

CDC 00200
Number 35

Holiday 1980

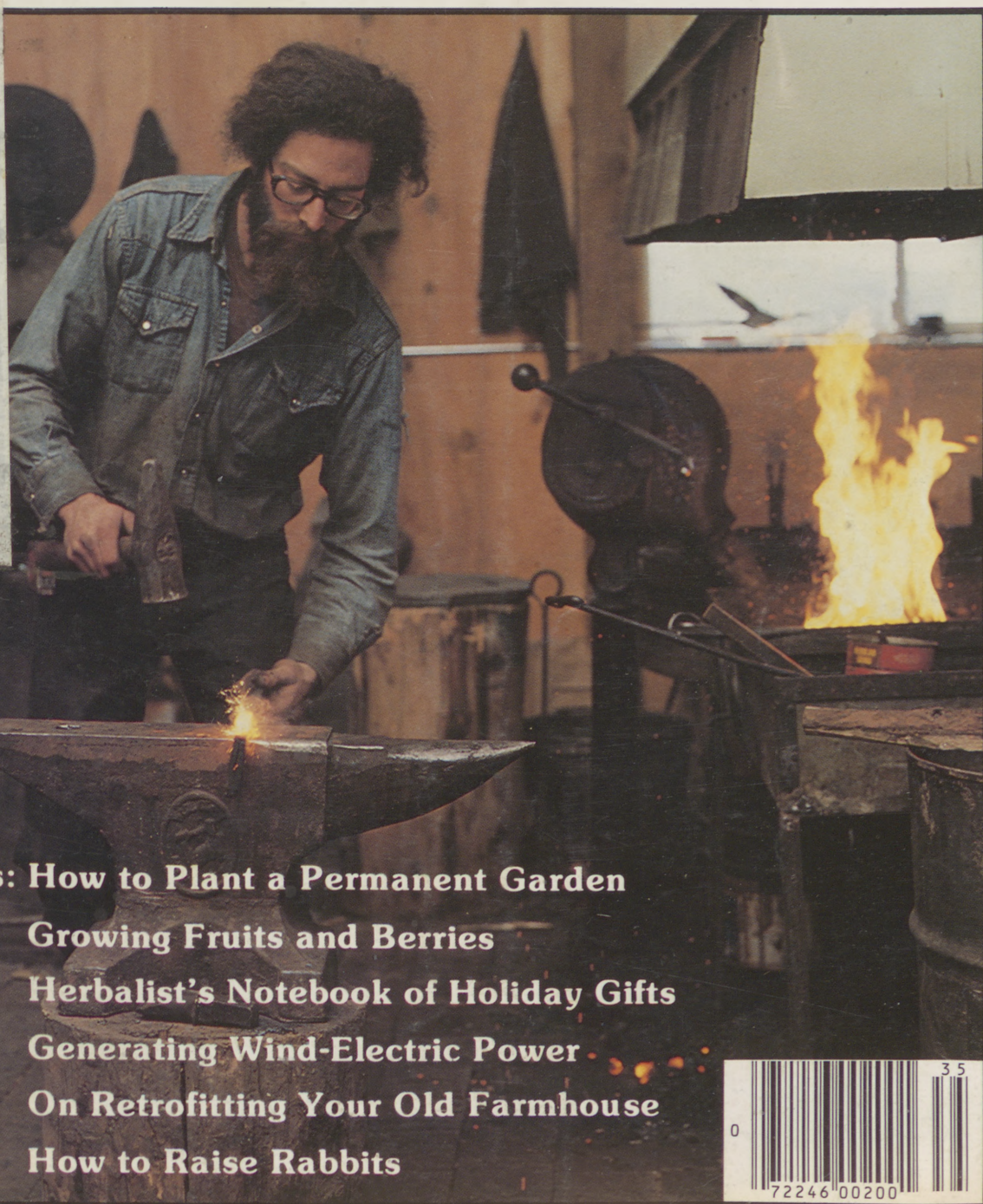
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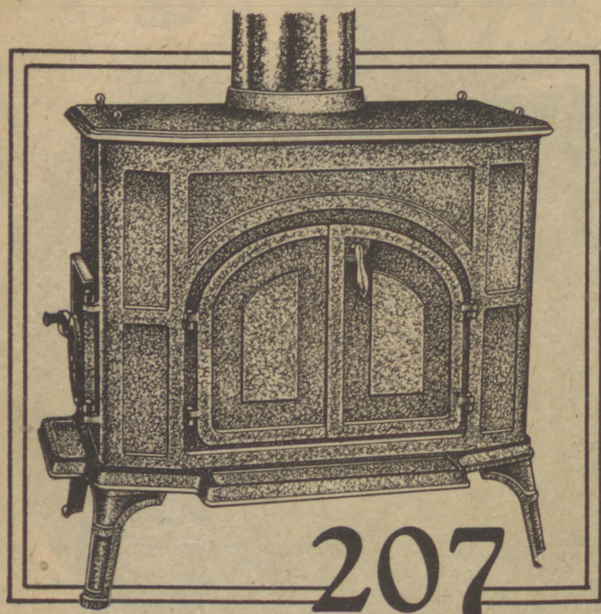
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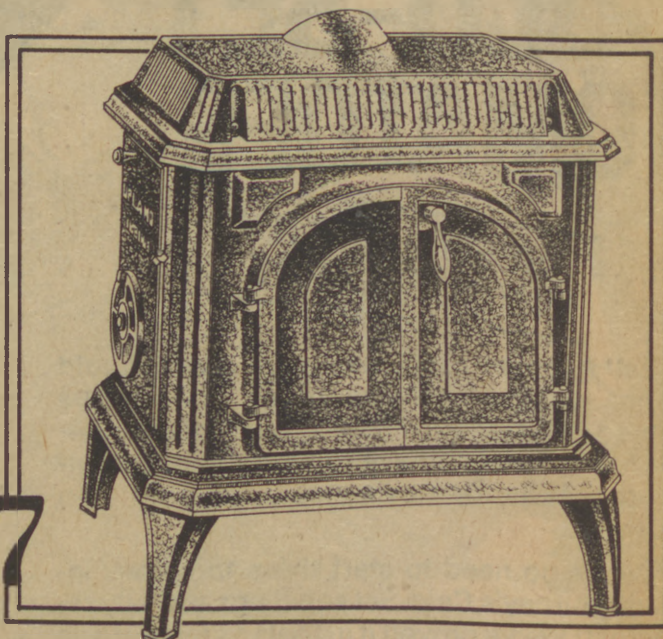
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FARMSTEAD

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Letters



MASONRY STOVE

Dear FARMSTEAD,

I have just been reading your Fall 1980 issue, particularly the article on building masonry firestoves. This is just what we need in our home.

After rereading the article we could not find an address or information on how to get plans for one. Would you have this information available?

We read and reread **Farmstead** each time it comes and have learned a lot.

Mrs. George Elder
Grove City, Pennsylvania

SUGGESTION BOX

Dear FARMSTEAD,

I greatly enjoy your magazine and hope that issues will grow larger and more frequent.

Subjects I would like to see articles about would include making dandelion wines and ciders and phases of the moon and its control of growing cycles.

I think your magazine gives its readers a good well-rounded foundation of learning, but I would like to see it become more in-depth in the future.

Rose Marie Healy-Picard

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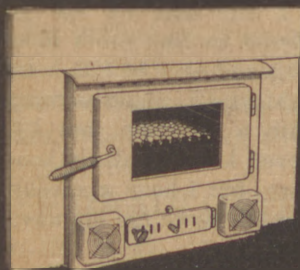
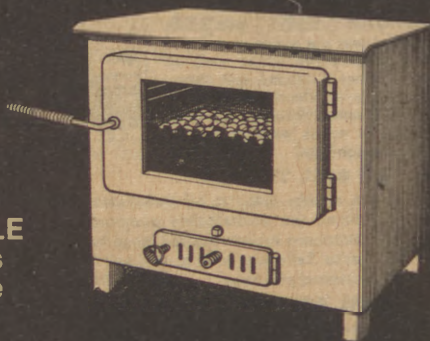
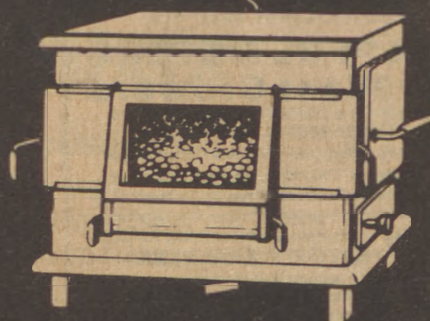
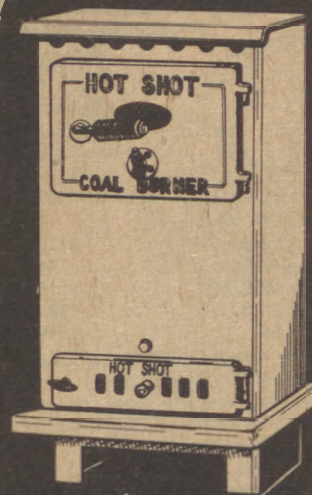
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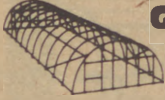
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wonderful childhood memories of these beautiful machines. However, we lived in Ohio most of our lives and every August, in London, Ohio is a steam threshers show. We, and our daughter, have shared the joys of the sweet smell of steam. We've seen the tractors in action and heard the whine as the threshers whip out the grain. We've seen the straw baled by horsepower (real horse power!). We have had the joy of eating steam-pow-er-ground grain.

Our only regret is that we haven't been able to find a threshers show to visit here in Florida. That yearly show is something we miss. As I read the article, I returned to that steam show. Thanks for the memory.

Mr. and Mrs. Charles Moore
and MerriLei

FRESH MILK RECIPES?

Dear FARMSTEAD,

With milk now zooming up to \$2.50 here in eastern Kentucky, our recent purchase of a five-year-old Jersey is a big break on our grocery bill. We now have our own whole milk, buttermilk, fresh country butter, and cottage cheese.

However, as I try to use the milk and milk products, I find that some recipes calling for butter do not mean "fresh country butter". If anyone has any recipes using country butter, I would appreciate having them. Thank you.

M. R. Rutherford
Box 393
Belfry, Kentucky 41514

GETTING UNORGANIZED

Dear FARMSTEAD,

I have often thought my days might be easier if I did things in some kind of order. Seems I'm always going off at a tangent and end up having to hurry to get a meal on the table or get to an appointment on time. If I do try to plan my day it never works, because I don't co-operate.

I hurried, one sunny day recently, to be at the bank when it opened at nine o'clock, thinking I would still have lots of time to wash clothes before lunch. The round trip to the bank in a near-by town should take about 45 minutes. My downfall that morning was two garage sales that I passed on my way to the bank. By the time I came back, my curiosity had taken over and I stopped to browse through them both. When I got home it was too late to do the laundry before lunch. It would have served me right

if we'd had an early afternoon shower, but we didn't, so the clothes dried on the line well before dark and no harm done.

My unplanned shopping had paid off, too. I had three good dress shirts for one son for \$1.50; a sweat shirt for the farmer son for a quarter and several books for my daughter and me for rainy day reading.

The recycling of usable goods through garage sales appeals to my frugal nature (frugal with everything but time).

This very day, instead of getting supper meat out of the freezer before noon and doing lunch dishes right after lunch, I decided to pick the string beans before the afternoon sun got any hotter. With a bucket of beans picked, I came upon a row of small beet plants that needed weeding. The ground was ideal for weeding in the row. Not hard and dry at all, so the small plants weren't disturbed by pulling a chick-weed or lamb's quarter nearby. The afternoon sun got hotter, but once started, I wanted to see the whole row cleaned, so I weeded on.

With the beets done, I was at the far end of the garden, and as I carried the beans to the house, it dawned on me that no meat was thawing for supper. The lunch dishes weren't done, the beans weren't snapped and it was way past three o'clock. Not long until three hungry men and a little girl would be ready to eat.

Why do I do this, I wonder, as I hustle to do two or three things at once. But lo and behold, come five o'clock there are sloppy joes, string beans and salad on the table. The dishes are drying in the rack. There are extra beans cooked for three bean salad for next day's lunch, and I'm glad the beets are weeded.

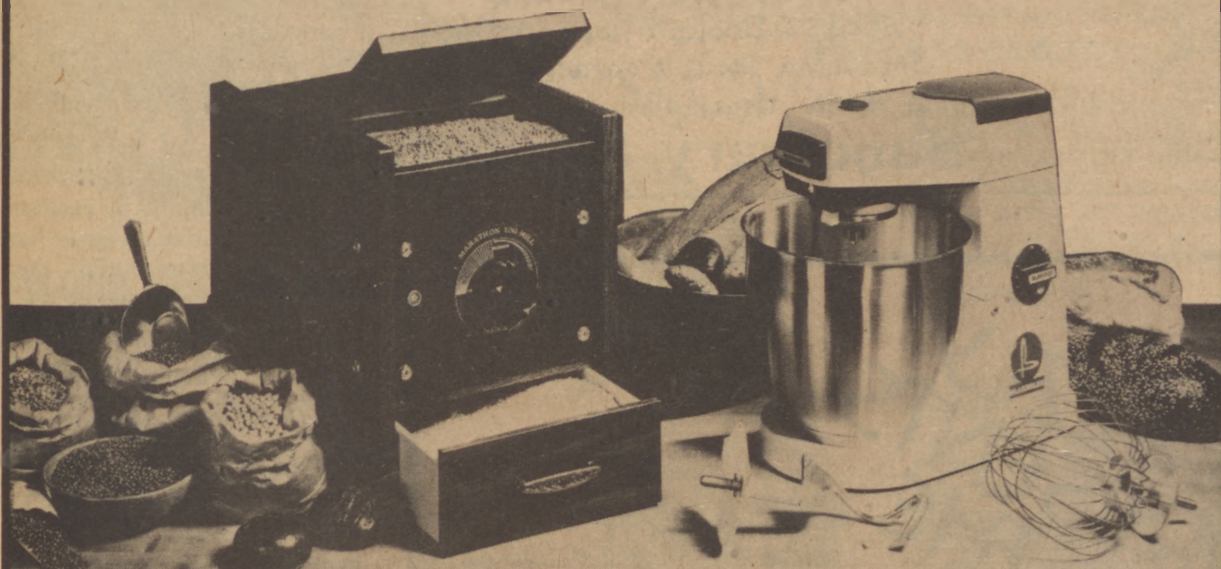
I find this to be the way most of my days go. I carry some clean clothes upstairs and linger to dust or put away some things, although I have set up the ironing board and plugged in the iron, intending to come right back to it.

I can start for the garden and decide to look for a hidden guinea nest and blow half an hour.

Maybe I would accomplish more with a schedule, but I'll probably never know. I don't know this for sure, but I have a sneaky suspicion that it's more fun my way.

Carolyn Arbuckle
Clarks Mills, Pennsylvania

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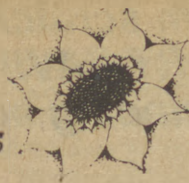
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POND MAINTENANCE

Dear FARMSTEAD,

In your "Ask Farmstead" column of the Fall 1980 issue, a reader asked about an environmentally safe control for pond algae and pond weeds. Ducks and carp were ruled out because of dogs and some other restrictions.

If the lakes referred to were large and communally-owned, there is very little that can be done without offending one or the other of the shoreline residents. But if the lakes are small enough to be enclosed with fencing, try turning hogs or horses in around the lake during the most rampant growth period of the algae. Dogs will seldom bother a few old sows or horses as they will ducks or geese.

We have a man-made pond on our place that "greens" up when the water reaches the right temperature. We considered turning hogs into the pasture to control pond algae and to muddy the water, but discovered our two horses wading into the pond and eating the algae. We'd had an unusually dry summer, and the pasture grass was short. The horses kept the pond clean, and they stayed in good condition with very little supplemental feed. Some horses, perhaps, are too finicky to eat the slimy green stuff, but hogs (which are no less messy than ducks, as a matter of fact) are likely to eat just about anything they can get into their mouths.

To control pond weeds the animals will not eat, mechanical removal and composting of weeds is still the best bet. For those with smaller ponds, it is certainly worth a try to avoid the over-use of chemicals.

By the way, I enjoy reading Farmstead and get a number of very useful ideas from your magazine.

Catherine Ganske
Burton, Texas

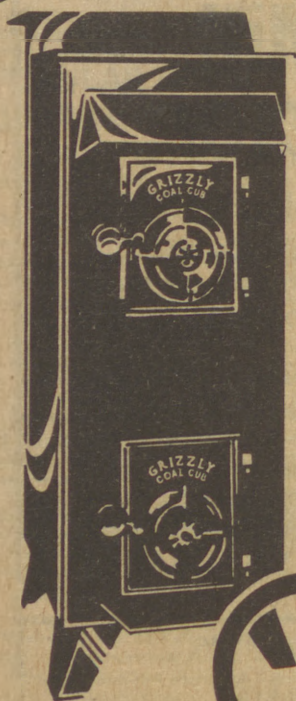
STEAM THRESHING

Dear FARMSTEAD,

I loved the article "Recollecting the Old Steam Engine Days of Threshing" by Bennie Bengston. My husband and I are steam lovers. We love the steam locomotives, and the steam tractors used in threshing.

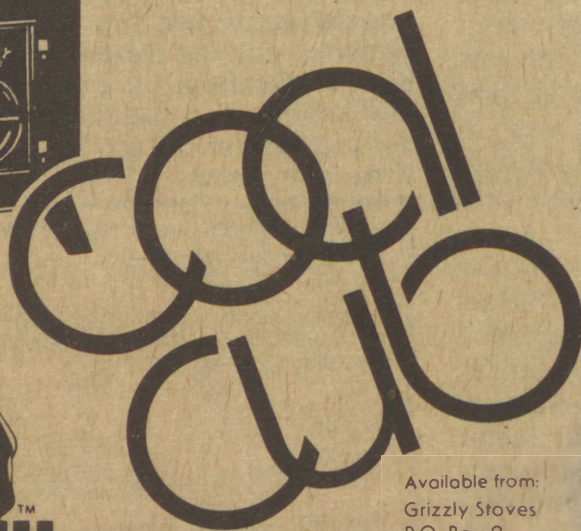
I know you'll have a lot of letters from "old timers" whose memories are freshened by the story. Chuck and I are too young (30 and 28) to have

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ASK FARMSTEAD



I want to convert to gasahol for my small farm equipment. Is there anything I need to know about using gasahol that is different from using gasoline?

There are notable safety risks to using gasahol or pure alcohol fuels--they are Class I flammable liquids. Gasahol is highly volatile--35 per cent more volatile than gasoline when only 10 percent alcohol is added. At 150 degrees gasahol may be twice as volatile as gasoline--the resultant build up in pressure in the fuel tanks of farm equipment, like tractors, where the fuel tank is carried above the hot engine is considerable.

Particularly to be guarded against is the spewing out of hot fuel when you remove the fuel tank cap. To prevent a fire or injury to yourself, the National Safety Council warns that the engine should be turned off and allowed to cool. The tank cap should be removed very slowly to let off pressure gently. Vent caps--seals and gaskets--should be checked regularly to make sure they are clean and functioning. Only standard tank caps should be used.

If you blend your own gasahol, be sure to use "clean" 195 (or higher) proof alcohol that has been in moisture-free storage. Store gasahol underground if possible or in a tank that is well shaded from the sun and well sealed to prevent evaporation and overheating.

Gasahol can damage engine parts unless it is very "dry" while pure alcohol or pure gasoline will not.

Finally, patience, common sense, and cool temperatures seem to be the primary guidelines to handling gasahol or any other flammable fuel.

My son wants to make some sort of electric gadget to bring fishing worms to the surface so he can catch them. Do you have any plans?

There are accounts of several people who have used plans to build their own worm shockers with unpleasant results. One young boy in Wisconsin built such a device consisting of two metal prongs attached to wooden handles, operated on a 110-volt house current through an extension cord. Standing on wet ground (the worms would be more easily induced to the surface on wet ground) the youth was electrocuted and died.

We recommend using only commercially produced worm shockers as they use low current battery power or vibrations to "charge up" the worms. These also come with complete, safe directions.

Is there any way, short of moving south, that I can get my garden to produce over a longer season?

The obvious answers are to plant sooner and keep second planting cool-weather crops going longer with mini-greenhouses of hay bales alongside rows and glass or plastic covers over the rows of crops.

Less obvious are the techniques of changing--tempering--the local climate. "Local" meaning the climate of your own garden, the microclimate. There are three ways of altering this microclimate--by creating warm sheltered areas. One is to improve the heat absorbancy and retention of the soil. Darker colors absorb more heat than lighter ones and so black plastic, coal dust or charcoal may be used as a ground cover to warm soil sooner and keep it warmer, longer.

Another climate control is provided by the creation or use of existing windbreaks. These can prevent soil from cooling due to evaporation and by pocketing sun-warmed air over soil and plants. Windbreaks can keep their protected, leeward microclimates from two to five degrees warmer than surrounding areas. Any tomato or eggplant or pepper grower knows what a difference that could make--equivalent, perhaps, to moving from Maine to Connecticut or Pennsylvania. Windbreaks can be temporary in the form of brush hedges, snow fence or permanent as the stone walls with which Helen and Scott Nearing surround their Maine garden, hedgerows of berries or other edible close-growing perennials or tree plantings.

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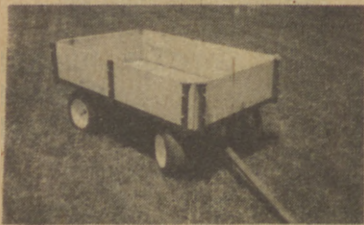
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A more drastic but excellent climate metamorphosis can be achieved by changing the slope of your land. The more southerly a slope is the warmer it gets and the longer into fall it will be warmed by the descending sun. A volume called *Climate and Agriculture* by Jen-Hu Chang reports that a 5 percent slope to the south in Connecticut provides the same solar climate as level land 300 miles to the south--say in Richmond, Virginia. A south-south west slope is best and if you do not have such a slope on which to plant your garden, you can create mini-slopes by hilling up garden soil (sloped planting beds) in 40 degree east-west ridges and planting near the bottom of the ridges. The slopes should be higher than the plants will be to ideally warm the microclimate, but even shallow slopes will speed the sun's warmth to seedlings in spring.

One of my dairy goats had an illness of some kind which gave her a cracked, scabby mouth and a slight fever. It passed on its own and seems to have done no damage, but I wonder what it could have been.

You were fortunate not to have contracted the disease yourself and not to have the whole herd infected if the disease was ecthyma. Ecthyma is an increasingly common disease of both goats and sheep because there are more fairs and sales where animals are brought together and the disease can be spread. It is caused by a virus usually in goats under a year of age (although older goats may contract it too, as you found) in congested surroundings where lots of animals have congregated. It produces painful inflammations of the goats' lips and scabs do form. The animals may exhibit depression, go off feed and suffer a fever as high as 105 degrees. Mastitis may result if infected kids nurse a doe or if an infected doe is nursed at all. Ecthyma spreads like wildfire because contact with the scabs or the pus alone will infect the animal--or person--involved. When people contract the sore mouth disease it is called Orf.

Sore mouth is self-limiting, disappearing within about a month with or without treatment. Separation is recommended and kids should be fed by other means than nursing. Goats should be vaccinated for sore mouth every year with a vaccine consisting of a water suspension of scabby material taken from lesions on infected goats.

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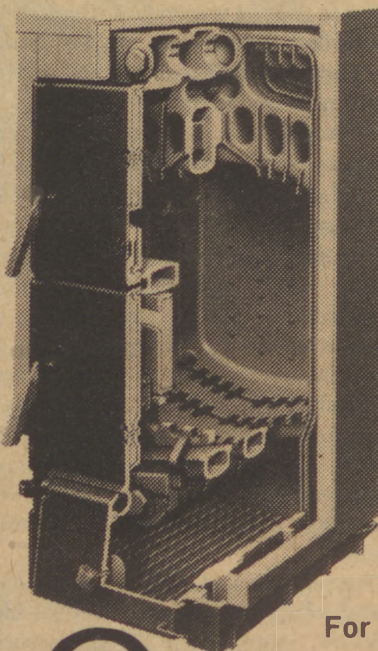
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no till--new soil

The energy conserving benefits of no-till crop production have been countered in the minds of some organic farmers by the potential for a subsequent increased use of herbicides to control weeds that tilling once controlled. However, where heavy mulches or companion and cover crops are used instead of herbicides, the benefits to soil health are as obvious as the energy savings.

For eight years scientists at the University of Delaware Georgetown substation conducted field tests comparing no-till to conventional corn production methods. The build-up of organic matter in the upper three to nine inches of mulched soil was noticeable on no-till fields. The high organic content caused a "slow-burn" by micro-organisms heating up, breaking down organic material--releasing nutrients slowly, without leaching.

The cation exchange capacity--the ability of the soil to hold nutrients like calcium, magnesium and potassium for plant root use--of the no-till plots was 25 to 55 percent higher in the top six inches on tilled fields. And no-till soil retained 30 to 60 percent more potassium than plowed fields where

the potassium had leached to deeper soil layers, beyond the reach of corn roots.

While mulches were found to build soil in the Delaware study, cover crops were recognized as highly successful nutrient pumps, lifting phosphorus, zinc, potassium, and manganese into top soils within reach of corn plants. Nitrogen -fixing leguminous plants cancelled the need for commercial fertilizers. Such studies clearly pave the way for viable organic agricultural practices on conventional farms.

SPPA

The Society for the Preservation of Poultry Antiquities, the SPPA, under the Presidency of Loyl Stromberg of the Stromberg Hatcheries, will be sponsoring the Ninth Annual National SPPA Show in November. To be held November 7th, 8th and 9th at the Ohio State Fairground in Columbus, the show is anticipated to draw 9000 entries from all over the United States and Canada. Visitors will travel great distances to attend the show, coming from as far as the Netherlands, Lebanon, Great Britain and other countries.

The SPPA was established to save and protect some breeds from becoming extinct and to encourage the breeding and showing of fine, fancy, colorful poultry of all varieties. The Society publishes a directory, the fifth due this fall, to keep members apprised of the location and ownership of rare breeds. The Society's Critical List keeps members and the public alerted as to the status of endangered species.



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At this Ninth SPPA show, cash awards will amount to \$1,000 and trophies include oil paintings of exceptionally rare breeds commissioned from Harold Geesaman of Palmyra, Pennsylvania.

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thin bread

In an effort to help consumers verify the dietary nature of "low calorie" foods, the FDA requires that all food products bearing the labels "reduced calories" or "low calory" contain at least one third fewer calories than standard, similar foods. Until recently bread was the exception to this requirement--needing to be only one quarter reduced in calories. Spokesmen of the baking industry and the FDA now agree that the technology is feasible for reducing calories in commercial breads to meet the one-third requirement. Bakers have until July 1, 1981 to comply with the reduction.

a friend at the bank

The evil black-caped and mustachioed banker of Depression films and cartoons has been really laid under in Saskatchewan. He will foreclose on few farms in the province where small farmers now have a friend at the Saskatchewan Land Bank Commission. In an effort to protect farmland from purchase by non-farm, non-local ancestors (non-local purchasers do acquire about 40 percent of the farms that are sold) the Land Bank Commission buys farmland on the market and turns it over to qualifying farmers who have "a net annual income of no more than \$10,000 and a net worth of no more than \$60,000" according to the Conference on Alternative State and Local Policies. The purchasers are given lifetime leases with options to buy after five years. The sellers are given a choice of cash payment or an estate-protecting interest-bearing annuity. More than 800,000 acres and 2,500 farmers have been involved in the Land Bank.

poultry museum

Loyl Stromberg, President of the Society for the Preservation of Poultry Antiquities and of Stromberg Hatcheries reports that Madeline Storm of the Tallent Hatchery in Tallent, Oregon 19540 has opened what may be the nation's first poultry museum. She is seeking items to include with the displays, which will include old poultry breeding and raising equipment, shipping equipment, labels, signs, records, photos and documents



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our pets & our health

Some years ago newspapers carried reports that links had been indicated between the ownership of (small) dogs and the occurrence of multiple-sclerosis. A recent study at the Mayo Clinic by Janet Scarlett reveals no significant relationship between the disease and dog ownership.

On the other hand, veterinarian Michael Burrige at the University of Florida has observed a potential for transmission of feline leukemia to humans. While there is no certain correlation as yet, the ease of transmission between cats, the number of instances of leukemia in people who had sick cats and the unusually high incidence of leukemia in veterinarians causes Burrige to suggest isolation or euthanasia of sick cats.

organic farming in Japan

The last decade has seen a considerable interest in organic farming in Japan where efficient mechanized chemical agriculture was encouraged widely for the recovering nation after World War II. Concern for the impact on health and environment of herbicides, pesticides and chemical fertilizers has lead the Nippon Yakinogyo Kenkyukai (NYK)--the Organic Farming Research Institute--to select four

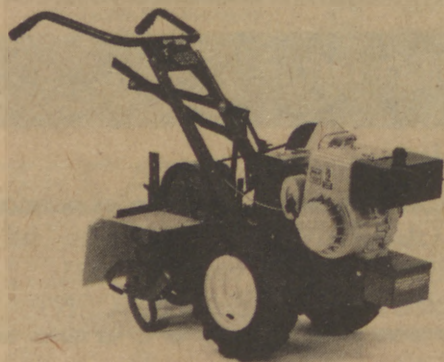
guiding principles. The first is to achieve self-sufficiency. More than the US, Japan depends on imported petroleum-agriculture chemicals and equipment. Secondly, to recycle organic wastes back to the land--an appropriately full-circle Buddhist notion. Thirdly, to protect and maintain health and finally, to achieve a mutually beneficial relationship between the farmer and the consumer.

One solution to the problem many American organic farmers find marketing their produce has become a vogue in Japanese metropolitan regions. The grower-family subscriber arrangement organizes a local consumers' association of 10 to 15 families and connects them with an organic market farmer. The families provide occasional labor, they and the farmer agree on the kind and amount of crops to be raised and establish schedules for production. The farmer is guaranteed cash payment and the consumer is guaranteed his fresh produce.

All is not harmonious in Japanese agriculture, however. Perhaps even less than the USDA is the Japanese Ministry of Agriculture and Forestry affiliated with or convinced by the NYK that organic methods are wholly viable. In fact, the first meeting between the Ministry and the NYK occurred less than a year ago when the USDA Organic Farming Study group presented their summary in Tokyo.

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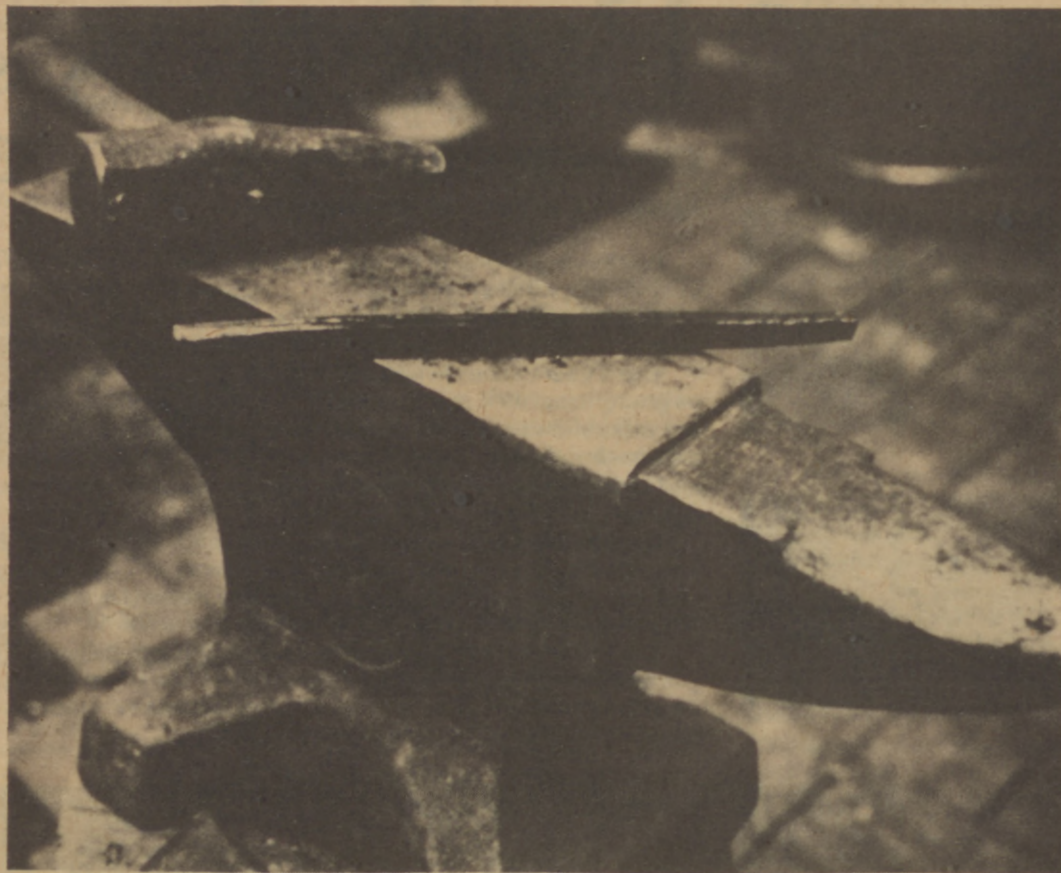
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BLACKSMITHING:



by Jim Day

Walk into an old farm shop--you'll be surprised at its forging capabilities. Not long ago, the farmer's workshop, and particularly the forge, were the hub of the farm operation. The forge produced hardware and tools when income and availability of merchandise were low. Enough skill can be acquired with a dozen fires or so to begin producing some functional tools like hooks, log dogs, fire pokers, nails and so forth. Perfecting the techniques, however, will take much longer. As one old-time farm smith told me, the only limits you have with a forge are imagination and ability.

Jim Day is from Juliaetta, Idaho. Photos by Dave Hoffman. Illustrations by Liz Buell.

Assuming you've never worked a forge, there are a few basic areas that will be important right from the start--metal, tools and basic techniques.

Source and Structure of Metal

The basic media forged in the smithy (blacksmith shop) is metal. But, metal covers a wide range of types from aluminum to zinc. Steel, an alloy, will be the metal most used for producing tools and implements, and we must understand this metal before changing its form. The major constituent of steel a smith is concerned with, is carbon. Various steels will have more or less carbon in their molecular structure, and for tool making, a high carbon steel is generally preferred. One of the most common sources of steel is the junk yard. Old farm machinery is also an excellent source, especially cutting implements such as disks or plows, which are made of reusable high

carbon steel. Old leaf or coil springs and car axles are other good sources depending on how you plan to use them.

The structure of steel is altered when forged to give particular characteristics. Depending on the tool, the steel can be made very hard and brittle, or soft and malleable.

Generally, putting steel in the stressed state is called "hardening." Removing some of these stresses is "tempering." When a piece of scrap metal is going to be forged, annealing, or removing all of the stresses, is a good idea so it won't break when worked. Annealing draws out the hardness, returning the steel to a somewhat original state. This is done by heating the steel to 1400 degrees Fahrenheit (about cherry-red), and then cooling slowly, placing the hot metal in a dry medium such as ashes, lime or sand.

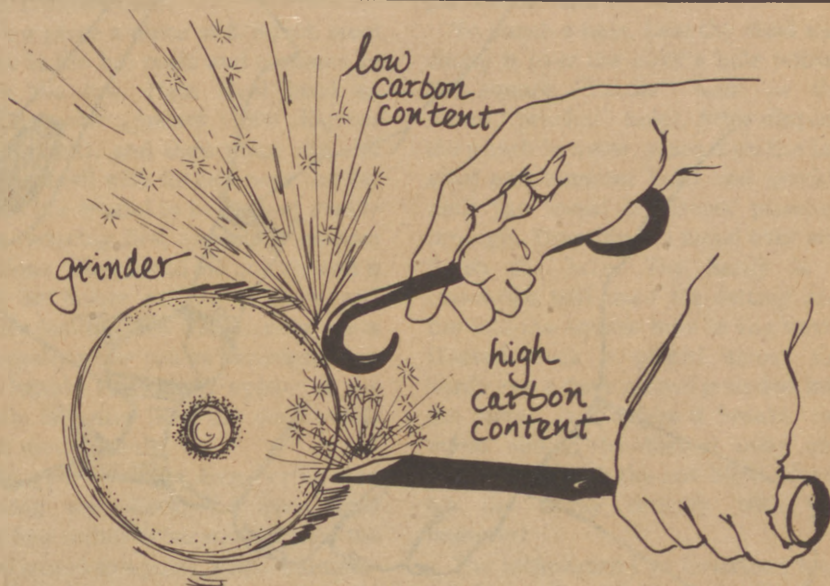
Besides beginning with a fairly soft piece of metal, it's a good idea to know its carbon content. A low carbon

TOOLS & TECHNIQUES

bar of steel would simply not make a good cold chisel. Carbon content can be estimated by the spark pattern produced when the metal is lightly ground on a grinder. If the metal produces a short, dense trail of sparks, it has a lot of carbon, but a long spread out pattern indicates a low carbon content.

It's also a good idea to understand the various colors metal becomes when heated, and how those colors correspond to temperature ranges. Metal is approaching good forging color when it's heated to a dark red, which is about 1000 degrees Fahrenheit. Next, it becomes a dark cherry (1300 degrees F.), then brightens to a cherry-red (about 1400). The color gradually gets brighter and brighter. A light cherry indicates 1600 degrees; an orange, 1800 degrees Fahrenheit. Blazing yellow is about 2000 degrees; white 2500; a brilliant white, 2700 degrees Fahrenheit.

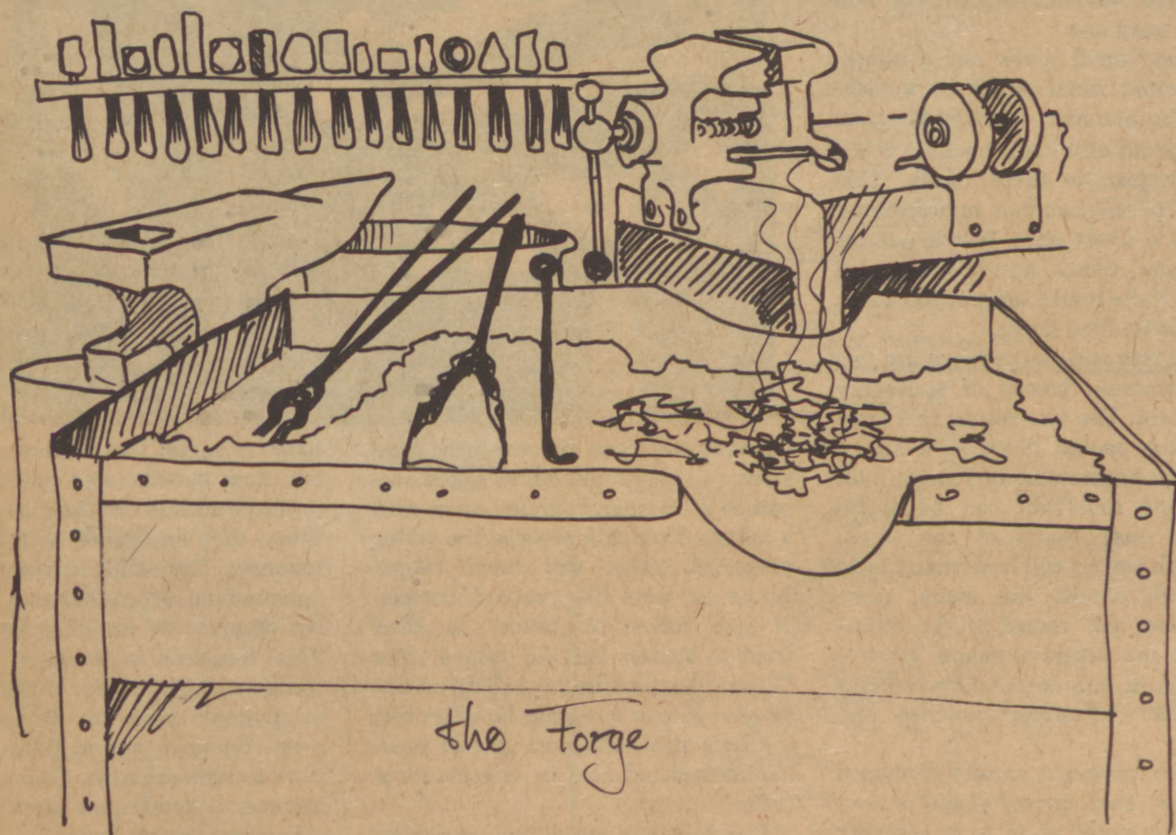
Metal heated from 300 degrees Fahrenheit (pale yellow), to a blue heat (700 - 900 degrees F.), is in the tempering range.

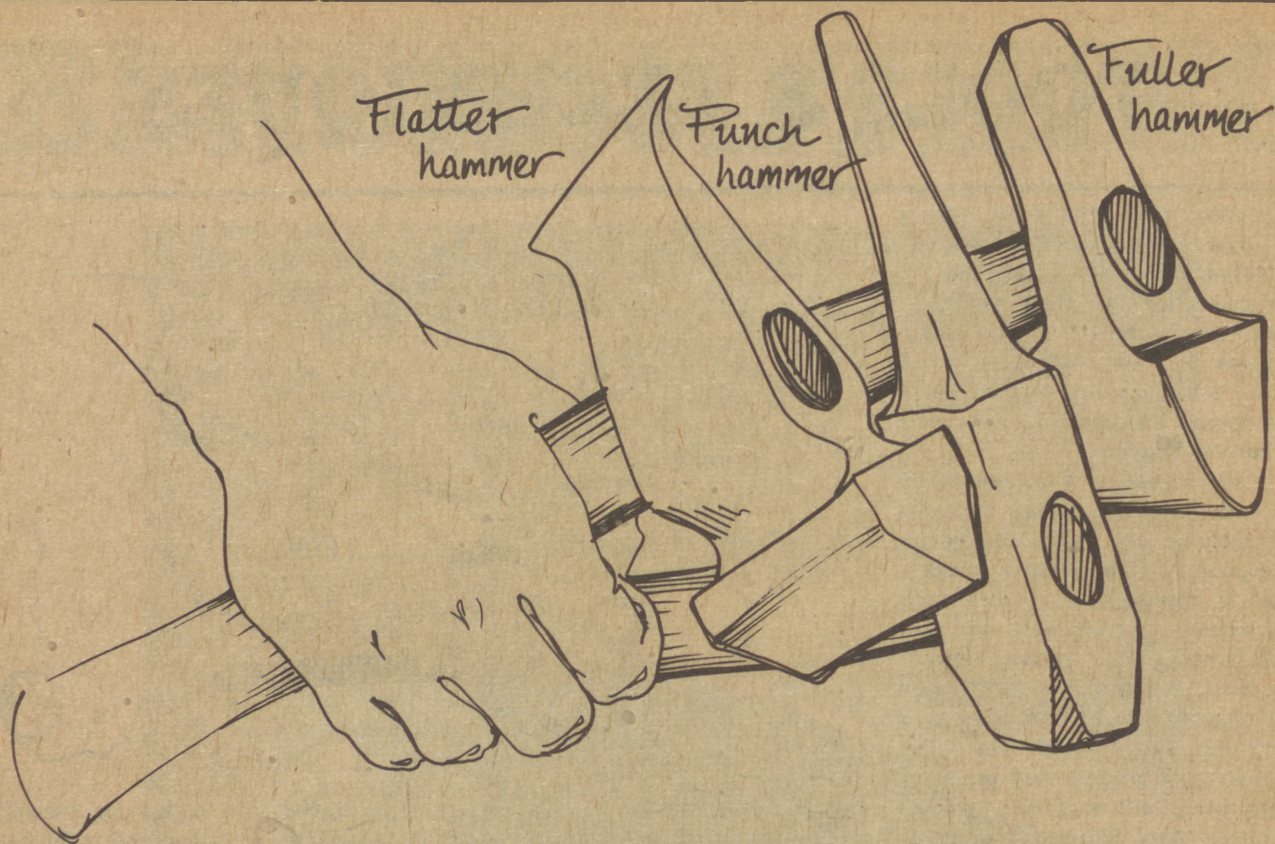


Known mostly by his or her hammers and anvil, the smith harbors many other tools. Because it's practical, many smiths make their own tools while learning the trade.

The forge is usually in a centrally located area. It is an open hearth where the fire is made, and consists of

a firebox, the tuyere (or blowpipe) where the blast of air enters the forge, a hood or chimney, a hearth and the blower or bellows. A forge can be either circular or square, portable or permanent, made of brick or metal, and usually stands about thirty inches high. A box with a water barrel should be close by.





The anvil is only a few feet from the forge. Most likely you'll need one weighing 100 to 150 pounds, and you'll want to secure it to a sturdy log which has been countersunk into the floor for stability. New anvils are expensive, but with luck you can find a good used one.

A good anvil gives out a sharp, clear sound when struck by a hammer. The hammer, when striking an anvil should also jump back up a bit, and not just lie there, dully. This bounce of the hammer indicates the anvil is a lively one. Watch out for too many dents and deep chisel marks. If the marks are not too deep, they can be filed down.

A leg vise and swage block are two other common pieces of stationary equipment. The vise serves as a third hand; the swage block is a set of molds for hammering hot metal into.

A hand tool rack can be found within easy reach of the anvil. Although smiths will have many tools that look almost the same, close inspection will reveal slight differences in the weight or shape. Most of the tools fit into one of four categories: fullers, flatters, punches and cutters.

Fullers come in a variety of shapes and sizes. Their curved shape is used to spread metal when it is hot. For



example, a piece of one-inch wide stock will be spread out to about two inches wide when pounded upon with a fuller. After this process the wider piece of metal will have ridges across it from the curved surface of the fuller. A flatter is then used to flatten out the ridges. The flatter, like the fuller, is usually on the reverse side of a regular hammer like the ball of a ball peen. A ball peen hammer would also be considered a fuller.

Punches are used for punching

holes in metal and cutters obviously cut. Both punches and cutters can be on the backside of a hammer. To use them, they are struck with a second hammer. The smith traditionally has one medium-weight hammer (three to six pounds) as an all-purpose tool. This hammer is actually a small sledge hammer with a straight, cross or diagonal peen on its back. The peen, being a type of fuller, can be used to spread metal. This particular hammer is used much more than the others in forming metal.

Oftentimes, a piece of metal is too hot to grip. If so, the smith reaches for a pair of tongs. Tongs also come in many shapes to hold all sizes of round, square and flat stock. As one smith mentioned, there is nothing sacred about their shape (and this goes for other tools), if the tong doesn't fit--reforge it!

Other tools used by the smith include files, hack saws and special tools such as the hardy that fits into the anvil and is used for cutting hot steel.

Fire starting is the first technique you must learn. Only first-hand experience teaches the tricks, but basically the forge is prepared by dumping the old ashes and placing coal or coke around the blower vent. Coke is produced as the fire burns and can be saved from previous fires. It burns much hotter and cleaner. A lit piece of crumpled up paper is set over the vent and some kindling wood is added. Slowly, the blower is cranked and green coal placed on top and around the burning paper. The first fire is bound to be smokey, but after that, the left-over coke can be used instead of kindling.

The coke starts easily and does not smoke.

When the coal is burning, sprinkle water around the fire's perimeter. This should be done periodically to prevent the fire from spreading and to help produce coke.

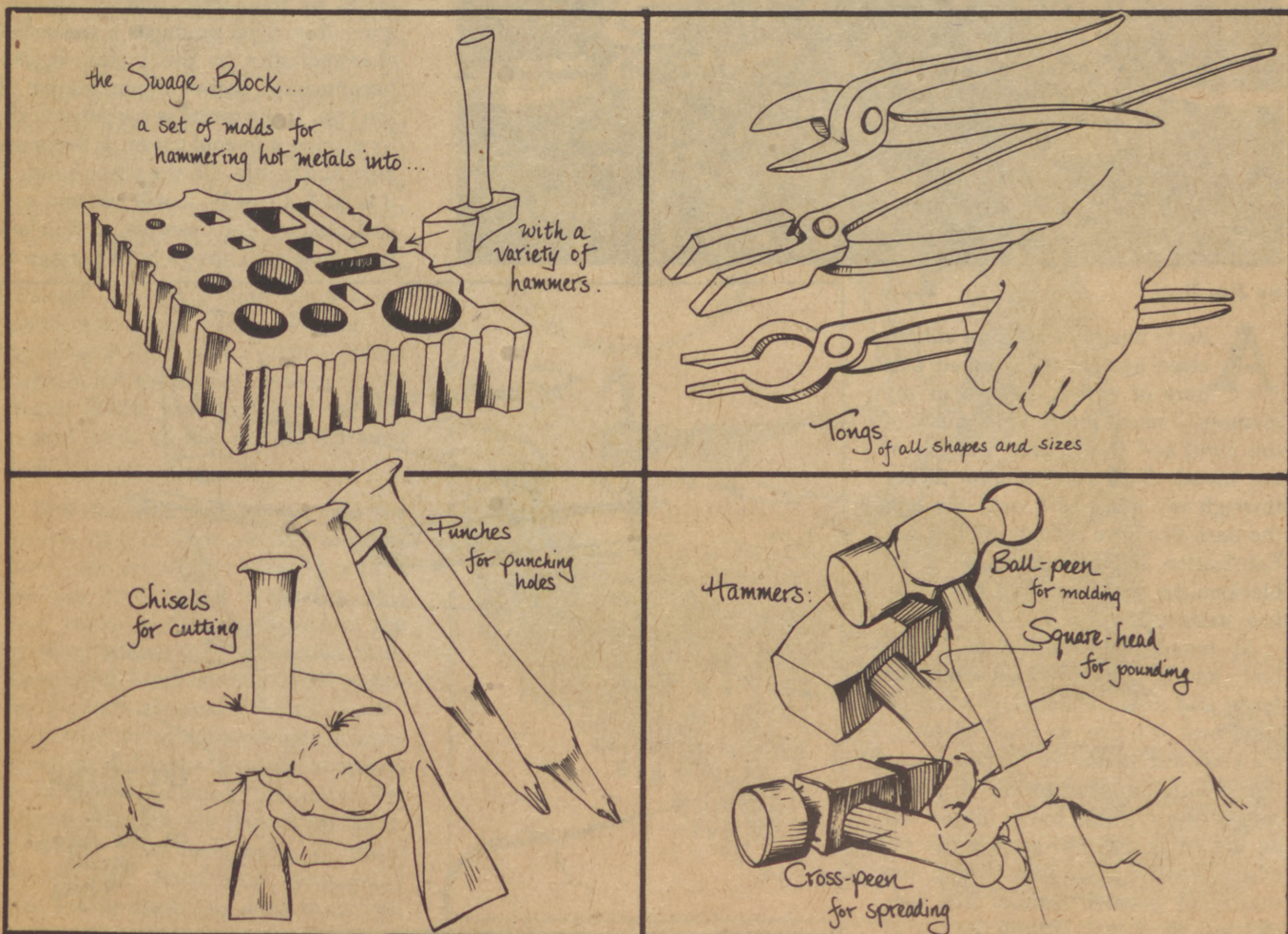
Now place a piece of 3/8-inch steel stock in the hot coals and continue to blow the fire. Heat steel until an orange color appears (1800 degrees Fahrenheit), and then place the rod on the anvil with its end near the far edge. It's crucial to heat steel evenly in a reducing fire, especially heavier sections. Heat metal too quickly and it will be hotter on the surface and cooler inside. This will make it crack internally while you're hammering on it. Outside cracks will appear if the inside is hotter than the outside. So heat metal evenly.

As you alternate hammering and turning the stock, be sure your hammer comes down squarely. As the steel comes to a point, begin hammering up the rod so a long even point is drawn out. Only work the metal while it is hot--red to orange. The drawn point can now be curled by placing it on the anvil's horn and tapping its end around.

Other methods of bending hot steel include the use of a vise or jig. If you have a square piece of stock, the center can be heated and one end placed in the vise. The other end is then rotated around with a wrench to put a twist in it.

To punch a hole, heat the steel and clamp it over the anvil's hole (either the square "hardie" hole, or the round "pritchel" hole). After dipping the punch in water, place it on the hot steel and hammer hard and quickly until the metal is almost punched through. Then flip the metal over and finish the hole. The hardy is a chisel-like tool used for cutting and fits into the square hole in the anvil. Heated stock is placed across the hardy and a deep groove pounded into the metal. Just before it breaks, the metal should be turned over and snapped off with the last blow. Never hit the hardy directly with the hammer!

The techniques I've described here are but a few of the ways to work steel. First-hand experience and experimentation are the best teachers of these methods, in the long run. Once you light your fire, never leave it banked too long. Keep it burning! □



PORTRAIT: WORKING SMITH



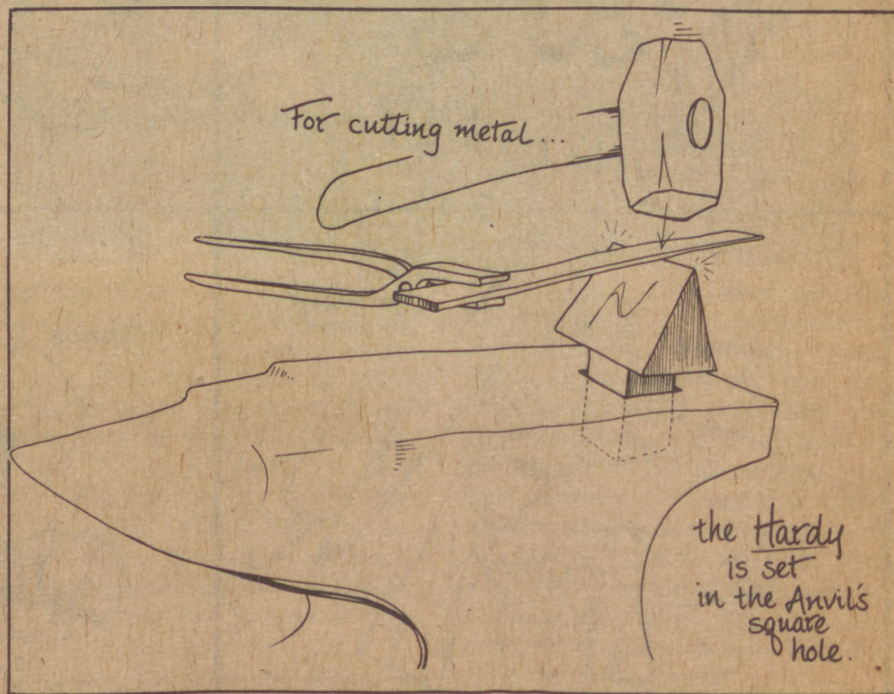
the bar squarely while it's rotated, elongates the hot metal. As the tip is brought to a point, the hammer speeds up while the blows are reduced to a gentle tapping.

In this ten second interval of action, Mark has succeeded in transforming my cultural image of metal as something hard and unyielding. The usual working temperature of 1500 degrees Fahrenheit prohibits contact with the working surface. Metal, unlike some materials, cannot be worked directly with the hands. The forming process is always done with deliberate preconceived movements. The fast-cooling metal must be worked immediately and the smith is always prepared for this. In addition, a crystalline-like inner structure allows the metal to be worked in only a few ways. If the steel is hit wrong, it deforms; if hit too cold, it can crack or break. The experienced smith controls the final internal structure of the metal by tempering, hardening and annealing. This produces a variety of characteristics in the metal. It can become hard, soft or a combination of the two. If the metal is cooled quickly by placing it in cold water, it becomes hard and brittle. On the other hand, if it is cooled slowly, it will become soft and pliable. For example, a finished cold chisel will have a hard surface to

by Jim Day

A burly image of a figure silhouetted against the banked embers of a fire, lingers in my memory. I recall the ringing music of the anvil and the fizzling quench of hot metal. Such recollections flicker through my mind as I walk through the barn-like door of Idaho Forge and Fabrication. Inside, I meet one of the blacksmiths reviving this trade to its lost stature--Mark Solomon.

At twenty-six, Mark's tall, lank body spryly maneuvers between the forge and anvil. Removing a bar of steel from the fire, its orange-red tip glowing with heat, he demonstrates the technique of drawing a point. Moving swiftly, the rod is placed flat on the anvil with its tip near the far edge. Powerful strokes bring the diagonally peened hammer into contact with the metal. Hitting the end of



Basket-Handled Fire Poker

hold an edge, and a soft core so it won't break. The core absorbs the shock of hammering.

Understanding the metal, however, is not enough. Knowledge of fire is essential. Within the fire is a reducing area and an oxidizing area. Each are used for heating metal in different ways. Normally, the steel is heated to an orange-red color in the oxidizing section of the fire. For welding metals, however, a miniature coke furnace must be built to produce the reducing fire and high welding temperatures. Coke is nothing more than a by-product of soft coal and water, combined in the fire. It will always be produced in the fire while working metal. Coke produces a clean, hot fire.

Anxious to watch the synchrony of Mark's movements again, I asked him to create something in the forge. He suggested a basket handled fire poker.

Cutting off four pieces of quarter inch square steel at twelve inches, he bound them together with wire. These would eventually become the handle. Cranking the old stand blower as he prepared the fire for welding, he mentioned a rule of thumb. Two inches below, four above (of coke), should be enough for a welding fire. As sparks filtered up through the coal, Mark doused the perimeter with water. Poking an opening in the coal, an intense yellow color filled the cavity. Twenty Mule Team Borax was sprinkled on the bound stock, as flux to help the weld fuse.

The end was then thrust into the yellow cavity. Four or five minutes later, the handle was tested with a welding tool. Placed in the fire, this tool sticks to the metal when the welding temperature is reached. Ready to weld, Mark laid the metal on the anvil and shouted "stand back" before he brought his sledge squarely down on it. Sparks filled the shop and even fifteen feet away I felt one slowly burning through the flesh of my hand. It would have been safer to stand behind him. Mark later commented that sparks always fly away from him.

Beveling the opposite end of the handle to match a beveled piece of steel one half-inch by twenty-four inches, he prepared to weld a shank to the handle. With shank and handle firmly bonded, the blunt poker was placed in the vise and tools made ready for the next step--opening the handle's basket. Mark adjusted a double-handled monkey wrench to grab the top of the handle with, while the shank was tightly gripped in the vise. The tool adjusted, he returned the poker to the fire.

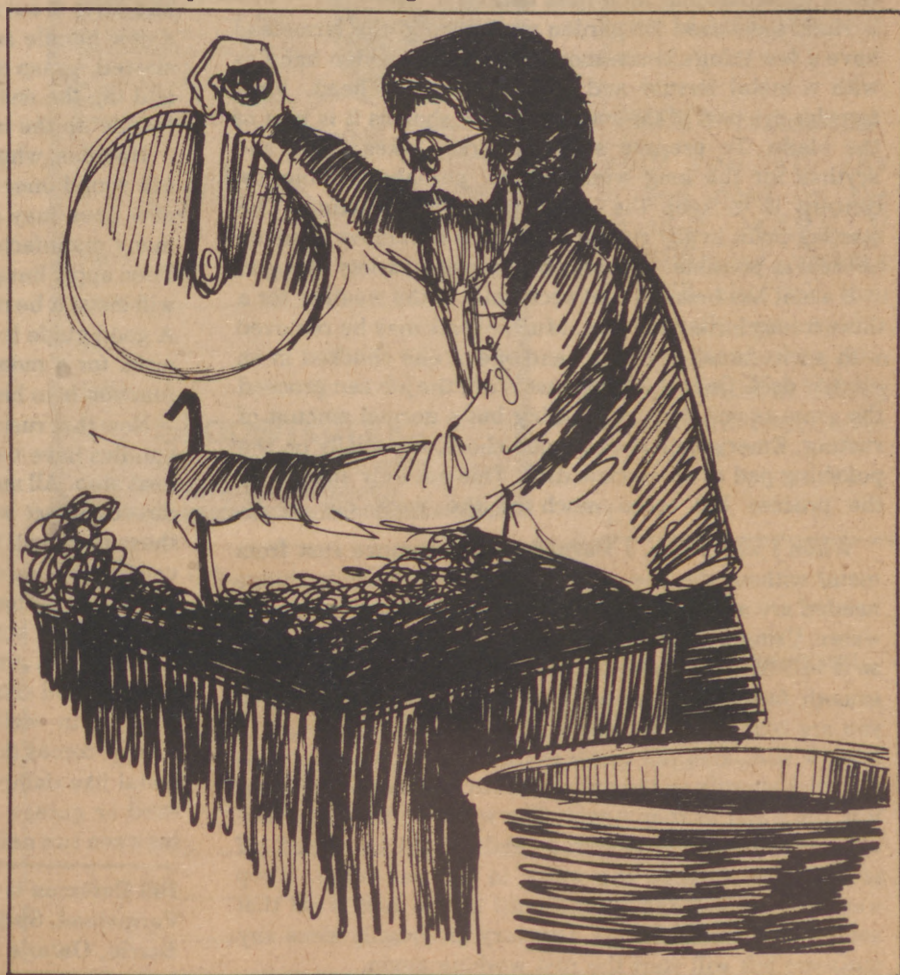
When the handle was orange with heat, the shank was clamped in the vise and the monkey wrench engaged at the top of the handle. Slow, but deliberate and forceful, he twisted and pushed down on the handle. Its four pieces of stock twisted and blossomed out to create a beautiful basket handle. Flattening and then bending the end of the handle over the anvil's horn, he finished a hook from which the poker could be hung.

Swirling it in water quickly cooled it to room temperature. This end was finished.

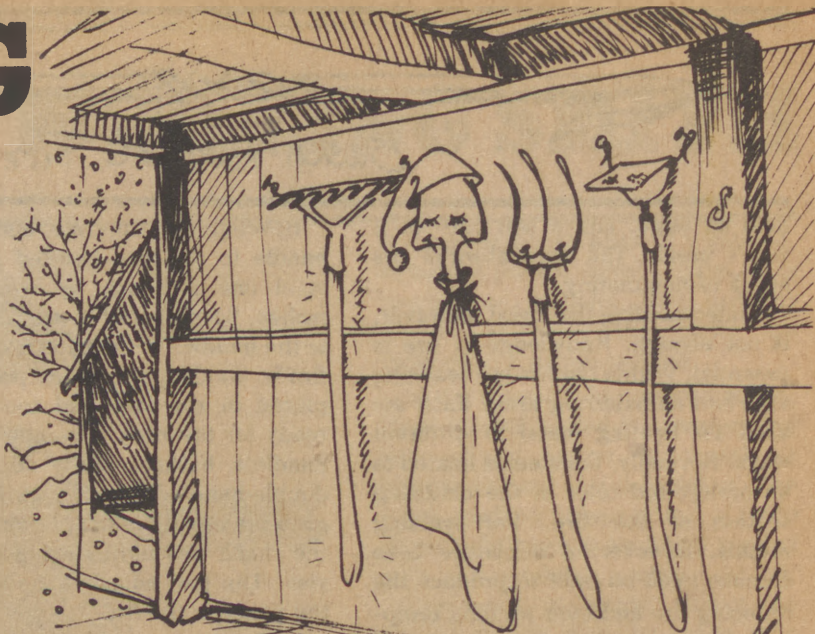
The other end was then placed in the fire to be worked into a poker. About two inches of the hot shank end was bent back on itself and welded. This is called a faggot weld. Cutting the end in two where the metal had been folded was done with a cold chisel. This left the end looking like a barbed fish hook. After the barb was carefully drawn to a point, it was bent away from the handle.

As a final touch the shank's center was heated and the poker clamped in the vise. A single rotation of the handle produced an artistic twist in the shank.

Standing back from the forge, Mark started to hand me the poker--point down. Just as I was about to reach for it, he let go. The perfectly balanced tool vibrated as it stuck squarely into the wood floor. □



PUTTING TOOLS TO REST



by Bill Bateman

A very important part of tool care, especially garden type tools, is putting them away for the winter. During the last part of September or early October you will have more time to fix things than in the spring. Major repairs may be put off until time and parts are available. However, take a rainy afternoon to sort them out.

Do the easy ones then and there, and make a list of the parts needed for the others. The odd one may even have to be replaced. In this age of shortages, strikes and back orders, order parts or replacements early so you will have them come seeding time next spring.

Hand tools used for garden work around the farmstead have a few things in common. Most have wooden handles with a metal ferrule and a steel blade or head. Most ferrules are part of the handle, but in shovels it is part of the blade. To prepare shovels, forks, rakes, hoes and scythes for the long winter sleep, perhaps the biggest concern is to keep the metal parts from rusting. The starting point in any rust prevention is to remove as much old rust as possible. This may be done in a variety of ways.

If a tool has been left out accidentally in the weather for a time, it may have flaky rust. Much of this may be removed with a wire brush, either a hand one or one chucked in an electric drill. Once the loose rust is off, the job can proceed the same as one that has nothing but a normal amount of rusting. Emery cloth does a good chore, especially on the polishing pad of an electric drill. This not only speeds up the process but takes much of the work out of it.

When I was a boy, I learned how to remove rust from metal without the use of any machines. The only things needed are a broken brick, an old cloth and a container of water. Using a hammer and chisel, cut a piece of the brick so it will fit comfortably in your hand. It should have one smooth face. Soak the brick in water over night. When you are ready to work, clamp the tool handle in a vise to keep it still. Wet the metal surface before starting. Rub the brick smartly on the metal in a circular motion, dipping it in the water to keep it wet. The water on the metal will very soon turn rust coloured, and should be wiped off periodically. Change the water in the pail often. Keep wetting, rubbing and wiping until all the rust is off that seems willing to come off. Dry very thoroughly since any moisture left will start the rust working again.

Next check handles for cracks, looseness or rot. A badly rotted or cracked handle should be replaced with a new one. Better now than some day next summer when you are busy. This is easier than it may seem at first glance. If the ferrule is part of the handle, as in a hoe, simply drive off the steel head. Sometimes drying or heating helps since wood shrinks when it is dry. You install the new handle by tapping the metal head into the handle.

Shovels are a little different since their ferrules are attached to their blades and held to the handle by a rivet. Grind or file the rivet flush with the metal, and drive it out with a punch, then remove the handle. Fit a new handle and start it into the ferrule. Once it is well started, grasp the handle in your left hand, blade down, and tap the end with a wooden mallet to draw the metal ferrule up the handle. Install a new rivet.

Handles, whether old or new, need preparation too. Old but sound ones need weathered surfaces sanded off, and new ones may need sanding to remove the shellac that many manufacturers put on to make them nicer looking. Then apply linseed oil, either boiled or raw. Many fanatics will insist it be raw, but I have used both with good results. A good guide is as follows, once a day for a week, once a week for a month, and once a month forever after. The function is to harden wood and keep out moisture and rot.

Now that rust has been removed from the blades and the handles have been sanded and oiled we are ready for the next step. All metal parts which are not going to come into direct contact with soil should be painted. Since most of these parts will have hard rust, ordinary paint is not much use. I use a good rust paint, such as Tremclad, in a bright yellow or orange. This not only stops further rust from developing, but makes the tool easier to find if its misplaced in grass or weeds. Metal that will be in contact with the soil should be oiled. Used motor oil is good. Just rub oil in well with a cloth or an old paint brush.

Now comes the storage part. Because neither wood nor metal like damp, a dry place is important. An implement shed or garage is ideal. Most garden tools can be hung between two nails the proper distance apart. □

Bill Bateman is the author of "Shovels" and "Forks" in *Farmstead, Spring and Early Summer*, 1980. He farms in Barrie, Ontario. Illustration by Liz Buell.

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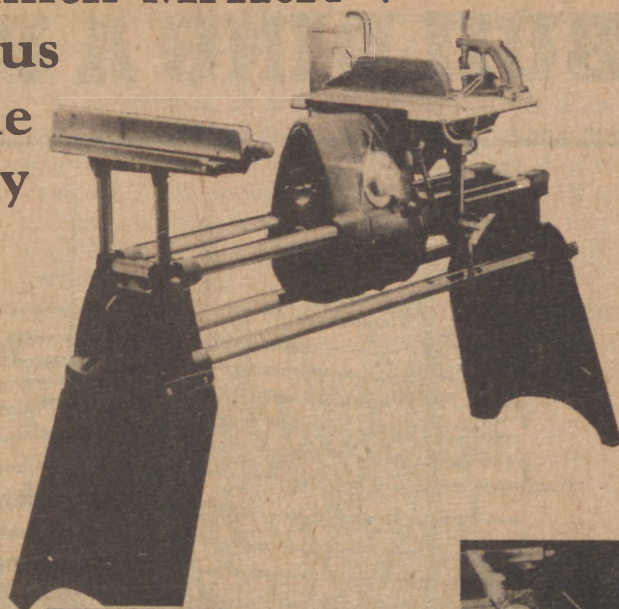
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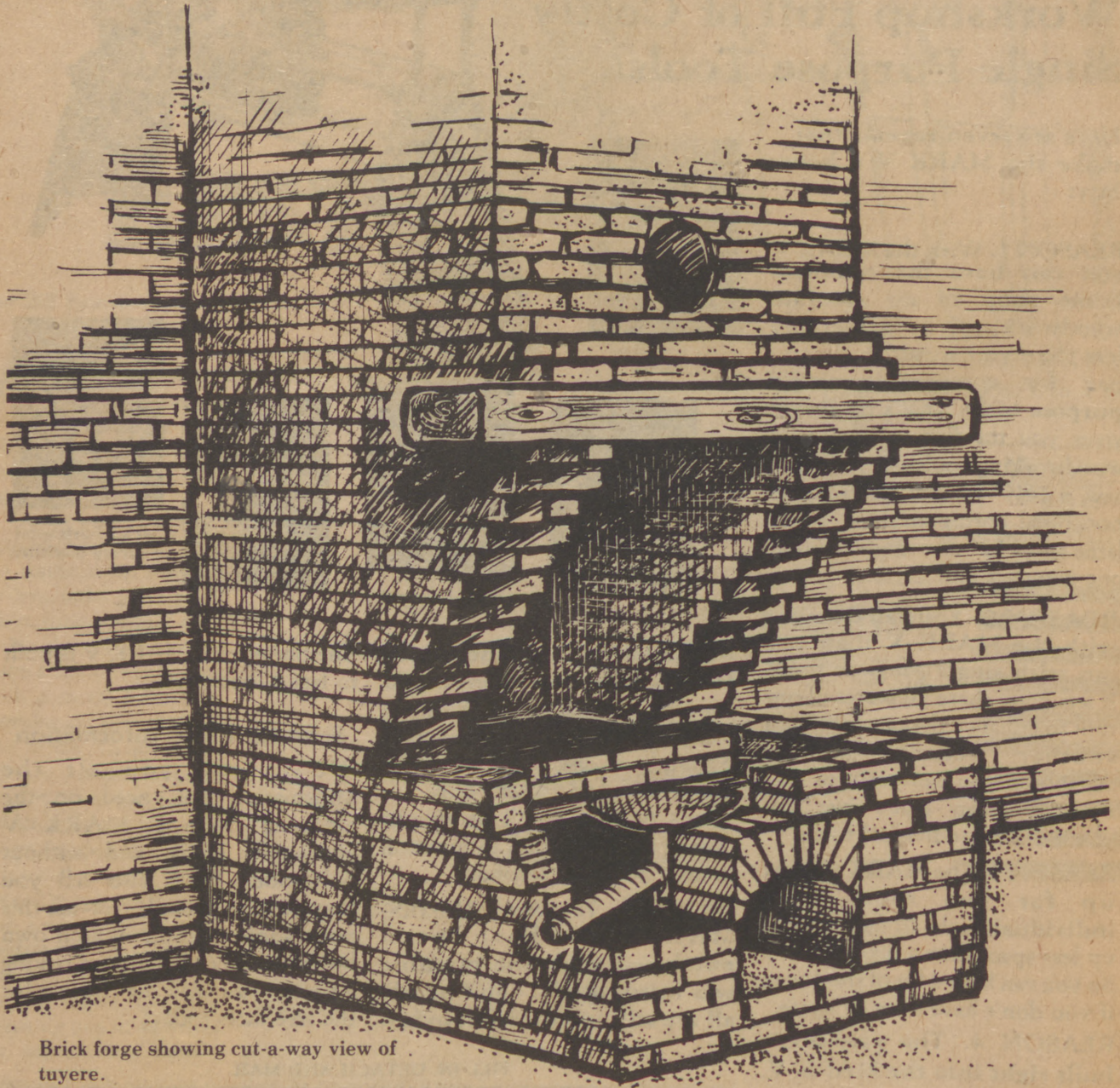
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BUILDING A BRICK FORGE



Brick forge showing cut-a-way view of tuyere.

by J.P. Manley

Without a doubt, the dramatic focal point of a blacksmith shop is the forge. These days many forges are commercially constructed of metal with blowers built into them, but for centuries, permanent forges were commonly crafted of the most readily available material—stone or brick.

This summer, I had the opportunity to design and construct one of these permanent style forges for a couple in New Hampshire. Years ago, these folks bought an old

cape first built in 1790, and they have been restoring it in a way to maintain the authentic beauty of the place. At one end of an addition to their farm workshop is now a forge and smith shop, designed to resemble a nineteenth century foundry building. Three sides of the 15 x 20 foot shed addition is constructed of wood. But the forge itself on the inside, and one wall that incorporates the chimney for the forge—is entirely of brick, complete with a brick-arched window.

The footing for the brick wall was a cement pad 16 inches wide, eight inches thick and 15 feet long. The footing to support the forge chimney was 32 inches wide, 24 inches deep and eight inches thick, and extended into the forge room. Both of these were poured at the same time and they interlock to make one footing. These were set four feet deep in a trench. Standard size cement block (8" x 8" x 16") was laid up from the footing to come just below ground level.

The first thing we did was cap the cement block with granite lintels, and we back-filled the trench so that the cement block was completely covered. This gave the foundation a beautiful granite appearance.

From there began the construction of the base of the brick wall and the chimney/forge hood.

The forge wall was two courses of brick eight inches thick with a "header" course every seventh course. A header is a brick laid across both sides of a double-thick brick wall and serves to tie the wall together.

We then proceeded along with the chimney base to a height of 30 inches, a standard workbench height. At this point, the chimney changed into the beginning of the forge hood. On each side of the chimney, the brick was "corbeled" out one inch, eight inches in on each side. The middle of the chimney was left empty, and I continued building up the U-shape for approximately 14 courses. At that point, the hood extended about 14 inches out over the base of the chimney.

Brick lends itself beautifully to corbeling, which simply means to set each successive course so that it extends one-half inch to one-inch beyond the course below it. A good rule of thumb is not to corbel beyond half the depth of the brick mass you are building out from. In other words, if your chimney is 20 inches deep into the room, your corbeling should not extend beyond 10 inches.

We put a curved piece of granite, five inches thick, eight inches deep and three and a half feet long, across the top face of the corbeled section. From there, the brick was corbeled in on three sides, for two more feet, and then reduced gradually to the size necessary to accommodate an eight inch by 12 inch flue tile.

If a chimney already exists in your shop, a hole can be tapped into it and a thimble installed with a sheet metal hood designed to cowl over the tuyere. But if a chimney needs to be built for the forge, a brick corbeled hood is a good way to go.

On this particular project, the chimney I built had to go up approximately nine feet above the roof, due to its having to rise above the main peak of the shop. Because of the height involved, the owner and I decided to build the chimney two bricks thick and gradually corbel it so it was one brick thick at top. The result was a very stylish chimney, and the icing on the cake for this job was the installation of a three foot tall cast-iron chimney pot the owner acquired, set into the top of the chimney.

The final setting up for this forge was the attachment of a forge tray. In this case, the owners fabricated their own out of heavy steel. The tray was basically a two-foot wide, 40-inch long sheet of 1/4-inch steel, with an opening in the center to accommodate the tuyere. (a metal bowl-shaped device to hold the coal and coke, with a blower attached to the underside.) The four sides of the tray all had five-inch high steel sides welded at a 45 degree angle up and out from the flat bottom of the tray. One end of this tray was bolted onto the masonry, and the other supported with metal legs.

There are other ways to set up a forge, however, besides the attached metal tray method, as mentioned. A free-standing all metal forge can be set up under the hood, or you can go all the way and build the entire forge tray with brick.

To construct an all brick forge tray, you would have to pour a concrete footing approximately six inches wider and deeper than the forge. Excluding the chimney, dimensions would be about two feet wide, two feet long and 30 inches tall. It could be as large as 32 inches wide, four feet long and 30 inches tall, depending upon your needs and methods of forging.

As you lay up your bricks for the forge tray, a chamber must be built to fit a blower or bellows to carry air to the forge burner. The actual brick tuyere would be a concave area, approximately 12 to 18 inches in diameter and four to six inches deep which would be lined with fireclay or a castable refractory cement. It would have a grate in the center bottom to keep coke from falling in the air inlet.

Two Rules of Thumb

One helpful rule of thumb: Before starting to lay up the brick with mortar, be sure to lay out the brick to see that they all interlock well and that the corners are also well tied in. Make sure each brick you set down lays over the vertical joint of the bricks below. This is called "staggering."

Another rule of thumb when bricklaying is to insure that the bricks have enough moisture in them. Modern new brick does not absorb much water (very dense), but older brick generally has a higher absorption rate. To know if the bricks you use need to be wetted down, draw a one-inch circle on the bedding surface of a sample brick and with a medicine dropper place 20 drops of water in the circle. If the water is absorbed in less than one and a half minutes, the brick should be wetted. Bricks should be dipped in water and then set (out of the water) for a few hours before use.

The older bricks on the orangey-pumpkin-colored side, will almost always absorb a lot of water. You can watch them bubbling in the water. As long as they are bubbling they are absorbing water, and when this bubbling ceases, the bricks have reached their absorption capacity. Often the water the bricks are immersed in gets too dirty for me to see the bubbles--so I pick up the brick and listen to it. If its still giving off a rapid bubbling noise, I put it back in the water. When this noise slows down markedly or ceases, I know the brick is ready.

The deeper red, almost black-colored used brick will, as a rule, not absorb a lot of water. They will probably just need a quick dunking to remove dust.

I think building a permanent forge is ideal for one committed to a homestead way of life and who desires to continue learning more blacksmith skills to make useful objects for the farm. All you need is a trowel, a level, a brick hammer--and time. Besides the obvious practicality and permanence--brickwork adds its traditional beauty to our lives. □

J. Patrick Manley is the author of "On Building A Masonry Firestove", Farmstead, Fall 1980. He is presently building his workshop in Stickney Corner, Washington, Maine.

Fruitful Living



Take another look at your yard or that weedy pasture. You can put any wasted space to good use by growing wholesome fruits and berries. Here's how.

by Bev Klauer

From its delicate spring blossoms to its summer and fall transformation into delicious sweetness--there is little as rewarding to the eye or tastebuds as fruit. When I drive through city residential areas and suburbs, I wonder why people don't use their yards more productively than they do. Beauty of landscaping need not be sacrificed. Even on homesteads and farms in the country where space is usually not a problem, people do not seem to take an interest in growing nature's sweetest bounty. It's a shame that folks don't give more

thought to growing their own apples, cherries, pears and berries. Maybe they think their yards aren't big enough. I know that many people have the idea that growing fruit is difficult and too much hard work.

But growing fruit is not difficult, and it is not a lot of hard work. It just takes some understanding, a little planning and the know-how of a few basic procedures.

Keep in mind, I live in the Midwest where we have the extremes of hot and cold weather. We also have droughts and rainy seasons. Even under these varied climatic

conditions, with just a little help from me, Mother Nature usually wins over adversity.

We will consider here: strawberries, cherries, raspberries, plums, peaches, apricots, grapes, pears and apples. I have listed these fruits in the order in which they are harvested. Apples, of course, may be either summer or fall, depending on the kind. I have only fall apples because they are the most popular, and because they work in best with a busy summer schedule.

One other point to consider when planning a fruitful year is to grow only

a one-time bearing fruit. The everbearing fruits are fine if you want only a couple of different kinds of berries. But if you want a variety of fruit throughout the summer, the everbearing berries can grow overbearing when they come back and interfere with the harvest work of another kind of fruit. Since I have so many kinds, and there are a hundred other things to do during the summer months, I want one fruit ripe at a time, or as close to that as I can get. Then I'm done with it. I don't have to break my neck trying to keep up with the work of two or three kinds of fruit ripening at the same time. That can be very discouraging. The whole idea is to enjoy the harvest and take pride in what you and nature have accomplished, while at the same time, enjoying other things, too.

Strawberries

First, let's look at strawberries. They are the first fruit to ripen--in June--and one of the most popular of all.

Strawberries are not hard to grow but probably do require more time than any of the other fruits. But, careful planning and patience will eliminate a great deal of the time needed for care. These plants will not grow tall, well-leafed out, or bear big luscious berries if they are weedy. A weedy strawberry bed is usually what discourages the would-be grower.

Strawberry plants are set out one season, and will bear the following year. I always try to set my plants out on April 15th. No earlier. But if on that date your garden or yard is still covered with snow, I would suggest setting them out just as soon as the snow is gone. They will blossom some the first year, but it's wise to pick those blossoms off. By doing this, the plant will grow and strengthen, and shoot out strong new plants so that you will have a better, healthier bed the second year. The fruit will not be good if the plants are not strong. Twenty-five original plants should provide plenty of fresh strawberries for the average family, and also plenty for the freezer!

The best place for a strawberry bed is in a location that has been a garden for two or three years. That location is already pretty much free of stubborn weeds if you've been a good gardener. If you want a different location, such as preparing a

spot in fresh tilled sod, that's fine, except I would suggest a little caution and patience here. Prepare the spot one year, keeping it freshly tilled and weed free that whole year, and set out the strawberry plants the second year. This will prolong your first harvest of strawberries, yes, but it will be well worth the extra time. It is very difficult to start a permanent strawberry bed in freshly tilled soil. Believe me, you would become discouraged fast, and probably abandon the whole idea. The weeds would be nearly impossible to keep up with.

My strawberry bed is flat and in a well-drained section of my garden. I have few weed problems. I pull the very young weeds that start early in the spring, and then in late summer after a good rain, I pull the tall weeds that I missed in the spring. That's all the time I spend on my strawberries, except for picking. However, if I want to reset my bed in a new location, I do this right after picking, by digging up and resetting the new young plants that have spread from the mother plant. That way I have strawberries every year without a break, even if I've started a new bed.

I always thought you had to start a new bed about every other year, buying new plants. This is not so. I have two strawberry beds that are four and five years old. The beds grow bigger every year if I don't keep them tilled back, and their berries are just as big and good as they were the first year.

The elements of nature have a lot to do with the abundance of a strawberry crop. If the spring is dry, your bed will need watering or the plants will wilt. Their roots are not very deep in the ground, so surface moisture is important when the plants are setting blossoms and berries. If June, the harvest month, is quite wet, your berries may not be firm, but rather mushy, and they will mold easily in the patch. If you plant a good firm-type berry in the first place, however, wet weather will have little effect on your crop. Don't despair. I have found it really takes weather extremes to noticeably harm the crop.

If your strawberry bed is taken care of properly, and you have strong tall leafy plants when winter arrives, then you need not cover your bed with anything. A good snow cover is the best protection it can have. I have found that a straw or hay cover only

deposits weed seeds in the bed. Sawdust, I think, smothers the plants too much.

Cherries

After fresh strawberry shortcake, a fresh cherry pie is the best dessert in the world. Fresh cherries are so superior in taste to the canned cherry pie filling, that there is no comparison, and if you've bought a can of cherry pie filling lately, you're aware of the economic bonus of raising your own cherries. And don't make the task of pitting cherries seem to be an insurmountable job. It isn't.

A cherry tree or two is a must for a yard. I prefer the sour or semi-sour variety. Cherries are extremely hardy and fast growing, quick to bear and easy to pick. The trees are relatively disease free. Two sour cherry trees will produce all the cherries an average family would want, and the fruit freezes well, retaining its fresh-picked flavor. A few well-tended trees are far more rewarding and productive than a huge, neglected orchard.

Cherry trees require little care. Sweet cherry trees like light sandy soils and have the same growing range as the peach. The sour cherry can tolerate heavier clay soils and more extreme climates, which is why they are a good bet for the more northern areas.



In the winter, usually during the January thaw, I like to prune them. A cherry tree, as any fruit tree, does best when it is kept trimmed out, but it really requires less pruning than most fruit trees. Don't overfeed your trees or you'll have a fast-growing one that doesn't produce as many cherries. A tree that is too dense and filled with a lot of little limbs, will tend to have small fruit and be difficult to pick. It will also look unsightly. When I prune, I cut out broken and dead limbs and the branches that tend to grow across each other in large numbers. I keep the top cut down so the tree doesn't get too tall, and I also trim trees to a nice round shape, especially cherries.



Raspberries

The raspberries will be at their peak as soon as the cherries are picked. This fruit is a real delicacy and requires very little work.

I have three kinds--purple, black and red. The purple are big and very prolific, but in my opinion, lack a real good raspberry flavor. The bushes are thorny and do not reproduce themselves very well. The blacks, however, are delicious, but horrible devils to pick. The berry is small, the bushes thorny, and they actually seem to take delight in attacking you. The bushes appear to reproduce themselves merely by touching the ground, thus producing a forest of menacing black raspberry canes if not carefully controlled. They also need to be tied up to a post for easy picking. The black takes the most care.

The red raspberry is the one I recommend, and seems to be the favorite for most. It's the easiest to care for, the flavor is excellent, and it produces a good size berry that develops on strong upright canes. The canes reproduce every year by sending shoots up from the roots. But, like the strawberry, the red raspberry will not do well and grows unsightly if left to survive in a mass of weeds. Again, a good unweedy location is desirable.

Early spring is the time to give red raspberries most of the care they need. Pull young weeds as soon as they appear, and cull out dead canes from the

previous year. All the dead canes have been replaced with healthy new ones. As soon as the new shoots appear, they can be dug up and replanted wherever you wish. The small new shoots transplant well, needing just a little water to survive, but the older canes do not. By digging up the shoots, the patch can be easily controlled or guided in any direction.

Someone once told me to bed or mulch my raspberry patch with a thick layer of old hay or straw. Well, I had some old mulching material and tried it. My suggestion now, however, is don't do it! I imagine the mulch was very good for the soil, but it left my patch in a mess. It deposited more weeds, thistle and red clover than I could keep up with. I had to dig up the entire patch and move it, losing a lot in the process. Now I don't mulch with anything, and the patch is no problem to keep clean with a minimum of effort.

Raspberry harvest starts right around the Fourth of July and lasts until almost the end of that month. As soon as the reds are done bearing, clip the canes to about two feet from the ground. If any undesirable weeds escaped you in the spring, dig them out before they go to seed. There! The raspberry patch is all cleaned up until the next spring.

Plums Aplenty

At this time, there is a break in the fruit harvest until the last part of August. Plums, followed by peaches and apricots, are then ready. If you

really enjoy fresh fruit, you'll be anxiously waiting for the next kind to ripen.

Most plum trees are fast growing and bear young and heavy. There are American varieties such as Ember and Pipestone that ripen the first part of August, but types such as Redcoat and Waneta mature later. The American hybrids are the most hardy of all the plum groups, and so are the best choice for colder climates. The plum tree stays relatively small and makes a nice ornamental for the yard. I have several of the Blue Damson type. It is a medium-size freestone which does well in Zones 5 --8. It is good for jelly, juice, plum butter and canning whole. Shropshire is a Damson that produces a very good yield of dark purple fruit.

I would suggest having at least two trees for plums aplenty. Even though they do bear heavily, with literally bunches of plums on each branch, sometimes they do not bear every year. If they bear every other year, two trees may assure plums every year. For reasons I do not know, sometimes my plum trees bear two years in a row and then sometimes they bear every other year. I have never had to buy a new replacement tree; they reproduce themselves from a pit dropping onto the ground. I was told that seedlings grown from pits would not bear fruit as good as the parent's fruit, but mine always have. I've had very good luck digging up the young fruit tree and moving it to another spot.



Plums grow in bunches along small but strong branches.

Then there are peaches and apricots. Although these fruit trees are not as big as standard size, I do recommend the dwarf size for the small lot. The apricot can grow relatively large. It's a pretty tree and a desirable ornamental along with the plum. The fruit borer likes the peach and apricot, so that is something to watch for and catch early. These trees do well in the more temperate zones where summer is long and winter mild. If you are in Zone 6 --8, okay. Even with hardy varieties, you take a chance to plant them in Zones 3 and 4 and even 5.

No longer is the homegrown peach or apricot a small, very pale tight-stoned fruit. The fruit on the modern tree is large, juicy, sweet and freestone. The trees are heavy bearers. A couple of years ago I had Elberta peaches that were the size of softballs. (Only a small exaggeration.) They were perfect and delicious. The tree was small, but I still got about two bushels of peaches. I was so proud, I showed those peaches to everyone in the neighborhood.

Peaches can be hard, if not impossible to get started in parts of the country that have severe winters. I wrap my young trees very well for the first two winters at least, and see that they have plenty of moisture around the roots if it is a dry fall.



Roman Apricot.

It's a good idea to plant two or more varieties of apricots together, to have a better yield. The hardiest varieties are Moongold and Sungold--and from Canada, there are two called Scout and Andy's Delight. Another variety from South Dakota is called Manchu, and is being grown in Zone 5 and sheltered areas in Zone 4.



Grapes

Now to the grapes. Wine, jelly and juice are the treasures from this fruit. Once the vines are well-established, they last for years and years. I have one arbor with thirty-year old vines on it, and they bear very heavily every summer.

Grapes love a real sunny area and light sandy soil. If you're in a cooler zone, plant them near buildings, or where hills form heat pockets. Grapes are virtually care-free except you'll need to cut back in the late winter of each year. Once established, the vines can be cut back severely with no harm done. Of course, all grapes need an arbor to grow on which can be a very eye-catching attraction in your yard. If you use a heavy wire (10 gauge), for the vines to twine on, and big heavy creosoted posts for the ends, the arbor should never have to be replaced. White wood boards, or a nice trellis, are of course, more attractive, but it is a difficult task trying to repair or replace that kind of arbor when it rots.

Plant vines about eight feet apart. As the season progresses, allow two side branches to grow in each direction, and train them on the

wires. It helps to pinch off buds that push in other directions. By the end of the second season, the space between the wires should be thick with growth, and by the third year, you'll get a few grapes.

I have two kinds of grapes--the purple Concord and a red table grape. However, I would not recommend the red, since its too much like the purple (at least the home variety is). Instead of the red, I'd recommend a white grape. But the good old Concord is still my first choice.

Apples and Pears

The last of the homegrown fruits are fall apples and pears. They are both ready about the same time--October!

Apples come in many varieties; it all depends upon whether you prefer an eating apple or a cooking apple. Some kinds serve both purposes. If you want only one kind of fruit in your yard or small orchard, apples would be the one I'd choose. And I would certainly recommend the dwarf tree. Apples grow to be very big and they get hard to pick. The best ones always seem to be at the top.



Once apple trees are firmly established, they take little care. They seem to adapt well to different soils and climates. They should be kept pruned out like any fruit trees because they soon get dense with unnecessary wood and shoots. Remember, though, if you don't spray at correct times your apples can be next to worthless.*

By the first of May, nothing is more beautiful than pear trees in full bloom. The trees appear as one huge white flower--absolutely brilliant. When my pear trees are in blossom, I know good weather is here. (They tell me the mushrooms should be out too). I would recommend dwarf pear trees since they bear earlier than standard types. Also, standard pear trees grow straight up to a very tall height, which of course, makes picking hard.

You don't have to wait for pears to be tree ripe before picking. If left on the tree until perfectly ripe, they begin to rot and are useless. Wait until the fruit is developed and can be easily separated from the branch. Remember, the fruit bruises easily, so handle gently.

Pears are hardier than peaches and some of the hardiest types originated in Canada. Some varieties good for Zone 3 and 4 are Andrew, Clark,

Lucious, Manning-Miller, Parker, Patten, Jubilee and Golden Spice. There is a new delicious variety called Nova from the St. Lawrence Nursery in Canada.

Pears are a good canning fruit. If you like canned pears and have bought a can in the supermarket lately, I'm sure you can see the value of a couple of dwarf pear trees. I don't think the Bartlett pear can be beat, for canning or eating fresh, but it does well in the warmer Zones since it's only a bit harder than the peach.

Some More Tips

Here is a good place to give other tips about fruit trees. The first couple of winters after planting, when the tree is very young, I like to wrap them in a clear plastic material to avoid winter kill. Peaches are especially susceptible to this.

After the first hard frost, wrap the trees with a thick layer clear up to the top of the young tree. Leave only the very top of the protective material open for breathing.










I do not prefer to plant trees in the fall. Fruit trees need the spring rains and summer growing season in order to survive their first winter. Sometimes fall planting is successful, in the case of apple trees, but I still prefer spring. Fruit trees do cost money, and I do not believe it is worth the chance.

All fruit takes the cold weather best if the roots are frozen in a lot of moisture. The roots are more susceptible to a hard winter if they freeze dry. So if I notice a dry fall, I always try to water my fruit well before the ground freezes solid.

Well, why not give it all a try? Even if you have an average size city lot, there is room for a fruit. Put your grape arbor on the lot line to divide you from the neighbor. If you have a fence around your yard use that as an arbor. Or, use your grape arbor to seclude your back patio instead of a fence. In place of a shade tree, use a fruit tree for shade, such as a standard size apple. Dwarf fruit trees could line the back of your lot, or along a walk. Cherries are also available as a bush type. Use a couple of bush berries in place of shrubs you use for landscaping. This will give you spring bright beauty. Raspberries can be planted at one end of your garden, or along one side of your garage or barn. Strawberries can be grown in a couple of the round tiered beds and set on your patio or along side your driveway. Even a small lot or pasture can produce something more than just grass. □

Bev Klauer is a free-lance writer and makes her home in Tipton, Iowa.

* See *Farmstead, Spring, 1980*--review of Steve Page's *The Spraysaver's Apple Calendar*.

Fruit	Years to First Bearing Time	Number Plants for Family of 4	Soil Conditions	Planting Time	Height When Full-Grown	Planting Distance
 Strawberry	June of Second Summer	25--40	Not too alkaline. Light, rich loam-plenty humus. Ph 5-6	April		18--30 inches apart in rows 3--4 feet apart depending upon variety and method of cultivation.
 Cherry	Sour: 3--5 years, July. Sweet: 4--7 years	2--3	Well-drained sandy loam. Improve poor soil with peat moss and compost at planting	Spring is best. Fall is okay.	8--12 feet.	Dwarf: 18 feet apart. Standard: 30 feet apart
 Raspberry	July of Second Summer	30--40	Prefers good soil enriched with humus.	Spring		4--6 feet apart
 Plum	Late August of Third or Fourth summer	3--5	Damson: Heavy loam. Japanese: Light sandy soil. American: Tolerates wide range, but light clay best.	In Moderate Zones Plant in Fall. Winters below -0 Spring is best.	Standard: 18 feet Dwarf: 8 feet.	Standard: 16--20 feet apart Dwarf: 12 feet apart
 Apricot	September. Bears about Fourth Summer	2--4	Deep, fertile, well-drained fine texture.	Early spring before buds swell. (Plant 2-year old whips.)	Standard: 18 feet Dwarf: 8 feet.	Standard: 25 feet apart in all directions.
 Peach	September. 2--4 years.	2--4	Tolerates most soils. Sandy or light clay best.	Spring only.	Standard: 18 feet. Dwarf: 8 feet.	Standard 16--20 feet apart. Dwarf: 12 feet apart.
 Grape	Late September of Third Year.	8	Sandy or light clay best. Full sun. Well-drained, fairly deep, both heavy & light soils. Slightly acid.	Spring (March to May) or Fall (late October.)	An arbor 7 feet wide by 6½ feet high by 24 feet long supports 8 vines--4 on each side.	
 Pear	Late Fall 4-7 years.	2--3	Well-drained loam with ample moisture. Heavy mulch boosts production.	Spring. (usually one-year-old whip.)	Standard: 18 ft. Dwarf: 8 ft.	Standard: 16-20 feet apart Dwarf: 12 feet apart.
 Fall Apple	Red Delicious: 5--8 Yellow: 3--5 McIntosh: 4--6 Winesap: 4--5 Crab: 1--2 Baldwin: 5--10 Northern Spy: 5--10	3--6 (semi-dwarf or standard)	Almost any soil condition. Best: clay loam.	Fall is best. (Before ground freezes.) (one-year old plants good.)	Standard: 25--35 feet Semi-Dwarf: 15--20 feet Dwarf: 7--10 feet	Standard: 40 feet apart Dwarf: 12 feet



On Planting A

Permanent Garden

by Barbara Overton Christie

When we bought our old farmhouse over thirty years ago, ninety acres of woods, rocks and open pastures came with the deed--but there wasn't a square foot of previously cultivated vegetable or flower garden. We concluded all former inhabitants of the place had been meat-eaters and hay fever sufferers. The morning after we moved in, my husband went out and dug up several feet of virgin sod in the middle of hip-high grass and inserted a dozen tomato plants. Amazingly, these produced by September--virtually unassisted by us. Our first crop! All that summer, my husband was building turkey coops and I was occupied in the house with a new baby. But next year, we vowed, we'd start a real garden.

When our second spring rolled around, my husband was going full speed ahead with our turkey business, and I had a toddler to watch. We did manage to plow up a regular patch for lettuce and beans and create more space for tomatoes. I threw some petunias and marigolds in around the back door. Come spring, we agreed, we'd put in asparagus and rhubarb and order some perennial flower plants.

The third spring arrived, but it was unusually wet and cold. Somehow we didn't get around to preparing the ground for vegetable roots. I was thinking of the new baby coming and forgot to shop for those rosebushes and peonies we'd planned on, in time. But the following year, we promised each other, we'd put in apple trees and berry bushes.

When the fourth year came, though, we decided it was extravagant to spend money on fruit trees. Our one Clapp's Favorite pear tree on the side lawn had borne a bumper crop the preceding August, and we had four peach trees finally budding by the stone wall in front of the house. Of course, we couldn't anticipate that a hurricane would knock down the frail peach trees that summer, and we never noticed how vigorous young maples were closing in on all sides of the pear, eventually to kill it. Wild raspberries produced thickly in a vacant lot just down the road--it never occurred to us that the lot would be sold in a few years and the berries lost forever under a house foundation.

Barbara Overton Christie gardens perennially in Westbrook, Connecticut.

"...a long-range garden design is one of the surest ways to outwit our own mortality...It gives a continuity to existence."

And so the years crept busily on. Suffice it to say--what with procrastination, preoccupation with other matters, and just plain laziness--it was ten years before we got around to buying and setting out asparagus roots. And if a friend hadn't moved and given us some rhubarb plants she was thinning out, it might have taken even longer than the 12 years before we planted rhubarb. When I think now of all the springs gone by, and how we missed out on just these two so easily grown delicacies, my taste buds water in reproach. As for permanent flower plantings. Well, we have at last a lilac bush by the front door where I can bury my nose in blossoms each May without bending over, and we have a rail fence along the driveway where floribunda roses finally riot like the pictures I yearned over in seed catalogs all those years. But how many unfragrant springs I let go while I worried about such items as peeling paint on a bedroom wall!

I know from hard experience that planting a root, a bulb, a shrub or a tree, calls for planning, foresight and superhuman patience. You can easily set out a flat of already blooming petunias in May. You foolishly think: Why use money and space for potted foxgloves or poppies that may not show for a whole year? Why plant a cherry tree that won't fruit till four or five years later? Life is too short, too hectic. We might have to move unexpectedly. Who wants to gamble time and limited funds on something that can't bring immediately visible results?

I think the answers are right there in the questions. Human life is short and unpredictable, but a long-range garden design is one of the surest ways to outwit our own mortality. Planning for your garden's future, and planting perennials, lends an incomparable sense of accomplishment and security. It gives a continuity to existence. It provides something to look back to with joy, and to anticipate with faith.

Each spring I marvel at the way the professional garden centers are making it ever easier for us to turn our grounds, almost overnight, into showplaces of productive beauty and value. It wasn't too many years ago when such hard-to-transplant items as squash and zinnias were first offered in flats. This year, started string beans, beets and morning glories were in our local market. But annual gardening is only half the game!

Perhaps the greatest incentive to planning a permanent garden is the realization that it can be indulged in at any season year round. After the fever pitch of spring activity dies down, the real gardener's work and fun has just begun. Perennial seeds can be started in summer and fall in a cold frame, anytime in the house. Nearly all bulbs, and many shrubs and trees, do best set out in fall after the annual garden parade is over. And what better winter pastime is there than a cozy evening spent with pencil and paper laying out a design of your grounds with seed catalogs and garden manual at hand?

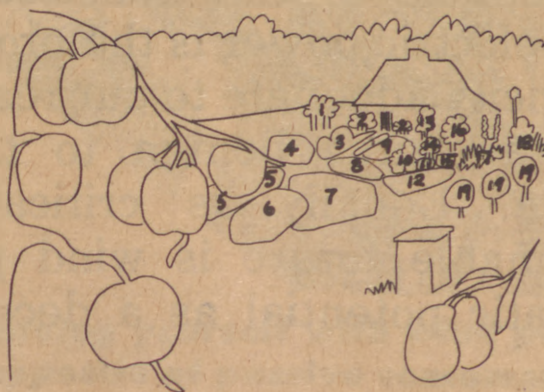
Present day Americans have become dependent on instant gratification in every area of living. Too many of us are consumers, not enough are producers of things that nourish spirit as well as body. We are besought on all sides to "Buy! Buy! Buy!" How much more sense it would make to change the tune to "Grow! Grow! Grow!" We spend boundless time and sums of money on our wardrobes, our houses, our cars and even our green lawns--which grow, but could so much more wisely be put into food or flower plots.

As a nation, we have a 200-year-old memory as well as an unlimited future if we continue to use foresight. It behooves us now to pay heed to the way our forefathers gardened. When life expectancy was 35 or 40, grown men planted apple seeds as they pioneered westward; you and I can eat the fruit from their trees today. In covered wagons, women carried from their old homes, tenderly nurtured lilac shoots and rose slips that still blossom every spring by the cellar holes of long-gone cabins.

Maybe you will only live in your present home a few years. Planting for the future still makes sense. As the old saying goes, "Brighten the corner where you are!" If you live to be a hundred, and wouldn't be remembered for anything else, by starting a blackberry patch or dropping a few daffodil bulbs into fertile earth, you will have done something marvelous for those who will come after you. North, south, east or west--whatever season--wherever you live--start digging now! □

Permanent Garden Key

1. Jerusalem artichokes
2. Rugosa hip roses
3. Herbs--chives, Egyptian onions, sage, thymes, oregano, southernwood
4. Comfrey
5. Berries--raspberries, blueberries
6. Strawberries
7. Bee garden--clovers, balms, flowers
8. Flowering ground covers
9. Asparagus
10. Bay and rosemary trees, potted
11. Flowering herbs and mints
12. Rockery
13. Lilac
14. Peonies, daisies
15. Rhubarb
16. Crabapple
17. Bulbs and vines
18. Ornamental grasses
19. Dwarf fruit trees



WIND-ELECTRIC SYSTEMS



by **Daniel Shea**

“Implicit in the renaissance of wind-electric power is the promise of electricity adequate to our real needs from a source benign to the biosphere. Equally as critical to a sustainable future is wind power’s dramatic potential as a decentralist force.

As a wind-electric homesteader, you can provide your shelter with the electricity it requires without having to become a client to any corporation.

If you wish to extract electric power from the wind, and you want to do it efficiently, you will have to accustom yourself to climbing towers and to working with heavy equipment at altitudes ranging from 10 feet above your rooftop to 80 or 100 feet above the ground depending upon choice of equipment, amount of electricity required and the physical characteristics of your shelter site. If your shelter sits on a bluff overlooking the ocean, and there are no tall obstacles in the vicinity, tower height will be less crucial to your design than to the plans of a homesteader on a south slope in Vermont who must position a wind generator high enough to get clear of surrounding forest.

The easy way to get into wind-electric power is to buy a complete component system from a business firm and pay them to install it. By providing your own labor, you can cut the cost of a full installation crew and hire one of the firm’s installation supervisors to work along with you. The help of an experienced supervisor will prevent costly mistakes, but at a price. Some companies charge as much as \$150 per day for the services of an installations supervisor, plus traveling expenses. Even without hiring the supervisor, the cost of a new wind-electric system can prove prohibitive. Large systems such as a 4-kilowatt aerogenerator mounted on a 70-foot tower and connected to a set of new home-lighting cells for energy storage, could cost a homesteader between \$8,000 and \$10,000 for the equipment alone!

Smaller systems will cost proportionately less, but wind power is still a relatively expensive form of solar energy. You may find that the economic constraints involved in bringing wind power into your shelter make it impossible for you to afford. You may be able to reverse that situation by scaling down your requirements for electrical power to a more modest level, but there are other factors that will enter into your decision.

The wind is an energy source not likely to run dry.

Last summer I was having a conversation with a homesteader who told me about plans to bring electricity into the communal farm of which she was a member. She was thinking about doing it with wind power and had heard about a used system for sale. I told her that we would have to check out the system and that if it were in good repair and a sale were made, it would take several days to disassemble it, truck it to her homestead, and then reassemble it.

I heard no more for several weeks. Eventually I heard that an agreement had been signed with the area utility company for the farmstead's electrical power. Hooking into the grid in this situation cost \$8,000. Not counted in that figure are any of the monthly bills which are very likely to increase over the long term as the inflation fired by the utility industry's exceptionally high demands for capital get fed back to its customers.

I've already mentioned that for a roughly equivalent sum of money, these people could have purchased a new 4-kilowatt component system. Assuming an average monthly wind speed of 10 miles per hour at the generator's site, this unit would yield them approximately 300-350 kilowatt hours per month. Since the "average" American family of four consumes about 550 kilowatt hours of electricity per month, we can conclude that a homestead practicing energy frugality could do quite well on a monthly 300 kilowatt hours.

Slipping Toward the Wind

Once a unit such as this is installed, it begins to pay for itself. When the dollar cost of the wind-electric system has been returned to the owner in an equivalent amount of net energy consumed, calculated at going utility prices and including the initial cost of hook-up to a utility line, the unit has paid for itself. Payback periods as short as five years have been reported for some new wind-electric systems.

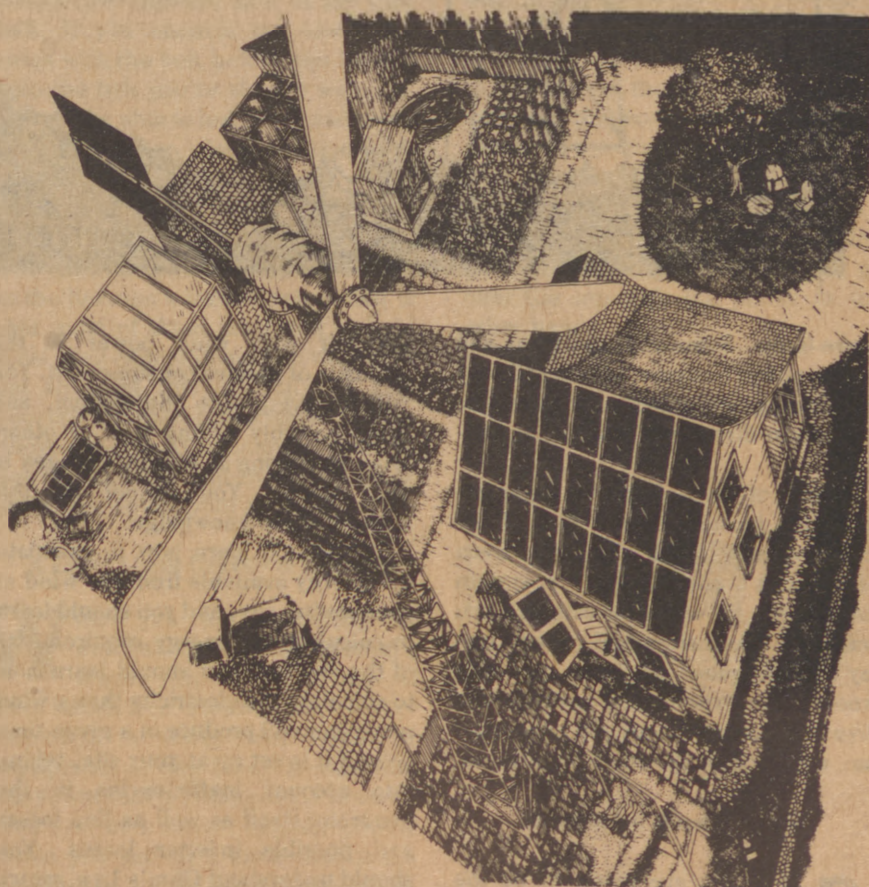
Because the utility company is a monopoly, it can afford to make the price of electricity affordable to a homesteader no matter how outrageous the cost involved. A small wind-electric power company, struggling to stay alive in a non-subsidized, marginal corner of the economy, cannot afford the same luxuriant terms. As the price of utility power rises (and if the economies of mass production are applied to wind systems), the actual cost of wind-power vis-a-vis utility power will even out, and the economic incentive will slip toward the wind. Until that time, the incentives operating in the economy point toward continued dependence on centralized power production. If you live far enough away from any main roads to make the cost of hook-up to a utility truly outrageous, then wind-power may already be a cheaper option for you.

If you cannot afford the price of a new wind system and the cost of paying someone to install the unit for you, and if you cannot afford utility

power or simply refuse to be beholden to someone else for your electricity--then you will be going at it alone.

If you are in this position, the first step is to learn as much as you can about the generation of electricity from the wind. If there is anyone in your area who has experience working with wind-electric generators, seek out that person, tell him about your plans and see if he would be interested in helping you get it together. People with direct, hands-on experience in either the take-down or installation of wind generators are still few and far enough between to be considered a precious asset. They're usually more than eager to communicate with people of like mind. If you have no experience yourself, contact with people who do can save you a great deal of time and help you avoid costly mistakes. Also, these people could be an invaluable help in locating used equipment.

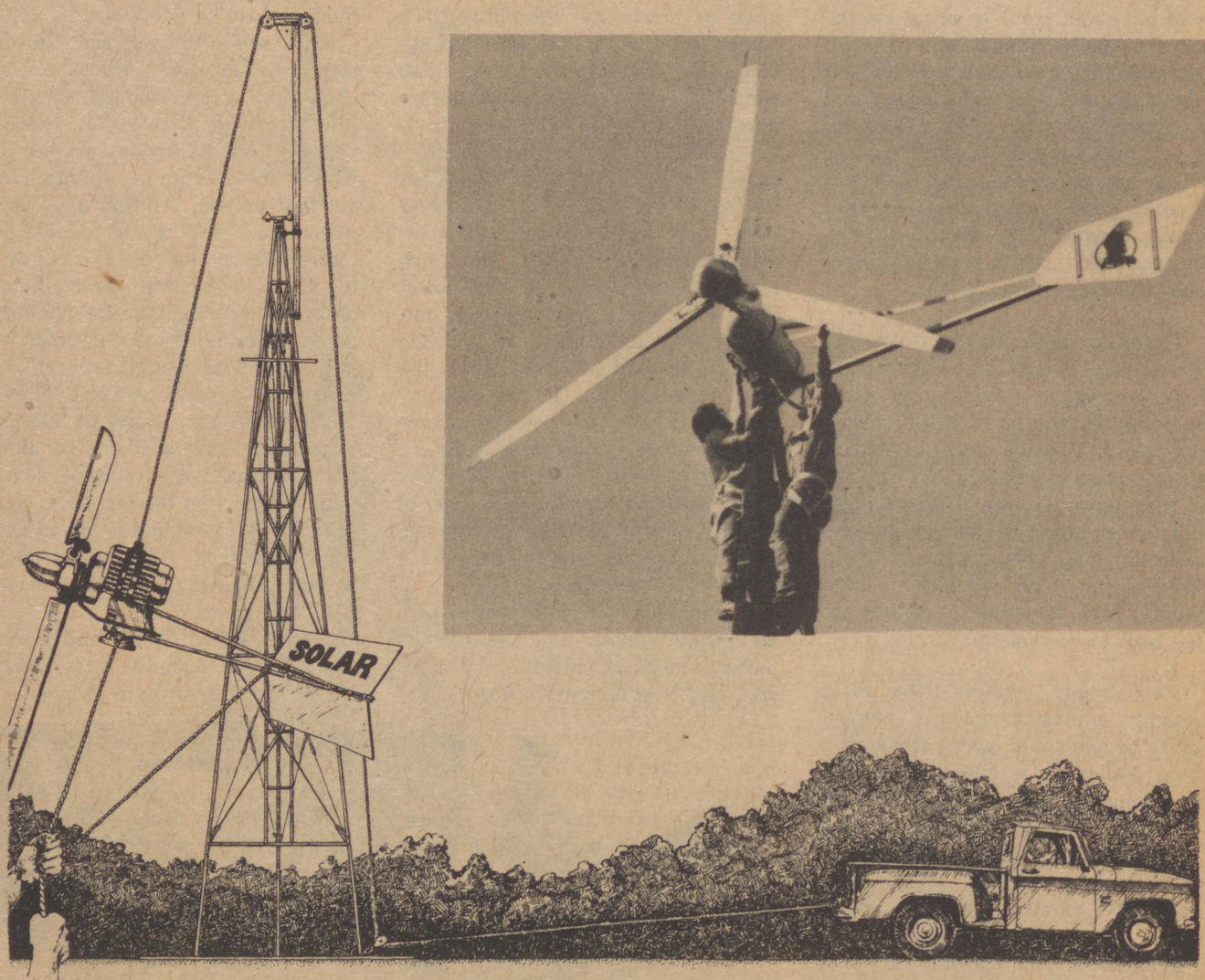
In the United States and Canada there are 36 business firms selling wind-electric systems or related hard-



"Involving yourself with wind power is the opposite of passive consumerism."

Illustrations by Bonnie Russell from *Other Homes and Garbage, Designs for Self-Sufficient Living*. By Jim Leckie, et. al., Sierra Club Books, 1975.

"A basic point of procedure in wind power work is that people do not do any work on a tower until they are strapped in securely with a safety belt."



ware items. Some of these firms sell entire power systems; others sell only monitoring equipment or inverters to transform direct into alternating current.

If any of these firms or organizations are located in your part of the country, get in touch with them. Even if you can't afford to buy a system from them, these people can give you valuable information and answer many of your questions. They may also know about experienced persons who live in the area who are not connected to any company or organization.

Know What It's All About

Since you are going to be the owner and operator of your wind power system, you must know what it's all about. Involving

yourself with wind power is the opposite of passive consumerism. You will be living with the system, and quite possibly adding to it or otherwise modifying it to suit changes in your needs. You cannot do this without some knowledge.

You should learn how to calculate the energy available from the wind at your shelter site, and you should learn to calculate the energy requirements of the shelter. You should learn how to calculate the electricity that a wind generator will produce in a given time span if it is set up at your site, taking into account inefficiencies in the generator itself as well as line losses and possible inverter losses. You should understand Ohm's Law, which relates watts, amperes and volts, and you should familiarize yourself with the Betz coefficient and with notions

such as tip-speed ratio and the distinction between horizontal and vertical axis wind generators.

The best tool I know about for this purpose is the section on wind power in the Sierra Club book--**Other Homes and Garbage**. By studying this section, with pencil and paper and perhaps a small electronic calculator handy, you can teach yourself the fundamental mathematics involved in the intelligent planning of a homestead wind system. You do not need to be a mathematical wizard to do this. You do need the ability to add, subtract, multiply and divide. And it will take patience and perseverance until you get the hang of it. Once you do, however, you will have acquired a

Photo of Skyhawk wind-electric generator by S.J. D'Angelo.

basic understanding of how the high-quality energy we call electricity functions, and you'll be thinking about wind power in terms of concrete and quantifiable problems.

In order to take full advantage of a relatively undisturbed air stream, wind generators are mounted atop tall towers. You will need to know how to go about putting a tower up and, once you've done that, how to get the generator up there where it can do you some good. Positioning a full-size wind generator on its saddle has been compared by more than one person who has done it to lowering an engine into a car while it (and you) are perhaps 80 feet up in the air. You're going to want to know about the rigging involved and about the use of safety belts, hard hats and hand signals. You will need to know about the use of the gin pole and the use of a vehicle to raise or lower the generator. The drawings and photographs in *The Home Built, Wind-Generated Electricity Handbook* by Michael Hackleman can help you out here. Understanding the steps in a generator installation is critical to your safety and to the safety of your equipment. Again, there is no real substitute for experience, but others have learned it on their own without the help of any books at all. So, you're still at an advantage.

What You'll Need

You will need the **generator** itself, plus a **tail vane** to keep it positioned into the wind. You will need a set of **propellor blades** and an **automatic governor** to feather the blades and let them spill excess wind when the windspeed gets higher than the rated-output speed of the generator. You will need a **tower**, either free-standing or guyed, high enough to place your generator at least 30 feet above any surrounding obstacles. Obstacles create turbulent air. When wind generators encounter turbulence it increases wear and tear and reduces power-output efficiency.

You will also need a **brake assembly** appropriate to your generator so you can furl the unit in a storm. In furlled position, the tail vane is parallel to the propellor blades and the oncoming storm winds strike only the edges of the blades—not the airfoil sections. Consequently, the blades spin more or less idly, despite the high winds,

preventing over-speeding and possible generator burn out.

You will also need a **control box**. Among other things, the control box allows the generator to begin charging the battery storage bank when it reaches the correct rotational speed, and it also protects the generator from putting out too much current. The control box senses the state of the storage bank, allowing a high rate of charge when the storage is low and cutting the generator back to a "trickle-charge" when the batteries are full and no heavy load is draining them. It may also send power directly from the generator to the load when windspeed is high, conserving stored power for the moment when the wind drops. If you can't find a control box for your generator, you could have an electrician build one for you.

You will also need **safety belts** like those used by telephone company linemen. This is a two-piece, heavy-duty leather belt. One piece encircles your buttocks so that you can sit into it when you're up on the tower. The second piece fastens to one side of the belt with a hook that snaps closed over a ring. You then encircle a tower leg with this piece of the belt and snap it onto the opposite side of the first belt. If you encircle the tower leg twice with the belt before you hook it onto the belt you're already wearing, you will be able to lean back and away from the tower. Both positions are necessary for wind power work.

There are other types of safety belts than the one I have just described, but I haven't used them. One advantage to the lineman's leather safety belt is that most of them are fitted to hold tools. You cannot imagine how practical an asset this is until you find yourself strapped into a tower 60 feet above the ground wondering where to put the hammer and the screwdriver while you adjust your wrench.

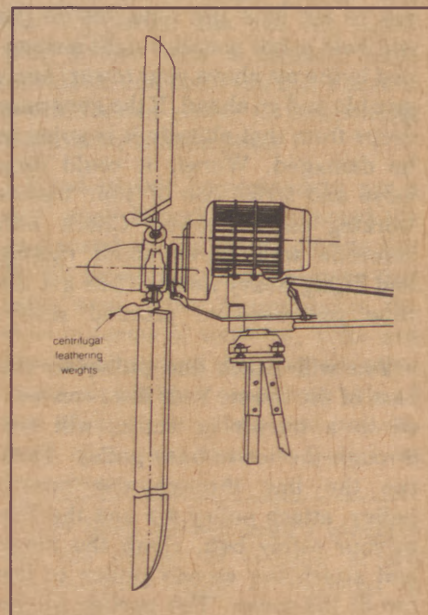
A Little About Gravity & Altitude

When you are ascending or descending a wind system's tower, you will want both of your hands free. Please don't ever try to climb a tower with tools or equipment in one hand. It may look easy, but that is a dangerous illusion. You are, in a sense, defying gravity when you are on a tower and it's a sound idea to use both hands whenever you're defying anything as universal and relentless as this irrevocable law.

That goes for working on a tower too. **Don't try to hold on with one hand while you work with the other.** First, it's awkward and you can't relax and work efficiently. Secondly, it's dangerous. You could become so absorbed in what you're doing that you inadvertently let go of the tower to use both hands on the task. In that instant you are, as the song puts it, already gone, destined for a broken back or a funeral.

Before you start climbing to 60 or 80 or 100 feet, it is a good idea to get used to the sensations that flood you when you first start climbing either the naked angle-iron edge of a thin tower or the ladder that usually scales a three or four-footed free-standing tower. Put on your safety belt so that it feels snug. Climb up ten feet and strap yourself in. Then lean back into the belt and take some time to get the feeling that you're secure because of the belt, even though you're not holding on. Then try it at higher elevations, gradually breaking yourself in.

A basic point of procedure in wind power work is that people do not do any work on a tower until they are strapped in securely with a safety belt. The one exception to this rule is that point in the installation procedure when the rigging line is secured to the top of the gin pole. At that moment, the worker is standing on a section of the tower close to the top in order to reach above the tower and place a pulley into the gin pole with a hook. That means holding onto the gin pole with one hand while you go over the top with the pulley in the other hand.



Dunlite centrifugal-weight blade feathering system.

It's also a good idea to wear a **hard hat** whenever you work on or under a tower. It's not unusual for people working on a tower to drop things, like tools. If you're standing below the tower and a wrench slams into your skull after an 80 foot drop, you're in for a direct revelation of what physics means by accelerating acceleration. It's good practice not to work in the area of wind-power installation without a hard hat.

Also, unless your tower has a platform where you can stand while working, plan to wear boots when you go up. Spending any significant amount of time with your feet balanced on a thin strip of metal is going to increase the pressure on a thin strip of your foot. **Heavy-soled boots** will protect you from this discomfort. Anticipate an ache in your legs after several hours perched on a tower. Nothing can protect you from that, but you'll get used to it. Soon you'll learn that in reply to stress towers "talk" and you'll discover that they torque in moderate to high winds. That is to say, they twist a little. One wind-power enthusiast here in Vermont has been known to go up a 110-foot tower when it's windy for the sheer thrill of riding that tower when it's torquing in reply to the wind.

You will need **two heavy-duty pulleys** and enough **rope** to raise equipment and tools to the altitude required, which means four or five feet above the top of the tower. If your generator weighs 300 pounds and you're not sure the rope you've got will hold a 300 pound weight suspended in the air above your tower, don't gamble and go ahead. If the generator drops from that altitude it is going to be damaged. Worse, it could drop loose and strike one of your friends working on the tower. Check with someone who knows about rigging and lifting heavy items. Then get the rope you need to proceed safely.

You will attach one pulley to the base of the tower. Your line, connected to a tractor or truck, will run through the tower-base pulley. Then run the line through the second pulley, attach pulley # 2 and the line to your safety belt, climb the tower and attach the second pulley to the top of the tower. The portion of the line running from the tower-top pulley

to the ground will be used to raise and lower tools and components. Two members of your crew should hold onto this section of line whenever you are raising and lowering items to people at the top of the tower. Have one of these persons wrap the line two or three times around his buttocks. He can then loop the line through the coil around his body, but he shouldn't tie it in case he wants to get out of the line quickly. Both ground persons should hold onto the line when it's in operation. They stabilize the line and steer it by adjusting their position on the ground. They will, of course, be moving in closer and closer to the tower as the line goes higher and higher, just as the vehicle pulling the load is at the same time pulling away from the tower.

You'll need a **gin pole**, which is a piece of two-inch pipe about four or five feet long. The gin pole is mounted to the side of the tower so that it sticks up above the top of the tower. One of your pulleys is mounted atop the gin pole so that when you raise the generator, it's above the tower. Then, carefully coordinating hand signals with your ground crew and vehicle driver, have them inch the vehicle in toward the tower so that the generator gently comes down onto its mounting. The remaining components can then be raised in the same way.

You can attach the base of the gin pole to the tower with a short chain which has iron hooks on each end. Wrap the chain around the tower at a side-brace junction and the gin pole will sit right in the hooks. Farther up the tower you'll need a clamp to hold the top of the gin pole firmly in place. This is critical. The clamp will have to bolt to the tower and to the gin pole and hold it securely in place. A gin pole wrenching itself out of place can be a serious hazard. You'll probably have to improvise your own gin-pole clamp. Be sure it's strong enough to take the strain and be sure it's tightly clamped to both the gin pole and the tower before you begin operations.

Finally, you'll need a **stub tower**, and you'll need **batteries** for energy storage. The stub tower is the top section of the tower in any wind-electric installation. It is fitted with a shaft in which the generator rotates and with collector rings to transfer power from the aerogenerator to the lines. The collector ring assembly allows the genera-

tor to track the wind in a full 360 degree circle without tangling the transmission lines. If you buy a used system, be sure to take the top section of the tower it's mounted on even if you're not buying the tower. Without it, you cannot proceed.



The Wind-Electric Scrounger

Scrounging, the post-industrial equivalent to hunting and gathering behavior, is essential to cost-cutting success when you set out to assemble your own power system. One homesteader I know here in Vermont scrounged his entire battery storage bank from the Bell Telephone Company. As I understand it, Bell purchases industrial-capacity storage cells with a lifetime of ten years and then sells them for scrap after only

two years use. Each cell is rated at two volts so you would need six to make one 12-volt battery storage bank, or 55 to make a storage bank for a 110-volt system. Another homesteader solved his storage problem by linking golf cart batteries (8 volts each) in units of four ($4 \times 8 \text{ volts} = 32 \text{ volts}$, the voltage produced by his generator). Using 20 8-volt cells, he was able to make 5 composite 32-volt batteries, ample to store the power he needs to get through doldrum periods.

Ordinary 12-volt automobile batteries are the most common, but they are the least well-adapted to wind-electric use. Designed for a quick burst of intense power, they are poorly adapted to frequent deep-cycling (becoming drained or almost drained of power) and wear out quickly under these conditions. Nickel-cadmium aircraft batteries are preferable. They are lightweight, not damaged by moderate overcharging and they are not adversely affected by cold weather like lead-acid batteries. But they are expensive, and this makes them beyond reach for many wind-electric scroungers.

The most practical choice is probably a set of "farm lighting cells" or "home lighting cells" designed for repeated discharging. Looking around and placing ads in your local paper can help you turn up what you're looking for. Check with electricians and electrical supply businesses. Don't overlook a chat with the nearest Bell Telephone maintenance supervisor. If you're near an airport, check into Ni-Cad's that are used but still serviceable. For all you know, the Air National Guard may be just about to sell off a pile of storage cells for scrap.

Here's something else to think about. Your generator will produce a form of electricity called direct current, or DC. DC is a linear voltage, which means that the electrons traveling the circuit move in only one direction. The electricity sold to consumers by utility companies is called alternating current, or AC. AC is a pulsating form of electricity. The electrons in the circuit pass any given point in the circuit moving forward and backward 60 times per second. This is called 60-cycle AC, or 60 Hertz. If an appliance is stamped 60 Hz on its identification plate, this means it will operate only when connected to an outlet supplying it with 60-cycle AC current.

If you are going to connect your wind system to a house already electrified by a power company so that the two sources of power interface with each other, you are going to have to have a device called an inverter. The power company only sells AC in the 110-volt range because by stepping up the voltages down the line from the power station, they can avoid the more severe line losses they would encounter sending you DC. It follows that most appliances are set up to receive AC, not DC.

However, older appliances, like wringer washers, may be designed in such a way that you can replace an AC motor with a DC motor of equivalent horsepower. Some appliances may be outfitted with a motor that will operate on either current. These appliances will be stamped on the identification plate with the symbol AC/DC. For example, Black & Decker, Milwaukee and Rockwell all manufacture AC/DC power tools.

The recreational vehicle industry manufactures some appliances which run on 12-volt DC and at least one wind power company (Independent Energy Systems, Inc., 6043 Sterretania Road, Fairview, PA 16415) carries a line of DC appliances adaptable to wind systems.

Stereo requires the smooth-flowing sine wave of 60Hz AC to reproduce sound without distortion. If you want to set up a straight DC system and still enjoy sound, you could consider replacing a home stereo set with a car stereo set. This works out quite well. A homesteader in Plainfield, Vermont runs house lights and car stereo with the power supplied by his refurbished Jacobs wind generator, and finds the music to his satisfaction.

The Story on Inverters

There are two types of inverters currently available. The newer, solid-state inverters, still considered experimental by many, are rated as high as 90 percent efficient. That means that, theoretically at least, they will consume only 10 percent of the power generated from the wind in their own internal operation, leaving 90 percent of the power to do useful work. That is the theory. People who have used solid-state inverters, however, find them more like 75 -- 80 percent efficient. Moreover, since the solid-state inverters have built-in controls to protect the instrument from a sudden overload, it sometimes hap-

pens that tiny wires burn out to protect the system. Not a bad idea until you realize that burning wire particles can then drop onto expensive circuit boards and put you right out of action. I know one wind-electric homesteader who went through three of these fail-safe devices before giving up on them altogether. Solid-state inverters can weigh as much as 300 pounds and, get this, they will cost you, new--anywhere from \$1,500 to \$3,000--a very considerable cost indeed.

Rotary inverters are small DC motors that turn a micro-generator producing AC. Rotary inverters have been around for some time and you can scrounge for them. The person who went through the three solid-state inverters finally found what he wanted in a small rotary inverter formerly used in an ambulance. Depending upon capacity, rotary inverters will cost you--new--anywhere from \$250 to \$1,700. These inverters tend to be more reliable than their newer solid-state cousins, but they will consume anywhere from 20 to 40 percent of the electricity your generator supplies from the wind.

If you can get away with it, going into wind power with straight DC systems lets you forget the problem of energy inversion from DC to AC. Inverters cost you a large chunk of money and they cut into the efficiency of your wind system by a factor of 20 to 40 percent. With a direct DC system, power goes directly from the generator either to storage, or if storage is full, directly to the load requirement. You do not sacrifice power to the inversion process and that may mean that you can power your shelter with a smaller, more affordable unit since you don't have to produce extra power to compensate for inverter consumption.

Wind-electric homesteaders are a very small minority. They prowl the land searching for arcane objects like 32-volt light bulbs and inverters that really work. They conceptualize the wind in terms of amperes, volts and kilowatt-hours and they pay attention to the wind with a sensitivity akin to that of airplane pilots and sailors. They know that there is power in every breeze.

Daniel Shea teaches design concepts and the history of religion at the Community College of Vermont in Newport.



**“The prettiest
Christmas tree we ever had was a six-foot
rosemary...It was a tree to please all the senses
with airy snowflakes...fragrance from spice balls
and scented calico hearts speaking of love for all.”**

Make Your Own Holiday Gifts

by Madeleine Seigler

Hand crafted gifts are the most popular of all presents, as any gift shop owner can testify. Consider your herb garden and spice cupboard if you are looking for a new source of material for your Holiday gifts this year. If you do not yet have an herb garden or a friend who has a surplus, many of these gifts could easily be made with material available in herb shops or natural food stores. Of course, the recipient of your labors will be really impressed and pleased if you grew it all yourself.

Abundant information for making herbal gifts appears frequently in popular magazines and in nearly all the herbals available in bookshops or the library. One very good reference is *A Merry Christmas Herbal* by Adelma Grenier Simmons. This paperback gives details of Christmas legends, as well as many recipes for Christmas foods and gifts. Reading it could well change your whole approach to December 25th.

By the time I got my copy of this delightful book, I was pretty set in my ways, and so the projects I describe for you will not be quite the same as those she provides. I will simply tell you how to make a few things which have proven so popular that I repeat them year after year.

Fragrant Tree Ornaments

The prettiest Christmas tree we ever had was a six foot rosemary tree trimmed with handmade ornaments. That rosemary was of such perfection, I have yet to grow its equal. First we placed a single string of tiny white lights on its fragrant branches. For trimmings we used white snowflakes made from pressed Queen Anne's lace, spice balls hung with red velvet ribbon, and tiny red calico hearts

filled with sachet. It was a tree to please all the senses with air currents twirling the airy snowflakes, heat releasing fragrance from spice balls, and scented hearts speaking of love for all. It remains in my memory as the only Christmas tree I hated to dismantle.

To make snowflakes, go out in the fields and gather newly opened flowers of Queen Anne's lace. Drying flowers can be a painstaking, time consuming task, but don't panic, these are easy. Simply open yesterday's newspaper to the centerfold, lay the flower heads face down (remove stem). Fold the other half of the paper over them, and slide the whole thing under a heavy rug. You can even put them under a rug you walk on! In a month, the flower heads will have dried to a very sturdy hardness and will truly resemble snowflakes. Use purchased ornament hangers to suspend them from the tree.

A dozen of these, carefully packaged along with some hangers, would surely be a nice gift for a friend in the city. Not exactly from your herb garden, but from the field next to it.

Spice balls are fun to make and are an ideal project for children who want gifts to give of their own doing. To make about 20 small balls you will need one cup of unsweetened applesauce, 1½ cups ground spices, and two teaspoons of orris root (optional). I use homemade sauce from cull apples, and one half cup each cinnamon, nutmeg and cloves. The orris root is a fixative to help hold the fragrance, but they are strongly scented without it. Commercially canned sauce with sugar in it can be used if you find that to be more convenient.

Gradually stir the spices and orris root into the cold applesauce. The resulting dough should be thick enough to roll into a ball without sticking to your fingers. If too much spice has been added so that it is crumbly, add a few drops of water.

Using your hands form small balls from the mixture. Place on waxed paper on a cookie sheet to air dry. These are NOT baked. In a few days they will be dry and hard. A few of these individually wrapped in netting make attractive trim for Holiday gifts in place of a bow. Tied with cord to resemble a bunch of grapes, they make nice air fresheners to hang in any room.

Make them larger, about the size of a golf ball, pierce through the middle with a skewer and let them half dry. Then carefully insert a length of narrow ribbon, folded in the middle, through the hole, tie a small bow with the two ends on the bottom of the ball--and you have a tree ornament. Use a coat hanger with the ends bent up to hold these while they finish drying. An egg carton makes a fine container for these, either for storing your own or for gift giving. These spice balls will hold their fragrance for many years if packed away in a covered container.

Roll this same mixture between sheets of waxed paper to about a ¼ inch thick and cut with fancy cookie cutters to make more tree ornaments. Hearts, stars, trees and gingerbread

This is part five of a series by Madeleine Seigler who owns and operates Monk's Hill Herbs in Readfield, Maine. Drawings by Caren Caljouw.

The art of making fragrant potpourri has changed hardly at all since the days of King Tut.

people are some that I make each year. Trim while moist with bits of cloves, allspice, star anise or herb seeds such as coriander or fennel. Heavy spices that do not adhere to the surface when dry can be glued on with household glue. Make a hole for a hanger before you set them aside to dry.

Calico hearts scented with sachet are the finishing touch for our Christmas tree. Using a heart-shaped cookie cutter for a pattern, I trace the design on two thicknesses of fabric remnants, wrong side together. Use pinking shears for this. Insert a loop of light cord in the cleft of the heart for a hanger, and stitch three sides, leaving a two-inch opening on a flat side for filling. Fill with any of the fragrant mixtures which follow, then machine stitch closed. I stuff some of these quite fat, and some slim, as I like to enclose the slims with my Christmas cards. You may prefer to use white organdy or any other suitable fabric if calico does not suit your decor.

Sachet and Potpourri

The chief difference between these two fragrant products seems to be that sachet is finely pulverized, while potpourri contains whole leaves and flower petals or buds. To define potpourri, we could say that it is a mixture of fragrant flowers, leaves, spices, and fixatives which has a long-lasting aroma, used either to freshen the air in a room or to add subtle fragrance.

Potpourri is a French word pronounced po-poor-ree, the accent on the first syllable. A very literal translation is "rotting jar" and the first potpourris were just that. The Egyptians of 2700 B.C. called perfume the "fragrance of the gods," and buried jars of fragrant rose petals with their dead kings. Cakes of compressed rose petals, properly decayed and dried were found to still be fragrant after many, many years in covered containers. Basically, the art of potpourri making has changed very little since the days of King Tut. The whole subject could not be

covered here; I am going to offer a few recipes which you may want to try. Some will use herbs you may have grown in your garden this year, some ingredients you will have to order from an herb shop.

SIMPLE ROSE POTPOURRI

1 cup rose petals or buds (dried)
½ teaspoon dry mint leaves
½ teaspoon each ground cinnamon and cloves
1 teaspoon orris root
3 drops rose oil

Stir the drops of essential oil (which is highly concentrated) into the orris root, then combine this with the other ingredients. Place in a covered container, glass or pottery, and let it age for a month, shaking daily. The fragrance may be raw at first. It mellows as it ages.

The rose buds or petals should be from very fragrant roses, picked at the peak of perfection and quickly dried on a screen or shallow tray. The potpourri should be blended as soon as the roses are ready in order to hold their fragrance. However, older dry petals may be used for color and bulk, or for sentimental reasons, and more oil added to enrich the aroma.

This basic recipe uses all the essentials which I mentioned above: fragrant flowers and leaves, spices, fixative (orris root) and oil. Any other recipes will contain additional flowers and leaves, different spices, more exotic fixatives, and a few drops of many different oils. All these will result in richer mixtures which will hold their fragrance for as long as a hundred years. If you become fascinated by this art, you will have many years of pleasure ahead of you as you search out new ingredients and experiment with different combinations and methods.

The recipe which I have used for many years contains vetiver root, patchouli leaves, rosemary, lavender, sandalwood chips, tonka beans, frankincense, myrrh and rose geranium leaves. It is a rich mixture and quite expensive to make. The next recipe is quite simple.

HERB GARDEN POTPOURRI

Combine half cup each:

pineapple sage
spearmint
lemon balm
thyme
rosemary
sage
summer savory
basil

Add: 12 cardamom pods, crushed

¼ cup dried lemon peel chips
1 tablespoon crushed benzoin
2 tablespoons orris root
3 drops heliotrope oil
6 drops bergamot oil

Mix this well, combining the oils with the orris root, and let it all age in a covered container. Do not hesitate to experiment and substitute. This herb garden blend would be good even if you omitted the heliotrope oil and substituted ginger for the cardamom, and orange peel for the lemon. Some of the herbs could be omitted and others, such as tarragon, sweet woodruff or lemon verbena could be added.

Lavender Sachet

Nothing quite equals the clean fresh scent of lavender. You may be able to pick enough flowers from your own plants to make this recipe, or you may use imported lavender purchased from an herb shop. Lavender flowers are so rich in oil that they seem to hold their fragrance forever.

2 cups lavender flowers
2 cups lemon verbena or sweet woodruff or lemon balm
½ cup oak moss (very nice, if you can find it)
½ cup granular orris root
8 drops oil of lavender

Leave out the oak moss if you don't have it, and use powdered orris root if the granular is not available. I often use gum benzoin for the fixative with lavender, but the orris root works nicely.

So there you have three recipes for fragrant mixtures which can be used in many ways. Any of them would be nice for the Christmas tree hearts. Old candy jars make good containers for your prettiest potpourris, so do odd sugar bowls as long as they have covers.

If you enjoy making patchwork or crewel pillows, you might enclose some sachet in a square of cloth and include it in the pillow stuffing.

Sachet bags are easily stitched from remnants of fabric. I make bags by cutting two pieces of fabric 6 x 12 inches. Even a half yard of material, folded, will yield several bags. With right sides together, stitch three sides, leaving a narrow end open. Turn and press. Turn under about 3½ inches of the open end to form a cuff, and fill the bag with about a cup of sachet.

Hold it all together with an elastic at the point where it will secure the raw end you turned under. Finish it off with a length of narrow satin ribbon tied in a small bow. The bags can be made smaller and the top edge trimmed with narrow lace. The herb garden mixture would be compatible with a small bag of calico with a simple pinked edge, and tied with thick yarn.

Pomander Balls

These fragrant clove-studded fruit evoke sweet memories for most of us. Perhaps your mother or grandmother had one hanging in the hall closet, or maybe you have only seen pictures of great brown balls tied with fancy ribbon. Their spicy fragrance certainly seems to last forever.

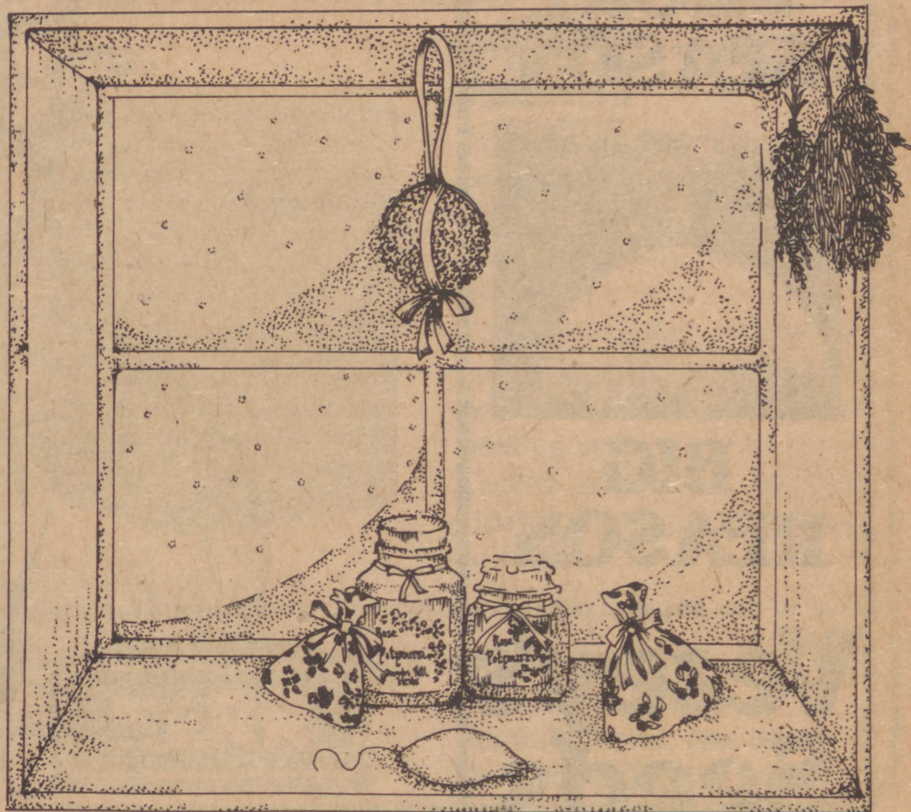
Apples, oranges, lemons or limes may be used. Apples are the most easily obtained for most of us, and the cloves are easily pushed through the skin. They are the messiest however, because a lot of juice seeps out as you work. Lemons and limes are smaller and take fewer cloves, but their skin is very tough. A medium size thick skinned orange is ideal; the cloves penetrate easily, no juice exudes, and the citrus fragrance is more pleasing than that of the apple.

You'll need one-half cup of the best quality cloves for each orange plus about one and a half cups ground spices and a bit of orris root for rolling them in. Allow one hour of time for each one and try to finish the studding at one sitting. Push the cloves through the skin firmly, place them

so they are about a clove head apart. A few heads will break, which is all right. Combine the ground cinnamon, nutmeg and cloves with about one tablespoon orris root in a wide shallow bowl. A wooden salad bowl is ideal. Roll each finished pomander in the spices and leave in the open bowl for about three weeks to cure, turning them each day.

The house will smell marvelous while this drying is going on. They will gradually shrink and harden as they dry. When thoroughly hard and dry, finish them off ready for gifts by tying with fancy ribbon. I use pins to hold the ribbon in place until I achieve the look I want and then a drop of white glue to hold it. Gold covered wire from the florist looks quite elegant or you may prefer to wrap each one in nylon net and tie with yarn.

One-half cup of whole cloves is about two ounces. The broken pieces leftover may be used up by adding to potpourri. The ground spice mixture may be used to make the spice balls already described.



Moth Bags

Three perennial herbs worth space in or near the garden, are common wormwood, southernwood and tansy. Each has a strong pungent odor, not unpleasant, but not sweet potpourri material. I keep one large plant of wormwood near the lamp post at the edge of my garden, and southernwood grows at the back of another section. Tansy was originally planted in the raspberry bed and there it spreads and flourishes.

Each of these plants has many legends woven into its long history. They are all reputed to be insect repellents. Wormwood is said to be especially useful for fleas on pets; tansy is said to keep ants away. Southernwood is disliked by moths. Many other herbs are said to be moth repellents, including lavender costmary, and sweet woodruff. I started using my pungent trio many years ago. It works, and I shall continue, leaving the more fragrant herbs for sweet mixtures.

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I cut and dry great stalks of these three, using the bright yellow buttons of the tansy for dried arrangements, as well as the sprays of very small pale yellow flowers of the wormwood. All the foliage is stripped into a large plastic bag. Then I cut and stitch cloth bags similar to the sachet bags mentioned above, and fill them with my clean smelling mixture, adding a few cloves to each bag. These are fastened with elastic, tied with a ribbon bow, and if I am making them to fit on a coat hanger, I make a knot an inch from the center fold of the ribbon, so the bag may be slipped onto the coat hanger. These make very welcome gifts as so many people dislike the odor of moth balls.

Catnip Critters

If you grew catnip, you may have harvested and dried a shopping bag full of leafy stems. Here is the material for welcome gifts for any cat lover. First, strip all the leaves and store your hoard in a safe place away from the sharp nose of your own cat. I usually strip my best quality leaves for soothing catnip tea, and use damaged leaves and even tender bits of stem to stuff my catnip critters.

Trace a shape on cardboard that may resemble a mouse or a whale or even a hotdog. Whatever shape you can easily manage to sew and stuff, is all that matters. The cat will not mind at all if her mouse is not anatomically correct, though she seems to enjoy a length of yarn stitched on to represent a tail. Use pinking shears to cut the fabric, which should be durable. Stitch on the right side, leaving an opening for the filling. Stuff with catnip, insert a length of heavy yarn, and double stitch closed. A French knot can be quickly made on the head to represent an eye. I have seen adorable catnip mice made of brown velour with suede ears and embroidered features, including whiskers. Actually, a cat is equally pleased with a small bag of plain catnip to be doled out a bit at a time when he suffers the winter doldrums.

Culinary Herb Gifts

The simplest gift from the herb garden, and often the most appreciated, is a small bunch of herbs tied with yarn and labelled. The recipient may hang in the kitchen to use as needed. Tuck a half a dozen

different bunches into a pretty flower pot and you have a gift for the person whose kitchen does not lend itself to hanging greenery.

Herb vinegars are easily made and are always welcomed. The ideal time for making these is during late summer when the fresh herbs are at their best. My method is to put a good handful of tarragon or basil into a quart jar, fill with plain cider vinegar, and place in my sunniest window. In two weeks time the vinegar has absorbed the essence of the herb. It is then decanted into smaller suitable containers and one small sprig of the herb included for appearance and identification.

Good herb vinegar can be made from the dried herb as well. For this method, heat the vinegar to a near boil and pour into a preheated jar into which you have put as much as half a cup of dry herb. Let steep for two or three weeks, then strain through a coffee filter or several thicknesses of cheesecloth to remove all tiny particles of the herb.

Experiment with other herbs, such as thyme and savory for vinegars. Add a clove of garlic or shallots to the jar. Once you have enjoyed your own herb garden vinegars for salad fixings you may well wonder why it took you so long.

So there you have a few ideas for gifting from your garden. There are many other ideas we could share. Perhaps these few will whet your appetite for more herbs in your future. □

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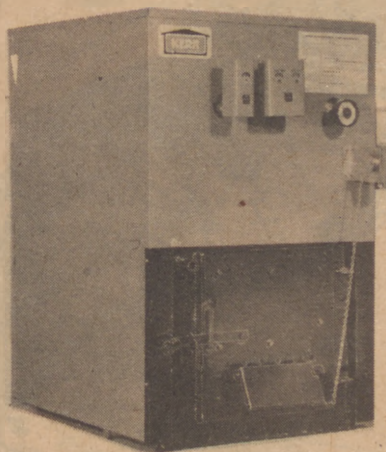
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Symbolic of freedom, strength and wisdom, birds of prey are some of the most majestic members of America's wildlife community. The aid that hawks, falcons, owls and others provide in maintaining nature's balance should afford them the stature and protection they deserve. Yet in some locals they continue to be misunderstood and maligned by the very citizenry they serve.

Man has a history of persecuting predatory animals, and the birds of prey are no exception. Because they must kill in order to survive, these hunters of the airways have encountered the wrath of man. While the larger predatory birds' diet is similar to that of its smaller cousins, the luxury of ambivalence often shown the diminutive species has not been transferred to the larger kin. A prime example is the red-tailed hawk. While this soaring raptor feeds mainly on rodents, they once were widely known as "chicken hawks". For that matter, any large hawk is still considered a chicken killer in many areas.

The birds of prey were also blamed when there was a reduction in the number of game birds. Severe winters, wet springs, habitat loss and the low phase of a naturally occurring cycle were never considered as causes. The larger owls were deemed the culprits when the rabbit population seemed to dwindle. The accuser, hastily looking skyward for a scapegoat, never saw the havoc he or she was wreaking by cleaning fence rows, burning brush piles and turning under corn stubble.

The truth is, no wild species should be classified as good or bad. Each has a particular niche to fill in our ecosystem. Studies by ornithologists and wildlife biologists into the habits of the "harmful" birds of prey revealed evidence to exonerate these creatures. A scientific examination and analysis of the stomach contents

Sam Skeen is a free-lance-writer and naturalist who resides in Ripley, West Virginia. He is author of "Bringing Back Bobwhite", Farmstead, Summer, 1980. Ink drawings by Tom Paiement.

of individual birds and a study of the undigested, regurgitated masses known as pellets, proved these so-called "blood-thirsty and wanton killers" had eaten a variety of prey. When this variety in diet is coupled with the fact the birds feed on a surplus produced by nature, one can understand these feathered hunters are not a threat to any one specific

found, or once found, in the Northeast.

The Buzzard Hawk

The first family of hawks is the Buteos or buzzard hawks. This group can be recognized afield by their broad rounded wings, short fanned tails and robust body forms. They are the wide-soaring hunters. The broad feathered appendages that catch the rising air thermals enable the Buteos, and especially the red-tailed species, to effortlessly rise and fall as they search for prey.

When not riding the airways, members of this family are likely to be found sitting upright on a perch as they survey the ground below for a meal. When prey is spotted, the feathered bomber will launch its dive or "stoop" toward the target. With its wings braking, the legs are thrust forward at the time of the impact. The weight of the hawk behind its sharp, piercing talons quickly dispatch the unsuspecting animal.

For the would-be hawk-watcher, the three most common Buteos found in the Eastern United States are the red-tailed, red-shouldered and broad-winged hawk.

As the name implies, the red-tailed hawk's rudder has a rufous-red color on its upper surface. Although the tail is whitish when viewed from beneath, strong sunlight may transmit the rusty color to the underside. The upper surface of the tail may also be revealed to the alert watcher when the bird veers or banks in its soaring effort. The back of this common raptor is brownish, the breast is buff colored and the belly is streaked light brown. The red tail feathers are tipped with white on the adult. Observers should listen for the rasping cry of "Keer-r-r" as the bird soars overhead.

The red-tail resides in wooded uplands surrounded by open country. Farm country is ideal for this bird because of crop fields and hay meadows. Its extraordinary eyesight (eight times more acute than man's) enables it to locate prey from great heights. *Buteo jamaicensis*' diet is composed of a variety of smaller creatures with rodents being the chief item. This bird, misnamed the "chicken hawk", should be considered an asset by every landowner because of its taste for the crop-destroying rodents.

Like its red-tailed cousin, the



bird or mammal. To date, the only animal that has demonstrated an ability to completely exterminate a specific species is that two-legged animal labeled as the most intelligent.

There are a variety of birds throughout the United States that can be considered predatory. The most basic method of classifying these winged hunters is to divide them into

their two biological orders--the diurnal or daytime order of Falconiformes and the generally nocturnal order of Strigiformes. The latter is limited to the owls, while the former is composed of a thirty-four member squadron which includes hawks, falcons, kites, vultures, eagles and osprey. The discussion contained herein shall be limited to birds of prey

red-shouldered hawk's name is also based upon the color and location of certain plumage. Since the shoulder patches are not visible when the bird is airborne, the viewer must depend upon other characteristics to identify this species. In addition to its robin-red breast and the narrow white bands on its black tail, translucent "windows" appear at the wing "wrists".

Buteo lineatus' habitat is primarily swampy woods, bogs and river bottoms. It generally avoids the upland habitat occupied by the red-tail. A bit more sluggish than its two soaring cousins, this *Buteo* prefers to sit quietly on a low branch where it can drop down and capture its favorite prey of snakes, frogs and crayfish. The red-shoulder also feeds on such pests as grasshoppers, caterpillars and rodents. It rarely takes birds or poultry. Like the red-tail, this *Buteo* will also scavenge. Flushed from a dead game bird, the buzzard hawk may be mistakenly blamed for the kill.

Would-be observers looking for the red-shoulder should visit its habitat in the spring or early summer. Listening for a long drawn-out scream of "Kee---" you will find the bird. Unless it has been shot out, the red-shouldered hawk can be found in settled farming areas.

Akin to his red-shouldered relative, the smaller broad-winged hawk has the black and white banded tail. But on this crow-sized *Buteo*, the rudder markings are about equal in width and more distinct. The tail of the broad wing is also shorter than the red-shoulder's.

This unobtrusive hawk lives mainly in the woods where it feeds on a summer crop of frogs, toads, snakes and small rodents. In late-summer its bill of fare will include grasshoppers, crickets, cicadas and large caterpillars. Hardly a "harmful" bird by any standards. Since the broad wing (*Buteo platypterus*), lives in the woods, it is rarely seen except when it begins its spectacular migration along the Eastern ridges in mid-September. When the migration is complete, the bird will have traveled some four or five thousand miles to reach its winter quarters in South America.

During the winter, Easterners may see a visitor from the arctic. A *Buteo* in shape, the rough-legged hawk has



SPECIES	*LENGTH	*WINGSPREAD
Red-tailed Hawk	22½	50
Red-shouldered Hawk	21	42
Broad-winged Hawk	16	36
Rough-legged Hawk	21½	52
Goshawk	23	44
Cooper's Hawk	17	31
Sharp-shinned Hawk	12	24
Duck Hawk (Peregrine Falcon)	18	42½
Pigeon Hawk (Merlin)	11½	25½
Sparrow Hawk (Kestrel)	10¼	22½
Osprey	23	68

*The sizes given are based on averages. Individuals may differ and females of the species are usually larger than the males.

a longer tail and longer wings when compared to its resident kin. This vacationer from the cold country can be identified by a tail that is white at the base and dark at the tip. The rough-leg can also be recognized at any distance because of its habit of suddenly stopping in mid-air and beating its wings rapidly so as to hover in one spot.

The Accipiters

The second group of hawks belongs to the Accipiter family. These woodland hunters can be distinguished from the soaring, robust *Buteos* by their flight patterns and body forms. This clan of true

hawks have short rounded wings and long tails which enable them to twist and turn amid the trees as they pursue their quarry through the forest. The typical flight pattern of an Accipiter would be four or five short, rapid wingbeats followed by a glide.

When intent on capturing their prey, these feathered javelins are seldom denied. Several years ago I had the opportunity to watch an episode take place between a gray squirrel and a Cooper's hawk. While approaching a hickory tree occupied by a squirrel eating its brunch, I saw the hawk sail toward the tree. The eating stopped when the hawk disappeared into the foliage. A few

seconds passed before bedlam erupted. The squirrel came spiraling down the main trunk hell-bent on escape. In hot pursuit behind was the hawk diving headlong and matching every move the squirrel made to avoid capture.

I failed to realize I had been afforded the opportunity to witness one of nature's basic confrontations--prey vs predator. In my juvenile haste, I ended the drama by shooting the squirrel. Recalling the scene, I have wished many times I had let the act unfold and reach its natural conclusion.

The largest member of the Accipiter family is the fierce-looking, heavy-bodied goshawk. The goshawk sports a back plumage of dark blue-grey and a black crown with a white eyebrow. The pale underparts are finely barred with gray, and the rounded tail feathers are white tipped.

The now-rare goshawk nests in secluded stands of heavy timber and does most of its hunting near clearings and brushy openings. When it is on the prowl, the "blue darter" flies through the woods beneath the treetops and often close to the ground. If its frightened prey escapes to the presumed safety of a thicket, the Accipiter is not averse to giving chase on foot.

This member of the "bird hawk" family takes a variety of mammals. The young are fed rabbits, squirrels, chipmunks, weasels and mice. Because *Accipiter gentilis* has a taste for the large, ground-dwelling grouse, this hawk was hated by hunters who believed it depleted the grouse populations. But a toll taken on any species by any bird of prey will

not exceed what nature can reproduce the following year. In those areas still occupied by the goshawk, ol' Ruff continues to be a common resident.

The middleweight of the true hawk clan is the Cooper's hawk. It is approximately crow size and has the same blue-grey back plumage as the goshawk. But the breast coloration of the smaller *Accipiter cooperii* is rusty colored and cross-barred.

This Accipiter, as well as the others, will perch in the dense, leafy crown of a tree as it waits to ambush smaller birds and mammals which comprise a portion of this raptor's diet. Because the Cooper's hawk is not averse to taking a barnyard fowl on occasion, it is the culprit responsible for the label of "chicken hawk" being attached to its more conspicuous red-tailed kin.

The littlest Accipiter is now the most common. The sharp-shinned hawk is almost identical to the Cooper's in coloration. The field characteristic that separates the two is the square-tipped rudder of the smaller, sharp-shinned hawk. When it is folded, a notch in the middle of the tail is also noticeable.

Taking smaller prey than its larger cousins, the sharp-shinned employs the same hunting technique. Although its primary prey is sparrow and warbler-sized birds, this little Accipiter can handle pigeons. Rodents ranging from red squirrels to mice are also caught. On occasion the sharp-shin will fill up on large insects.

Unlike many other birds of prey, the sharp-shinned (*Accipiter striatus*), usually builds a new nest each year. If it doesn't set up house keeping in a conifer, this species may select a cliff crevice or a hollow tree

for its nesting site. When alarmed about the nest, its shrill squeal of "Kik-kik-kik" is likely to be heard.

The Falcons

The streamlined, fast-flying falcons are the third group of raptors. The falcons are characterized by long pointed wings, long tails and a trim body. The falcons rarely soar at all. Instead their flight pattern is characterized by strong rapid strokes. Although the falcons are not hawks, they are termed the duck hawk (peregrine), the pigeon hawk (merlin) and the sparrow hawk (kestrel).

Quite tolerant of man, the presence of the cliff-dwelling *Falco peregrinus* would be a possible solution to many a city's rock dove problem. Using the skyscrapers as lookouts and utilizing window ledges as nesting sites, the duck hawk would find an abundant supply of food in the form of the statue-spotting pigeon. However, this situation is not likely to occur!

Throughout most of its range, the peregrine is rare because of infertility caused by the presence of pesticides in its food supply. Being at the top of the food chain, this bird of prey and others are frequently exposed to an accumulation of toxic chemicals. Some say the eating of one badly contaminated duck will cause infertility. Whether it be caused by the eating of one or a dozen, the peregrine has suffered from the presence of pesticides.

This crow-size raptor had a black head, slate-gray upper body parts and underparts that are buff with a cross-wise pattern of black bars. In addition to the long pointed wings and a compressed narrow tail, the most conspicuous field mark of the peregrine is its black "mustache". The mustache results from the black head plumage which extends down past the beak onto the cheek.

The hunting technique of the peregrine is a sight to behold. Most of its prey is killed in the air. Birds too large to be plucked out of the air are sent spinning to the ground by a blow from the duck hawk's powerful feet. Diving from tremendous heights at an estimated speed of 150 to 200 miles per hour, the peregrine delivers its knock-out punch.

The merlin's stocky build, pointed wings and rowing-like flight pattern give it the appearance of being a pigeon, hence the name pigeon hawk. While the merlin lacks the mustache





of the peregrine, it has a distinct field marking of a white-tipped, barred tail. Brownish streaks on the buff-colored breast and belly run lengthwise.

From a lofty perch in woodland openings or near a marsh, pond or lake, the pigeon hawk watches for its prey. When it spots its intended victim, a swift chase generally results in a meal. Warblers, sparrows and thrushes are taken as well as chimney swifts and barn swallows. Large insects such as butterflies, grasshoppers and cicadas are caught and eaten in flight. The stomach contents of one *Falco columbarius* revealed nearly three dozen dragonflies.

The kestrel is a common sight throughout the Northeast.

Alert motorists often notice the sparrow hawk on some aerial perch over a newly mown meadow. When there is no convenient lookout station, the kestrel will hover in one spot as it scans the ground for small rodents and insects.

Unlike the peregrine and merlin, this chestnut-tailed, rufous-backed, rusty-capped species generally captures its quarry on the ground.

Fortunately for man, the kestrel is quite comfortable with the ways and activities of humans. An appetite for insects make it a welcome guest on any farmstead. Cities are also good sparrow hawk habitats because of ample nesting crevices and convenient lookout stations. A liking for the pesky little English sparrow as prey increases *Falco sparverius*' value to both the urban and rural resident.

The Osprey

Studies have shown the raptors take a variety of birds and animals as prey. The only child of the Pandioninae family does not. The osprey concentrates on those denizens of the deep--fish.

Commonly called the fish hawk, this long-legged, long-winged bird is superbly equipped as an avian angler. Spiny projections on the feet and four long talons, pairs of which are located opposite each other, effectively and efficiently seize and hold the slippery prey.

When it is "fishing", the osprey will hover 50 to 100 feet above the water until it spots its would-be meal swimming near the surface. Half closing its wings, the bird plunges

into the drink, feet first in a flurry of spray. After the catch is made, the bird rises and heads for its nest or feeding perch.

The airborne osprey is easily identified. At the point where the outer half of the wing begins its backward sweep, there is a patch of black plumage. The back and wings are dark brown while the breast, belly and head are white. A brown line of plumage also runs through the eye of *Pandion haliaetus*.

The work of wildlife professionals has done much to dispel the general untruths surrounding birds of prey. But traditional prejudices are difficult to dispel because of ingrained misbeliefs and false information. As late as 1969 a well recognized encyclopedia stated "bird hawks are harmful to agriculture". Although it is now illegal nationwide to trap or shoot a bird of prey, it is still possible to see a few lifeless forms of these magnificent birds hanging on the fences that border rural roads. While the "chicken hawk" paranoia hasn't completely died, the number of roadside displays seems to be declining. Hopefully the slaughter is slackening and a recognition of the birds' true worth is emerging. □



Raising Rabbits

by Jan Willems

Remembering two good friends:
Kees in Holland
Geeltje in Maine

In Europe, rabbits have always been widely popular. The general meat shortage during and after World War II especially generated an increasing number of backyard rabbit raisers. Rabbit meat is very tasty and has a high protein, low-fat and low-calorie content. It is very digestible. Many a European with stomach troubles is advised by his doctor to eat rabbit instead of pork or beef. Here in America, it is still less popular, and if available, is not cheap either. The commercial, deep-freeze rabbit sold in some supermarkets is prized more as a luxury (at about two dollars the pound), than as a simple, tasty subsistence fare. And as long as people don't know rabbit meat, they usually won't spend their money for a rather expensive, unknown dish.

On the homestead, rabbit can still cost you a minimum of about 75 cents the pound, ready-to-cook. That includes only the commercial feed expenses and not your investment in cages and stock, nor your labor. If you get three to four good sized litters a year, your investment costs per carcass decline, of course. Labor, if you know how and what you are doing, is not too much. Your feed costs are the main part of your expenses, and unless you can supply part of the feed from your own farm, they are rather high these days, at ten cents a pound for 16% protein pellets.

As youngsters in Europe, we never bought, indeed didn't even know about rabbit pellets. Our rabbits lived off the land from greens and hay we gathered ourselves in summer. I will always remember the long three to four mile walks with a feed bag along the country roads and some plots to

gather dandelions, wild clover and other goodies for my rabbits, then dragging the bag home. In winter we had hay, big winter carrots, mangels in various forms, cabbage, leftovers from the kitchen and an occasional handful of grain or whatever else you could get. I lived in a flax-growing area, and an occasional small hand of shiny dark brown flaxseed I got from a friendly neighbor lady would give my rabbits gorgeous shiny coats. Good hay (grass and clover, or if you knew a farmer, some alfalfa) was always a basic ingredient in the feed. We didn't get four litters, but usually two. If we had a very good doe we got three litters, and our young rabbits were not ready for slaughter in eight to ten weeks, but it sufficed. These rabbits were usually healthy and the meat, as long as you didn't know it was from one of your favorite rabbits, tasted delicious. With the perspective of climbing energy and feed costs, we might have to revert back to this kind of subsistence rabbit-keeping.

"This overview is for the homesteader who wants a few hutches with enough rabbits to enjoy, and to harvest a regular supply of quality meat for the table or freezer."

Drawbacks to the Commercial-style Hutch

Housing for rabbits involves two aspects: 1) The hutches or cages themselves. 2) Where to place them.

For the serious rabbit raiser these days, housing means wire cages. With the help of a pair of special pliers and clamps or rings, one can construct them oneself after buying the wire or get them ready for assembly from well-known manufacturers. Whatever you do, they are not cheap. One can have them with or without trays for droppings. They are usually stacked up in tiers of two or three (three is less convenient). If they are without trays, there is a slanting smooth board between stacked cages to let the manure drop and slide to the ground. In the bottom cage, the droppings just fall to the floor. The system without trays is preferable for cleaning (always a big job in rabbit raising), as the trays in the cold winter months have a tendency to freeze stuck because of the frozen urine of the rabbits. This is a real drawback and means that you often have to wait until a warm day to do an overdue cleaning job.

The ready-to-assemble cage is usually made of good galvanized wire 1" x 2" for sides (or 1" x 1") and top, and 1" x 1/2" for the bottom. It has a bunny guard all around, made of either metal plate or small gauge wire up to four to five inches high. The minimum cage size for a medium size rabbit is 2 1/2' x 3' x 1 1/2' (height) for a doe cage. The door should be one foot wide to facilitate working in and cleaning the cage. This is also just the right size to shove a nestbox about 24-inches deep, 12-inches high and approximately 12-inches wide in the cage. It is my experience that in a colder climate a nestbox of wood is preferable.

Building Your Own Hutch

Now if you have some lumber and suitable wire, you can easily construct a cage yourself. The usual objection to this is that rabbits chew on the wood, which is true. But one can minimize this by giving them other chewables-

hay, straw, stale whole wheat bread, or just some pruned branches. (They will certainly appreciate the branches of a fruit tree.) Just cover the preferred chewing spots on the wood-cages with strong hardware cloth.

As a boy, I always had my rabbits in wooden cages. In fact, a cheap one can be made from a big wooden crate (in my case, the large Swedish match crates were a favorite) from any grocery or other store. Here in Maine, large fish or lobster crates have a lot of utility. Use them either single or combined for all kinds of animal cages. As long as you keep the general requirements of enough space, light and easy cleaning, and keep droppings and drainage in mind, you can build your own rabbit cages. These cages with practical use of a piece of lumber here and there, are definitely much cheaper than the wire ones. [See "Build Your Own Rabbit Hutch", *Farmstead*, Early Summer, 1980.]

Now the construction of wood or wire cages may be modified according to where one puts them. A rabbit can stand cold much better than heat. They need fresh air and ventilation, shade against the sun, but also enough light and if possible some sun and protection against wind and wetness in cold weather. A lot of wire cages are put in a barn, an old kitchen house, garage or small shed, which is fine so long as one remembers the basics of fresh air (also no dust), enough light, and in summer some ventilation. I emphasize enough light, because this is often neglected, and yet it greatly affects the fertility of rabbits. For example, a friend of mine who bought a pair of rabbits from me came back a couple of months later, complaining he didn't get any young from these rabbits. I knew it was good stock; they had no disease. However, a visit to their place showed the poor creatures in clean, large cages but in a dark shed with one small window. Relocation of the cages to a much lighter building soon had its result in a healthy litter of bunnies.

One can also keep hutches outside, against a wall of a barn or a henhouse, as long as they are not directly

exposed to wet and cold wind, are covered on top against rain and snow, and in summer offer the rabbits shade against the direct sun. Shades made of any material that you can roll up and down can help to protect the occupants of the outside cages against cold and wet weather.

All you need now for housing, is feed and water containers, the nest-box for does, and (in winter especially) a piece of board in the wire cages for the rabbit to sit on. For feeders, you can buy the commercial metal ones that allow feeding from the outside, without opening the cage. Again, one small disadvantage in very cold winters: if the rabbit has just drunk and has a wet chin it might freeze against the feeder and the rabbit can lose some fur. For water, one can use upside-down water bottles with a kind of nipple, but these are no good once it freezes. A normal small, round crock, which won't break once the water freezes, is usually the simplest. Don't use one that is too deep. Later the very young bunnies might get in and be thoroughly soaked and chilled. They usually hop out fine, but they might get too chilled on a cold day.

What Breed Is Best?

If your goal is rabbits for subsistence (meat), the choice is pretty wide in the medium-to-giant class. Depending on how economical you want your little enterprise to be, you can select from two or three favorite meat breeds: the White New Zealand, the Black (nose, ears and feet) and White Californian or, less frequently seen, the Satin, in various colors. (The Satin is a breed developed in the thirties.) But you can also go for the Flemish Giant or the Checkered Giant, or any other large rabbit like the Chinchilla, American and Giant. The larger

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rabbits give you more meat but take a longer time and more feed to grow to the desired size. They may need larger cages.

Finally with rabbits it comes down to what you like, when you don't raise them commercially. As a boy I kept Flemish Giants for years, and still feel that special kind of fascination when I see them at a show. A very popular breed for meat in Europe is the Lop (which comes in an English and French variety), a large rabbit (up to 10 to 11 pounds adult weight) with a massive thick-set body and large ears hanging down in a horseshoe shape from a strong head. In America it is still more of a show breed and not always easy to find.

Until recently most rabbit breeders were told to stick to purebreds because that way you get the best chance to confirm the specific qualities (meat and fur) they were bred for. Also, the value of any surplus breeding stock would be more attractive than for just any kind of mixed breed. However, the last few years, more practical-minded rabbit raisers have started cross-breeds, which often have the advantage of first generation hybrid growth for good and rapid meat production. But if you go on breeding these crossbreeds, you usually lose this advantage, so that means you have to go back, at least partly, to the original cross. A common cross is White New Zealand and Californian (both special meat breeds). In my own experience it works quite satisfactorily. Of course, you have to maintain some original purebred stock to be able to keep making the right crossbreeds. I have tried other crosses, and by knowing my rabbits (individual does and bucks), I can soon find out what gives the best results. A good, productive mixed breed doe, which consistently gets a sizeable, healthy, fast-growing litter, may be worth more to you than blue ribbon purebred rabbit.

Beginning

Whatever your choice, the basic rule is to begin with some purebred, healthy and productive animals. Your best bet is to start with young animals, around three months old, making certain that they are not culls (rabbits excluded from further breeding, for one reason or another). Above all, ask the seller about the breeding

record of the young stock's parents. Any good breeder will keep a record of this and will gladly give you advice on buying the right combination of does and bucks. If you want to start on a modest scale, you might postpone buying a buck, and either try to get a bred doe, at least two weeks away from kindling, or ask the seller if you can come back to have the young stock mated. A doe is ready for mating at about five months. The breeder might be reluctant to do this if he doubts whether you know enough about raising rabbits to keep them healthy, because you might introduce disease into his flock. I have granted this service at various times, but on the condition that I can look over the animal and see where it is kept before I let it into my stable for mating.

Now if you also buy a young buck, you should realize that if possible, it should be at least a month older (to ascertain good fertility) than the does you buy. This is to obtain the right time-schedule to start your breeding. One mature buck would normally be enough to handle up to half a dozen does, provided of course, you don't want to breed them all at the same time.

Feeding

We smallholders have a tendency to overfeed our rabbits. This not only costs more, but results in overly fat rabbits that are usually poor breeders. Furthermore, when butchering your animal you might find an extra large accumulation of fat on the shoulders, in the abdominal cavity and around the kidneys.

There are two systems of feeding: the so-called free-feeding which is for pregnant and nursing does, keeps an unlimited supply of feed in the feeders. In general, animals don't have our human tendency to overfeed and eat everything in sight, but still they may eat too much. Therefore, for other rabbits (dry does, rabbits on maintenance, not too active bucks) a certain rationing is desirable. Still, how to ration feed depends on temperature (they eat more in the cold than in the hot weather), availability of extras (hay, carrots, etc.), the size of the rabbit, and even its individuality. A nervous young buck always excitedly jumping in his cage will need more

calories than a calm, sedate doe who quietly sits in her favorite corner lazily munching on a blade of hay or straw.

Templeton, the classic authority on rabbits, gives the following guidelines in **Domestic Rabbit Production**: Dry does and so-called herd bucks, in breeding condition, should get 3.8 percent of their live-weight daily. For example, this means six ounces of complete pellets a day for a ten pound doe. If there is other feed available, like good quality hay or roots, the pure pellet ration should be reduced to about three ounces. Since high quality hay is rather scarce here in Maine, you should closely watch the rabbits on mixed ration to see that they get enough nourishment. Just stroking and feeling their backs all the way from neck to tail will tell you. Watch for overfed bucks! Young and developing bucks and does need 6.7 percent of their body weight in complete pellets each day.

The above ration standard depends of course on the quality and in particular, the protein content of the pellets or grain you buy, which can vary between 16 percent and 20 percent protein. The quality of the protein is also important. The last couple of years I have heard and read about complaints from various rabbit breeders that, although the effective protein percentage remains the same, the quality of grains seems to have declined. Another thing to watch for is dusty feed (from a bag at the bottom of the pile or the last load of a feed-mixer). Rabbits cannot stand dust. It often gives them lung disease. If you find a bag with too much dust, return it to your dealer.

As said before, if you don't mind a slightly less than optimum production, by all means substitute some other feed. Your rabbits will love farm grown feeds and your out-of-pocket expenses will be lower. In fact, even when using a pellet feeding regime, always give your rabbits some hay. They like it. It prevents the forming of furballs in the digestive system, and alleviates boredom. I am convinced that a lot of our penned and caged animals suffer from monotony, which must influence their well-being and production. It is the same for chickens in a coop. Just throwing a few hands of scratch or grass clippings in a pen keeps your hens moving and scratching and can prevent featherpicking out of sheer ennui. As a boy, I learned

that a rabbit that gets good hay and behaves in a lively fashion seldom gets sick.

Whatever you feed as supplement or substitute for pellets always observe your rabbits, feel them, examine their eyes, watch their droppings to check if everything is right. And whatever goodies you want to give to a pregnant doe, keep in mind that too fat an animal is bad and can result in difficult kindling with dead or mutilated young. Just take care that they have a good variety of feed with the right minerals and vitamins. Regarding vitamins, not every rabbit keeper knows that rabbits during the night produce a special kind of soft droppings which they reingest to further benefit from their vitamin contents. Early in the morning you will often see a rabbit quietly bring its mouth under its tail and then chew something. Nothing is wrong with this. On the contrary, that is a rabbit's kind of double digestive system.

Remember above all, one thing: Rabbits drink! And with today's composition of pellets they need quite a bit of water. Always keep clean, fresh water in front of them at all times. This is especially important in winter when water is subject to freezing. And if it is very cold out, your rabbits will enjoy a bit of tepid fresh water in the morning instead of stomach-chilling ice-water.

The time of feeding, if you can't do it twice a day (morning and late afternoon) is preferably in the afternoon, as rabbits eat most of their feed at night. As with most domestic animals, keep a regular feeding schedule at about the same time each day with some variations for the short winter days or long summer hours. You'll notice that if you are too late they'll often be hopping impatiently around in their cages. When you are much too early they'll come out of course, but not in too much of a hurry. By the way, rabbits know when you come down with feed, because they have a very keen sense of smell.

Mating

After your rabbits are well housed and fed, you could leave it at that, but most of us want to see young rabbits produced. So you start by bringing a buck and a doe together for mating. Select only healthy and mature partners. Maturity depends on the size of the breed.



The small dwarf doe is ready in about four months. In general, add a month to that for the buck. The medium sized does (New Zealand, Californian) are best mated the first time at five to six months, and the giant types of does need almost nine months to a year until they are ready. A rabbit remains efficiently productive until she is about two to three years old. At a later age they still can be bred, but litters may be smaller.

When to breed? It was formerly assumed that rabbits had no specific heat period and could be mated the year round. In nature, during spring and early summer, the free-roaming buck goes after does whenever he gets a chance. A kindling wild doe is mated again about the second day after kindling, has a gestation period of 31 days, and consequently weans her young in three to four weeks. In our domestic rabbits there is a 16-day cycle, and only during the first two and last two days of this cycle are there no fertile eggs available. The rabbit ovulates about eight to nine hours after being mated, so a rabbit is ready for mating about 24 (2 x 12) days out of a month. You can watch her behavior, in particular when there are other rabbits close by, and observe a certain restlessness, rubbing her chin against objects in the cage, jumping around with some straw or hay in her mouth. If you examine the vulva you'll sometimes see it is a bit swollen, moist and pink/red in color. For a rabbit in full production and in the right seasons, this is almost always the case. The buck, when he is healthy, not too young, not too exhausted by previous

matings, not too hot or molting, is almost always ready to perform.

The most active season is from about the beginning of the year until the hot days in the second half of August. You can try to mate in the off-season (and some rabbits do fine--by all means keep them in your stable), but the chance of success is less. It helps very much to have a light in the housing during the shorter days in fall and winter. Frequency of mating is your choice. But don't overdo it. For a young buck, twice a week is a safe margin, and give him two to three days rest between matings. So that you don't work the doe to death, avoid the practice of some super-commercial breeders, of breeding again two weeks after kindling, then weaning the young two weeks later, with a new litter every six to seven weeks. It is not only bad for the doe, but bunnies weaned at four weeks of age will need special care and high protein bunny (or creep) feed, which in many places is not available.

If you want to have healthy rabbits, don't wean before the little ones are at least eight weeks old, and if the doe is in good healthy condition, you can mate her at five to six weeks after kindling. As a general rule, a doe should stop nursing the previous litter about two weeks before a new litter arrives. The above is all under a maximum feed program. If you have a less than optimum but otherwise healthy feeding program, slow down accordingly. Taking into consideration the slowdown in winter and false pregnancies, I am usually very satisfied to get four good litters a year.



The technique of mating you can usually leave to the buck, unless it is a young, overly excited buck who may start at the wrong end or side and may be put off by an older, aggressive doe. Always bring the doe to the buck cage for the smell plays an important part in mating. You'll see within minutes whether or not the mating is successful. The doe may need a short warm-up or may coily let herself be chased around the cage (take feed and water crocks out before mating), but usually she will comply fairly quickly. If the buck falls on his side after copulation, as if fainting, at times with a kind of grunt, that is the natural reaction to a good mating. If the doe is not willing and keeps her tail down, stands on her hind legs in a corner, bites and fights the buck, better give up. So-called forced matings, by restraining the doe usually have a low percentage of success. In case there is no alternative buck available, try it a few days later. It might work to switch cages for these every one or two days--that is leave the doe in the buck cage and bring the buck to the doe's cage, provided of course there are no young rabbits there.

If you fail once again to get a satisfactory mating, better give that doe a thorough inspection. She might have some infection around her sexual organs or otherwise be sterile. If she kindled successfully before, you can still wait a bit, but otherwise, eliminate the doe from breeding. Because rabbits ovulate eight to nine hours after mating, a lot of breeders

give it an insurance run by mating the next day or if the first try was early morning, later on in the evening. Some experts say it doesn't make any difference. Others continue the practice. If you go to someone else's stable with your doe(s) for mating, you'll have only one mating anyway.

The time of the day for mating depends on the season. In spring and summer the cool, early morning hours or the late afternoon time is best. In winter, the warmest time of day, with some bright sun, and if possible a temperature around 32 degrees or more offers the best chances. In any case, if you feel unsure and have problems, go and see an experienced rabbit-breeder or the person from whom you bought your stock and ask for advice. It has helped me a lot in my turn to always have follow-up from people to whom I have given advice.

One more hint for mating: If you have more does to be mated, try to do two or three at about the same time. That gives you additional nursing does when there is a surplus (over eight) of young in the litter, or some doe abandons her young in another litter.

Pregnancy

Even if you watch an apparently successful mating, it is no guarantee that 31 days later there will be a nice litter. The buck can be sterile, the doe too fat or she may have some hidden ailment, or she may be in a barren period. Because of some natural instinct, when it is not the right time to have young, or when frightened by

an animal or person, the doe can reabsorb embryos in her body. Human impatience and attempts at efficiency make the breeder try various checks. Some breeders have their does mate again after ten days to two weeks. If then the doe grunts and won't have anything to do with the buck, she is assumed to be pregnant. But this is no ironclad rule. Many books mention palpitation after about 12 days. This is a fine method for the experienced expert, but for the average breeder there is the risk of damaging the fetus and the doe herself. I haven't talked to too many rabbit breeders who actually did it, and as an average amateur, I prefer to stay away from this method. Then, there is a pretty fool-proof method around 18 to 21 days, when the doe herself announces a "false" pregnancy by making a nest and even pulling some fur, but you'll see no young. This is a sure sign it didn't work and the best action is to mate the doe again immediately. Otherwise, the breeder waits until the 31st day.

I bring in a nestbox with suitable nesting materials about a week before kindling time. Many publications suggest that two to three days ahead is time enough, but I don't agree. The doe gets restless, and might push some hay in a corner of the cage before that. Usually the moment you bring in the clean nestbox (I always try to give each doe a familiar nest box), she'll start working on making a nest. You'll see her dig in the hay or straw in the box or run around the cage with mouthfuls of material to make a nice deep, low hole in the darkest corner of the box. Normally she won't pull fur from her front body for lining and warmth until shortly before and during kindling. Don't get upset if the doe goes off her feed one to three days before kindling, and just sits there or hops in and out of the nest box repeatedly. She just has the pregnancy blues and usually everything will be fine. Don't disturb her. Leave her alone. Mother Nature knows best.

Kindling and Nursing

Around the 31st day after mating, the doe kindles (gives birth), normally in the readied nestbox. Rule Number One: Leave the kindling doe alone and reduce disturbance in the rabbit house to a minimum. The time of kindling can vary widely. Many books say early in the morning or during the

night, but I have seen kindling occur at all times. During, and especially after kindling, the doe pulls fur to line the nestbox and to cover the naked, blind bunnies. As soon as they are born, the doe licks them clean and gives them their first feeding. If any of the above two (fur pulling and bedding down the well-fed bunnies) goes wrong, there is trouble. Some don't pull enough fur to give adequate protection in cold weather. If a doe doesn't start with feeding, there is something wrong with the milkflow and you can usually write off the litter as a loss.

Sometimes, but rarely, the doe comes back with milk production. If you have a second doe kindling around that time, you can foster a few hungry babies with that other doe (if she does not reject them because of their strange smell). Provided she has a small litter, she will be able to adopt the orphans. If there is not enough fur it can be remedied by using old, clean fur-pullings you have kept for that purpose, sometimes even by taking the doe (if she is very used to you) and pulling some fur while she is in the cage. It comes off easily in front and on the belly. Put it on the nest.

Not pulling enough fur has another drawback in that the milkteats are not bared enough, so that the babies have trouble finding them. In general, a doe has eight teats and that's the number of bunnies she can adequately feed. However, some manage to raise litters of ten to twelve well. Some observers also say a doe seems to rotate the drinking turns. There always seem to be one or two of the litter at birth that consequently have trouble getting to the teats, but they usually finally make it.

Another basic problem is when the bunnies are not properly deposited in the nest, or are even outside the nestbox altogether. If this happens on a cold night, you'll find some cold dead bodies in the morning and the doe, unlike a cat or dog, doesn't move her babies around. If there is a trace of life, rapidly bring the victims inside, put them in a wool-lined, covered box on a warm source of heat. Often I take them in my hand and give them a light massage. It is almost a miracle (and a great satisfaction) to see these blue, near-dead, bodies gradually turn into pink, warm, glowing live bunnies. Once they are all right, and the proper nest is ready, I return them to the

nest, sometimes on and in the fold of the piece of wool in which they warmed up. Will the doe still accept them? After eliminating smell-rejection (I always rub the doe's underside and the cage area before I work or get my hand in the nest), do everything calmly and quietly, talk to the doe, give her some choice bit to eat, then hope for the best.

Most books stress the need to inspect the nest as soon as possible after kindling. The key phrase is "as soon as possible". Know your doe, see how she acts when you open the cage door. If she cowers with fright in a corner or jumps in the nestbox, wait! Once you think you can make the inspection (don't do it on a very cold day when disturbing the nest would mean too much warmth lost), divert the doe with some goodies, and take the afore-mentioned no-smell precaution. Never go in a nestbox after you have been in another cage or even a nestbox. Check for numbers. If there are more than eight, but they look well fed, don't bother. See if there are any dead or mutilated ones, and in general ascertain that they look cozy, warm and have full round bellies.

Another hurdle to overcome is a young doe's often odd behavior. Maybe she will not nurse the bunnies, or worse, she will eat them. This can be due to nervousness, being frightened by something, or, some think, a mineral/protein/vitamin deficiency of some sort. It seems to occur more frequently outside of the normal breeding season. Little can be done. If you see the doe in the nestbox for a long stretch, and, for instance, in the middle of the day, her behavior is suspect. Coax her out and inspect the nestbox. If only one or a few young are damaged or bleeding, try to salvage them with another doe. Regard the doe as a possible cull from further breeding, but give her one or two more chances. I have had does who, after the first kindling disaster, later became exemplary mothers. But often one has to discard a bunny-eating breeder.

Once past the first hurdles (and mind you, with well-selected does they are an exception), the doe takes care of the nursing, usually at night, late in the afternoon, or early in the morning. Don't disturb her when you see she is nursing. Always check first thing in the morning to see if there are bunnies

outside the nestbox. They sometimes hang on to drink when the doe jumps out of the box. If you find one too cold, apply the emergency procedures; otherwise put it straight back into the nestbox. When you notice undue moving in the nestbox or hear some tiny shrill peeping, it means the young are very hungry, because the doe has not enough or no milk at all. Inspect the doe to see whether her udders have milk or if she has an inflammation. In case of inadequate milk, try to improve this with lactation-stimulating feeds, like California or other super-pellets, fresh greens, carrots or bread with dried milk powder. It can be worth a try, and in some cases succeeds, but occasionally a litter is lost. Don't try artificial feeding. It usually won't work, and at best, results in weakened bunnies am sure I will hear some moving stories of handraised bunnies--and I fully appreciate the devotion to a young life by some loving souls--but in most cases it ends in failure. Dealing with many kinds of animals over quite a few years, I have learned that one rarely can beat Mother Nature's whims, be they good or bad.

The Young

The little rabbits, which were born with closed eyes, begin to open them at ten to twelve days of age. A few days later you notice much more movement in the nest. At around three weeks, they begin to come out, usually late in the evening, and try to chew on whatever feed they can find. If they come out much earlier, it is a sign that they don't get enough milk from the doe. At this stage things can be managed. Provide accessible feed in low crocks and preferably some high protein pellets or other goodies. Give only a few greens to begin with, and especially no lettuce or hard-to digest cabbage. The first few days they'll pester the doe constantly to get to her teats, but as the doe consistently hops away they will soon get the message. One often sees the comic picture of the doe hiding in the nestbox and all the bunnies hopping around the cage.

Now there is one major risk in the beginning of this period--that the little ones get out of the nestbox in the evening and can't get back in. This could be risky, particularly on a very cold spring night with frost. It is a pity to see a couple of ice-cold bunnies huddled together in a corner of the

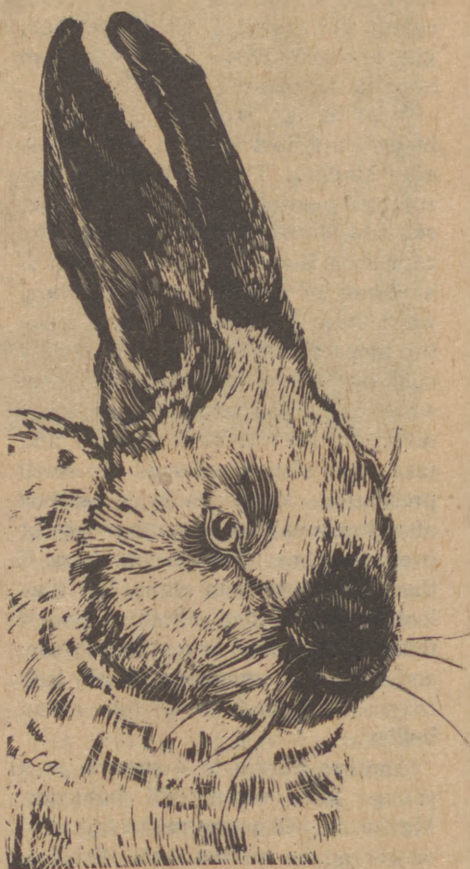
cage. My remedy is to place a ramp with non-slip strips perpendicular to the front of the box. They very soon discover that this is the simplest way to get out and in. It is all worth the special care, for this is the most fascinating time of keeping rabbits—a doe with a litter of lively little bunnies hopping around in the cage.

How long do you keep them with the doe? For me the absolute minimum is six weeks, but I usually make it at least eight. One of my major objections against selling and buying little bunnies for kids at Easter is that, apart from the lack of good care, these poor things have been weaned much too early to give them a reasonable survival chance. Please, don't buy them—or substitute a day old duckling. Both cases involve cruelty to animals!

Once bunnies are taken from the doe, one almost always notices that the youngsters lose some weight the first few days, but with good feeding this is soon overcome. Young things like to move around, so don't put them in too small a cage. You can leave them together until about three to four months. After that a separation of young bucks and does is desirable, and about a month later, it is time for individual cages. Some bucks start to fight does and begin riding each other, as they approach their sexual maturity. So unless you want to use your surplus immediately, plan enough cage space for that period. Should you want to select future breeding stock from this litter, it might be desirable to see them grow a bit longer before making your decision about which does or bucks you want to keep. This is the time, shortly after weaning, to watch out for diseases and other problems, like so called buck-teeth, a malocclusion of the front teeth.

Diseases

In many books about rabbits there is a frightening long list of rabbit diseases, with sometimes puzzling names for the layman, and what is worse, a lot of near-identical symptoms. Don't let it frighten you. I have lost very few rabbits to disease, even in the years when I was a youngster and all kinds of antibiotics and chemical remedies and vaccinations were unknown. Start with healthy rabbits, feed and house them well, never over-crowd and keep



everything clean. Set any rabbit apart as soon as you notice any change from normal. Breed with stock from a healthy line. Don't over-work your rabbits. Prevent stress from overcrowding, fright and noises, and you'll do fine in most cases. A lot of breeders these days are all too ready with antibiotics or other medication in the drinking water, either as a preventive or as a possible remedy against improperly diagnosed ills ranging from sniffles to diarrhea, lack of appetite, or a bloated or skinny appearance. This kind of hit or miss policy can result in rabbit meat with antibiotics or chemicals in the tissue, and not much better rabbits.

If serious disease strikes your stable and you lose more than just a few animals, the best action is to get rid of your entire stock and start over again in clean, well-disinfected cages. Put the cages outside in the sun for a few days, trying to eliminate what might have been the origin of the disease. It could be from the outside, like flies, rats or contaminated feed. Let's be honest. In general, it doesn't

pay to go to a vet and pay up to \$10 for a visit, plus medication and treatment for an animal which is barely worth that amount. Unless it is a favorite pet, or you are a show or specialty breeder and have valuable stock, it isn't worth going to a vet. Your best remedies are preventive. Good, clean management! Be a bit restrictive regarding visitors from outside who also have rabbits and might introduce disease in your stable.

Butchering

You knew when you started keeping rabbits that you would have a surplus to supply some tasty and nutritious meat for the family. So, when do you start butchering? Commercial breeders usually butcher or sell at about eight weeks, when, with good management, they can have a young rabbit weighing from four to four and a half pounds, which gives about two and a half pounds of tender frying meat. When your rabbits reach this weight, you can do the same, or you can wait a few weeks until they are close to 12 weeks old and still have a nice fryer producing up to three and a half pounds for a family meal. Rabbits weighing over six pounds live are usually called roasters. They might require a bit longer cooking, but still are excellent eating. When getting rid of older rabbits, you get stew rabbit, which is a nutritious dish in various forms.

How does rabbit meat taste? Delicious, and certainly not to be compared with gamey, wild rabbit. The meat is creamy white, a bit firmer than chicken, and has a nuttier flavor than store-bought chicken. Believe me, once you taste it, you can't wait for the next one. Don't discard the giblets, especially the liver and kidneys, which, in my opinion, are delicacies. You can also cook the heart and let your dog wag its tail in appreciation.

Butchering a rabbit, once you know how, is a fast job. With some experience, you can bring a clean carcass to the kitchen in about 10 minutes. The best way to learn is from a rabbit-fancier. Ask if you can watch the next butchering. Do things quickly with good sharp knives (fur blunts a knife very quickly) and don't be nervous, as the rabbit will sense this and be more difficult to handle. Have the rabbits fast for 12 hours in advance, but supply water. It is an easier job than dressing a chicken. □



Rabbit Recipes

by Gerry Willems

PAN FRIED YOUNG RABBIT

Cut rabbit in six pieces: 2 front legs, 2 hind legs, rib-cage, and middle part (if large rabbit, cut this part in two). Salt and pepper pieces. Melt $\frac{1}{3}$ stick butter and fry rabbit pieces on both sides. Add water and $\frac{1}{3}$ cup sherry or red wine (optional). Simmer for $1\frac{1}{2}$ to 2 hours, depending on age of rabbit. It is done when meat can easily be removed from the bone.

RABBIT POT PIE

For filling:

3 to 4 cups cut up cooked rabbit
3 large carrots
2 stalks celery
1 large onion
2 large or 3 small potatoes
 $\frac{1}{2}$ pound young green peas

6 tablespoons butter

$\frac{1}{2}$ cup flour

2 cups whole milk

$1\frac{2}{3}$ cups rabbit broth, vegetable water, some sherry (optional)

salt, pepper, nutmeg, parsley

For crust:

2 cups flour

1 tablespoon baking powder

$\frac{1}{3}$ cup grated cheese

$\frac{1}{2}$ stick butter

$\frac{3}{4}$ cup milk

cayenne pepper, salt

Cut vegetables (except peas) in bite-sized pieces and cook (including peas if fresh) in salted water about 20 minutes. Drain and save juice. Make sauce by melting butter (don't

brown), add $\frac{1}{2}$ cup flour, gradually add stock, vegetable water and milk. Let boil a minute, remove from heat, add sherry, parsley and spices. Add chopped rabbit and vegetables. Put in large casserole (8 x 12) or two smaller ones.

To make crust: Measure flour, baking powder, cayenne, cheese, salt, in a large bowl. Cut in cold butter, as with pastry. Add milk all at once. Stir with fork to gather dough together. With floured hands knead briefly to form dough. Roll out with floured pin, cut to size to cover casserole. Use leftover dough for biscuits. Place on top of casserole and bake in 425 degree oven about 20 minutes or until top is golden brown and casserole is bubbling.

Serves six to eight.

RABBIT CROQUETTES

Recipe makes about two dozen croquettes.

4 cups ground cooked rabbit (we often use meat from front legs and ribcages for this and the rabbit can be quite an old one.)

5 tablespoons butter

$\frac{1}{3}$ cup flour

$\frac{3}{4}$ cup milk

$\frac{3}{4}$ cup broth

2 tablespoons lemon

2 tablespoons sherry

finely chopped parsley

spices: pepper, nutmeg, $\frac{1}{2}$ teaspoon tabasco (optional)

salt to taste

2 eggs

corn flake crumbs

Make very thick sauce of the butter, flour, milk, broth, spices, etc. Stir in ground rabbit. Let cool. Form croquettes or small balls. Dip in slightly beaten eggs. Roll in corn flake crumbs. (Deep) fry in hot oil. If fried in shallow pan, turn them to get them evenly browned. Put on paper towel to drain fat. Eat warm or cool and freeze.

Bon appetit.





New for Old

by Alden Stahr

You've found your dream place--good land, open fields, woods, fine view. But the house! You probably cried out: "It's not fit for the pigs to live in! What can we do?!"

You can do what I did when I had to find a house and land affordable on a small income. I finally found one that had the land I wanted (6½ acres) and an approachable price--\$5,000, with only \$500 down. But the house! I was too numb when I saw it to take a "before" picture of it, but here's a word sketch. It was at least 75 years old. The walls were of double planks covered by split clapboards, loosely speaking. At the south end was a one and a half story wing that was open to the weather. Some owner in the long ago had wisteria "hysteria", for he had let one of the vines he planted get completely out of hand. In time, the wisteria had overpowered the house, breaking down the wing roof, splitting open the main roof and sending tendrils, like octopus arms, shooting out of the cracks in the clapboards. The back porch had collapsed under its weight, and its accumulated leaves had left a compost heap on the wing roof. Out of this heap grew a lone sumac tree.

The wing had been built from the bare ground up (no foundation visible under the wood), and its underpinning and floor were rotted away. The

front porch was in the same condition, and the walls of the main part of the house bulged fore and aft, a spread of about six inches out of plumb. The southwest corner of the house jugged out, supported over air by the rest of the building. Some of the windows were broken, and the frames in the kitchen disintegrated at a touch.

Higher up, the roof seemed sound, except that cleavage at the peak, where the expanding wisteria had forced it apart. Then, there was a see-through chimney. The ancient bricks had long since lost the clay mortar between them and were leaning forlornly together trying to hold each other up. Where the chimney joined the roof, some rusted tatters of flashing flapped in the breeze, and the rain was free to trickle down outside the chimney into the house, to the detriment of the upstairs plaster.

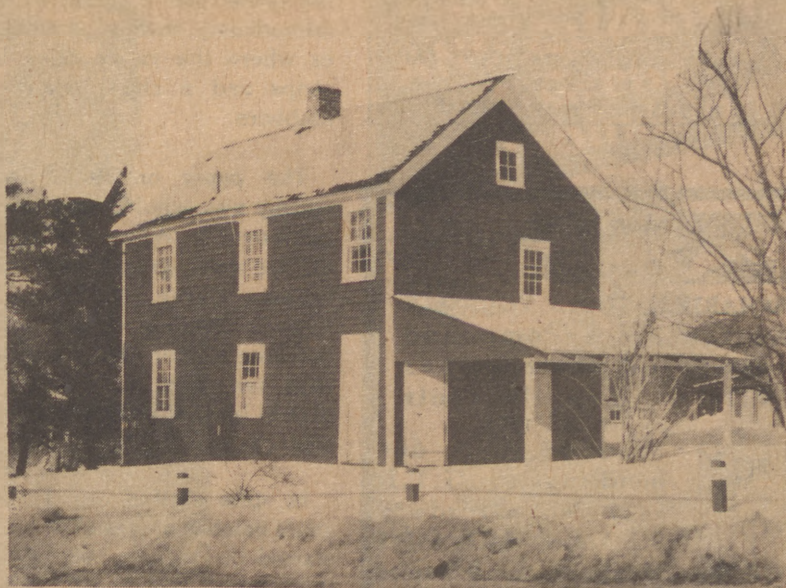
Now for a view of the inside, if we dare. The back door was askew because the frame had been twisted out of shape by the bulging and settling of the walls. Wrenched open, it revealed a dismal scene. A huge, antique coal range dominated the kitchen. It was one of those monsters with many shelves, doors, lids and a hood, and it was a dark rust color all over. Near it was a moldy Morris chair, cabinets with doors askew, broken dishes, and litter everywhere. Here and there floorboards yielded under foot where they had been worn thin by the feet of generations.

The living room, just as cluttered, had nevertheless, a feeling of welcome about it. As I entered, something seemed to pull me in. It was the sloping floor. The upstairs rooms were that way, too, and I felt as if I had an urgent appointment in the middle of each room. There were three ghastly rooms upstairs, littered with old clothes, yellowed newspapers, a pre-TV radio-phonograph, some strange cabinets. No bathroom. No closets. Just three stark rooms with pennants of wallpaper hanging limply, and water-stains dribbling down the chimney. A little pile of plaster rested on the floor. The walls--dark. The trim--gloom. Patches of linoleum here and there.

There was a full-length stoop-attic, about five feet high, with sunlight streaming cheerfully into it through a hundred spaces between the wood shingles, and a broad shaft of light angled through the split in the roof. A glaze of creosote ran down the crumbling chimney. In the gable, a main timber had rotted away, and a window frame dangled among flapping clapboards.

In every room there were yardsticks--yellow ones, red ones, white ones, green ones. And there were more empty whiskey bottles than yardsticks. The cellar floor, however, looked dry. Actually, it was frozen mud. Posts supporting the old log beams were rotted at the base. There was only one item of plumbing in the house--a kitchen sink set so low I had to bend over to turn on a faucet.

Life an House



So there you have it. Even though I had worked as a carpenter, I didn't really know what I was getting into. I had worked on new houses only. I was soon to learn that renovating an old house is as big a job as building a new one--and just as expensive if you have the work done professionally. But there was a possible structure within my means, and I couldn't wait to jump into it.

I undertook the job inside-out, backwards and upside down. The normal thing to do would have been to attend to the underpinnings first, repairing the rotted sill and working on up the outside to the roof and then going inside. But this was February in New Jersey, with blizzards and near-zero cold that winter. Outside work was out. And besides, the inside had to be readied first so that I could move in at the end of three months.

Starting Inside

Here are the tools I used for this job:

- Claw hammer
- Scraper and putty knife
- Chisels (wood and cold chisels)
- Wrecking bar
- Nail puller
- Crowbar
- Sledge hammer
- Stone hammer (necessary only for stonework)
- Framing square (or smaller one)
- Screwdrivers (Phillips and regular)
- Plane

Brace and bits ($\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1")

Electric drill and twist drills

Hacksaw

Wire brush

Nail set and center punch

Mason's trowels, large and small

Level and plumb bob

Saws--cross-cut, rip, keyhole, coping, bucksaw

Pair of pipe wrenches--15"

Tape measure

Pick

Shovel, pointed

Tin snips

Pliers (regular and long-nose)

Wire cutters

Assorted nails (6d, 8d, 10d, 16d common, some 6d and 8d finishing nails for trim)

Assorted screws

Bolts as needed

Leather gloves for ripping out old stuff, plastic gloves for working with plaster and mortar

Although I had a carpenter's tool box, I found that an ordinary 10-quart pail was the most convenient tool carrier for anything but long saws and large items.

Having prepared myself mentally and toolfully, I waded in. I carried enough old furniture and junk out of the kitchen so I could turn around and started ripping up the cracked and pieced linoleum. At first I carefully pried out the tiny nails that held aluminum strips in place. But that threatened to take months. I found that if I hooked an end of a strip into

the claw of the hammer and yanked, an entire strip would come up at one jerk, with nails popping in all directions.

The linoleum came up easily then, since it had not been cemented down, and I folded it into squares for convenience in carrying. After removing many layers of newspapers, I found the floor underneath was sound enough to use until I could at some future date cover it with plyscore and flooring tiles.

For doing a cruddy job like this and removing old plaster, I recommend using a respirator. If there was one discomfort that superceded all others it was the dust. It fell from the open beams. It clouded from the walls when I removed wallpaper and plaster. It rose from under every square foot of linoleum. It surrounded and permeated everything. It was the worst part of the job.

After clearing out the downstairs floors, I had a big sweeping session (more dust). Although I knew there was more dirt to come, it was satisfying just to clean out some of the filth and junk. At least I could now see the floors. Next I assaulted the walls. Ordinarily I would have wet down the old wallpaper with a solution of a

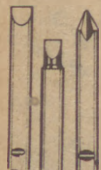
Alden Stahr farmsteads, retrofits shelters for himself and others, and freelance authors articles on woodcrafting, shelter and the like in Columbia, New Jersey. Photos by the author.

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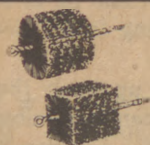


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couple of ounces of vinegar per gallon of warm water. But it was so cold in the house that it would have frozen immediately. Instead, I used a scraper where the paper came loose in strips and a chisel where it was stubborn.

The paper on the living room ceiling was whole, so I decided to paint over it. Where the paper came off the walls, great cracks appeared, running zigzag, the result of the house's settling. I got a bag of patching plaster--five pounds at first, then ten, then a 25-pound bag. I should have started with a 50-pound bag--cheaper that way.

In spite of the cold, I mixed up small batches of plaster at a time and started the tedious task of filling in the cracks and small holes. The spackle set very fast because I mixed it in a coffee can that had a little old plaster in it. For some reason this hastens setting, so it hardened before it froze. The flexible putty knife worked fine for this purpose.

At first I planned to use molding to cover the spaces at corners and ceiling. But there was no free molding available and even if it had been, it would have required a lot of time to install. Instead, on advice that plaster would make a tighter, draft-free job, I applied spackle. The trowel and putty knife were useless in the corners. I put on a pair of plastic gloves and whammed the spackle in roughly. Then I smoothed it with the putty knife and removed the excess, finishing by running a finger down the corner or along the ceiling edge. If you don't use plastic gloves, this is a fast way to remove skin from fingers.

The whole job of renovation seemed overwhelming, so I undertook one room at a time, did it completely, and went on to the next one. This meant going ahead with painting in near-freezing conditions. There was dampness in the plaster walls that might have blistered the paint in warm weather, so I applied a basement paint that permitted moisture to come through it even after it dried. It has one drawback, though--it is so permeable that sizing from old wallpaper comes through it, as did creosote on the wall beneath the chimney thimble. I had to cover these areas first with shellac and then a couple of coats of paint.

To simplify things and to give a feeling of color unity, I did all the ceilings light ivory, the walls in pastel turquoise, and all the floors in mahogany.

A Fly on the Wall

Painting ceilings is for flies. My face and neck and the newspapers on the floor were soon spattered. I even got some on the ceiling. My neck ached and my eyes seemed permanently tilted upward. My wrists hurt and my arms and back groaned in the mornings. But once the ceiling and a couple of walls were covered, the effect was astonishing and gratifying. How could a thin layer of colored chemicals produce such a miracle of cleanliness and brightness? From that point on, the job seemed possible.

With ceiling and walls painted, the living room needed only the floor done to make one room complete. (All trim, incidentally, received the same color as the walls.) The usual thing would have been to refinish the floor with a sander, and varnish it. But this would have involved more labor and expense, and the floors were too rough to warrant such treatment. An alternative would have been to cover all the floors with plyscore after shimming up to make level, and then laying tiles or other material. Again--too much labor and expense. The expedient was to clean thoroughly, sweeping and vacuuming, and then to apply a coat of tough porch-and-deck enamel.

Before painting, though, I filled knotholes with plastic wood, cracks with caulking, and pulled small nails left from the linoleum strips. Then I went over the entire floor, driving in projecting nail heads. In some areas, years of foot-wear had worn down the floor an eighth of an inch around them.

What a satisfaction it was to get one room finished. It gave me the impetus to start on the kitchen. Here the plaster was worse. I had to knock down one large area altogether, and I didn't feel like replastering such a large space. There was a way around that. The beams were exposed in the kitchen, and I liked them that way. But a previous owner had put up two slabs of sheetrock as the beginning of a ceiling. By taking these down carefully I was able to use them on the wall. Elsewhere were many cracks when I removed the wallpaper, so I spackled these.



Of the nine room-doors and four cabinet doors in the house, not one came anywhere near fitting, probably due to the sagging of the house. I had to take down all the doors and saw and plane as necessary to make them fit. The old screw-slots had been filled in with paint, and I had to clear them with a chisel before I could insert a screwdriver. Where screw-holes were too loose, I used either larger screws or filled with plastic wood before screwing. I removed latches and catches up or down or sideways as necessary.

At the bottom of the stairs several floorboards had been worn so thin there was danger of breaking through to the cellar, so I replaced them with boards of near-equal thickness to the sound part of the floor. The log beams underneath were so irregular that I had to insert shims--in this case, pieces of wood shingles under the new boards to even them with the floor. I corrected springiness in the middle of the kitchen floor by putting two cinder blocks on the cellar floor and erecting 4" x 4" posts on them to support the log beams.

The built-in kitchen cupboards were badly littered and dirty, but were sound and usable once I had rehung the doors. The only solution to the inside condition was to scrape the dirt out with a putty knife, then wire brush and vacuum and scrub with detergent. A coat of paint on walls, top and bottom of shelves completed the sweetening and cleaning process.

Working my way upstairs, I removed torn linoleum and repaired the steps, replacing a few treads and risers with lumber I found in an old chicken house on the property. The second floor, too, was covered with ragged linoleum, but this time I left it down until I finished removing wall-paper, spackling and painting. Then when I took up the linoleum, I found a few gaps in the floor which I left open for heat and as a sort of intercom with the downstairs. The floors in the upstairs rooms were dished because of the 15-foot span of the 2" x 6" beams, but I left them that way for their "antique" value and to avoid replacing all the beams or putting posts in the downstairs rooms.

Water had trickled down around the chimney and had ruined the plaster, but there was no use replastering or painting here until I could fix the chimney in the spring. It was next to the chimney, too, that I wanted to cut a door for a bathroom, so I left this area unpainted for the time being.

To Make A Bathroom...

The problem of a bathroom was acute. One of the upstairs rooms was very long, so I measured off enough space for a bathroom and started to cut a door through the wall next to the chimney.

A couple of blows with a hammer knocked down enough plaster to uncover the old lathing. It also showed that the studs were rough-hewn timbers approximately 3" x 5"

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on 15" centers. This meant building a door that was a bit narrow--25"--but it was preferable to knocking down more wall than I had to. The upstairs ceilings were only 6'2" high, so I had to make a door opening full height, with only narrow trim on top. I was constantly banging my head on the other two door lintels upstairs, as they were only 5'8", and my own height is, unfortunately, 6'2".

Breaking down plaster for the doorway was easy, but it made a terrific cloud of dust. Then I had to pull off and de-nail every strip of lath. To even the edge of the remaining plaster I cut a straight line with a hammer and an old chisel. I had to remove only one stud and accomplished this by knocking its bottom free with a heavy hammer and then using the stud as a lever to free itself from the toed-in nails on top. I had to saw through the baseboard, plaster and all, and was glad I had an old crosscut saw for that purpose.

I put in a 2" x 4" header, level and square with the studs even though it did not agree with the sloping ceiling. Then I made a door frame from lengths of 3/4" x 6" pine that I ripped by hand to conform to conditions. One side of the door butted against the chimney, which was so irregular that I had to custom-saw the frame on that side and fill gaps with spackle.

I made a bathroom door out of flooring boards, held together by two cleats of 1" x 6". The floor sloped away from the chimney, so I had to cut the bottom of the door in such a way it would swing freely, but it left a one-inch gap when it was closed--an advantage for ventilation.

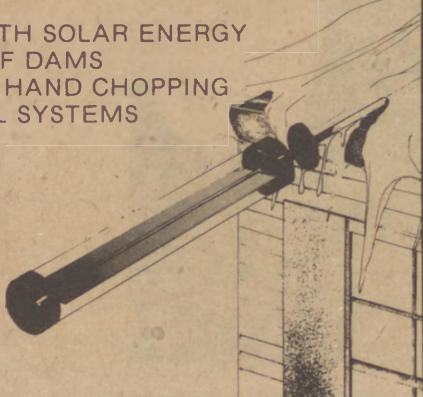
There were plenty of used 2" x 4"s in the chicken house, so I framed the partition with these. Once the studs were up, I drilled holes and ran #10 electric wire from the ceiling socket in the kitchen to provide outlets in both the bathroom and bedrooms.

The sloping floor made it necessary to measure for each stud individually because each length was different. I had to use makeshifts for temporary wallboard. Part of the kitchen floor had been covered with masonite, and another piece had been in the wing. I cut these to measure for an inside wall for the bathroom until I could afford a couple of sheets of tileboard. I covered the bedroom side of the wall with used Homasote, painted it with latex-base paint, and the bathroom side with enamel.

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New bathroom fixtures would have been too expensive, so I had to find a way to reduce that cost. The man who sold me the house was a plumber with a farm. Down in his pasture was a bathtub that served as a watering trough for his cattle. He let me have that—a white tub on four black feet—and a used basin and toilet for \$25, and he installed these fixtures for about \$100.

Under the bathroom, the floor was supported by slender 2" x 6"s, 15-feet long, too long a span for comfort under a bathtub. I cut in a short 2" x 4" under the ends of several beams to give added support, but I still warned that anyone who filled the tub beyond half would have the responsibility of getting himself and the tub back up from the kitchen in case of disaster.

Although there was a 4" tile sewer line from the kitchen to the septic tank, the plumber advised installing a new line with root-proof Orangeburg pipe, because in all probability the old two-foot lengths of tile had been penetrated at the joints and heaved out of line by roots in the 25 years since the line had been installed. A backhoe dug a trench and sump hole in three hours at a cost of \$25. Because of the expense I said I would refill the ditch in spare time. You never really know how much work a machine can do until you try to follow its work by hand. I took me three months at 15 minutes a day to fill in the ditch.

I filled the sump hole with stones to provide a place for excess water from the septic tank since there were no laterals. Also, I laid an extra pipe in the ditch and ran it to road edge to serve as an emergency cellar drain.

Having a bathroom necessitated a vent pipe through the roof, and installing this was a neat trick. The plumber's helper brought a length of pipe up an extension ladder while I descended from the peak of the roof on a "chicken ladder". Between the two of us we raised the long 2" pipe and lowered it through a hole in the roof. It was a dangerous job, and we both felt relieved when it was over. □

This is the first of a two-part article about Mr. Stahr's home retrofitting. Part Two will detail the rejuvenation of the outside of his home.

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Hole in One:



Making Your Own Doughnuts

by Frances Sheridan Goulart

Do you brake for doughnuts? You are not alone. Doughnuts sell like hot cakes in America. Even better. "75 percent of all the stores that sell doughnuts exclusively," writes Michael Lansky in *The Complete Junk Food Book*, "stay open 24 hours a day dispensing them with fresh hot coffee. And most do a lucrative business..."

In 1929, 216 million dozen of "the poor man's rich food" were sold. By 1974 sales were up to 15 billion dozen per year. And in 1979, Peter Dodswell of Earl's Barton, England set a world record by polishing off 113 doughnuts in eight minutes.

If you have the average American's love for explicit sweet stuff, about the best you can do is 750 a year which is more than enough in the opinion of the National Institute of Dental Research (NIDR). Jelly-filled and glazed doughnuts are at the top of the NIDR's new Cavity

Potential List. Taking a doughnut break is what the NIDR defines as a "sucrose meal". And "as the number of sucrose meals goes down from 17 to 3," they report, "the number of cavities drops almost 60%." Worse, doughnuts are addictive because of the sugar, and fattening because of the calories.

While one plain doughnut has three teaspoons of sugar, the glazed version will get you six. *The Fast Food Calorie Guide* notes that the average Dunkin Donut stick, ring or cruller, which can be polished off in a matter of minutes, is heavy stuff calorically, 240 calories a piece with maybe 10 to 50 calories for the glaze filling or topping. And generally speaking, the cake-type doughnut had five times more sugar than yeast-raised. And don't forget the fat. A normal cake doughnut absorbs about 18 percent of the fat it's fried in and yeast raised, 15 to 25 percent. Put another way, according to Frank Konishi, author of *The Exercise Equivalents of Foods*, to pay for that 120 seconds of doughnut-induced euphoria, you have to do one of the following: Walk 24 minutes per plain doughnut or 44 minutes per glazed doughnut, bicycle 19 or 34 minutes for plain or glazed, swim 15 or 27 minutes or jog for 13 or 23 minutes.

But the ecstasy of a good doughnut apparently is worth the agony. A typical chain operation, like Winchell's Doughnut Houses of California, may run 800 outlets open

Frances Sheridan Goulart helps her readers stay healthy and fit in Weston, Connecticut. Illustrations by Carol Varin.

seven days a week all year, which is why doughnuts are always big business even when they aren't called "doughnuts". Today, says Donut-King Verne Winchell, according to Dr. Fredric Cassidy, editor of the Dictionary of American regional English, "...fried cakes are the yeast-leavened, fried dough that you have during a coffee break in the north-central states. The original doughnut gained its name because the dough was shaped into a nut-like ball--later, a culinary genius conceived the toroidal shape, which enabled the cake to float in the frying fat so that it could be flipped over easily and not stay all soggy inside..."

In New York and New England, the fried cake word is cruller, from the Dutch "krull", or "twist"--root of "curl". Glazed doughnuts (also spelled donuts) are popular there; when the doughnut is long and straight, it takes on the name of underwear--long johns. During World War I, dunkin-style doughnuts were called doughboys. In addition, they may be called beignets, munchkins, sinkers or bismarcks.

Today, says Verne Winchell, "the doughnut that always seems the most popular is the chocolate-iced cake doughnut..." (Runner-up is the yeast-raised glazed doughnuts.) Yeast-raised, cake-style and cream puff are the three broad doughnut categories. Beyond that the possibilities are endless. After all, Dunkin Donuts makes 53 kinds with 200 variations.

Following are some old-fashioned formulas that keep tradition alive while eliminating "traditional" ingredients such as salt, sugar, white flour and in a few cases, even the frying. But first a few basics.

Doughnut Do's and Don'ts

Want a little crunch in your crullers? Add ¼ cup chia, poppy or sesame seeds per batch uncooked batter.

Nutmeg, say those in the doughnut know, is the best spice for doughnuts. But if you want to say nuts to nutmeg, who's to stop you? You could use cinnamon, for instance, which is number 5 on America's list of best-loved, most-used spices, or you could branch out and try a little mace in your dough, powder or glaze. Mace, says the Spice Trade Association, is "essential in pound cakes." It also adds a golden tone, an exotic flavor and it is an invaluable additive to chocolate dishes. Besides that, "it increases delicacy and cuts oiliness. It is often substituted for cinnamon or nutmeg."

If you're frying, keep your oil on high. To test readiness, drop in a few grains of salt. If salt rises to the top immediately, oil is ready. Reduce heat and begin to fry. Do not put in more than three or four doughnuts at once. Overloading lowers the temperature and tends to make the oil bubble, preventing dough from cooking properly. Remove and drain on brown paper bag, egg cartons, or white paper towels for maximum amount of absorption.

In general, doughnuts should be fried at 375 degrees. If the oil is hotter, they brown too soon. If it is cooler, they absorb too much oil before browning.

"A good doughnut," says the head of Salt Lake City's Spudnuts chain, "is fried only in top grade polyunsaturated vegetable shortening. Animal fat tends to leave a tell-tale taste."

Adding one tablespoon of shortening or butter per batch of dough contributes to the delicacy of texture and flavor.



And here's a little open-doughnut surgery. If you're planning to pack a frosted doughnut-to-go, slice doughnut in half horizontally and place the bottom on the top. The frosting thereby becomes a non-sticky filling.

Glazes and Frostings

Peppermint Frosting: Beat one egg white until stiff. Slowly incorporate ¼ cup honey and ½ teaspoon peppermint using a wire whisk. Continue beating until it thickens or add small amount of powdered milk.

Honey Glaze: In a small dish, sprinkle one teaspoon gelatin over ¼ cup cold water to soften for five minutes. In a saucepan combine ½ cup water with ¼ cup honey and bring the liquid to a boil. Remove the pan from the heat, stir in the gelatin, and continue to stir the mixture until it dissolves. Stir in one cup milk powder, sifted, blend the glaze until it is smooth. Keep warm until use. Makes one cup.

Maple Glaze: Follow instructions for Honey Glaze, substituting maple syrup.

Lemon Glaze #1: Put in small saucepan: 1 tablespoon butter, 2 tablespoons honey, juice of one lemon, ¼ teaspoon grated lemon rind. Boil three minutes until syrupy. Glaze as desired.

Lemon Glaze #2: Place in small saucepan: ¼ cup honey, ¼ cup lemon juice, ¼ cup powdered milk. Bring to a boil, boil 3 minutes. Cool one minute and drizzle over cake as desired. Stays moist and sticky.

Carob Frosting: Melt a 4 ounce square of chunk of carob (available now without and with sugar, so check ingredients), in a double boiler over hot, not boiling water. Keep warm.

Baste each doughnut while still warm with 1 teaspoon melted carob. Let dry at room temperature. Optional: Add a pinch of mace, cinnamon, nutmeg or allspice. Or a drop of vanilla or almond extract.

Cinnamon Rose Icing: Follow instructions for Peppermint Frosting, but substitute 1 teaspoon each of freshly ground cinnamon and dried rose hips.

Doughnut Dusting Powders

To use as "sugars", pour any of the following into a paper bag, adding warm doughnuts (two at a time) and shaking them until they are coated. Or to use as "sprinkles", spread any of the following on a sheet of waxed paper. Dip the frosted or glazed face of the doughnuts into the powder or simply sprinkle powder on by hand.

Unsweetened coconut, toasted or raw

Sprouts (seeds or nuts), raw or lightly toasted and coarsely ground

Citrus "zest" (the dried, ground peel of organic oranges, tangerines, lemons, etc.)

Toasted millet or toasted sesame, chia or poppy seeds

Crushed granola or toasted rolled oats

Wheat germ, corn germ or bran flakes

Unseasoned whole grain puffed cereals

Pumpkin seed or sunflower seed meal

Finely diced dried fruit

Bee pollen or leuthen granules

Powdered herbs (tea leaves): Try aromatic blends like peppermint and camomile, rosehips and cinnamon, lemon balm and alfalfa, alone or with any of the above combinations

Mocha or Pfefferneusse: Dry milk powder sifted with one part carob powder or substitute 1 teaspoon freshly ground black pepper for the carob

Mock Licorice: 2 teaspoons cinnamon, ½ teaspoon fennel seed, ½ teaspoon whole cloves. Grind and combine spices. Stir into ¼ cup dry milk powder.



Sugar 'n spice: Combine ¾ cup finely ground date sugar or barley malt powder with 3 teaspoons ground cinnamon plus ¼ teaspoon soy leuthen granules.

Jelly Rollers

YEAST-RAISED AND FILLED DOUGHNUTS

1 tablespoon dry yeast
¾ cup apple juice or cider
2 to 4 tablespoons honey
3 beaten eggs
3½ cups whole-wheat pastry flour
½ teaspoon salt
2 teaspoons cinnamon
1 tablespoon orange, lemon rind or mint
½ cup oil
1 teaspoon vanilla (optional)

Dissolve yeast in ½ cup warm apple juice or cider. Add sweetener. Stir and set aside five minutes or until mixture bubbles. Add eggs. Add enough flour to form a thin batter. Beat until smooth and not lumpy. Clean down the sides of the bowl with a rubber spatula. Cover and let rise in a warm spot until it is almost doubled in size.

Combine the rest of the dry ingredients (reserve ½ cup of flour) cutting in the oil. Add vanilla. Combine dry mixture with yeasted batter. Stir mixture and beat. Add only enough juice or cider to form a soft sticky dough. Knead dough on a lightly floured surface, kneading the reserved ½ cup of flour to make the dough smooth. Place in an oiled bowl, cover and let rise in a warm spot until doubled.

Flatten it out on a hard surface, and flour lightly. Fold dough in thirds like an envelope and pat it out again. Place it on wax paper on a board; cover with a cookie sheet or other flat surface. Place a weight on it and chill at least one hour to firm the dough. Roll, cut out doughnuts. Cover and let them rise five minutes.

Deep fry three to five minutes. When it is cool, cut a slit in the side of each doughnut and spoon in a teaspoon of your favorite jelly. Glaze and dust as desired.

ZUCCHINI NUT DUNKERS

1 recipe jelly rollers
2 small zucchini, shredded
½ cup finely chopped walnuts
1 additional egg
1 teaspoon grated lemon rind, lemon glaze

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Prepare recipe for doughnuts as directed in Jelly Rollers, but substitute nuts and zucchini for $\frac{1}{2}$ cup flour and add one more egg. Add shredded zucchini, walnuts and lemon rind. Roll out; cut and fry. Dip top half of doughnuts into Lemon Glaze. Dry at room temperature.

Fear of Frying

BASIC BAKED DOUGHNUT #1

2 cups whole wheat or unbleached flour
2 teaspoons baking powder
 $\frac{1}{4}$ teaspoon each mace and cinnamon
 $\frac{1}{3}$ cup date sugar or barley malt powder
6 tablespoons butter or nut oil
1 egg
 $\frac{1}{2}$ cup milk, cream or yoghurt

Sift dry ingredients. Cream egg and butter and add to dry ingredients alternating with the milk (or its substitute). Mix well.

Turn the dough out onto a lightly floured surface and knead it, adding more flour, if necessary, to make a soft but not sticky dough, for one minute. Roll out the dough $\frac{1}{3}$ -inch thick and cut out with a three-inch doughnut cutter.

Have ready in a bowl $\frac{1}{2}$ cup butter, melted and cooled, and in another bowl $\frac{1}{2}$ cup of any of the Dusting Powders. Dip the rounds and holes in the butter and then in the Dusting powder. Put them $\frac{1}{2}$ -inch apart on a lightly buttered baking sheet. Bake in the upper third of a preheated hot oven (400 degrees) for 15 to 20 minutes, until they are browned. Makes about 10 doughnuts and holes.

BASIC BAKED DOUGHNUT #2

1 cup water
 $\frac{1}{2}$ cup unsaturated vegetable oil
 $\frac{1}{4}$ teaspoon salt
1 cup whole wheat pastry flour
4 large eggs
1 teaspoon vanilla extract

Measure the water, oil and salt into a 4-quart pot and bring to the boil. Add all the flour at once, and immediately begin to stir batter briskly with a fork until it is quite cohesive, and the texture of well-cooked oatmeal. Remove from the heat and allow to cool for five minutes.

One at a time, beat the eggs in very well with a fork, until the batter shows a satiny sheen. Stir the vanilla in well. Grease two large baking sheets. Spoon into a pastry bag with a large aperture nozzle and squeeze out 3" circles leaving a 1" wide hole in the middle. Bake 40 minutes at 375 degrees until risen, golden and firm. Cool and glaze.

And finally to round things out:

GRANNY SQUARES

4 cups unsifted whole wheat pastry flour
1 teaspoon salt
1 teaspoon nutmeg
 $\frac{1}{2}$ teaspoon ginger
 $\frac{1}{2}$ teaspoon baking powder
 $\frac{1}{4}$ cup honey
2 tablespoons butter, softened
1 egg
1 cup sour milk or yoghurt

Sift dry ingredients. Cream honey and butter; add the one egg and beat. Add milk and beat. Add sifted ingredients all at once and mix well. Cover and chill a few hours or over night. Divide dough into two parts, toss on floured board and roll to desired thickness. Cut out with square biscuit cutter. Dough will be soft--do not add flour. Fry in deep fat at 400 degrees. Turn quickly as soon as doughnuts come to top. Brown and turn and cook to desired brownness. Makes about 2 dozen. □

MADAWASKA

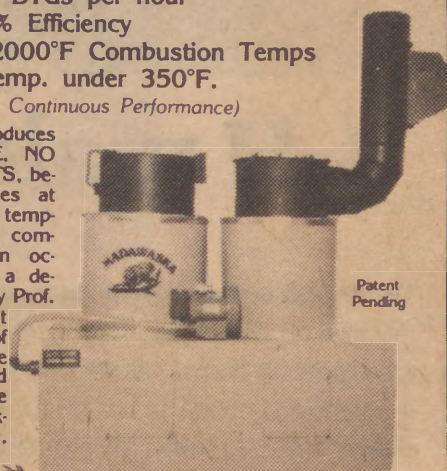
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GARDENING BREAKTHROUGH

A new miniature greenhouse system requires no installation or artificial heat and protects your plants down to 22°

John E. Bryan

Author, *Small World Vegetable Gardening*
Former Director, San Francisco's Strybing Arboretum

It's a miniature greenhouse system. You can now grow vegetables months earlier this year with a greenhouse system so practical it doesn't require installation or artificial heat---even when it's 10° below freezing.

I've been growing vegetables for 24 years. I've tested every kind of greenhouse for home gardening. And just like you I've been alarmed at the cost of building and heating a greenhouse. But now I've found a miniature greenhouse system that needs no installation, yet protects plants down to 22° without using artificial light or heat.

It's true! I've grown vegetables in freezing cold weather when I've used these miniature greenhouses. Without artificial heat I've grown vegetables months ahead of outdoor growing seasons. With GUARD 'N GRO I've grown cool weather crops like carrots, spinach and lettuce when it's too cold to grow anything outside. Without any installation these miniature greenhouses have protected my plants down to 10° below freezing. And now to help my friend who invented GUARD 'N GRO I want to tell gardeners everywhere about this superb gardening system.



Energy-Saving Double Wall Construction. Even on cold cloudy days, thermal air cells sealed between each GUARD 'N GRO panel trap and seal in solar heat to provide a constant warm climate for your plants.

DEVELOPED IN CALIFORNIA

These miniature greenhouses were developed in California by my friend who named them GUARD 'N GRO. He spent years testing every possible kind of solar enclosure on plants and watching the plants react to each enclosure. From these years of testing he developed GUARD 'N GRO, the miniature greenhouses with sealed in thermal air cells.

When he sent GUARD 'N GRO to me I tried them on plants in freezing cold weather. GUARD 'N GRO kept my plants growing even in 22° cold. Soon my friend started selling GUARD 'N GRO to gardeners in other states.

It has produced superb results in Minnesota, Michigan, Colorado and Iowa. 2,000 GUARD 'N GRO systems are being used by gardeners in 46 states.

Last winter I gave GUARD 'N GRO to expert, experienced gardeners to test for themselves. They reported "We don't believe it but it's true, GUARD 'N GRO protected plants down to 22° without artificial light or heat." That's what hard boiled experts say.

But even more important to you is what other average gardeners say. Here's a typical letter...from Mrs. Ruby Schultz of Tucson, Arizona. "Last winter I put my geraniums and tender plants in our GUARD 'N GRO...it was freezing cold - at least 18° to 20° above zero. I like GUARD 'N GRO very much. We have a larger greenhouse, but it gets cold in the winter as it is not insulated - it has to be heated in cold weather."



The basic GUARD 'N GRO unit is 42" long x 18" wide x 21" tall. Extensions that add another 40" to each unit let you connect individual units together. You can expand GUARD 'N GRO to six, nine or twelve feet...or as long as you like.

GUARD 'N GRO is different from any cold frame or greenhouse you've ever used. It folds flat for storage, sets up anywhere outdoors and doesn't require installation. Without using artificial heat each unit creates a dependably warm growing environment even when it's 10° below freezing outside.

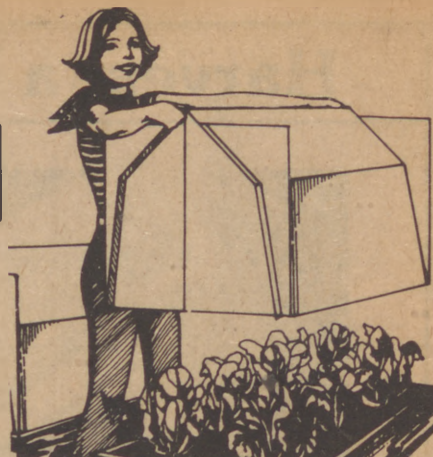


Your entire garden can be protected by the GUARD 'N GRO system when you join individual units together.

Think what this means to you! Now at last you can grow your own vegetables weeks, even months earlier this spring. You can protect your plants from killing frosts, freezing cold, hail and sleet...and never spend a penny for greenhouse heating or lighting. You can extend your growing season at least 4 weeks, spring and fall. You can grow cool weather crops like lettuce, carrots, broccoli, spinach, beets, Brussels sprouts, cauliflower, onions and broad beans, and do away with buying these vegetables at stores.

QUALITY FEATURES

Don't confuse GUARD 'N GRO with those plastic "bag-like" greenhouses that puncture easily. GUARD 'N GRO is made of tough, shatterproof polypropylene...won't shatter, rip, or puncture. Patented, galvanized metal fasteners anchor GUARD 'N GRO against strong winds. Solar panels trap and seal in the sun's heat...keeps your plants warm even on overcast, freezing cold days.



Grow vegetables weeks, even months earlier this spring. GUARD 'N GRO - with it's thermal air cells - keeps soil and plants warm and moist even in 22° temperatures. No installation, no artificial light and no artificial heat is needed. In 46 states GUARD 'N GRO is saving time and money for home gardeners. Now at last you can grow vegetables weeks, even months ahead of normal growing seasons...and never spend a penny for greenhouse heating, lighting or building.

NO RISK TRIAL

No longer do you have to wait until warm weather to enjoy vegetables from your garden. Order GUARD 'N GRO...the miniature greenhouse system that needs no artificial heat...on a trial basis. Then really test the system. Use GUARD 'N GRO anywhere you like...use it as often as you like...to prove it's plant growing powers.

See for yourself how GUARD 'N GRO creates an ideal growing climate for your plants. See how it traps and seals in the sun's heat...how it keeps plants warm and moist...even when it's 10° below freezing outside.

Use it to grow lettuce, carrots, spinach, beets, broccoli...most any cool weather vegetable you like to eat.

Put GUARD 'N GRO to every test. If you don't agree it's the greatest gardening breakthrough you've ever used...if it doesn't pay for itself many times over in the vegetables it gives you, you have used it entirely free. It won't cost you a penny.

FREE BOOK

To get your GUARD 'N GRO system now, mail coupon below. Order now and receive free my 26 page gardening book. It's packed full of tips for year round gardening with the GUARD 'N GRO system. Don't delay. Supplies are limited. Mail the coupon now.

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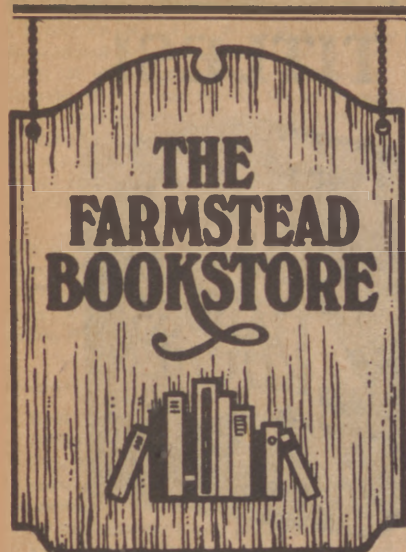
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THE UNDERGROUND HOUSE BOOK by Stu Campbell

As reviewed in FARMSTEAD, Fall 1980

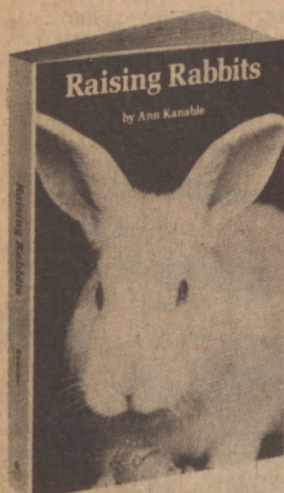
G42 THE UNDERGROUND HOUSE BOOK by Stu Campbell. "This book can help you to decide if you wish to live in-ground and can instruct you how to begin. The book begins with an overall look at the nature and history of below-grade housing. In its remainder it is 'a book of facts, about financing, lighting, humidity control and the rest. But more important it's an emotional book--about warmth and security, privacy and peace of mind.' For the first time I would consider moving underground." E.LaC.



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RAISING RABBITS by Ann Kanable

As reviewed in this issue!



R55 RAISING RABBITS by Ann Kanable. "Mrs. Kanable formerly owned and operated both commercial and home rabbitries--her expertise is apparent in this volume. In four areas, particularly, **Raising Rabbits** offers the beginner valuable information. The nature, causes and treatment of common rabbit ailments are covered. Methods of prevention, including natural and herbal remedies are explained clearly. Clear explanations of rabbit slaughter and butchering and two dozen tempting recipes are offered along with methods of incorporating rabbit manure into an earth worm raising and composting scheme. Most importantly, Mrs. Kanable makes precise recommendations for diet and nutrition including suggestions for supplementing bought feed rations with home grown feeds. She supplies an analysis of nutritional value of home grown feeds so that the farmstead rabbit raiser can carefully measure feed supplements. **Raising Rabbits** reminds the prospective rabbitier that this small stock animal is a large contributor to the small farmstead." E.LaC.

Paperback; 208 pages \$5.95

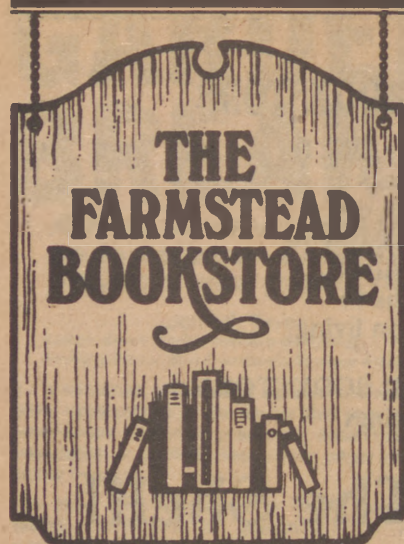
WOOD HEAT SAFETY by Jay W. Shelton

To be reviewed in FARMSTEAD Winter 1981

G38 WOOD HEAT SAFETY by Jay W. Shelton. "You can never know enough about woodburning--especially in the area of safety. **Wood Heat Safety** is a new publication that thoroughly covers this all-important topic--the best book on the subject I've seen to date. If you are at all anxious about using a wood stove, furnace or fireplace, Jay Shelton will reassure you. He's a nationally known heating consultant and researcher who heats his own home with wood. He'll tell you about how to work within safety codes, how to start a fire, how to inspect for creosote build-up and what to do with the ashes. In his well-organized chapters, everything is covered from chimneys to insurance, from safe clearance to stove designs. The pages are filled with detailed diagrams and descriptive photos clearly demonstrating safe and unsafe systems." L.A.A.

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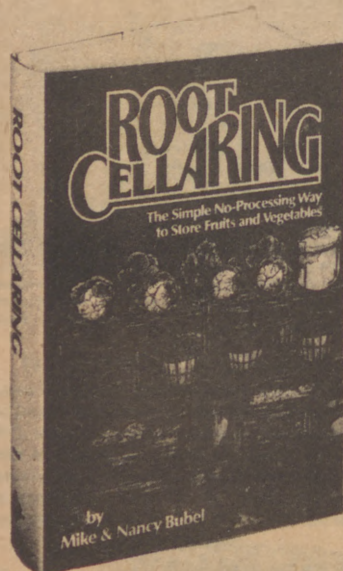


As reviewed in FARMSTEAD, Summer 1980



G36 HOME ENERGY FOR THE EIGHTIES by Ralph Wolfe and Peter Clegg. Solar Energy. Wind power. Water power. Wood heat. The energy alternatives for the productive and conserving homestead of the next decade are discussed completely as to theory, technology and the equipment used in each field. What this easy-to-read book offers the lay reader is the true picture for each energy alternative, so the reader can make knowledgeable, accurate decisions about alternatives to his or her present systems. The explanations are non-technical, but the terminology would be recognized by any consultant or supplier. Source catalogs of equipment, dealers, consultants are included for each type of energy alternative. The kind of guidance the book offers is vital and instructive. 272 pages, 300 photos and illustrations.

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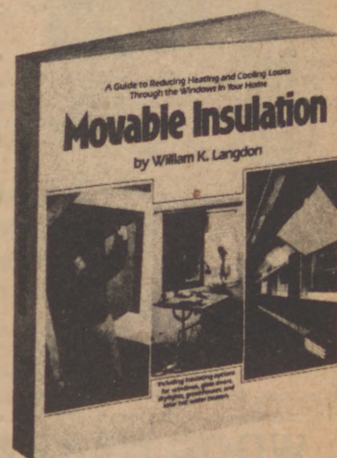


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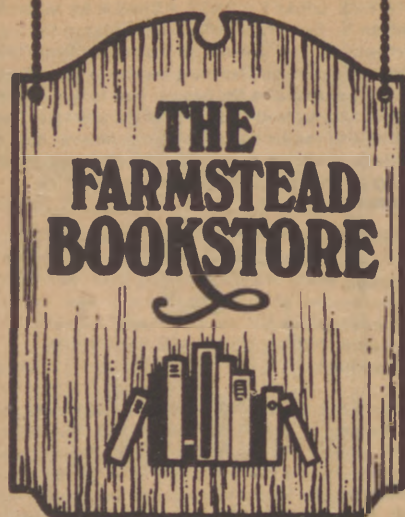
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The Farmstead Reviewer

RAISING RABBITS. By Ann Kana-
ble. Rodale Press. 1980. \$5.95 paper-
bound.

by Ellen LaConte

For those who are convinced by
Jan Willem's thorough article
that rabbits are a basic meat
animal for the farmstead, Ann Kana-
ble's book is an excellent next read.
Mrs. Kanable, now retired, formerly
owned and operated both commercial
and home rabbitries, and was rabbit
editor for *Countryside* magazine and
its predecessor *Small Stock Journal*.

In four areas particularly, *Raising
Rabbits* offers the beginner valuable
information. The nature, causes and
treatment of common rabbit ailments
are covered in sufficient depth to give
the reader confidence to begin raising
rabbits (they are not, after all, the
Camilles of small stock) and a fighting
chance at prevention and diagnoses of
rabbit illnesses. Methods of prevent-
ion, including natural and herbal
treatments, are explained clearly,
especially when illnesses are caused
by nutritional deficiencies, stress,
crowding or insufficient care.

Clear diagrams and descriptions
make rabbit slaughter and butchering
seem a possibility akin to dressing
chickens. A dozen or so recipes
from Rabbit Salad to Creole Rabbit
and recipes for the odd parts make the
otherwise odious task of killing the
furry beasts worth the repression of
Easterly memories.

Recommendations for supplement-
ing store bought feed, for growing or
blending your own, for using vitamins
and a thorough nutritional analysis of
home-grown rabbit feed stuffs offer
the potential rabbit raiser a rational
hope of raising rabbits that are thrifty
both financially and physically.

Finally, Mrs. Kanable makes use-
ful suggestions for using rabbit
wastes and for combining a rabbitry
with earth worm raising and compost-
ing. Suggestions that remind the
prospective rabbitier that this small
stock animal is a large contributor to
the small farmstead.

This is a good and encouraging
book. A farmstead tool.

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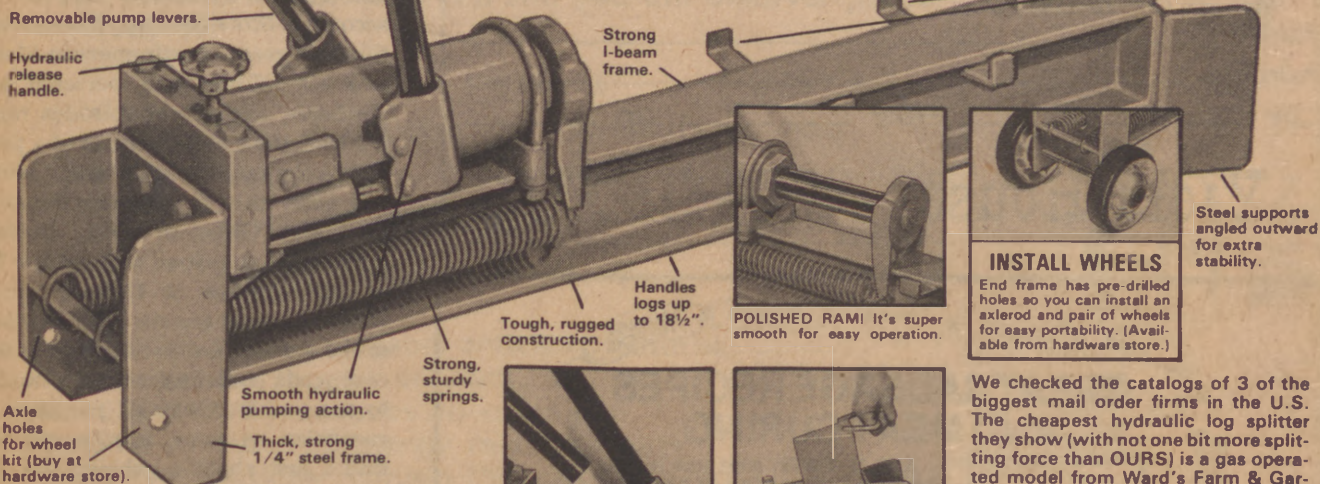
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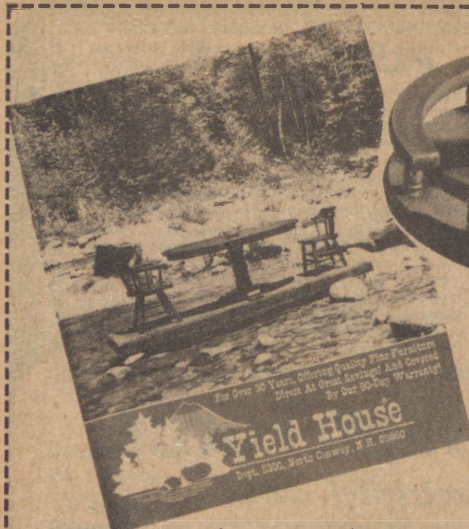
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THREE FROM STEPHEN GREENE

by Ellen LaConte

DOWSING FOR EVERYONE. By Harvey Howells. Stephen Greene Press, Brattleboro, Vermont. 1979. \$5.95.

If you are not predisposed "to matters not of this world alone", not willing to believe that a person can find things--water, hidden objects, your car, even other people--by dowsing for them with rods of metal or wood charged with belief, then this volume is not for you. If you are curious, open-minded and willing to suspend disbelief or if you'd really like to learn to dowse your own water or other elements and emanations, you will find the history, techniques, legends and enthusiasm for the art in Howell's account of his five years as a converted believer and dowser. A retired playwright, author and adman--a rational man by all accounts--Scots-born Mr. Howells has filled his years of retirement in Maine and his volume with personal and verifiable accounts of episodes ranging from the simple location of a pond site to the map-dowsing--from Maine --of water sites in bone-dry Bermuda by Harry Gross in 1949. Howells suggests that anyone with faith in his or her abilities (a Celt by birth, Howells claims genetic predisposition to the unseen powers, but denies that one needs such links to other worlds to succeed at dowsing), can learn to recognize an aura, man a rod and find...just about anything. Dry humour, an intelligent, Anglicized style and anecdotes by the score make **Dowsing for Everyone** a fun and potentially useful read.

FARM EQUIPMENT AND HAND TOOLS. By George Martin (in 1887). Facsimile edition edited by Grant Heilman. Stephen Greene Press. 1980.\$7.95.

Editor Heilman bemoans in the introduction to **Farm Equipment**, the changes to our society that prohibit the locating of anything much more reclaimable than cracked engine blocks in most town dumps and locating at all a smithy or all-purpose handyman to help the ill-equipped small-farmer to take oddments to make farm tools. In his own way, Heilman has brought the best of that time when you could find scraps and handymen to us. By re-presenting this practical manual of nearly a century ago to us, Heilman

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WIND CATCHERS: THE AMERICAN WINDMILLS OF YESTERDAY AND TOMORROW. By Volta Torrey. Stephen Greene Press. 1976.

Volta Torrey was named by his electrical engineer father after the inventor of the battery. For a score of years he has been an awarded science writer for MIT and NASA. His abilities as a researcher and a writer for laymen, and his fascination with the wind are apparent in this thorough documentation of the history of the uses of windmills. From Persia to the present, Torrey's account explains the purposes, designs, successes and failures of windmills of all sizes and shapes from simple to ambitious, from backyard to SANDIA labs. For the historian or wind energy enthusiast this is a fascinating overview of an undeniable, permanent source of power.

KEEPING LIVESTOCK HEALTHY: A Veterinary Guide. By N. Bruce Haynes, D.V.M.. Garden Way Publishing. \$9.95 paperback.

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The MAINE Page

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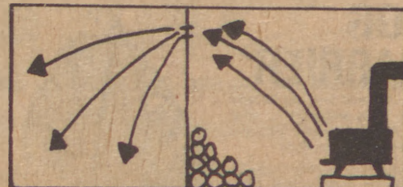
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That is the purpose of this book by veterinarian N. Bruce Haynes. **Keeping Livestock Healthy** is a book dedicated to what its title implies: the prevention of disease and maintenance of good health through proper knowledge. "...this is not," says the author in his preface, "a book on how to treat sick animals. Instead it attempts to explain the nature of the disease process and outlines methods of preventing illnesses of the major farm animal species."

The species covered are cattle, goats, horses, sheep and swine. Each section of the book deals generally with a certain area of animal care, such as nutrition, housing, reproduction, etc., and then proceeds to delineate specifics for each species.

Dr. Haynes does more than just list infectious diseases and their preventative treatments. His concept of disease is broad—in his own words from the Introduction, "...disease is any condition that results in a departure from normal function." Along with infectious diseases, he lists "heredity, nutrition, parasitism, accident and injury, and environmental stress." And he adds, "To this list, man must be added as an indirect and occasionally direct cause of animal disease problems." The Introduction proceeds to define some of the general concepts to be met in the overall text.

The book is divided into two general categories: "Preventing Disease," and "Animal Diseases." The first section deals with the overall understanding of the animals' needs and bodily processes. Chapters included are: "Nutrition and Health," which contains an excellent breakdown of nutritional elements, their uses and symptoms of deficiency (this section alone is worth the price of the book!), "Housing and Health"; "Animal Reproduction", which provides a brief description of the male and female sex organs and how they function, discusses conception and gestation, provides excellent illustra-

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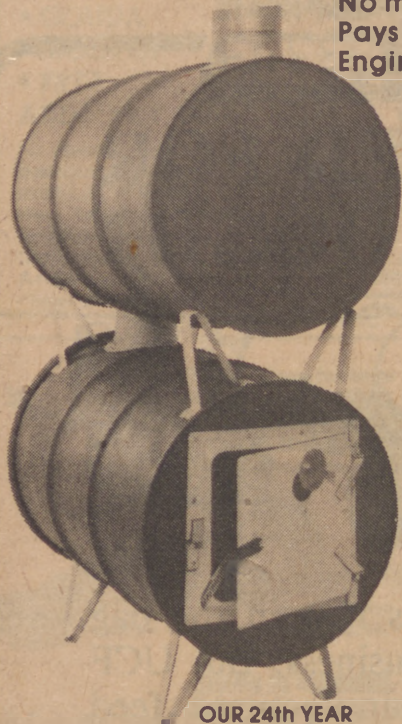
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tions and text on birthing and birthing problems and how to deal with them, care of the young, and a discussion on artificial insemination. (As in other chapters, the author then proceeds to discuss each animal species individually.) A chapter on restraint again has ample illustrations and deals with the proper way of restraining and handling animals in such a way that neither they nor their handler is injured. The final chapter in the first section is "Physical Examination," and defines how to see and assess various symptoms.

The section on diseases does an admirable job of breaking animal disease down into causative factors. Included are diseases caused by bacteria; viruses; yeasts, molds and fungi; protozoa; parasites; metabolic and deficiency diseases and "miscellaneous" and foreign animal diseases. Dr. Haynes considers this last category important because, he says, it is not a matter of "if", but of "when", these diseases will enter the U.S. Since our animals have no immunities built up to these diseases, it is of primary importance to be aware of them, and guard against their arrival. One has only to recall the introduction of Equine Encephalitis into the southwestern United States a few years back, or the recent resurgence of Newcastle Disease in poultry due to contraband importation of exotic birds, to agree with him.

Keeping Livestock Healthy is so admirable organized and indexed that its information is instantly available. The discussions provide the layman with an understanding of the subject and its relevance to animal health which helps put all the "puzzle pieces" of randomly acquired knowledge into perspective. The breakdown of animal diseases should be highly prized: too often have we been subjected to handy, catch-all phrases which ascribe the wrong cause to a given condition. (For example, it is common to refer to coccidiosis as "worms", while it is actually a protozoan infestation, and as such requires much different treatment--because of its multi-phased "life-cycle"--than any type of parasitic worm.)

Dr. Haynes admits to an humanitarian concern in producing this volume, but whether your concern is strictly financial, simply sentimental, or both, you should find this book an absolute necessity in your livestock library.

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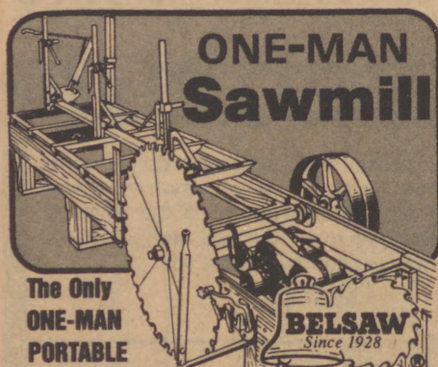
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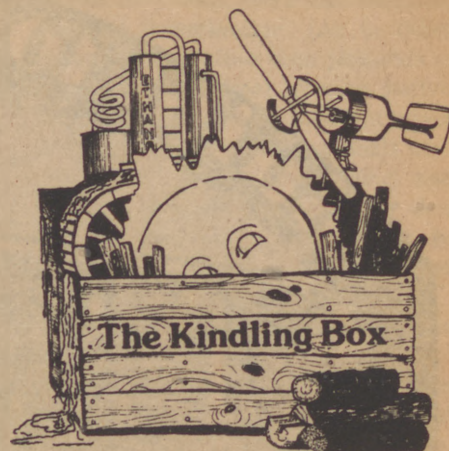
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--Ag. Communications

new fossil fuels?

The Solar Energy Research Institute's Biotechnology Branch is working on changing the notion that petroleum products are limited by the finite quantities of prehistoric fossil remains stored in the Earth's crust. Scientists have learned that certain micro-organisms--strains of bacteria and algae--synthesize oily substances for their own cellular development. A growing theory is that such microbial activity rather than intense pressure and eons of time produced fossil fuels. If such proves to be the case, conditions might be simulated in which micro-organisms could produce petrochemical substitutes. Work is underway at SERI to screen strains of algae and bacteria for optimum oil production and to learn how the micro-organisms do their work.

--In Review



TVA pushes wood alcohol

As noted by the Worldwatch Institute in Washington, D.C., one of the ominous consequences of fuel alcohol production from feed grains is the threat of diversion of grain producing cropland to fuel production. One of the ways of avoiding the potential loss in food production is to use only animal feed grains for fuel alcohol distillation because the residues can still be consumed by livestock. The TVA suggests in its recent fuel alcohol overview that as soon as the technologies become cost effective, fuel alcohol should be produced from wood. They recommend that technical assistance be offered to encourage the establishment and study of local wood-alcohol stills, that soil erosion be avoided in the production of grain and trees for fuel, and that marginal land in the seven-state TVA region be planted to fuel-suitable trees. The policy overview concludes that the TVA region could produce as much as half its liquid fuel by the middle of the next decade.

--Chemical Week

trees are cool

Forester Kurt Atkinson of the Oklahoma State Department of Agriculture says trees are often overlooked as a means of cutting rising cooling costs. He notes that trees on the south, east and west sides of a house can cut cooling energy costs by up to 50 percent. A large shade tree transpires an average of 88 gallons of water a day during summer. This is equivalent to the cooling effect of a five room air conditioner running for

twenty hours. The price of one of these air conditioners would pay for several sturdy fast-growing trees--and the benefits in beauty, permanence and wildlife shelter are enormous.

--Agricultural Briefs

no free lunch

The present Administration has reminded the American people that our wealth of coal energy equals and may even be superior to the wealth of imported oil energy. In an effort to make sure we remember that there is no such thing as a free lunch--or free coal--environmentalists and economic and legal counsels have worked hard to insure against the impacts of strip mining and coal burning on land and air.

One more warning about the effects of a switch to coal comes from staff members at Resources for the Future, Constance Boris and John Krutilla. They have completed a study which indicates that the impact on water of coal mining and processing in western coal regions like the Yellowstone River Basin and the Colorado Basin may be the most major impact. Conversion of coal into synthetic fuels--the thrust of the current coal revival--requires the use of enormous quantities of water, in precisely that region of the country where the issue of water supply is already front page copy. The potential problems and questions about synfuel coal mining and water are several: Water in the west is not abundant. Conflicts over water rights and usage are already rife. Not all claims on the limited water supply can be met simultaneously. What are the rights to water of area citizens as opposed to the rights of industry and citizens in other regions to which the water might be exported? The final effects on water quality and flowage may be negative. Costs of water rights litigation and water management may substantially alter the current "cheap fuel from coal" notion.

The results of the study, published by RFF under the title **Water Rights and Energy Development in the Yellowstone River Basin: An Integrated Analysis** are available from the Johns Hopkins Press in Baltimore, Maryland.



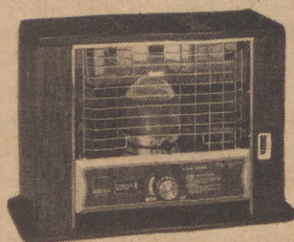
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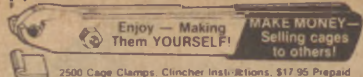
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the giveaway

Have you wondered how the odd and sometimes otherworldly energy grant proposals pass cabinet scrutiny and become pet projects? It is a case of spending funds when you've got them. A case in point is the upcoming starting-up date of the Carter Administration's Synthetic Fuels Corporation. When the Corporation becomes the overseer of energy grant spending for alternative fuels projects, the US Department of Energy loses its funds for such projects. Before the power and the funds are transferred, the USDOE is hoping to spend its budgeted funds on whatever synthetic fuel development projects it can muster. That's a \$5 billion bankroll looking for a home.

tidal power

The ability of the regular, pulsing cycles of the tides along the earth's coastlines to generate power long superseded modern technologists' schemes of giant tidal hydro power plants. Along the Maine coast, for example, small tidal power mills ground grains and sawed lumber over a century ago. While not expected to generate commercial electric power on a large scale, these small mills, if revived or newly constructed are anticipated to power mill operations, generate electricity for local consumers or local light industry. At the same time they are expected to revitalize interest in coastal ecology and economy. Grants, regulations and guidelines for studying and developing tidal hydro power are forthcoming from the USDOE and the Synthetic Fuels Corporation. Residents particularly in low population areas all along American coastlines may soon hear tidal power debates as they have in recent years heard coastal drilling debates.

--Mainely Renewable

decor as energy conserver

In many parts of America the return to wood heat has been accompanied by a return to simpler living and decorating styles. Cleaner styles they are called. Bare, gleaming wood and tile floors and wood stoves go together. It is to be granted that the attendant mess of ashes, bark and wood scraps is easier to clean up off of smooth, bare floors. Still the USDA notes that one of the best ways (after heavier insulation under floors is installed) of warming a room is to



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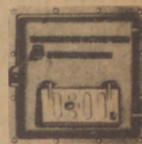


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carpet it. Carpeting--the thicker and fluffier, the better--is warmer to the touch and offers more insulation than wood, slate or tile. Less body heat is radiated to the floor and so the room feels warmer, enabling the wood-burner to burn less wood or the oil burner thermostat to be set lower.

solar ponds--worth their salt

The notion that water holds heat for longer periods than air is not new. And any Greek worth his salt knows that the magical Mediterranean is warmly welcoming because of the higher salt content that stores the sun's heat.

Since 1902 it has been scientifically verified that the temperature of highly salt (15 to 20 percent net weight) bodies of water rises to nearly boiling in sunlight. The salt settles in three zones with the greater storage concentration zone being at the bottom of the salt pond or lake. The upper convecting zone heats to nearly boiling and the middle gradient zone acts as a blanket to store the heat almost indefinitely.

Scientists at the USDOE and researchers at the Mid-American Solar Energy Conference (MASEC) are overseeing projects at Southern California's Salton Sea, the Great Salt Lake and Colorado Basin ponds which will explore ways of using solar salt ponds for space and water heating, low-grade industrial heating and rural electric generation. The hope is that solar salt pond facilities could displace up to 800 million barrels of oil in the next ten years.

--MASEC News

waste forage, waste energy

John Stephenson of the University of Vermont Extension Service notes that forage that gets to a manure pile without going through livestock or forage that is undigested by livestock represents wasted energy.

For example, late cut hay that is too long and tough will be eaten by a cow at a rate of one pound rather than three pounds per hundred pounds of body weight. Two thirds of the energy used to produce that late-cut hay is effectively lost.

Properly ventilated storage areas promote dry, sweet smelling hay in high condition which will be more thoroughly consumed by livestock. Even uncut stubble in the field or improperly raked and gathered hay represent an energy loss.



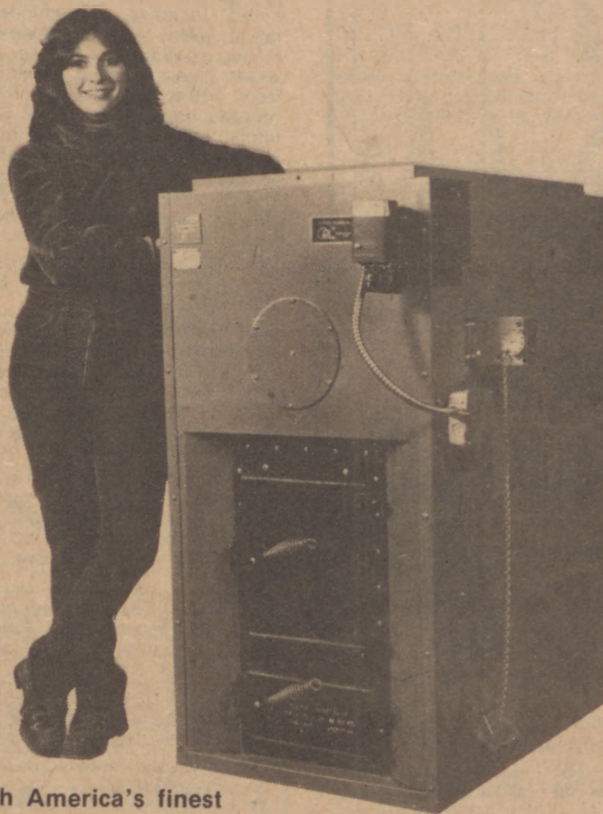
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Your ad in this section costs only \$1.00 a word. You get a 10% discount if you run the same ad in two or more consecutive issues: Garden (Jan. 15), Spring (March 1), Early Summer (April 15), Summer (June 1), Harvest (July 15), Fall (Sept. 1), Holiday (Oct. 15), Winter (Dec. 1). Copy must be received six weeks before publication date.

You may use this coupon to submit your ad; however, payment must be included.



Send your ad to:
FARMSTEAD MAGAZINE
Box 111 Freedom, Maine 04941

Name _____

Address _____

_____ Zip _____

Number of words _____

Cost: \$ _____

For issue(s):

- ☐ Winter ☐ Garden ☐ Spring
☐ Early Summer ☐ Summer
☐ Harvest ☐ Fall ☐ Holiday

WARM A FRIEND'S HEART...

GIVE FARMSTEAD FOR CHRISTMAS.

Christmas is coming, and now is the time to think about those many friends who would enjoy a subscription to **FARMSTEAD MAGAZINE**. For only \$12.00 your friend will receive the next eight issues of **FARMSTEAD**. You may enroll additional friends at the special discount rate below. An attractive card announcing your gift will be sent to each friend. Simply fill in the coupons below and mail this page with your payment.

DONOR'S NAME _____

ADDRESS _____



FARMSTEAD MAGAZINE 1st SUBSCRIPTION--\$12.00
Box 111 Freedom, Maine 04941

Please enroll the person listed below as a subscriber to **FARMSTEAD**. Enclosed is \$12.00 for eight regular issues.

Name _____

Address _____

Zip _____

Sign card from:

HL80

FARMSTEAD MAGAZINE 2nd SUBSCRIPTION--\$11.00
Box 111 Freedom, Maine 04941

Please enroll the person listed below as a subscriber to **FARMSTEAD**. Enclosed is \$11.00 for eight regular issues.

Name _____

Address _____

Zip _____

Sign card from:

FARMSTEAD MAGAZINE 3rd SUBSCRIPTION--\$10.00
Box 111 Freedom, Maine 04941

Please enroll the person listed below as a subscriber to **FARMSTEAD**. Enclosed is \$10.00 for eight regular issues.

Name _____

Address _____

Zip _____

Sign card from:

FARMSTEAD MAGAZINE 4th SUBSCRIPTION--\$10.00
Box 111 Freedom, Maine 04941

Please enroll the person listed below as a subscriber to **FARMSTEAD**. Enclosed is \$10.00 for eight regular issues.

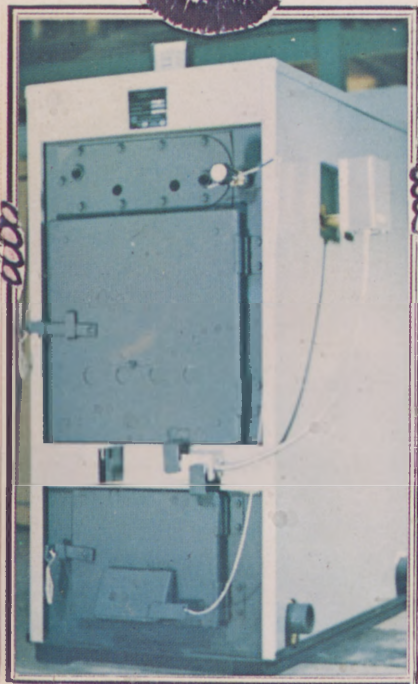
Name _____

Address _____

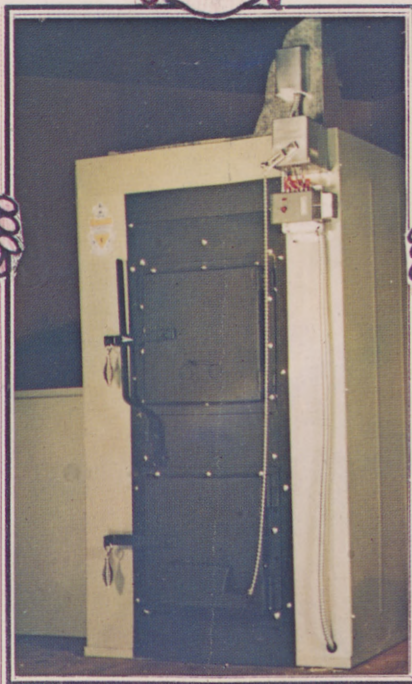
Zip _____

Sign card from:

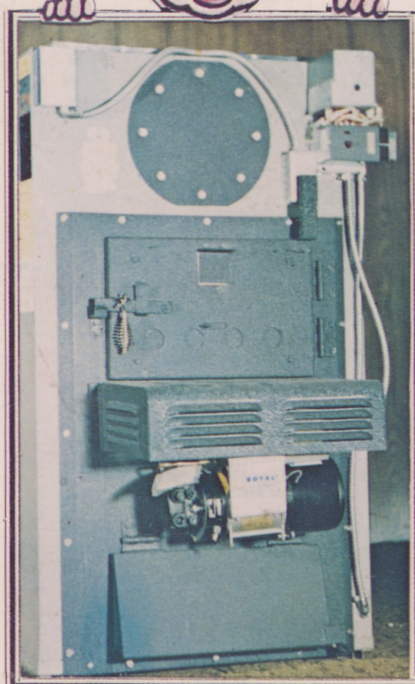
Presenting....the *Oneida Royal* Wood-Burning "Family"



CWOGB Series Boiler
(Wood/Coal & Oil/Gas)



ACGO Series Furnace
(Wood/Coal & Oil/Gas)

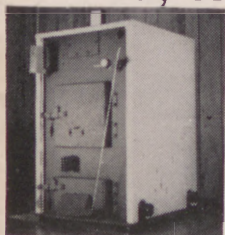


AWGO Series Furnace
(Wood Only & Oil/Gas)

Wood, or Coal, can be the primary fuel with the combination units above, as indicated.

Our Add-On Family:

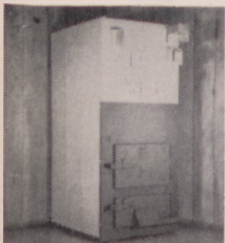
One of these add-on unit will convert your present heating system to a 2-fuel, combination system.



ACWB-100
Add-On
Boiler
(Wood/Coal)



Lumberjack
100
Furnace
(Wood Only)



JC Series
Furnace
(Wood/Coal)

For further information, fill in, clip & mail coupon to:

N

ONEIDA HEATER COMPANY, INC.

109 N. WARNER ST. • ONEIDA, N.Y. 13421

PHONE: AREA 315-363-5500

Please send me information
on central heating, **ONEIDA**
ROYAL equipment.

I Would Use:

- ☐ Wood Only
☐ Wood/Coal Only
☐ Wood Plus Oil/Gas

My Present Htg. System:

- ☐ Warm Air ☐ Hot Water

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP CODE _____

PHONE _____



Select Quality

**We begin with it -
We test for it -
Then we put
our name on it.**



Johnny's Selected Seeds

**Send for our all new
FREE 1981 SEED CATALOG**

**Select vegetable seeds
Herb and Farm seed
Cover crop seed**

Quality accessories, including Planet Jr. seeders and cultivators, soil testing equipment, cyclone seeders, speedling planter flats, biological insecticides.

Give us a look...

We're the garden seed specialists from the North.

If you do not wish to tear this cover, please use the coupon on page 94.



Johnny's Selected Seeds

Post Box 14, Albion, Maine 04910

☐ Please send my copy of the new
FREE 1981 CATALOG

Name _____

(Please Print)

Address _____

Town _____

State _____

Zip _____