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John Seymour

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The Complete Book of Self-Sufficiency

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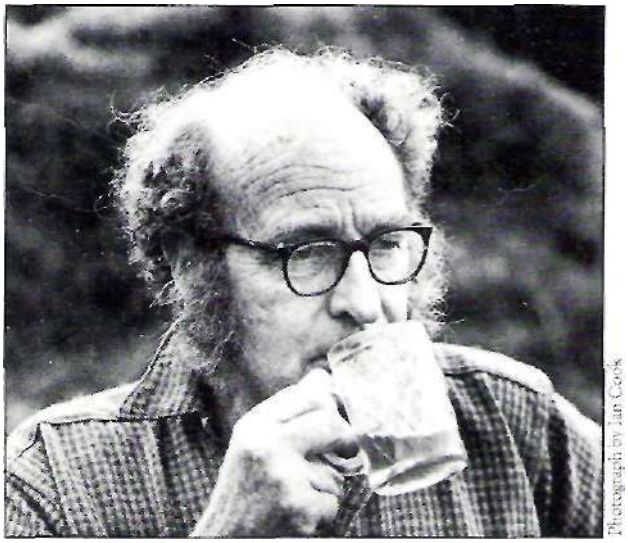
The Complete Book of

Self-Sufficiency

John Seymour

With a foreword by E. F. Schumacher
author of 'Small is Beautiful'

John Seymour was educated in England and Switzerland. After studying at an agricultural college, he worked on farms in England for two years and then spent some ten years in Africa where, among other things, he managed a sheep and cattle farm and acted as a livestock officer for a government veterinary department. After service in the King's African Rifles in the war, he travelled widely, lived on a fishing boat, wrote, broadcast, and studied the way of lite of rural people. Then, with his wife Sally, he settled down to running a self-sufficient smallholding in Suffolk, where he developed many, of the skills described in this book. Alter eight years in Suffolk they moved to Pembrokeshire, and a 62-acre farm. John Seymour has now remarried, and the farm is being developed as a school in the arts of self-sufficiency. The aim of the people on the farm is to endeavour to bring self-reliance, self-respect, people, culture and fun back to the countryside.



Photograph by Jan Cook

The Complete Book of Self-Sufficiency is a book for all seasons. Whether you live in town or country, on a farm or in a cottage, in a house with a garden or a flat with a window-box, this book has something for you.

If you want to
bake your own bread, brew your own beer, make your own cheese, pickle your own onions, this book will show you how.

If you want to
make hay, milk a cow, smoke a ham, design a dairy, convert to solar energy, this book will show you how.

If you just want to
grow your own vegetables, bottle your own fruit, dry your own herbs, this book will demonstrate exactly what to do.

The Complete Book of Self Sufficiency is an invaluable manual, packed with illustrations, and every illustration tells its own story, shows you what you need and how to do it.

John Seymour is everywhere recognised as *the* expert in self-sufficiency. He has lived the life for twenty years, and here he gathers all the expertise he has acquired into one authoritative volume.

The Complete Book of Self Sufficiency covers the whole range of the self-sufficient spectrum. It describes how, according to the size of your plot, *you can plan to support yourself, grow your own crops, keep your own livestock. It helps you over all the hurdles of growing and preserving your own food,* whether you harvest straight from the field or from the garden, from animals or from the wild. John Seymour guides you through every stage of the cycle. He shows you how to plant your crop, tend it, harvest it, preserve it, process it, and finally, how to cook it - in a variety of ways. He also includes chapters on how you can produce your own energy, and how you can help to re-vitalise many of the near-forgotten crafts.

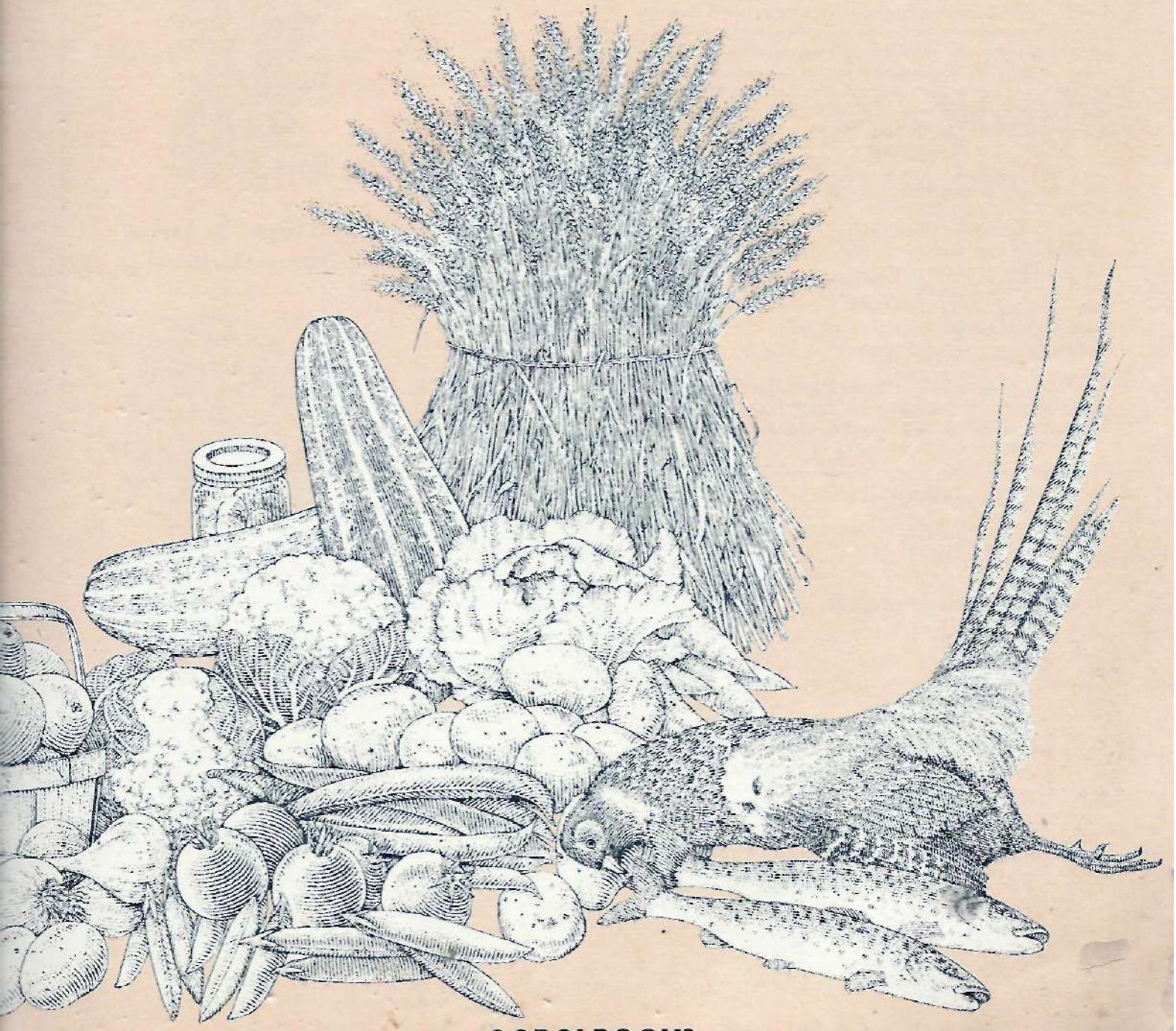
This is the first totally comprehensive book on supporting yourself. It is an encyclopaedia of practical advice on how to attain the skills and enjoy the fruits of the self-sufficient way of life.

See inside back cover
for press comments about this book.

The Complete Book of Self-Sufficiency

John Seymour

Foreword by E.F. Schumacher



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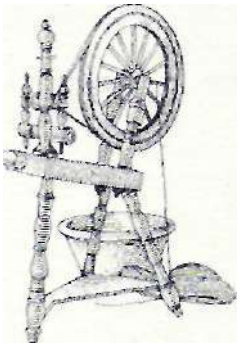

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FOREWORD

We can do things for ourselves or we can pay others to do them for us. These are the two "systems" that support us; we might call them the "self-reliance system" and the "organization system". The former tends to breed self-reliant men and women; the latter tends to produce organization men and women. All existing societies support themselves by a mixture of the two systems; but the proportions Vary.

In the modern world, during the last hundred years or so, there has been an enormous and historically unique shift: away from self-reliance and towards organization. As a result people are becoming less self-reliant and more dependent than has ever been seen in history. They may claim to be more highly educated than any generation before them; but the fact remains that they cannot really do anything for themselves. They depend utterly on vastly complex organizations, on fantastic machinery, on larger and larger money incomes. What if there is a hold-up, a breakdown, a strike, or unemployment? Does the state provide all that is needed? In some cases, yes; in other cases, no. Many people fall through the meshes of the safety net; and what then? They suffer; they become dispirited, even despondent. Why can't they help themselves? Generally, the answer is only too obvious: they would not know how to; they have never done it before and would not even know where to begin.

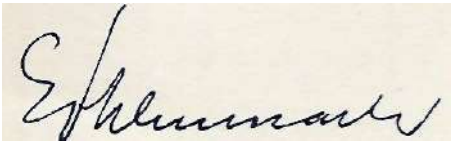
John Seymour can tell us how *to* help ourselves, and in this book he does tell us. He is one of the great pioneers of self-sufficiency. Pioneers are not for imitation but for learning from. Should we all do what John Seymour has done and is doing? Of course not. Total self-sufficiency is as unbalanced and ultimately stultifying as total organization. The pioneers show us what *can* be done, and it is for every one of us to decide what *should* be done, that is to say, what *we* should do to restore some kind of balance to our existence.

Should I try to grow *all* the food my family and I require? If I tried to do so, I probably could do little else. And what about all the other things we need? Should I try to become a Jack of all trades? At most of these trades I would be pretty incompetent and horribly inefficient. But to grow or make *some* things by myself, for myself: what fun, what exhilaration, what liberation from any feelings of utter dependence on organizations! What is perhaps even more: what an education of the real person! To be in touch with *actual processes of creation.* The inborn creativity of people is no mean or accidental thing; neglect or disregard it, and it becomes an inner source of poison. It can destroy you and all your human relationships; on a mass scale, it can - nay, it inevitably will - destroy society.

Contrariwise, nothing can stop the flowering of a society that manages to give free rein to the creativity of its people - *all* its people. This cannot be ordered and organized from the top. We cannot look to government, but only to ourselves, to bring about such a state of affairs. Nor should anyone of us go on "waiting for Godot" because Godot never comes. It is interesting to think of all the "Godots" modern humanity is waiting for: this or that fantastic technical breakthrough; colossal new discoveries of oil and gasfields; automation so that nobody - or hardly anybody - will have to lift a finger any more; government policies to solve all problems once and for all: multinational companies to make massive investments in the latest and best technology; or simply "the next upturn of the economy".

John Seymour has never been found "waiting for Godot". It is the essence of self-reliance that you start now and don't wait for something to turn up.

The technology behind John Seymour's self-sufficiency is still quite rudimentary and can of course be improved. The greater the number of practitioners the faster will be the rate of improvement, that is, the creation of technologies designed to lead people to self-reliance, work-enjoyment, creativity, and therefore: *the good life.* This book is a major step along that road, and I wholeheartedly commend it to you,



DR. E.F. SCHUMACHER, CBE

The Way to Self - Sufficiency

The first questions we must answer are: What is this book about? What is self-sufficiency, and why do it?

Now self-sufficiency is not "going back" to some idealized past in which people grubbed for their food with primitive implements and burned each other for witchcraft. It is going *forward* to a new and better sort of life, a life which is more fun than the over-specialized round of office or factory, a life that brings challenge and the use of daily initiative back to work, and variety, and occasional great success and occasional abysmal failure. It means the acceptance of complete responsibility for what you do or what you do not do, and one of its greatest rewards is the joy that comes from seeing each job right through - from sowing your own wheat to eating your own bread, from planting a field of pig food to slicing a side of bacon.

Self-sufficiency does not mean "going back" to the acceptance of a lower standard of living. On the contrary, it is the striving for a higher standard of living, for food which is fresh and organically-grown and good, for the good life in pleasant surroundings, for the health of body and peace of mind which come with hard varied work in the open air, and for the satisfaction that comes from doing difficult and intricate jobs well and successfully.

A further preoccupation of the self-sufficient person should be the correct attitude to the land. If it ever comes to pass that we have used up all, or most of, the oil on this planet, we will have to reconsider our attitude to our only real and abiding asset - the land itself. We will one day have to derive our sustenance from what the land, unaided by oil-derived chemicals, can produce. We may not wish in the future to maintain a standard of living that depends entirely on elaborate and expensive equipment and machinery but we will always want to maintain a high standard of living in the things that really matter-good food, clothing, shelter, health, happiness, and fun with other people. The land *can* support us, and it can do it without huge applications of artificial chemicals and manures and the use of expensive machinery. But everyone who owns a piece of land should husband that land as wisely, knowledgeably, and intensively as possible. The so-called-"self-supporter" sitting among a riot of docks and thistles talking philosophy ought to go back to town. He is not doing any good at all, and is occupying land which should be occupied by somebody who can really use it.

Other forms of life, too, besides our own, should merit our consideration. Man should be a husbandman, not an exploiter. This planet is not exclusively for our own use. To destroy every form of life except such forms as are obviously directly of use to us is immoral, and ultimately quite possibly, will contribute to our own destruction. The kind of varied, carefully thought-out, husbandry of the self-supporting holding fosters a great variety of life forms, and every self-supporter will wish to leave some areas of true wilderness on his holding, where wild forms of life can continue to flourish undisturbed and in peace.

And then there is the question of our relations with other people. Many people move from the cities back to the land precisely because they find city life, surrounded by people, too lonely. A self-supporter, living alone surrounded by giant commercial farms, may be lonely too; but if he has other self-supporters near him he will be forced into cooperation with them and find himself, very quickly, part of a living and warm community. There will be shared work in the fields, there will be relief milking and animal feeding duties when other people go on holiday, the sharing of child minding duties, there will be barn-raisings and corn-shuckings and celebrations of all kinds. This kind of social life is already beginning in those parts of Europe and North America w-here self-supporting individuals, or communities, are becoming common.

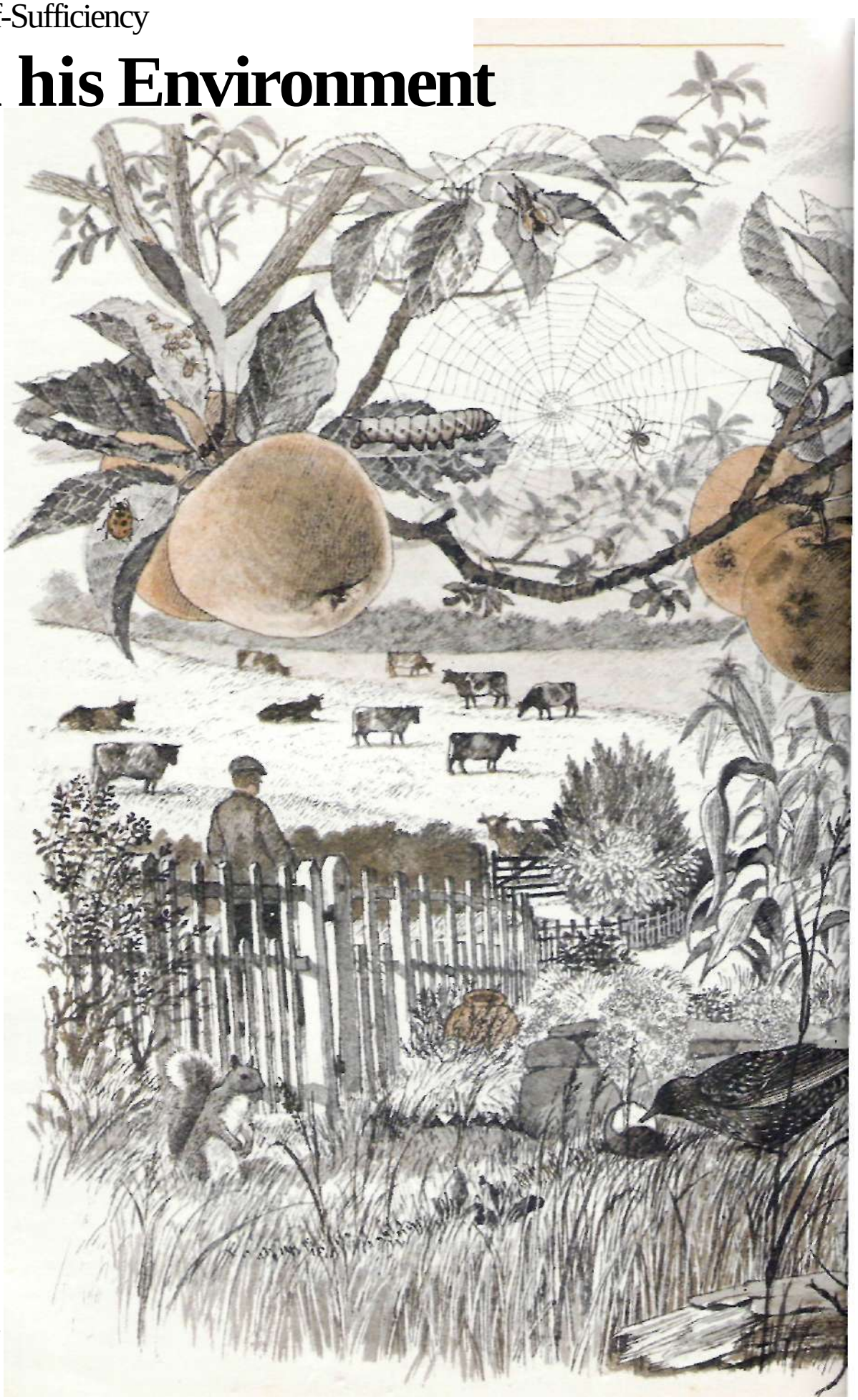
Good relations with the old indigenous population of the countryside are important too. In my area, the old country people are very sympathetic to the new "drop-ins'.' They rejoice to see us reviving and preserving the old skills they practised in their youth and they take pleasure in imparting them to us. They wax eloquent when they see the hams and flitches of bacon hung up in my chimney. "That's *real* bacon!" they say. "Better than the stuff we get in the shops. My mother used to make that when I was a boy - we grew all our own food then" "Why don't you grow it now?" I ask. "Ah - times have changed'.' Well, they are changing again.

Self-sufficiency is not only for those who have five acres of their own country. The man in a city apartment who learns how[7] to mend his own shoes is becoming, to some extent, self-sufficient. Not only does he save money, he increases his own satisfaction and self-respect too. Man was not *meant to* be a one-job animal. We do not thrive as parts of a machine. We are intended by nature to be diverse, to do diverse things, to have many skills. The city person who buys a sack of wheat from a farmer on a visit to the country-side and grinds his own flour to make his own bread cuts out a lot of middle men and furthermore gets better bread. He gets good exercise turning the handle of the grinding machine too. And any suburban gardener can dig up some of that useless lawn and put some of those dreary hardy perennials on the compost heap and grow his own cabbages. A good sized suburban garden can practically keep a family. I knew a woman who grew the finest outdoor tomatoes I ever saw in a window-box twelve storeys up in a tower-block. They were too high up to get the blight.

So good luck and long life to all self supporters! And if every reader of this book learns something useful to him that he did not know before, and could not very easily find out, then I shall be happy and feel that the hard work that not only I as author have put into it, but also the hard-working and dedicated people who have done the very arduous and difficult work of putting it together, and illustrating it, have not worked in vain.

The Way to Self-Sufficiency

Man & his Environment



The *true* homesteader *will seek to husband his land, not exploit it. He will wish to improve and maintain the "heart" of his land, its fertility. He will learn by observing nature that growing one crop only, or keeping one species of animal only, on the same piece of land is not in the natural order of things. He will therefore wish to nurture the animals and plants on his land to ensure the survival of the widest possible variety of natural forms. He will understand and encourage the interaction between them. He will even leave some areas of wilderness on his land, where wild forms of life can flourish. Where he cultivates he will always keep in mind the needs of his soil, considering each animal and each plant for what beneficial effect it might have on the land. Above all, he will realize that if he interferes with the chain of life (of which he is a part) he does so at his peril, for he cannot avoid disturbing a natural balance.*

The Way to Self-Sufficiency

THE FIRST PRINCIPLES OF SELF-SUFFICIENCY

The only way that the homesteader can farm his piece of land as well and intensively as possible is to institute some variant of what was called "High Farming" in Europe in the last century. This was a carefully worked out balance between animals and plants, so that each fed the other: the plants feeding the animals directly, the animals feeding the soil with their manure and the land feeding the plants. A variety of both animals and plants were rotated about the same land so that each species took what it needed out and put what it had to contribute back, and the needs of the soil were kept uppermost always in the husbandman's mind. Each animal and crop was considered for what beneficial effect it might have on the soil.

If the same crop is grown on a piece of land year after year the disease organisms that attack that crop will build up in the area until they become uncontrollable. Nature abhors monoculture: any cursory inspection of a natural plant and animal environment will reveal a great variety of species. If one species becomes too predominant some pest or disease is sure to develop to strike it down. Man has managed to defy this law, to date, by the application of stronger and stronger chemical controls, but the pests (particularly the fast-evolving viruses) adapt very quickly to withstand each new chemical and to date the chemist has managed to keep only a short jump ahead of the disease.

The new homesteader will wish to husband his land in accordance with the principles of High Farming. He will have to substitute the labour of his hands for imported chemicals and sophisticated machinery. He will have to use his brain and his cunning to save the work of his hands. For instance, if he can get his animals to go out into his fields and consume their share of his crops there, then he will save himself the work of harvesting the crops for them and carrying them in. In other words, take the animals to the crops, not the crops to the animals. So also, if he can get the animals to deposit their dung on his land, then this will save him the labour of carrying the dung out himself. Thus the keeping of animals on limited free range will appeal to him: sheep can be "folded" on arable land (folding means penning animals on a small area of some fodder crop and moving the pen from time to time), chickens can be housed in arks that can be moved over the land so as to distribute the hens' manure while allowing the hens to graze fresh grass, and pigs can be kept behind electric fences which can also be easily moved. Thus the pigs harvest their food for themselves and also distribute their own manure. (To say nothing of the fact that pigs are the finest free cultivators that were ever invented! They will clear your land, and plough it, and dung it, and harrow it, and leave it nearly ready for you to put your seed in, with no more labour to you than the occasional shifting of an electric fence.)

Now the true husbandman will not keep the same species of animal on a piece of land too long, just as he will not grow the same crop year after year in the same place. He will follow his young calves with his older cattle, his cattle with sheep, his sheep with horses, while geese and other poultry either run free or are progressively moved over his grassland and arable (arable means land that gets ploughed and planted with crops as opposed to land that is grass all the time). All animals suffer from parasites and if you keep one species on one piece of land for too long there will be a build-up of parasites and disease organisms. As a rule the parasites of one animal do not affect another and therefore following one species with another over the land will eliminate parasites.

Also, the true husbandman will find that every enterprise on his holding, if it is correctly planned, will interact beneficially with every other. If he keeps cows their dung will manure the land which will provide food, not only for the cows, but for the humans and pigs also. The by-products of the milk of the cows (skimmed milk from butter making and whey from cheese making) are a marvellous whole food for pigs and poultry. The dung from the pigs and poultry helps grow the food for the cows. Chickens will scratch about in the dung of other animals and will salvage any undigested grain.

All crop residues help to feed the appropriate animals - and such residues as not even the pigs can eat they will tread into the ground, and activate with their manure, and turn into the finest *in situ* compost without the husbandman lifting a spade. All residues from slaughtered birds or animals go either to feed the pigs, .or the sheep dogs, or to activate the compost heap. Nothing is wasted. Nothing is an expensive embarrassment to be taken away to pollute the environment. There should be no need of a dustman on the self-sufficient holding. Even old newspapers can make litter for pigs, or be composted. Anything that has to be burnt makes good potash for the land. Nothing is wasted- there is no "rubbish'.'

But before the potential self-supporter embarks on the pursuit of "true husbandry" he should acquaint himself with some of the basic laws of nature, so that he can better understand why certain things will happen on his holding and why other things will not.

THE FOOD CHAIN

Life on this planet has been likened to a pyramid: a pyramid with an unbelievably wide base and a small apex.

All life needs nitrogen, for it is one of the most essential constituents of living matter, but most creatures cannot use the free, uncombined, nitrogen which makes up a great part of our atmosphere. The base of our biotic pyramid, therefore, is made up of the bacteria that live in the soil, sometimes in symbiosis with higher plants, and have the power of fixing nitrogen from the air. The number of these organisms in

the soil is unimaginably great: suffice it to say that there are millions in a speck of soil as big as a pin-head.

On these, the basic and most essential of all forms of life, lives a vast host of microscopic animals. As we work up the pyramid, or the food chain whichever way we like to consider it, we find that each superimposed layer is far less in number than the layer it preys upon. On the higher plants graze the herbivores. Every antelope, for example, must have millions of grass plants to support him. On the herbivores "graze" the carnivores. And every lion must have hundreds of antelopes to support him. The true carnivores are right at the apex of the biotic pyramid. Man is somewhere near the top but not at the top because he is an omnivore. He is one of those lucky animals that can subsist on a wide range of food: vegetable and animal.

Up and down the chain, or up and down between the layers of the pyramid, there is a vast complexity of inter-relationships. There are, for example, purely carnivorous micro-organisms. There are all kinds of parasitic and saprophitic organisms: the former live on their hosts and sap their strength, the latter live in symbiosis, or in friendly cooperation, with other organisms, animal or vegetable. We have said that the carnivores are at the apex of the food chain. Where in it stands a flea on a lion's back? Or a parasite in a lion's gut?

And what about the bacterium that is specialised (and you can bet there is one) to live inside the body of the lion flea? A system of such gargantuan complexity can best, perhaps, be understood by the utter simplification of the famous verse:

Little bugs have lesser bugs upon their backs to bite 'em,
And lesser bugs have lesser bugs and so ad infinitum!

This refers to parasitism alone of course, but it is noteworthy that all up and -down the pyramid *everything* is consumed, eventually, by something else. And that includes us, unless we break the chain of life by the purely destructive process of cremation.

Now Man, the thinking monkey, has to interfere with this system (of which he should never forget that he is a part) but he does so at his peril. If we eliminate many carnivores among the larger mammals, the herbivores on which these carnivores preyed become overcrowded, overgraze, and create deserts. If, on the other hand, we eliminate too many herbivores the herbage grows rank and out of control and good pasture goes back to scrub and cannot, unless it is cleared, support many herbivores. If we eliminate every species of herbivore except one the grazing is less efficiently grazed. Thus sheep graze very close to the ground (they bite the grass off with their front teeth) while cows, which rip grass up by wrapping their tongues round it, like long grass. The hills produce more and better sheep if cattle graze on them too. It is up to Man the Husbandman to consider very carefully, and act very wisely, before he uses his powers to interfere with the rest of the biotic pyramid.

Plants, too, exist in great variety in natural environments and for very good reasons. Different plants take different things out of the soil, and put different things back. Members of the pea-bean-and-clover family for example, have nitrogen-fixing bacteria in nodules on their roots. Thus they can fix their own nitrogen. But you can wipe the clovers out of a pasture by applying artificial nitrogen. It is not that the clovers do not like the artificial nitrogen, but that you remove the "unfair advantage" that they had over the grasses (which are *not* nitrogen-fixing) by supplying the latter with plenty of free nitrogen and, being naturally more vigorous than the clovers, they smother them out.

It is obvious from observing nature that monoculture is not in the natural order of things. We can only sustain a one-crop-only system by adding the elements that the crop needs from the fertilizer bag and destroying all the crop's rivals and enemies with chemicals. If we wish to farm more in accordance with the laws and customs of nature we must diversify as much as we can, both with plants and animals.

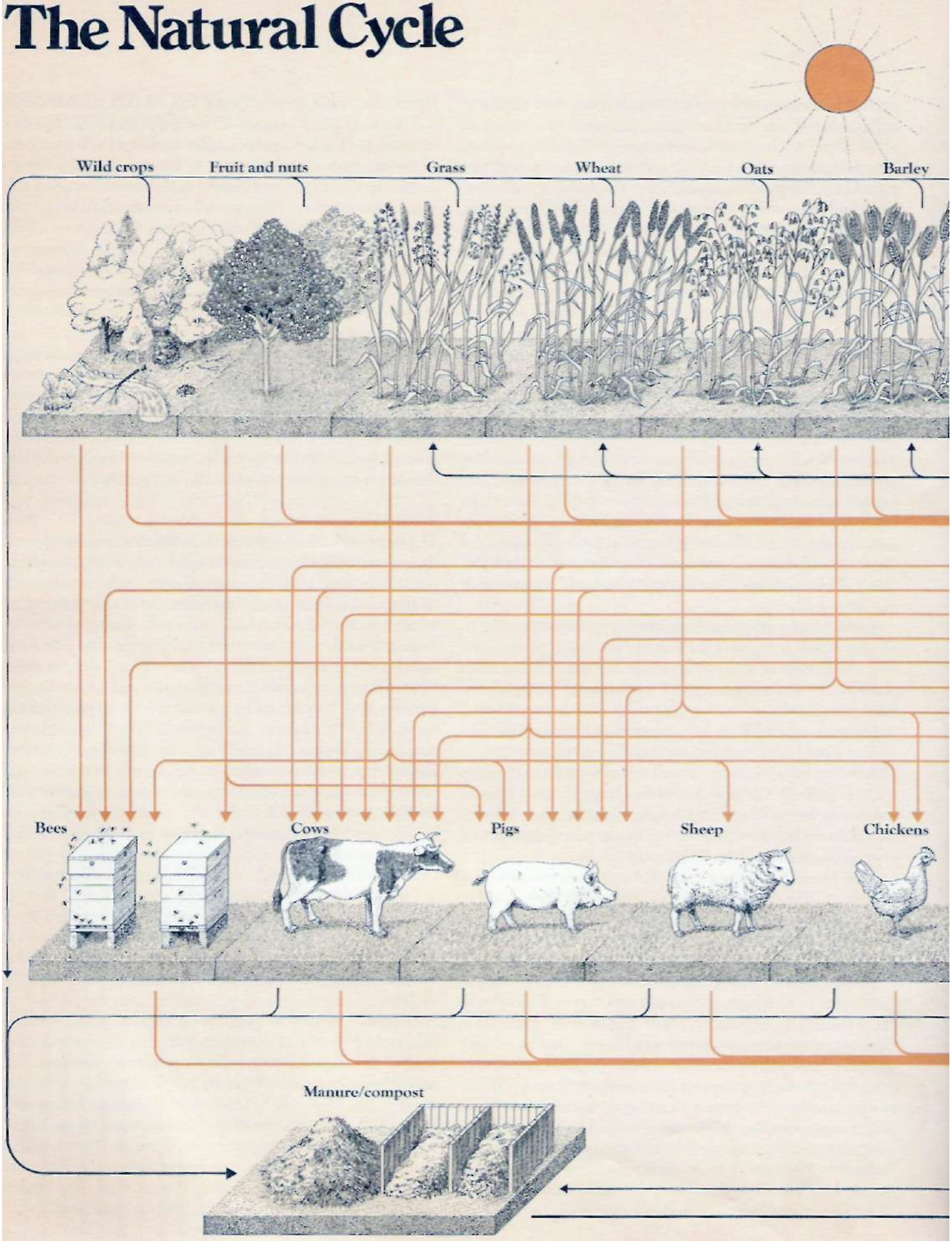
THE SOIL

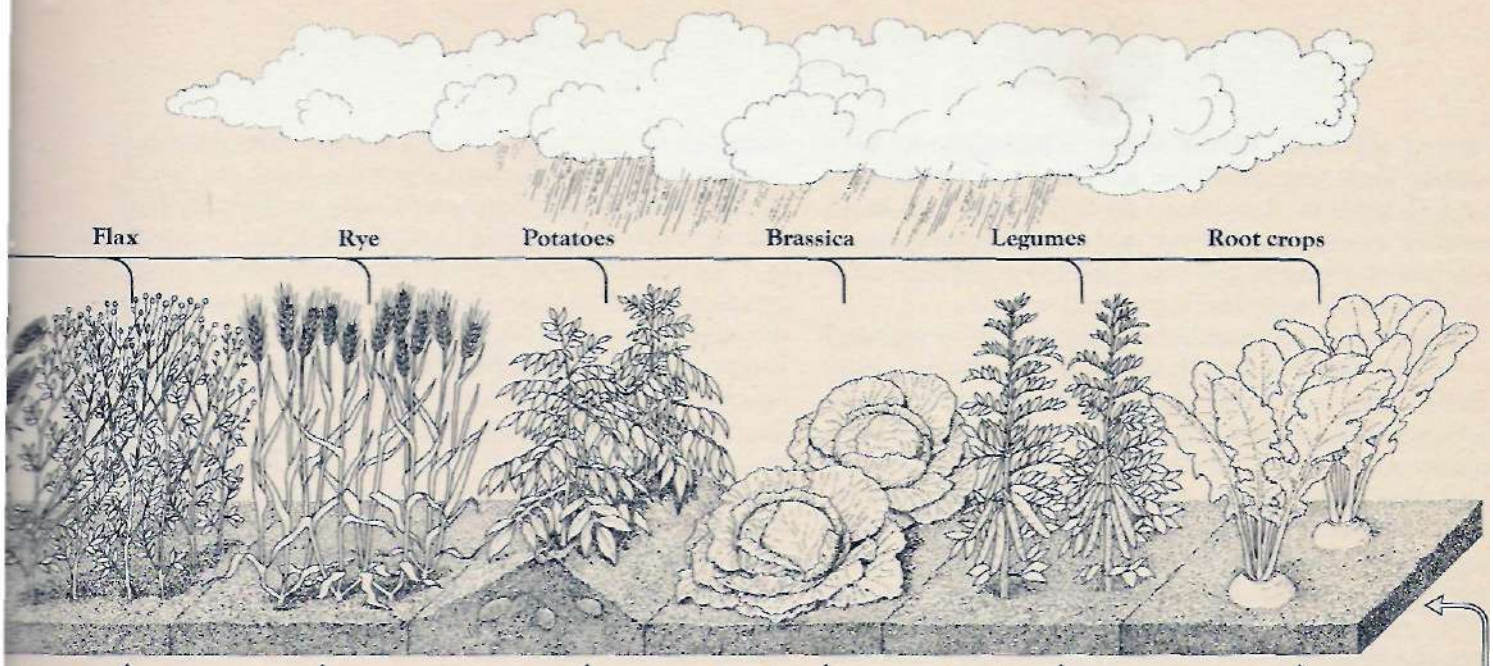
The basis of all life on Earth is, of course, the soil. But the soil that we terrestrial animals have to draw our subsistence from is the powdered rock that covers, fortunately for us, much of the land surface of the Earth. Some of this powder, or earth, was derived from the rock directly below it, some has been carried down by water from rock somewhere above it, some (such as the famous loess soil of North America and China) has been blown there by wind, and some dragged into its present position by glaciers in one or other of the ice ages. But however the soil got to where it is now, it was originally pulverized from the rock by agencies of weather. Frost splits rock, so does alternate intense heat and cold, water wears it, wind erodes it, and it is now known that bacteria and certain algae actually eat it; the hardest rock in the world will be ground down and eroded in time if it comes to the surface.

Newly-formed soil will have all the plant foods that were in the original rock, but it will completely lack one essential element - *humus.* It will not contain humus until life itself - that is, things that were living and have died and are in decay-puts it there. Only then does it become real complete soil, fit to grow the vegetation that sustains all animal life on land.

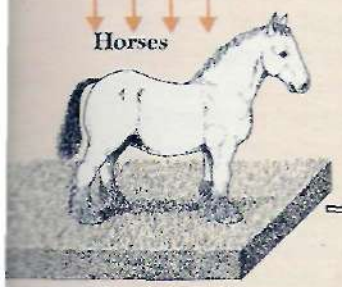
Because soil derives from many kinds of rock there are many varieties of soil. As we cannot always get exactly the kind of soil that we require, the husbandman must learn to make the best of the soil that he has. Depending on the size of their particles soils are classified as *light* or *heavy,* with an infinite range of gradations in between. Light means composed of large particles. Heavy means composed of small particles. Gravel can hardly be called soil but sand can, and pure sand is the lightest soil you can get. The kind of clay which is made of the very smallest particles is the

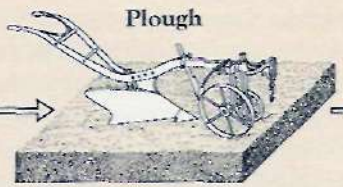
The Natural Cycle





The first rule in becoming self-sufficient is to understand the Benign Cycle: namely, the soil feeds the plants, the plants feed the animals, the animals manure the land, the manure feeds the soil, the soil feeds the plants . . . The true husbandman will wish to maintain this cycle, but he has to become part of the cycle himself; as a plant-eater and a carnivore he is liable to break the chain unless he observes at all times the Law of Return. This means that all residues (animal, vegetable and human) should be returned to the soil, either by way of the compost heap, or the guts of an animal, or the plough, or by being trodden into the ground by livestock. Whatever cannot be usefully returned to the soil, or usefully used in some other way, should be burned; this will make potash for the land. Nothing should be wasted on the self-sufficient holding.





Food produce cycle

Residue cycle

heaviest. The terms "light" and "heavy" in this context have nothing to do with weight but with the ease of working of the soil. You can dig sand, or otherwise work with it, no matter how wet it is, and do it no harm. Heavy clay is very hard to dig or plough, gets very puddingy and sticky, and is easily damaged by working it when it is wet.

What we call soil generally has a thickness to be measured in inches rather than feet. It merges below with the subsoil which is generally pretty humus-free but may be rich in mineral foods needed by plants. Deep-rooting plants such as some trees, lucerne or alfalfa, comfrey, and many herbs, send their roots right down into the subsoil, and extract these nutriments from it. The nature of the subsoil is very important because of its influence on drainage. If it is heavy clay, for example, then the drainage will be bad and the field will be wet. If it is sand, gravel, decayed chalk or limestone, then the field will probably be dry. Below the subsoil lies rock, and rock goes on down to the centre of the Earth. The rock, too, can affect drainage: chalk, limestone, sandstone and other pervious rocks make for good drainage: clay (geologists consider this a rock too), slate, mudstone, some shales, granite and other igneous rocks generally make for poor drainage. Badly-drained soils can always be drained - provided enough expenditure of labour and capital is put to doing it.

Let us now consider various types of soil:

Heavy clay This, if it can be drained and if it is worked with great care and knowledge, can be very fertile soil, at least for many crops. Wheat, oak trees, field beans, potatoes, and many other crops, do superbly on well-farmed clay. Farmers often refer to it as *strong* land. But great experience is needed to farm it effectively. This is because of the propensity of clay to "flocculate" - that is, the microscopic particles which make up clay gather together in larger particles. When this happens the clay is more easily worked, drains better, allows air to get down into it (an essential condition for plant growth), and allows the roots of plants to penetrate it more easily. In other words it becomes good soil. When it does the opposite of flocculate it "puddles" - that is, it forms a sticky mass, such as the potter uses to make his pots, becomes almost impossible to cultivate, and gets as hard as brick when it dries out. When it is in this condition the land forms big cracks and is useless.

Factors which cause clay to flocculate are alkalinity rather than acidity, exposure to air and frost, incorporation of humus, and good drainage. Acidity causes it to puddle, so does working it while wet. Heavy machines tend to puddle it. Clay must be ploughed or dug when in exactly the right condition of humidity, and left strictly alone when wet.

Clay can always be improved by the addition of humus (compost, "muck" or farmyard manure, leaf-mould, green manuring: any vegetable or animal residue), by drainage, by ploughing it up at the right time and letting the air and frost get to it (frost separates the particles by forcing them apart), by liming if acid, even, in extreme cases, by incorporating sand with the clay. Clay soil is "late" soil, which means it will not produce crops early in the year. It is difficult soil. It is not "hungry" soil - that is, if you put humus in it the humus will last a long time. It tends to be rich in potash and is often naturally alkaline in which case it does not need liming.

Loam Loam is intermediate between clay and sand, and has many gradations of heaviness or lightness. You can have a very heavy loam and a very light loam. A medium loam is perhaps the perfect soil for most kinds of farming. Most loam is a mixture of clay and sand, although some loams probably have particles all of the same size. If loam (or any other soil) lies on a limestone or chalk rock it will probably be alkaline and will not need liming, although this is not always the case: there are limestone soils which, surprisingly, do need liming. Loam, like every other kind of soil, will always benefit by humus addition.

Sand Sandy soil, or the lighter end of the spectrum of heavy-light soils, is generally well-drained, often acid (in which case it will need liming) and often deficient in potash and phosphates. It is "early" soil - that is, it warms up very quickly after the winter and produces crops early in the year. It is also "hungry" soil; when you put humus into it the humus does not last long. In fact, to make sandy soil productive you must put large quantities of organic manure into it and inorganic manure gets quickly washed away from it. Sandy soils are favoured for market gardening, being early and easy to work and very responsive to heavy dressings of manure. They are good soils for such techniques as folding sheep or pigs or other animals on the land. They are good for wintering cattle on because they do not "poach" like heavy soils do (i.e. turn into a quagmire when trodden). They recover quickly from treading when under grass. But they won't grow as heavy crops of grass or other crops as heavier land. They dry out very quickly and suffer from drought more than clay soils do.

Peat Peat soils are in a class of their own but unfortunately ' are fairly rare. Peat is formed of vegetable matter which has been compressed in unaerobic conditions (i.e. under water) and has not rotted away. Sour wet peatland is not much good for farming, although such soil, if drained, will grow potatoes, oats, celery and certain other crops. But naturally drained peatlands are, quite simply, the best soils in the world. They will grow *anything,* and grow it better than any other soil. They don't need manure, they *are* manure. Happy is the self-supporter who can get hold of such land for his crops are most unlikely to fail.

MANURING

Plants require traces of almost all the elements, but the elements that they need in large quantities are: nitrogen, phosphorus, potassium and calcium.

Nitrogen, as we have seen, can be fixed from the

atmosphere by nitrogen-fixing bacteria, and the organic grower is most apt to rely on this source. However, to ensure a really good supply, animal dung should be added to the soil and this will release nitrogen as it decays.

Phosphorus is probably present in the soil, but perhaps it is not being released in sufficient quantities. If analysis shows a serious phosphate deficiency then phosphorus should be added. Phosphorus deficiency may be seen sometimes by a purplish discoloration in seedlings, followed by yellowing as the plant gets older, stunted growth and lateness in coming to maturity. "Basic slag" is a common phosphatic fertilizer: it is the ground-up limestone lining of blast-furnaces and is thus a by-product of the steel industry. The word "basic" here means alkaline - it helps to correct acidity as lime does. Unfortunately new methods of steel making are reducing the supply. Ground rock phosphate is slower acting than slag, but it is longer lasting, and many organic growers think better. Superphosphate is rock phosphate (or bones) that have been dissolved in sulphuric acid; it is quick-acting but expensive and it may harm the soil organisms.

Potassium deficiency may show itself by yellowing of leaf-tips, and by a weakness in the stems of cereals - they fall down in wind or rain. There are huge rock-potash deposits in many parts of the world and until these are exhausted we can correct potassium deficiency by applying this material. Clay soil is seldom deficient in potassium.

Calcium deficiency causes acid soil and can lead to mal-formation of plants. In any case Time in some form or another will probably be added by the husbandman to soils which are acid, and calcium deficiency will then not occur. Lime can be added as lumps of lime or chalk (very slow acting), as ground lime or chalk (fairly slow acting), as quick lime or chalk (quick acting), and as slaked lime or chalk (quick acting). Quick lime, however, will burn plants and soil organisms; slaked lime is benign.

There are other elements in which your soil may be deficient. If, despite the addition of the elements listed above, you find that plants or animals are still sickly then you may suspect such things as boron deficiency, or deficiencies of other of these so-called "trace elements',' and you should call in expert advice.

But if your land has had proper additions of compost, or farmyard manure or the dung of animals added direct, or seaweed (which has in it *every* element), it is most unlikely to be deficient in anything. By getting your soil analysed when you take it over, and adding once and for all whatever clement the analysis shows the soil to be deficient in, and thereafter farming in a sound organic way, the "heart" (fertility) of your land should increase continually until it is at a very high level. There should be no need to spend any further money at all on "fertilizers". And, very often, if land is virgin, or if it has been properly farmed in the past, you may not even need to get it analysed.

THE ECOLOGICALLY SOUND HOLDING

One of the chief features of the High Farming era of eighteenth-century England was the famous "Norfolk Four Course Rotation'.' It was an ecologically sound system of husbandry, and it still remains a model for the productive growing of a variety of crops in both large and small-scale farming. The Norfolk Four Course Rotation worked like this:

1 **One-year Ley** A Ley is grass-and-clover sown for a temporary period. The grass-and-clover was grazed off by stock and the purpose of it was to increase the fertility of the land by the nitrogen fixed in the root nodules *o(* the clover, by the dung of the grazing animals, and ultimately by the mass of vegetation ploughed into the land when the **Ley** was ploughed up.

2 Root Break The crops in the Root Break might have been turnips or swedes to be fed to cattle, sheep or pigs, potatoes to be fed mostly to humans, mangolds for cattle, and various kinds of kale - the latter not actually "roots" of course but taking the same place in the Root Break. The effect of the Root Break was to increase the fertility of the soil, because nearly all the farmyard manure produced on the farm was applied to the root crop, and to "clean" (make weed-free) the land. Root crops are "cleaning-crops" because, by being planted in rows, they have to be hoed several times. The third effect of the Root Break was to produce crops which stored the summer's growth for winter feeding.

3 **Winter Cereal Break** This was wheat, beans, barley, oats or rye sown in the autumn. It "cashed" the fertility put into the land by the Ley and the Roots, benefited from the cleanlines's of the land after Roots, and was the farmer's chief "cash crop" - the crop from which he made his money. The beans, however, were for feeding to horses and cattle.

4 Spring Cereal Break This was possibly spring-sown wheat but it was more likely to be barley. After the barley had been drilled, grass-and-clover seed was *undersown* - that is, broadcast on the ground along with the cereal seed. As the barley grew, the grass-and-clover grew and when the barley was harvested a good growth of grass-and-clover was left to be grazed off next spring and summer, or to be cut for hay and grazed the following winter too. The barley went principally to feed stock but the best of it went to be malted for beer. The oats and barley straw was fed to the cattle, the wheat straw went under their feet to provide all that vast tonnage of farmyard manure (the best compost that ever was invented), rye straw was used for thatching, the roots were mostly fed to the cattle or to the sheep, and wheat, malting barley, beef, and wool went off to be sold to the city man. In the late eighteenth and nineteenth centuries, land properly managed in this way often grew two tons of wheat to the acre and this with *no* input of oil-derived chemicals whatever. There weren't any.

Now we can emulate this ecologically sound system, changing it to suit our different needs. We may not wish to live primarily on the bread, beef and beer of the eighteenth-

The Way to Self-Sufficiency

The Seasons

Early spring

Plough your land when the winter's frosts have broken up the soil. Prepare the fields to be sown with spring crops by harrowing with discs and spikes, and add lime or phosphate if your soil needs it. Make the most of shooting game before the close seasons begin. Be ready for lambing to begin; early spring is the ideal time for then the lambs can grow with the grass.

Late spring

Broadcast your seed or drill it into the earth, and be ready to combat *the weeds that will race the young shoots to meet the sun. Plant your early potatoes under glass to force them- on, and use cloches to protect* melons *and other squashes from late frosts. This is a good time for brewing beer in preparation for such thirsty jobs as shearing and haymaking later on. Mill some grain every month of the year so that you always have fresh flour.*

Early summer

In *early summer you have the delightful job of shearing your sheep. Wool from five of them will clothe a large family. With the summer flush of grass your cows will pour out milk and you should make butter nearly every day. Store some of your milk for the winter by making plenty of cheese. In midsummer comes the back-breaking, but satisfying, business of haymaking. You will need help from your friends and neighbours and you will all need plenty of home brew.*

Late summer

The wheat harvest in late summer is the crown of the year. Again you will need help from your friends, and again you will deserve to celebrate for you should have earned yourself a year's supply of bread. Orchard fruit, soft fruit, nuts, mushrooms and wild berries are gathered, and go into pots or pickle jars to be stored against winter scarcity. Wine-making continues through this time, and the last of the green tomatoes go for chutney.

Autumn

Autumn *is the time to harvest root crops, and clamp them or store them in root cellars. Plant winter wheat, broad and field beans. The sap is down in the trees which makes this an ideal time to fell those which have reached maturity. At the same time haul out wood which has fallen before it gets wet and use it for firewood. In the late autumn your barley is ready for malting, and you should have time to spin wool and the year's harvest of flax as well.*

Winter

In *midwinter, when the leaves are off the trees, you can build new-hedges and* rebuild *old ones, make and repair fences, gates and hurdles, sharpen and restore the implements on your holding. The weather will be cold enough for* killing *and hanging beef and mutton, and early in the New Year is the best time for slaughtering your baconers. Bacon and ham can be salt-pickled in brine, sweet-pickled, or dry salted and carried to the smokehouse. Above all, this is the time of year for you to enjoy the fruits of your labours.*

century Englishman. We may need more dairy products: butter, cheese and milk, more vegetables, a greater variety of food altogether. Also we have new techniques: new crops such as Jerusalem artichokes, fodder radish, fodder beet, maize in nothern climates, and devices such as the electric fence, which widen our possible courses of action.

Now whether our would-be self-supporter has nothing more than a back garden, or perhaps a city allotment, or whether he has say a hundred acre farm, or whether he is part of a community owning a thousand acres, the principles he should follow are the same. He should try to work with Nature, not against her, and he should, as far as he can while still serving his own ends, emulate Nature in his methods. Thus if he is to improve and maintain the heart of his land he should remember:

1 Monoculture, or the growing of the same crop on land year after year should be avoided. Disease organisms which attack any particular crop always build up in land on which that crop is grown year after year. Also each crop has different requirements from the soil and its residues return different materials to the soil.

2 The keeping of one species of animal on the soil and one only should be avoided, for much the same reasons as the reasons against crop monoculture. The old High Farming practitioners in England used to say:"A full bullock yard makes a full stack yard." In other words, the dung from the animals is good for the soil. Mixed stocking is always better than mono-stocking, and rotational grazing is the best of all: the penning or folding of a species of animal over the land so that the animals leave their droppings (and the inevitable eggs of parasites) behind and so break the lifecycle of the parasites. Following one species with another in such a rotation should be practised wherever possible.

3 To grow "leys," graze them, and ultimately plough them in.

4 To practise "green manuring." That is, if you don't want to grow some crop to graze off or feed off to animals, grow the crop anyway and then plough it in, or, better still, work it in with discs or other instruments.

5 To avoid ploughing too much or too deep. To bury the topsoil and bring the subsoil to the surface is not good. On the other hand, chisel ploughing-the cutting offurrows in the soil by dragging knives through it - does not invert the soil, helps drainage, breaks "pans" (hard layers under the surface) and can only do good.

6 To suffer not his land to remain bare and exposed to the weather more than absolutely necessary. When it is covered with vegetation, even with "weeds," it will not erode or deteriorate. If left bare, it will. A growing crop will take up and store the nitrogen and other elements of the soil and release them when it rots down. In bare soil many soluble plant-foods are "leached-out," or washed away.

7 To attend to drainage. Waterlogged soil is no-good soil and will deteriorate unless, of course, you are growing rice, or keeping water-buffalo.

8 To observe, at all times, the Law of Return. All crop and animal residues should be returned to the soil. If you sell anything off the holding then you should import something of equal manurial value back on to it. The Law of Return should apply to human excrement too.

Now if the Law *of* Return is properly observed it is theoretically possible to maintain, if not increase, the fertility of a piece of land without animals at all. Careful composting of vegetable residue is necessary, but it is noteworthy that on holdings where no animals are kept, but a high standard of fertility is maintained, almost always vegetable matter is brought in from outside the holding, and very often other high-energy substances, such as compost-activator, too. Seaweed, leaf-mould from woods, dead leaves from city street cleaning services, waste vegetables from greengrocers, straw or spoiled hay, nettles or bracken mown on common ground or waste ground or neighbours' land: all such inputs of vegetable residues are possible, and will keep up the fertility of land which has no animals. It is difficult to see *why* putting vegetable matter into animals and then returning it to the land as shit should be better than putting it direct on to the land, but it is demonstrably so. There is no doubt about it, as any husbandman with any experience knows, but there is some potent magic that transmutes vegetable residues into manure of extraordinary value by putting it through the guts of an animal. But when it is realized that animals and plants have evolved *together* on this planet perhaps this is not surprising. Nature does not seem to show any examples of an animal-free vegetable environment. Even the gases inhaled and exhaled by these two different orders of life seem to be complementary: plants inhale carbon-dioxide and exhale oxygen, animals do the opposite.

VEGETARIAN OR NON-VEGETARIAN

To be or not to be vegetarian: this is the argument that could (but mustn't) split the Organic Movement. Now there is not the slightest reason why vegetarians and non-vegetarians should not live perfectly happily side by side. The vegetarians say, on their side, that it takes so many units of vegetable protein fed to an animal to produce one unit of protein in the form of meat. Therefore it would be better for humans to eliminate animals and eat the vegetable protein direct. The non-vegetarians point out that the units of protein that are not directly turned into meat are not wasted: they are returned to the soil again in a transmuted form to improve its fertility and grow more crops. The vegetarians point out that it is cruel to kill animals. The non-vegetarians point out that *some* factor has got to control the population-increase rate of every species: either predators (such as non-vegetarians!), disease, or famine, and of these, predators are possibly the most humane. Vegetarianism seems to be almost wholly an urban, or big-city, phenomenon, and is possibly due to people having

been cut off from animals for so long that they tend to anthropomorphism. The humane non-vegetarian says (and I am one) that animals should be kept in the conditions most nearly approaching those for which they were evolved as possible, treated humanely and subjected to no cruelties and indignities, and, when their time comes, killed instantly and with no long journeys to far-away markets or abattoirs. This is perfectly possible on the self-supporting holding, and the animal need have no inkling that anything is going to happen to it.

Having said all this I will now say that it is perfectly possible to live a self-sufficient existence on an animal-free holding, and that it is perfectly possible to live healthily on a meat-free diet. It is also possible to do the opposite.

THE ONE ACRE HOLDING

Everyone will have an entirely different approach to husbanding his land, and it is unlikely that any two small-holders with one acre each will adopt the same plan or methods. Some people like cows, other people are afraid of them. Some people like goats, other people cannot keep them out of the garden (I never could and I don't know many people who can). Some people will not kill animals and have to sell their surplus stock off to people who will kill them, others will not sell surplus stock off at all because they know that the animals will be killed. Some people are happy to keep more stock than their land can support and to buy in fodder from outside, while other people regard this as contrary to the principles of self-sufficiency.

Myself, if I had an acre of good well-drained land I think I would keep a cow and a goat, a few pigs and maybe a dozen hens. The goat would provide me with milk when the cow was dry. I might keep two or more goats in fact.-1 would have the cow (a Jersey) to provide me and the pigs with milk, but more important I would keep her to provide me with heaps and heaps of lovely manure. For if I was to derive any sort of living from that one acre, without the application of a lot of artificial fertilizer, it would have to be heavily manured.

Now the acre would only just support the cow and do nothing else, so I would, quite shamelessly buy in most of my food for the cow from outside. I would buy all my hay, plenty of straw (unless I could cut bracken on a nearby common), all my barley meal and some wheat meal, and maybe some high protein in the form of bean meal or fish meal (although I would aim to grow beans).

It will be argued that it is ridiculous to say you are self-supporting when you have to buy in all this food. True, you would grow much of the food for cows, pigs, and poultry: fodder beet, mangolds, kale, "chat" (small) potatoes, comfrey, lucerne or alfalfa, and all garden produce not actually eaten by people. But you would still have to buy say a ton or a ton and a half of hay a year and say a ton a year of grain of different sorts including your own bread wheat, and a ton or two of straw. For I would not envisage growing wheat or barley on such a small area as an acre, preferring to concentrate on dearer things than cereals, and things that it was more important to have fresh. Also the growing *of* cereals on very small acreages is often impossible because of excessive bird damage, although I have grown wheat successfully on a garden scale.

The big question here is - a cow or no cow? The pros and cons are many and various. In favour of having a cow is the fact that nothing keeps the health of a family - and a holding - at a high level better than a cow. If you and your children have ample good, fresh, unpasteurized, unadulterated milk, butter, butter-milk, soft cheese, hard cheese, yoghourt, sour milk and whey, you will simply be a healthy family and that is an end to it. A cow will give you the complete basis of good health. If your pigs and poultry, also, get their share of the milk by-products, they too will be healthy and will thrive. If your garden gets plenty of cow manure, that too will be healthy and thrive. This cow will be the mainspring of all your health and well-being.

On the other hand, the food that you buy in for this cow will cost you perhaps two hundred pounds a year. Against this you can set whatever money you would pay for dairy produce in that year for yourself and your family (and if you work that out you will find it to be quite substantial), plus the increased value of the eggs, poultry-meat and pig-meat that you will get (you can probably say that, in value, a quarter of your pig meat will be creditable to the cow), plus the ever-growing fertility of your land. But a serious *contra* consideration is that you will have to milk the cow. Twice a day for at least ten months of the year you will have to milk the cow. It doesn't take very *long* to milk a cow (perhaps eight minutes), it is very pleasant when you really know how[7] to do it and if she is a quiet nice cow, but you will have to *do* it. So the buying of a cow is a very important step, and you shouldn't do it unless you do not intend to go away very much, or you can make arrangements for somebody else to relieve you with milking. Of course, if you only have a budgerigar somebody has got to feed it.

So let us plan our one acre holding on the assumption that we are going to keep a cow.

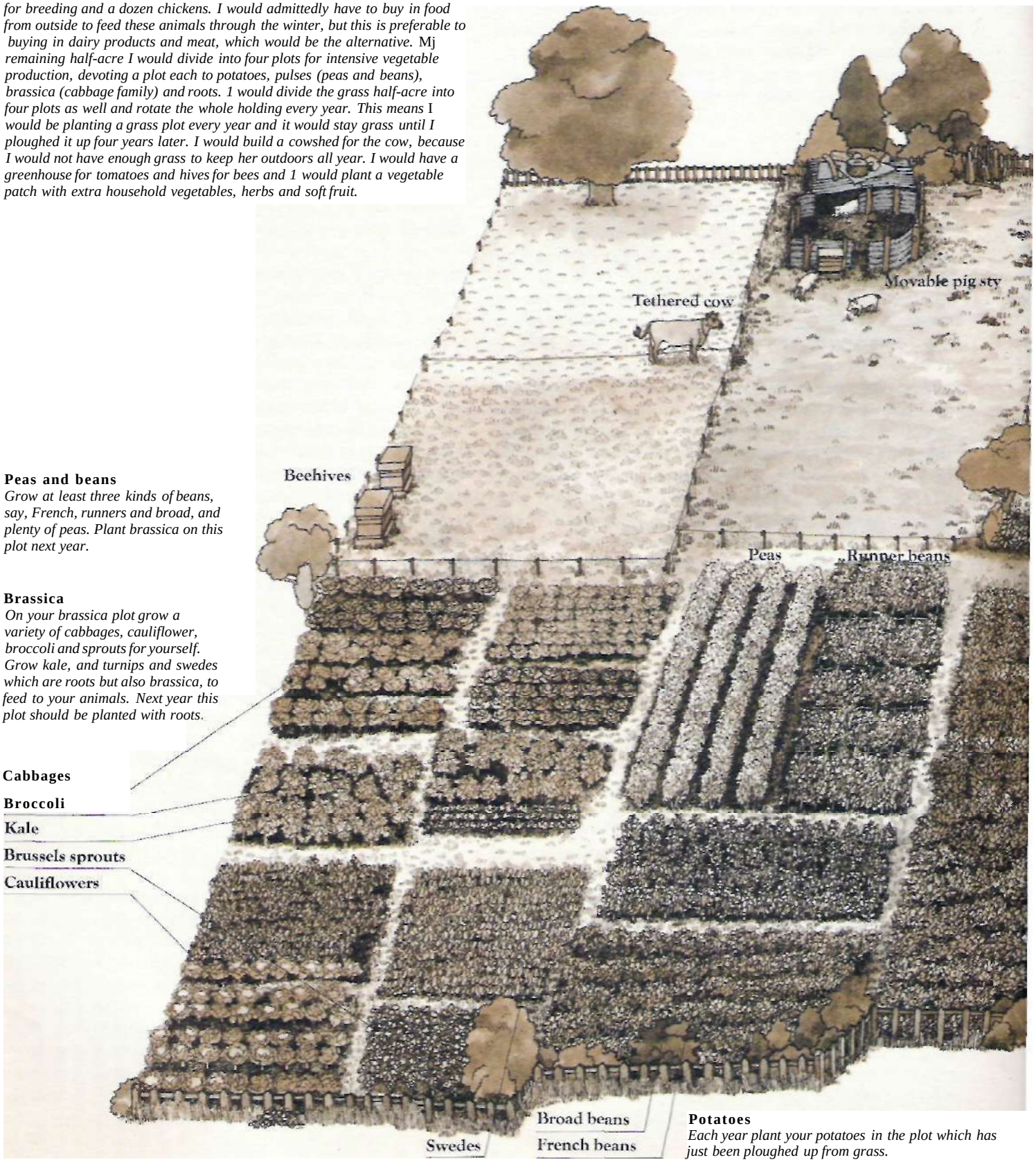
One acre holding with a cow

Half the land will be put down to grass, leaving half an acre arable (I am not allowing for the land on which the house and buildings stand). Now the grass half could remain permanent pasture and never be ploughed up at all, or it could be rotated by ploughing it up say every four years. If the latter is done it were better done in strips of a quarter of the half acre each, so each year you grass down an eighth ot an acre of your land. Thus there is some freshly-sown pasture every year, some two year-old ley, some three-year-old ley and some four-year-old ley. The holding will be more productive if you rotate your pasture thus every four years.

The Way to Self-Sufficiency

The One Acre Holding

If you had one acre of good well-drained land, you might choose to use all of it to grow fruit and vegetables. Myself, 1 would divide it in half and put half an acre down to grass on which I *would graze a cow, and perhaps a goat* to *give milk during the short periods when the cow would be dry, a sow for breeding and a dozen chickens. I would admittedly have to buy in food from outside to feed these animals through the winter, but this is preferable to buying in dairy products and meat, which would be the alternative.* Mj *remaining half-acre I would divide into four plots for intensive vegetable production, devoting a plot each to potatoes, pulses (peas and beans), brassica (cabbage family) and roots. 1 would divide the grass half-acre into four plots as well and rotate the whole holding every year. This means* I *would be planting a grass plot every year and it would stay grass until I ploughed it up four years later. I would build a cowshed for the cow, because I would not have enough grass to keep her outdoors all year. I would have a greenhouse for tomatoes and hives for bees and 1 would plant a vegetable patch with extra household vegetables, herbs and soft fruit.*



Peas and beans
Grow at least three kinds of beans, say, French, runners and broad, and plenty of peas. Plant brassica on this plot next year.

Brassica
On your brassica plot grow a variety of cabbages, cauliflower, broccoli and sprouts for yourself. Grow kale, and turnips and swedes which are roots but also brassica, to feed to your animals. Next year this plot should be planted with roots.

Potatoes
Each year plant your potatoes in the plot which has just been ploughed up from grass.

A half-acre of grass
Your half-acre of grass will feed your cow all through the summer. Let your hens run on it and give them a movable chicken ark. When you want to plough up your annual eighth of an acre, put the pigs on it and let them do the work for you.
Vegetable patch
In your home vegetable patch plant extra vegetables for your own consumption. Spinach, carrots, lettuce, celery, leeks and onions, when added to your brassica, pulses and potatoes should give you a varied diet. Plant a herb garden near the kitchen and sunflowers so you can press your own oil.
Movable chicken ark
Greenhouse
Tool shed
Cold frames
Cowshed
Compost heap
Fruit trees
Potatoes
Carrots
Spinach
Leeks
Onions
Lettuce
Mangolds
Sunflowers
Herbs
Strawberries
Currants
Beetroot
Roots
Grow roots to feed your animals in winter, especially mangolds and fodder beet, where the brassica were last year. Next year this plot will be grassed.
Fodder beet
Rhubarb
Raspberries

The holding may break naturally into half: for example, an easily-worked half acre of garden, and a half acre of roughish pasture. You will begin then by ploughing up or pigging (allowing pigs to root it up behind an electric fence) or rotovating half of your holding. This land you will put down to a grass-and-clover-and-herb mixture. If you sow the seed in the autumn you can winter your cow indoors on bought hay and hope for grazing next spring. If your timetable favours your sowing in the spring, and if you live in a moist enough climate to do so, then you will be able to do a little light grazing that summer. It is better *not* to cut hay the first summer after spring-sowing of grass, so just graze it lightly with your little cow; at the first sign of "poaching" (destruction of grass by treading) take her away. Better still, tether your cow, or strip-graze behind an electric fence. Just allow the cow to have, say, a sixth part of the grass at one time, leave her on that for perhaps a week, then move her to the next strip. The length of time she stays on one strip must be left to your common sense (which you must develop if you are to become a self-supporter). The point about strip-grazing is that grass grows better and produces more if it is allowed to grow for as long as possible before being grazed or cut, then grazed or cut right down, then rested again. If it is grazed down all the time it never really has a chance to develop its root system. In such super-intensive husbandry as we are envisaging now it is essential to graze as carefully as possible.

Tether-grazing, on such a small area, might well be better than electric fencing. A little Jersey quickly gets used to being tethered and this was, indeed, the system that they were developed for on the island of Jersey, where they were first bred. I so unequivocably recommend a Jersey to the one acre man, incidentally, because I am convinced that for this sort of purpose she is without any peer. I have tried Dexters, with complete lack of success, but if you *really* know of a Dexter that gives anything like a decent amount of milk (my two gave less than a goat), is quiet and amenable, then go ahead and get a Dexter and good luck to you. But remember, a well-bred-Jersey gives plenty of milk which is quite simply the richest in butter-fat of any milk in the world, she is small, so docile that you will have trouble resisting taking her into the house with you, moderate in her eating demands, pretty, lovable, healthy, and very hardy.

Now your half acre of grass, once established, should provide your cow with nearly all the food she needs for the summer months. You are unlikely to get any hay off it as well, but if you *did* find that the grass grew away from the cow then you could cut some of it for hay.

The remaining half of your holding- the arable half-will then be farmed as a highly intensive garden. It will be divided, ideally, into four plots, around which all the annual crops that you want to grow, will follow each other in strict rotation. (I will discuss this rotation in detail in the section Food from the Garden, pp 160-171). The only difference that you will have to make in this rotation is that every year you will have to grass a quarter down, and every year plough a quarter of your grassland up. I suggest that your potatoes come after the newly-ploughed bit. The rotation will thus be: *grass (for four years) - potatoes - pea-and-bean family - brassica (cabbage family) - roots - grass again (for four years).*

To sow autumn-sown grass after your roots, you will have to lift them early. In a temperate climate it would be quite practicable to do this; in countries with more severe winters it might be necessary to wait until the following spring. In areas with dry summers, unless you have irrigation, it would probably be better to sow in the autumn. In some climates (dry summers and cold winters) it might be found best to sow your grass in the late summer after the pea- and-bean break instead of after the root break, for the peas-and-beans are off the ground earlier than the roots. It might then pay you to follow the grass with potatoes, and your succession could be like this: *grass (for four years) -potatoes - brassica (cabbage family) -roots-pea-and-bean family - grass (for four years).*

A disadvantage of this might be that the brassica, following main-crop potatoes, might have to wait until the summer following the autumn in which the potatoes were lifted before they could be planted. When brassica are planted after pea-and-bean family they can go in immediately, because the brassica plants have been reared in a nursery-bed and it is not too late in the summer to transplant them after the peas and beans have been cleared. But potatoes cannot be lifted (main crop can't anyway) until the autumn, when it is too late to plant brassica. Actually, with this regime you will be able to plant some of your brassica that first summer, after early potatoes. Or if you grow only earlies, you may get the lot in. One possibility would be to follow the potatoes immediately with brassica (thus saving a year) by lifting some earlies very early and planting immediately with the earliest brassica, then following each lifting of potatoes with more brassica, ending with spring cabbages after the main crop have come out. This would only be possible in fairly temperate climates though.

All this sounds complicated, but it is easier to understand when you *do* it than when you talk about it. And consider the advantages of this sort of rotation. It means that a quarter of your arable land is newly-ploughed-up four-year-ley every year: intensely fertile because of the stored-up fertility of all that grass, clover, and herbs that have just been ploughed in to rot, plus the dung of your cow for four summers. It means that because your cow is inwintered, on bought-in hay, and treading and dunging on bought-in straw, you will have an enormous quantity of marvellous *muck* to put on your arable land. It means that all the crop residues that you cannot consume go to help feed the cow, or the pigs or poultry, and I would be very surprised if, after following this regime for a few years, you did not find that your acre

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of land increased enormously in fertility, and that it was producing more *food,* for humans, than many a ten acres farmed on ordinary commercial lines.

You may complain that by having half your acre down to grass you thus confine your gardening activities to a mere half-acre. But actually half an acre is quite a lot, and if you garden it really well it will grow more food for you than if you "scratch" over a whole acre. And the effect of being under grass, and grazed and dunged, for half its life, will enormously increase the fertility of it. I believe you will grow more actual vegetables than you would on the whole acre if you had no cow, or grass break.

We will discuss the treatment of the various kinds of stock, and of the crops, in the appropriate sections of this book, but there are a few general remarks to make about this particular situation. First, the cow will not be able to be out of doors all the year. On such a small acreage she would poach it horribly. She should spend most of the winter indoors, only being turned out during the daytime in dry weather to get a little exercise and fresh air. Cows do not really benefit by being out in all weathers in the winter time, although they put up with it. They are better for the most part kept in, where they make lovely manure for you, and your cow will have plenty of greenstuffs and roots that you will grow for her in the garden. In the summer you will let her out, night and day for as long as you find the pasture stands up to it. You could keep the cow on "deep litter": that is, straw which she would Hung on and turn into good manure, and you would put more clean straw on it every day. I have milked a cow for years like this and the'milk was perfect, made good butter and cheese, and kept well.

Or you could keep the cow on a concrete floor (insulated if possible), giving her a good bed of straw every day and removing the soiled straw, and putting it carefully on the muck-heap - that fount of fertility for everything on your acre - every day. You would probably find that your cow did not need hay at all during the summer, but she would be entirely dependent on it right throughout the winter, and you could reckon on having to buy her at least a ton. If you wished to rear her yearly calf until he reached some value you would need perhaps half a ton more hay too.

Pigs you would have to be prepared to confine in a house for at least part of the year (and you would need straw for them). This is because on a one acre holding you are unlikely to have enough fresh land to keep them healthy. The best thing you could have for them would be a movable house with a strong movable fence outside it, or you could have a permanent pig-sty as well. But the pigs would have a lot of outdoor work to do: they would spend part of their time ploughing up your eighth of an acre of grassland; they could run over your potato land after you had lifted the crop; they could clear up after you had lifted your roots, or after you had lifted any crop. But they could only do this if you had time to let them do it. Sometimes you would be in too much of a hurry to get the next crop in. As for their food, you would have to buy in some corn, barley, or maize. This, supplemented with the skimmed milk and whey you would have from your cow, plus a share of the garden produce and such specially grown fodder crops as you could spare the land for, would keep them excellently. If you could find a neighbour who would let you use his boar I would recommend that you kept a sow and bred from her. She might well give you twenty piglets a year. Two or three of these you would keep to fatten for your bacon and ham supply, the rest you would sell as "weaners" (piglets from eight to twelve weeks old, depending on the requirements of your particular market), and they would probably fetch enough money to pay for every scrap of food you had to buy for them, the poultry, and the cow too. If you could not get the service of a boar you would probably buy weaners yourself - just enough for your own use - and fatten them.

Poultry could be kept on the Balfour method (described on p. 126), in which case they would stay for years in the same corner of your garden. Or better in my opinion, they could be kept in movable arks on the land. They could then be moved over the grassland, where by their scratching and dunging they would do it good. I would not recommend keeping very "many. A dozen hens should give you enough eggs for a small family, with a few occasionally to sell or give away in the summer time. You would have to buy a little corn for them, and in the winter some protein supplement unless you could grow enough beans. You might try growing sun-flowers, buck-wheat, or other food specially for them. You might consider confining them in a small permanent house, with two outdoor runs a la Balfour system, during the worst months of the winter, with electric light on in the evenings to fool them that it was the time of the year to lay and thus get enough winter eggs.

Crops would be all the ordinary garden crops, plus as much land as you could spare for fodder crops for the animals. But you would bear in mind that practically *any* garden crop that you grew for yourself would be good for the animals too, so everything surplus to your requirements would go to them. You would not have a "compost heap? Your animals would be your compost heap.

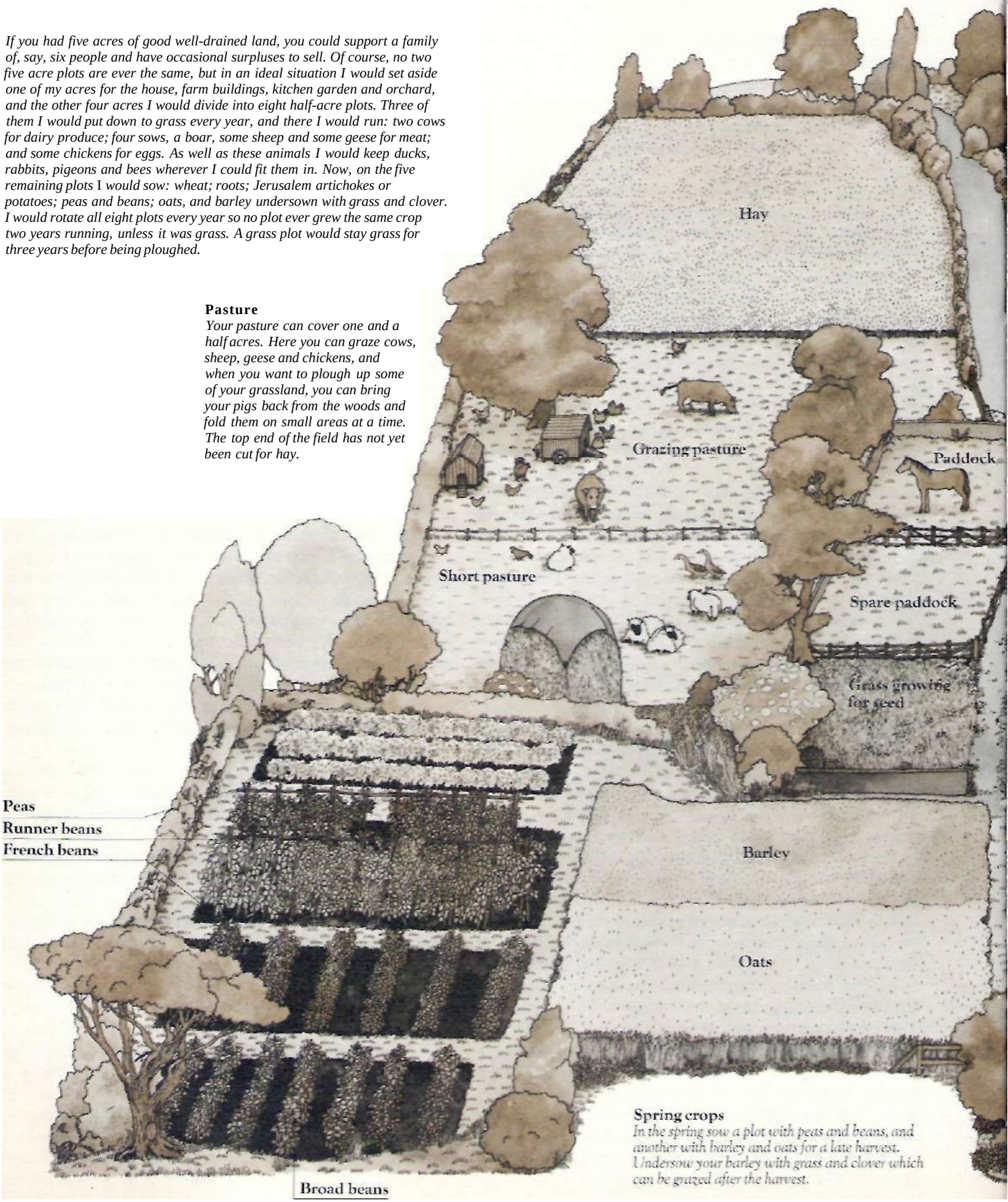
If you decided to keep goats instead of a cow (and who am I to say this would not be a sensible decision?) you could manage things in much the same way. You would only get a small fraction of the manure from goats, but on the other hand you would not have to buy anything like so much hay and straw, indeed perhaps not any. You would have nothing like so much whey and skimmed milk to rear pigs and poultry on, and you would not build up the fertility of your land as quickly as you would with a cow.

If you kept no animals at all, or maybe only some poultry, you might well try farming half an acre as garden and growing wheat in the other half acre. You would then rotate your land as we described above but substituting wheat for the

The Five Acre Holding

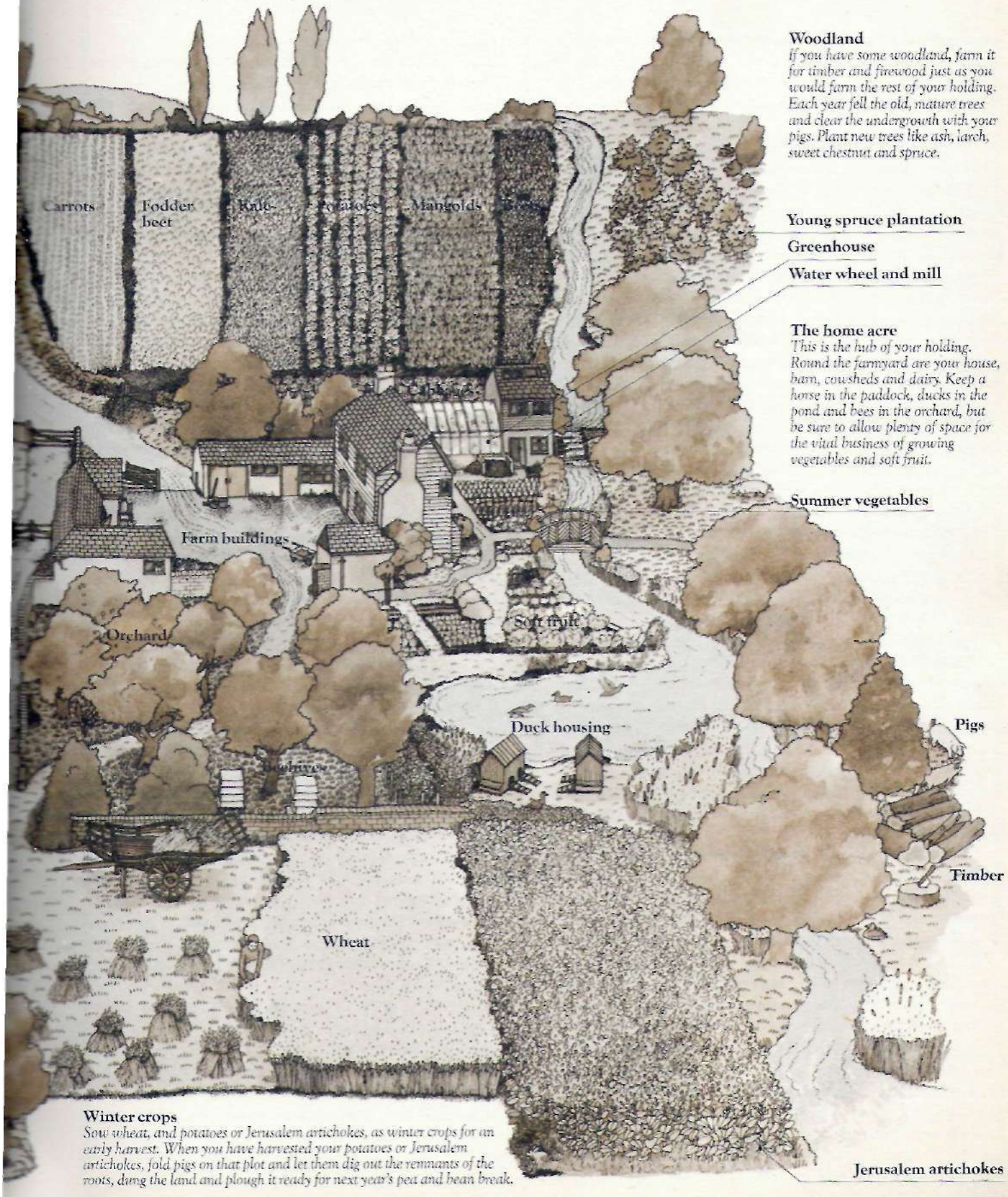
If you had five acres of good well-drained land, you could support a family of, say, six people and have occasional surpluses to sell. Of course, no two five acre plots are ever the same, but in an ideal situation I would set aside one of my acres for the house, farm buildings, kitchen garden and orchard, and the other four acres I would divide into eight half-acre plots. Three of them I would put down to grass every year, and there I would run: two cows for dairy produce; four sows, a boar, some sheep and some geese for meat; and some chickens for eggs. As well as these animals I would keep ducks, rabbits, pigeons and bees wherever I could fit them in. Now, on the five remaining plots I would sow: wheat; roots; Jerusalem artichokes or potatoes; peas and beans; oats, and barley undersown with grass and clover. I would rotate all eight plots every year so no plot ever grew the same crop two years running, unless it was grass. A grass plot would stay grass for three years before being ploughed.

Pasture
Your pasture can cover one and a half acres. Here you can graze cows, sheep, geese and chickens, and when you want to plough up some of your grassland, you can bring your pigs back from the woods and fold them on small areas at a time. The top end of the field has not yet been cut for hay.



Spring crops
In the spring sow a plot with peas and beans, and another with barley and oats for a late harvest. Undersow your barley with grass and clover which can be grazed after the harvest.

Root break
Divide your half-acre for roots into several small plots and grow a selection of roots for feeding your animals in winter. When you have dug your roots and stored them in a clamp or root cellar, put your pigs on the land.



Woodland
If you have some woodland, farm it for timber and firewood just as you would farm the rest of your holding. Each year fell the old, mature trees and clear the undergrowth with your pigs. Plant new trees like ash, larch, sweet chestnut and spruce.

The home acre
This is the hub of your holding. Round the farmyard are your house, barn, cowsheds and dairy. Keep a horse in the paddock, ducks in the pond and bees in the orchard, but be sure to allow plenty of space for the vital business of growing vegetables and soft fruit.

Winter crops
Sow wheat, and potatoes or Jerusalem artichokes, as winter crops for an early harvest. When you have harvested your potatoes or Jerusalem artichokes, fold pigs on that plot and let them dig out the remnants of the roots, dung the land and plough it ready for next year's pea and bean break.

grass-and-clover ley. If you were a vegetarian this might be quite a good solution. But you could not hope to increase the fertility, and thus the productiveness, of your land like this as much as you would do with animals.

THE FIVE ACRE HOLDING

The basic principles I have described for running a one acre holding will also broadly apply to larger acreages. The main difference would be that if you had say five acres of medium to good land in a temperate climate, and the knowledge, you could grow *all* the food necessary for a large family except such things as tea and coffee, which can only be grown in the tropics. And you *could,* of course, do without such things. You could grow wheat for bread, barley for beer, every kind of vegetable, every kind of meat, eggs, and honey.

Just as every person in the world is different, so is every five acre plot, but here is a possible pattern:-

Assuming one acre was set aside for house and buildings, orchard and kitchen garden, the remainder could be divided up into eight half-acre plots. It would be necessary to fence them permanently: electric fencing would do. Or, if you are a tetherer, you might tether your cows, and your pigs, and your goats if you have any, and not have any fencing at all. I tried tethering a sheep once but the poor thing died of a broken heart so I wouldn't recommend it.

The rotation could be something like this: *grass (for three years) -wheat-roots-potatoes-peas and beans-barley, under-sown with grass-and-clover-grass (for three years).*

This would only leave you, of course, one and a half acres of grassland, but it would be very *productive* grassland, and in a good year it could be supplemented with something like: a ton of wheat; twenty tons of roots; four tons of potatoes; half a ton of peas or beans; three quarters of a ton of barley.

You might well manage to get two tons of hay off your grassland, and then have enough "aftermath" (grass which grows after you have cut the hay) to give grazing to your cows until well into the autumn.

There are a thousand possible variations of this plan, of course. Flexibility is the essence of good husbandry. You could, for example, take potatoes after your ploughed-up grassland, and follow that with wheat. You could grow oats as well as barley, or oats as well as wheat. You could grow some rye: very useful if you have dry light land, or want good thatching straw, or like rye bread. You could grow less peas and beans. You could try to grow all your arable crops in four half-acre plots instead of five and thus leave two acres for grassland instead of one and a half. You might find you had some grassland to spare in your "home acre" - in your orchard, for example, if your trees were standards and therefore too high to be damaged by the stock. Of course if you were in maize growing country you would grow maize, certainly instead of barley, maybe instead of roots or potatoes. A good tip is to seek out farming neighbours, and ask them which crops grow best in your area.

As for stock - you might well consider keeping a horse to help you do all that cultivating, or you might have a small garden tractor instead. Your ploughing could be done with pigs. With five acres you might well consider keeping enough sows to justify a boar. Four is probably the minimum: we kept six sows and a boar for many years and they were astonishingly profitable. Indeed, in good years and bad, they paid all our bills for us: the Irish call the pig "the gentleman who pays the rent" and one can see why. But pigs won't pay you very well unless you can grow a great deal of their food for them. You could look upon your pig herd, whether large or small, as your pioneers: they would plough up your half acre of grass every year for you, plough your stubbles after corn, clean up your potato and root land after harvest, and generally act as rooters-up and scavengers.

Poultry, too, would be rotated about the holding as much as possible. Put on wheat or barley stubble they will feed themselves for some time on spilled grain, besides doing great good scrapping out leatherjackets and wireworm. Following the pigs after the latter have rooted up a piece of land they will also do good by eating pests and will do themselves good too. Ducks, geese, turkeys, tame rabbits, pigeons: your five acres will provide enough food and space for them all, and they will vary your diet.

I would recommend keeping two cows, so you would have ample milk all the year, you would have enough milk to make decent hard cheese during the summer to last you through the winter, and enough whey and skimmed milk to supplement pig and poultry feed. If you reared one calf a year, and kept him eighteen months or two years, and then slaughtered him, you would have enough beef for family use. That is, if you had a deep freeze. If you did not, then you could sell your bullock and use that money for buying beef from the butcher, or, much better, you could make an arrangement with several small-holder neighbours that you each took turns to slaughter a beast, then divided the meat up amongst you so it could all be eaten before it went bad.
• In a cold winter you can keep beef at least a month.

Sheep, on such a small acreage, are a more doubtful proposition because they need very good fencing and also it is uneconomic to keep a ram for less than say six sheep. But you could keep some pet ewes, get them mated with a neighbouring ram, rear the lambs and keep yourself in mutton and wool.

The above is only an introductory outline *of* how a prospective self-supporter might organize a five acre holding. Each person will wish to adapt according to his circumstances, the size of his family or his community, and the nature of his land. But the main body of this book is aimed at providing him with as much practical help as possible in selecting and managing his acreage, his crops and his livestock, and in making them the productive agents in his search for the good life.

Food from the Fields

"He gave it for his opinion, that whoever
could make two ears of corn or two blades of grass to
grow upon a spot where only one grew before,
would deserve better of mankind."
SWIFT

Food from the Fields

Clearing Land

Unless your holding is big and you plan to farm a proportion of it on the "dog and walking stick" principle, one of your first priorities will be to see if you can gain any extra usable land by clearing overgrown wood and bush land. Such land is worth clearing as long as it is not on a ridiculously steep slope, or is irretrievably boggy or is covered in boulders. Clearing land is hard but rewarding work, although it can be extremely expensive and time consuming.

Pigs and goats

Your pig is your best pioneer. If you concentrate pigs in bush land they will clear it for you with no effort on your part at all. They won't, of course, remove trees, but all brambles, gorse and undergrowth generally will yield to their snouts and they will manure the land at the same time. If there are any stubborn areas of thicket try throwing some corn into them and the pigs will soon root them out.

Goats will kill small trees, and big ones too if they are concentrated, by barking.them, and they will prevent trees from coming back. They will not of course get the trees out, any more than pigs will. You will have to do that.

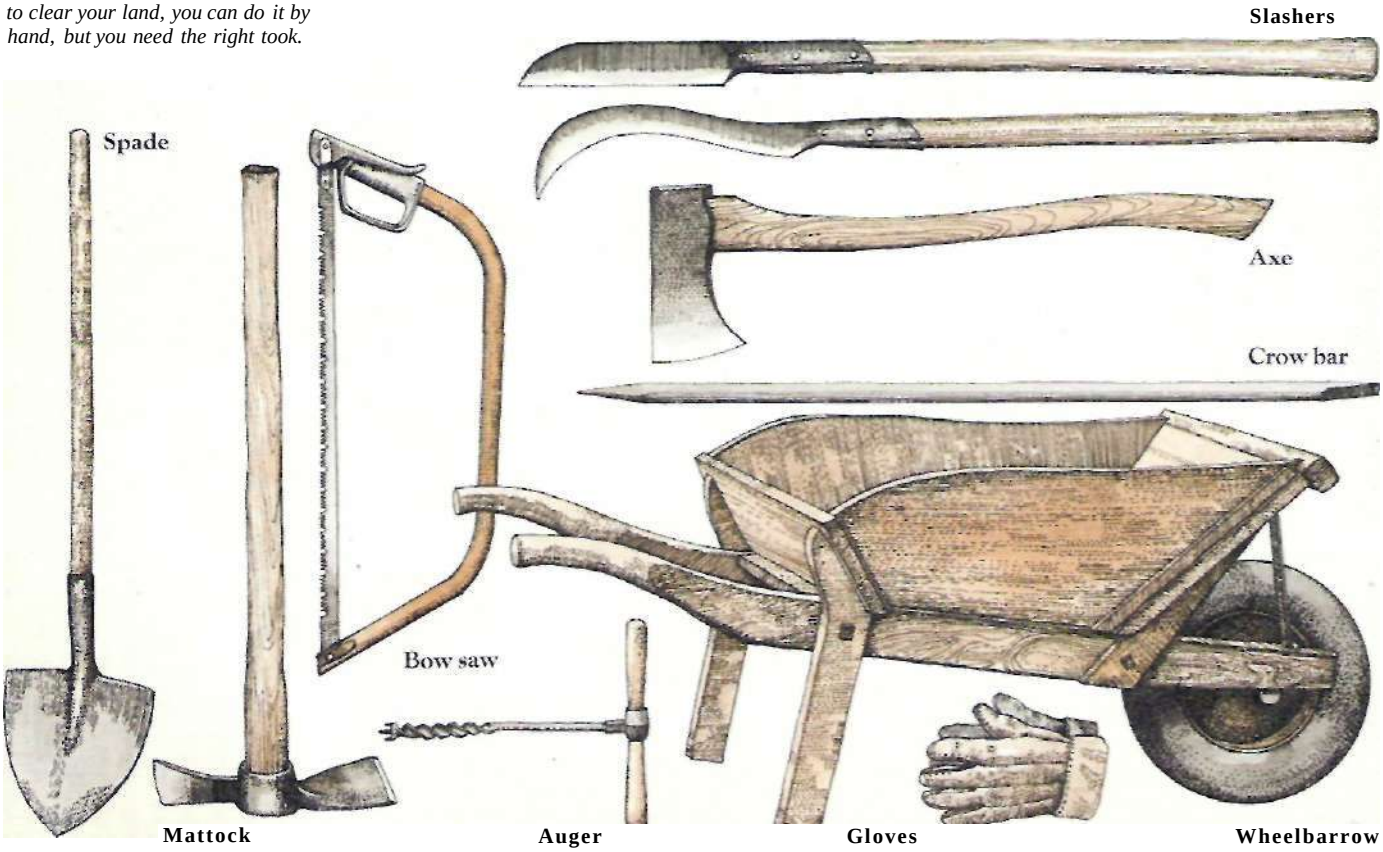
Clearing woodland

Stumping woodland may well cost you more than buying new land unless you happen to live in a country that has a large government subsidy for this work. But if you can spend the time and the vast effort needed, you can stump old woodland, and to produce fertile land where no cultivatable land was before is a worthy endeavour. Consider first, though, whether it would not be better to replant old woodland as new woodland and farm it as forest (see p. 33).

The most expensive method of stumping is to hire a mechanical excavator. One of these, plus a driver, costs a lot to hire but undoubtedly does a lot of work in an hour. It leaves the trees pulled out, higgledy-piggledy, one on top of the other. You are then left with the formidable job of slashing out the usable timber and burning the "slash", as the small branches are called. And to do the latter operation when the wood is green is a much harder j ob than you might think, but you have got to do it before you can cultivate the land.

It is cheaper to haul stumps out with a tree-jack or monkey-winch. You might hire or borrow one of these, or buy one if you had a lot of land to clear but they cost several hundred pounds. There are many varieties of them. Alternatively you can dig stumps out with spade and mattock, but this is very laborious. Or you can blow them out with gunpowder, gelignite, or other explosive. This involves driving a hole as deep down under the stump as you can get it and pushing your charge down there. A *lifting* explosive is the best thing to use: black gunpowder is fine if you use enough of it. Ammonol

Hand tools
If you haven't got pigs or machines to clear your land, you can do it by hand, but you need the right took.



is excellent or any "high-expansion-ratio" explosive. Thus it is better to use "open-cast" gelignite than ordinary rock-breaking gelignite. As for quantities - this is entirely a matter of judgment and trial and error. Two pounds (0.9kg) of ammonol might lift a big oak right out of the ground; it would take ten pounds (4.5kg) of black gunpowder to do the same thing. But get somebody who has used explosives before to help you.

A more accessible method for most of us is sodium chlorate, which is a common weed killer, much used by terrorists for the manufacture of their infernal machines. If you drill holes in the stump and fill them with sodium chlorate, put some cover over the holes to stop the rain from getting in, and wait a month, you will find that the stump has become highly inflammable. Build a small fire on the stump and it will burn right away.

Removing rocks

Rocks can be very obstructive, particularly on boulder-clay or glacial till in which boulders havebeenleft by theretreating ice in a completely random fashion. Again, the mechanical excavator can deal with these if they are not too big, hauling them out and dozing them to the side of the field.

You can lift quite large rocks, of several tons or more, with levers. Dig down around the rock, establish a secure fulcrum at one side of it - a railway sleeper will do, or another rock - insert a long beam of wood or steel girder - a length of railway line is ideal - and raise that side of the rock a few inches. Now pack small rocks under the big rock, let the latter subside, and apply your lever to the other side. Do the same there. Continue to work your way round the rock, raising it again and again the few inches made possible by your lever and packing small stones under it each time you have gained a bit. You will eventually work your rock to a point above the surface of the surrounding ground.

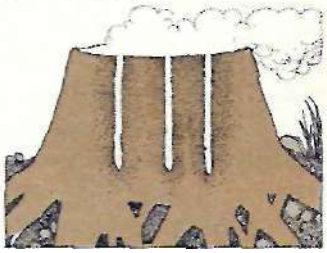
Once you have got a boulder out you may be able to roll it to the side of the field, again using levers. If it is too big for this you can try lighting a big fire under it, heating it right through, and then throwing cold water on it. This should crack it.

Breaking rocks

If you can get them explosives are the easiest way of breaking rock. Plastic high explosive is the best of the lot, but any fairly fast gelignite is fine. Drill a hole in the rock and put in your explosive. An ounce (28g) of gelignite splits a huge rock. You can drill rock with a compressor and rock drill, or you can do it by hand with a jumper - a steel bit like a long cold chisel - and a heavy hammer. You drive the jumper into the rock with the hammer, turning the jumper after every blow, and pouring water into the hole you are making from time to time. Wrap a rag round the jumper to stop the rock paste thus formed from splashing up in your face. But, as I said before, if you have never used explosives I strongly advise you to get somebody who has used them to come and help you the first time.

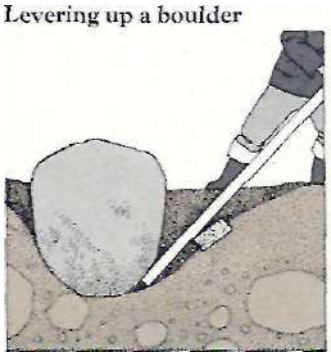
Using a monkey-winch
Use the base of one tree as a hold-fast and attach the wire rope as high as you can to the tree you want to pull out. Cut through as many roots as you can and then pull the tree over.

Blowing up a stump
Put *your charge in a hole deep under the stump and retreat.*



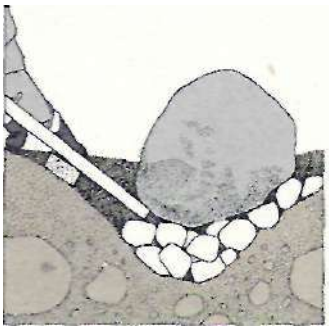
Burning a stump
Drill holes, fill with sodium *chlorate and cover over. Wait a month, then build a fire on top.*

Levering up a boulder

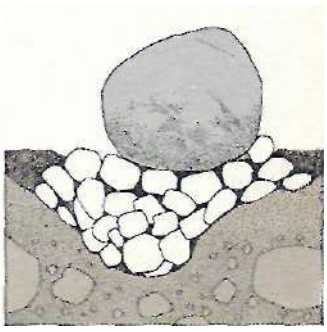


Use a rock or a chunk of wood as a fulcrum. Work a lever down beside the boulder.

Raise the boulder as far as possible, Prop up with stones. Take lever and fulcrum to the other side.



Repeat the process over and over, gaining a few inches each time.



Once the boulder is out, roll or lever it off your field.

Draining Land

If you are lucky your land will not need draining at all. Much land has porous subsoil and possibly rock through which water can percolate, perhaps has a gentle slope, and is obviously dry. But land with an impervious subsoil, very heavy land, land that is so level that water'cannot run away from it, or land with springs issuing out in it, may well need draining. Badly-drained land is late land, meaning it will not produce plants early in the year. It is cold land and it is hard to work. You cannot cultivate it when it is wet - particularly if it has clay in it. In short, it will not grow good crops.

You can tell wet land even in a dry summer by the plants growing in it. Such things as flag irises, sedges, rushes and reeds, all give away the fact that, although dry in the summer, it will be wet and waterlogged in the winter time and should be drained.

Cut-off drains

Often, on sloping land, you can drain a field by digging a ditch along the contour above it (see illustration). The effect of this ditch is to cut off and take away the water that is percolating down from above. The rain that actually falls on the field is not enough to cause it to become waterlogged: it is the water that drains down from above that does the damage.

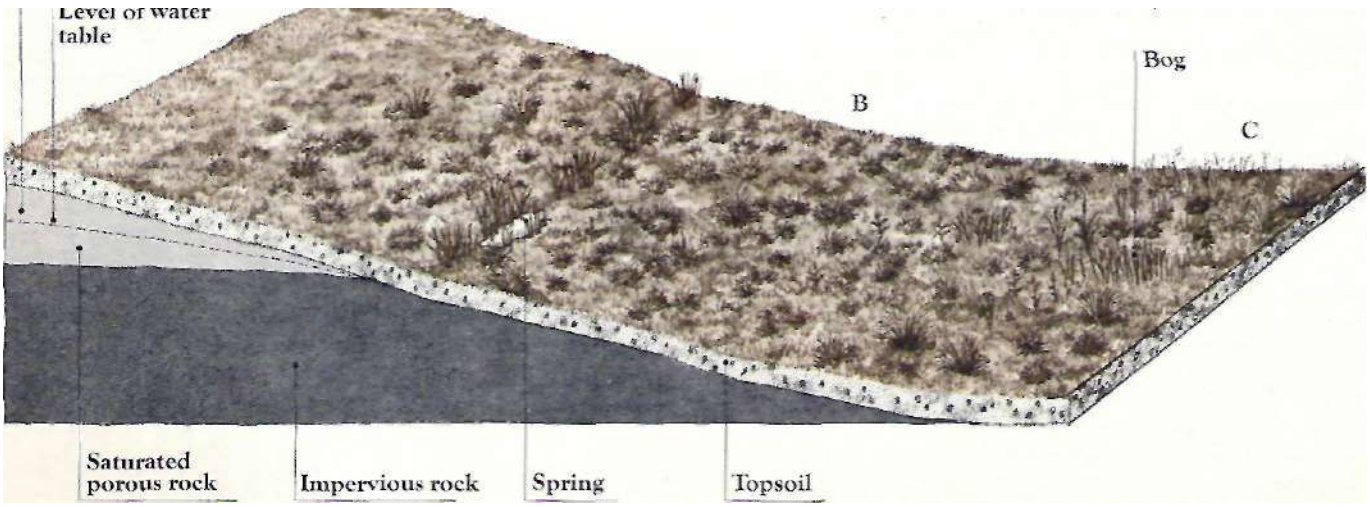
Springs

You can drain springs by connecting them by ditch or land drain (see illustration) to a stream that will carry the water away. You can see where springs are by wet patches or by water-loving plants. Ifthere is a large waterlogged area around the spring common sense might tell you to make a larger hole around the mouth of your pipe and fill it with stones.

Land drains

Level land can be drained simply by lowering the water table. The water table is the level at which the surface of the underground water lies. It will be higher in the winter than it is in the summer, and in severe cases may be above the surface. You lower it by digging ditches, or putting in land drains, to take the water away. You can even do this with land below sea-level, by pumping water from the deepest ditches up into the sea, or to raised-up rivers that carry it to the sea.

Obviously heavy soils (soils with a big clay content) need more draining than light soils, but even sand, the lightest of all soils, can be waterlogged and will then grow nothing until it is drained. The heavier the soil is the closer together your drains will need to be, for the less is the distance water can percolate. A very few drains will suffice to drain light or sandy soil. If you have had no experience it will pay you to get the advice of somebody who has: in countries with government drainage officers these are the obvious choice. There can often be heavy grants for draining, too.

There are three main types of land drain: open ditches, underground drains and mole drains. An open ditch is just what it says. You dig, or get dug by machine, a ditch with

Three situations where you need drains
A- *Water runs downhill through porous soil or rock before hitting an impervious layer. This forces it, generally sideways, to the surface where it emerges as a spring. B. An impervious subsoil prevents rain sinking.*
C- *Absolutely flat land has no slope to allow drainage.*
The plants on the right are sure signs of wet land: (left to right) marsh orchid, marsh violet, flag iris, marsh marigold, jointed rush, wood sedge, common rush and bulrush.