space, you can raise a multi-purpose flock of chickens for meat and eggs, with some chickens getting the hatchet at about 10 weeks, and the others living for a few years as layers. When chickens get to the end of their egg-laying days, it will be up to you to decide if you are going to keep feeding them, or if it isn't a better choice to turn them into soup.

**Chickens in the Garden**

Just to further add to the beauty and wonder of the chicken, you can also invite their help with your garden tasks. A small chicken tractor will provide a moveable run for the chickens that can be placed in areas that need turning over and fertilization. It's like a no-work, no-noise, non-electric rototiller digging in your backyard while you are busy at some other task. A chicken tractor is a great homesteading item to share with other folks because your need for it is intermittent and can easily be balanced with the needs of other gardeners.

The chicken tractor evolved through an assessment of the needs and yields of the chicken. A chicken will happily peck in the dirt in search of insects and organic matter to eat. When we use this yield of the chicken, we cut down on our workload while making positive connections between the yields and needs of the chicken and the garden. This is solid permaculture design; it exemplifies the way connections between elements in our gardens amplify productivity and the how stacking functions meets the needs of different creatures and makes less work for all.

You can also simulate the tractor effect by creating small runs for your chickens in areas you want turned over. You can do this with a moveable cage high enough to keep the chickens enclosed, and if you create this small run with chicken wire, it will move flexibly in response to the shape of your garden beds. You can use the chickens in this way to keep your garden paths mowed, or to overturn the soil in specific beds, as needed.

**Urban Rabbits for Fun, Food, and Fertilizer**

Rabbits are assets to the backyard homestead for some of the same reasons as chickens—they produce the best manure of all the backyard animals, they'll help you keep your lawn trimmed, they breed like, well, rabbits and thus are a sustainable source of meat, and they are much beloved by children on the homestead. If you are willing to consider butchering your own meat, or if you just want the benefits of their rich, pre-composted manure, rabbits are an excellent choice for the urban homestead. Taking care of rabbits is easy, and this task can...
Three bunny hutchies in a shady spot in the yard provide plenty of space for living, romping around, and breeding. Bunnies are let out during the day and protected from predators by fencing around and overhead.

be handed on to children, giving them a sense of purpose and belonging in the work of homesteading, as well as feeling the pride and sense of accomplishment any child gets from a job well done.

**HOUSING**

Rabbits need some basic care and secure housing, but once you have gotten it set up, they require little more than a few minutes a day. If you are raising them for meat, you will want at least one male and one female or consider a trio of one male and two females. If you just want them for entertainment and fertilizer, get two of the same gender. If they grow up together from a young age, they should remain compatible.

Rabbits can live in a wood or wire hutch. Rabbits need shelter from drafts, wind, and rain, but unless your temperatures go below freezing, rabbits do fine outside in the winter. If your temps do go below freezing, consider moving them indoors or weatherizing your hutches. Most importantly make sure their water source does not freeze. Each rabbit should have six square feet or so within their hutch (except nursing mothers with their kits), plus an opportunity to range farther in an open pen or run.

Rabbits prefer shade and can overheat and die if left in direct sun. They enjoy having places to hide (like a box or a burrow), especially in the heat of the day. They are perfect for a shady part of your garden that is otherwise unused for growing. They enjoy being let out of the hutch and running around in an enclosed area; use a low moveable fence to mark off an area where they can romp around during the day. When they are very small, this is not recommended, as they can become prey to hawks and other birds, but as they get older, and especially if you provide a box or crate they can crawl under as needed, there should be no problems with predators. If you're going to leave your bunnies out of their coops during the day, remember to lock them up again at night so that they do not become someone else's dinner.

You can also contrive a moveable enclosure of chicken wire to keep them penned in where you want them. Rabbits are great at mowing down anything growing in the enclosure, so only put them where you want them to munch and chew. A moveable rabbit tractor will serve the same function as the chicken tractor.

**FOOD AND WATER**

Rabbits have specific nutritional needs and it is unrealistic to consider growing everything they need on a small urban lot. Purchase a good-quality organic pellet, if you can find it. They are sold in 16 percent and 18 percent protein; 16 percent is sufficient for most rabbits. If you can't get a good organic pellet specifically for rabbits, mix 14 percent organic livestock pellets with 18 percent rabbit pellet to get a half-organic 16 percent pellet. For Mama and baby rabbits, supplement with Calf Manna. Rabbits also

An animal cage on wheels can be placed in different parts of the yard that need mowing. Rabbits keep the lawn trimmed and deposit high-quality fertilizer as they go.
enjoy greens from the garden, fruit tree branches (anything but stone fruit, which is toxic), alfalfa, or timothy hay. They will also chew on stale bread. You can toss them garden scraps, especially greens, brassica leaves, carrots, radishes, and celery. Whatever they don't eat can be raked up and placed in the compost pile. Rabbits need a plentiful and constant source of fresh water. Some people like to get an auto waterer, which works well if your pen is close to a hose outlet; otherwise the larger ball-tipped kinds work well.

**Breeding and Babies**

When you are ready to breed your rabbits, you can either let the male and female into a run together, or bring the female to the male's cage. A female rabbit is quite territorial, so it isn't a good idea to introduce the rabbits to one another on her turf. Once they mate, count four weeks from that date and put out a nesting box for the mama-to-be. In the interim, it will be hard to know for sure if she is pregnant, but you can try putting her with the male bunny two weeks from the first mating attempt to maximize the chances of impregnation. If she rejects him, she is almost surely pregnant. If you don't want baby bunnies, keep your male and female rabbits separate at all times. Breeding age males and females may also not get along well, so you may need a separate cage for each adult rabbit you want to maintain. That said, they are social and may be depressed if they don't occasionally get to see, smell, or touch other rabbits. We've had rabbits living alone, and rabbits living in pairs, and the rabbits in pairs are much more contented, less likely to try to escape, and live longer.

The mama rabbit will kindle (have babies) sometime between day 28 and day 31. Place a nesting box in the cage with the pregnant doe at this time. In the winter you may want to line the box with cardboard, or put a heating pad under it. At any time of year it should be lined with straw. The mamma will pull fur from her neck and belly to line the nest. This will also expose her nipples for better nursing. Once she has her babies, it is best not to disturb them much, though you should check to see that they are all alive.

In the first couple of weeks it will seem that the mama rabbit is ignoring her young. Rabbits do this instinctually as a way to discourage predators. She will nurse them privately at night. At about day ten the baby rabbits will open their eyes. At about three weeks they will come out of the nest. At this point, stop putting greens in the cage for the mama because the babies need some time for their digestive flora to develop before they eat fresh foods. Take the nest box out at six weeks and at eight weeks, sex them and separate the males and females. Keep your mama rabbit to rebreed for the next round of bunnies, and decide if you are going to slaughter all the babies, keep others for breeding purposes, or give them away to friends.

*Newborn bunnies in a warm nest.*
Ducks—The Perfect Permaculture Pets

Ducks in the backyard homestead also have a number of uses and benefits. Like the chicken, they scratch and peck, and they are extremely good at picking snails, bugs, and insects off your vegetables. (The permaculture cliché goes like this: "You don't have a snail surplus. You have a duck deficiency.") Ducks are also good at eating little sprouts, so you want to set them out in the garden after your plants have reached a pretty good size, or make a contained run for them in places where you want them to go. They happily waddle through the garden in a little flock, seeking out food and nesting under any available straw or leaf pile. They have great personalities and are fun to watch, much like their avian cousins. They lay eggs, and can also be turned into fancy food products if you are so inclined.

HOUSING, FOOD, AND WATER

You can house a small flock of two to four ducks in a large doghouse (easy to find at a recycling center or a lucky street giveaway) because they don't need much inside space to be happy. You can use an old box crate or desk, predator-proof, and out of the hot sun for much of the day. It should have good ventilation, and be a bit off the ground. Ducks will wander through the garden and seek shelter when needed, but are mostly out and about during the day.

Unlike the chicken and the rabbit, the duck needs a water habitat to be happy. You can set up an old bathtub filled with water-loving plants for use as a multipurpose duck habitat, plant growing, and rain storage feature in your yard. Or use an animal water trough and keep it filled for them, or a bucket, or even a kiddie pool. The exception to this is the Indian Runner duck, who needs less water. The Indian Runner is also a good choice if you are keeping ducks primarily for egg production; they are prolific layers, but do lay throughout the entire garden and need some watching.

Ducks eat well on non-medicated pelleted mash as a staple, supplemented with fresh vegetable trimmings, chopped hard-boiled eggs, tomatoes, cracked corn, garden snails, worms, night crawlers, and bloodworms. Most items are available at pet and grocery stores. Protein levels are very important to your duck's stage of growth. Ducklings need starter feed with 20 to 22 percent protein for three weeks. Adolescents do best on 16 percent protein. Adult ducks need 16 to 18 percent when they are laying and 14 to 16 percent if they aren't laying. Although the duck will feed happily off your snails and aphids and other bugs, they will also need to have their diet supplemented with store-bought food.

Raising Quail for Eggs and Meat

Coturnix, or Japanese quail, are a delight to raise. Their space requirements are small, they don't eat a lot, they convert feed into protein efficiently, and they are more congenial by far than the chicken.

Ducks in indoor habitat, feeder in background.
*Photo by Rachel Kaplan*
Feeding the friendly duck. Photo by Erik Bjöckquist.

Quail have been raised under domestic conditions since the Pharaoh ruled beside the Nile. The modern Coturnix has been bred to begin producing eggs when less than two months old. Once she starts laying, the hen will produce an egg daily for at least a year. The males are equally rapid growers, being ready for the table at six to eight weeks of age.

Coturnix eggs are nearly identical in taste and nutritional quality to chicken eggs. Coturnix hens, however, need less than two pounds of feed to produce a pound of eggs. Chickens need almost three pounds of feed to make that same pound of eggs. Five Coturnix eggs equal one chicken egg. Quail eggs are all different in appearance, being speckled and mottled.

**FOOD, WATER, AND HOUSING**

Because of their small size, Coturnix can be kept in small pens, such as a wire cage, rabbit hutch, or even a small dog kennel. Cages can be raised or can rest on the ground. If the cage is raised, it will be easier to clean, the birds will never be standing in manure, and their eggs will remain clean.

Quail don’t need special nesting or brooding boxes; they will gladly lay their eggs in the straw or wood shaving bedding you leave for them. If your quail enclosure is small, you can simply reach into the cage to get the eggs and don’t need to make a separate entrance into the cage to gather eggs. Quail are small but need some space around them, approximately one square foot per bird. For a small urban habitat, one male and three to six females is a good-sized flock that will keep the birds happy and productive.

Like most birds, Coturnix quail like to take dust baths in hot weather. You can place them in a mini quail tractor so they can run around and peck in the dirt and have a dirt bath in the sun. Always put water in the tractor with them and give them an option for shade. You can also include a small tray of soil for them inside their enclosure. Add a small amount of diatomaceous earth to further help them keep skin mites to a minimum.

Birds being raised only for meat will thrive and grow plump on a high-carbohydrate diet. Hens will need laying mash if they are to produce lots of eggs. Whether for meat or eggs, quail will thrive on a high-protein diet of 25 percent or more. Try a combination of high-protein 16 percent laying mash, some 22 percent turkey crumbles with a small amount of flaxseed, quail and dove seed mix, and if available, pure ground seed cake from seed oil extracting.

Supplement your hens’ diet with chopped greens from the kitchen. Food scraps for the compost pile can be processed through the Coturnix hens first. Chop leaves and other vegetable scraps fine enough for the birds to eat easily and there will be almost no waste.

Quail can be housed safely and comfortably in a large pet carrier. Any container will work as long as it protects quail from predators, has ventilation, and is placed in a shady and protected area of the yard.
Always provide the birds with fresh, clean water. Quail will need winter protection from cold. They are territorial and will peck if you introduce a new bird into their habitat. To prevent this, move them to an unfamiliar location with a different feeder and waterer when introducing new birds to one another.

**Breeding and Raising**

*Quail do not incubate their own eggs, so you will have to purchase young quail to raise rather than expecting to breed them yourself. You could also invest in an incubator, gather fertile eggs, and incubate them yourself. For beginners, we recommend checking your local classified ads for live birds when you are bringing your flock together and taking on the incubation project in season two. Your quail will begin laying eggs after a few months and should continue to lay for at least a year. Frequency of laying is linked to the length of the days, so you have to artificially increase the day length with additional lighting if you want them to lay through the winter. Left to their natural rhythm, they will lay from equinox to equinox. If you are raising quail for meat as well as eggs, you can set up a rotation schedule for buying new birds for eggs and meat.*

**Goats . . . in the City?**

We see goat herding on the outer edges of what's possible in most backyard homesteads, and are amazed to see goats gaining ground in cities around the country. Goats are curious, friendly, smart, and deeply relational creatures; they need attention, diverse forage, and one another. Goats are herd animals, and are unhappy living a solitary life. Goats will run up to you to say hello and jump up on you if you let them. They form a pecking order, like chickens, with one doe as the herd boss who butts the other goats around. Goats are territorial, especially around their children, and can be noisy and belligerent when crossed, threatened, or in unfamiliar territory.

Goats are generally kept for the milk and compost they provide, or because they are great at keeping whatever is left of the lawn in good trim. They are ideally suited for sloping areas that may be challenging for gardens, and can speedily clear a yard of bamboo or blackberry brambles. Goats are happy in marginal spaces and will quickly take over an abandoned lot. Goats demand a commitment of both time and money. While forage goats are hardy creatures that may struggle along on whatever is available, a goat that is expected to produce milk every day needs good-quality feed, housing, and medical care.

For these reasons, goat-keeping collectives are excellent ways to care for an urban herd. Members share the tasks of tending, walking, milking, and cleaning up after the goats in exchange for milk, meat, compost amendments, and good company. If you can join a goat collective or find someone who has goats who will teach you, becoming an apprentice is a good way to begin keeping goats.

City people also share herds of goats solely for lawn maintenance purposes. A shared, intermittent need for lawn mowing makes a moveable herd a quiet, fossil fuel-free, compost-producing, highly entertaining neighborhood asset.

**Shelter and Range**

Goats need a warm and dry place to sleep for the night, but they prefer sleeping outside and won’t really use the indoor space except when it is raining or snowing. Goat houses can be constructed from used storage
Walking a goat in an urban neighborhood is an educational opportunity for all, and it gives the goats a chance to encounter other animals and humans, stand down a stray dog, and sniff and nibble in a new place.

sheds, parts of unused garages, packing crates, or other recycled materials. A 6 x 8-foot indoor area is sufficient for up to four adult goats and six kids as long as there is plenty of room outside. We know people who keep two perfectly contented city goats in a 10 x 15-foot outdoor space, but in general goats prefer more room than that.

Goats need space to range, and a diversity of forage. By far the best option for extending the range of the urban goat is simply to take the goats for a walk in the neighborhood. Walking your goats stacks functions; goats get to range and forage; neighbors get to meet the goats; friends are made. Oakland goat girl Jeannie McKenzie reports, "The goats have created so much community in our lives. Once we started walking our goats, we met everyone in the neighborhood." Wethered (neutered) goats are great pack animals. They don't like being controlled on a leash like a dog, but will stay with their leader when they walk. Once the goat herder is the established head of the herd, the goats will scamper to follow along. Walking your goats in the neighborhood every other day (with your neighbors' permission, of course), gives the animals the space and diversity of forage they need.

**Food**

Adult goats need 14 percent protein food, generally a combination of corn and kibble. But goats need more fodder than hay and store-bought feed—give them scraps from the kitchen, or they will eat any plants you don't want. (They'll also eat plants you do want, so make sure you pen them in to keep them from eating the whole garden.) They enjoy black sunflower seeds—it's good for their coats and makes their milk richer. Grow these in the garden and harvest them for the goats, but you're not likely to be able to grow them in sufficient quantity throughout the year.

Goats are messy; in a small yard, this may pose a problem and should be given consideration in your homestead design. Goat poop can go directly into the garden, but the urine-soaked straw needs to be composted first. It breaks down rapidly in two to three weeks, and provides high nitrogen compost for the garden.
ON THE MENU FOR GOATS AT GREEN FAERIE FARMS

Morning and evening, each female in milk receives a gourmet meal consisting of the following:
- 1½–2 cups organic goat pellet
- 1½–2 cups organic alfalfa pellet
- 1½–2 cups organic whole oats
- ½ cup kelp meal
- ½ cup black sunflower seeds
- 1 tbsp probiotic

Topped with a few tablespoon of molasses, and garnished with a piece of apple, cactus pad or other garden forage. These are some happy goats!

BREEDS

When choosing a goat breed for the city, selecting for sound rather than size is a good mantra. Goats can be very loud, especially when uncomfortable, separate from their herd, or in unfamiliar places. A mother goat separated from her kid will scream for days. This hardly ever goes over well with the neighbors. The Oberhasli breed is quiet and highly recommended for urban use. Some urban homesteaders opt for the Nigerian dwarf goat due to its size, but this breed is quite noisy and not really well suited for city living, despite its small stature.

GOT MILK?

Unlike the other animals described in this chapter, dairy goats need to be tended twice a day. Four goats can take up to an hour to be milked, and goats are notorious for being resistant to the process at times. Busy urban dwellers deal with this workload by sharing it. People take on the task of caring for the goats in trade for the high-quality raw milk. With 14 weekly milking slots, this kind of community project provides a lot of people with the chance to learn about tending and feeding goats, raking and composting manure, and the art of milking.

Once a goat has had a kid, she can usually be milked for two years. When you breed the goat, she must be allowed to dry up for two months before she kids, so expect to milk a goat for approximately 8 months out of the year. The kid commands milk for the first two months, though some goat keepers wean the baby off the mother early and do the job of feeding the kids themselves. This interrupts a certain part of the relationship between mother and kid and can make both adult and young easier to manage. Goats that are bottle-fed by humans bond with humans and this makes them easier to handle.

The intricacies of breeding goats and supporting the mother/kid relationship while getting fresh milk on