Soil and Health Library

CHARTER FOR THE SOIL

by

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ILLUSTRATIONS

THE BEGINNING

I am a small Scottish laird, brought up in the old traditional school of small Scottish lairds, who have struggled along father to son for the last seven or eight hundred years, hoping for the best. We have thus been through all the systems, right down from the feudal. In 1928 I came to the conclusion that the landlord-tenant combination was played out. I devised a new system to replace it; estimated my plan to take, with the cash available, twenty years to complete. At the moment I farm seven farms, and have the central organization in working order. During the last fifteen years I've thought a bit, been about a bit, and read a bit, even listened a bit.... I believe my plan is applicable to the country as a whole and am sure it is a definite solution to the present attitude of 'je ne sais quoi' towards agriculture. This book, then, is a farmer's plan for the future of British Agriculture—a plan which is intended to place it on a footing comparable with that of other industries; to put it in such a position that it will pay its way without subsidies; to re-organize it so that it can provide fresher foods to the consumer; to plan it for freedom from slump and from political whims.

A healthy sign in Great Britain is the strong desire evinced by townsmen to get into the country. This urge is directly opposite to the Latins', whose sole aim is to get into the town. From this desire many business men have been drawn to farming as a pastoral extravagance ; as a means of preserving game; or sometimes from the praiseworthy motive of 'putting it right'. Any good business man is maddened by the average farm. On my own farms I have introduced many innovations and these delight the town mind. 'Ah, that is the way to do it,' they will say, 'why doesn't every farmer do it like that?' I smile as sweetly as my face permits, knowing that my experiments are costly, and often fruitless wanderings made in the hope of arriving at some definite formula. If every farmer altered his methods in this way, the result would be chaotic; for the very essence of farming is to achieve a working plan and to keep to it. But the fruitless wanderings and the occasional successes have given me a very deep know-

ledge of what you can and can't do, and this often bitter experience has paved the way to designing a complete plan that will work.

Before starting to construct—or to criticize—a national plan for our agriculture it is necessary, in the first place of all, to appreciate the almost infinite diversity of the conditions which govern the farming of this country. The farmer's practical and financial needs, his technical problems and his possibilities of earning a profit vary from district to district, and even from one farm to the next. It has taken me much travelling and a great many visits to farms up and down the country before I could feel that I had succeeded in understanding this diversity of conditions and their implications. In my first two chapters I have, therefore, put down some of the impressions and the definite convictions which I formed when I was visiting farms of widely differing types and when I was discussing them with the men in charge of them.

Next, before we start trying to plan for the future, we must have some idea of the principal forces and agencies which are outside the farm and outside the farmer's control—such forces as political and economic change, the requirements of the distributor and the consumer, sudden fluctuations of market prices, the shifts of fashion, the application of scientific discoveries.

Part One

THE PIECES OF THE PUZZLE

Chapter One

ROMANTIC FARMING

Oasts and Bodges—Mostly a Dairy Farm—Pigs by the Ton—The Mechanized Farmer—Hens Die in Debt

Kent has been called the Garden of England. When I was eight years old a cab used to clop me up the yellow beech road of Sevenoaks' High Street. Soon I saw oast houses, orchards, and cloverish pastures. I thought it was called the garden because of its fertility. Later, it occurred to me that as the farms were small in the main, and carefully cultivated, the name might spring from the size of the holdings.

Some say the size of the holdings was caused by the county being forced in historical times to pay heavily for coastal defence. Maybe it is because the hop garden represents such a big capital return that nobody worries unduly about the rest.

The farm to which we are going, is nobody's farm and yet everybody's farm, and is therefore important to us. In the orchard near the entrance the trees look healthy, their arms pushing upwards as if they wanted to 'get cracking'; brown rings on the grass show that the farmer has recently been spraying them with a winter wash of tar oil. I wonder what held him back from doing this until three weeks too late and whether it has not now done more harm than good. Passing a gate, I notice wire netting has so deeply grown into a tree, that the mahogany bark bulges out in diamonds like a stuffed sofa. There are a couple of Jersey heifer calves grazing round the trees, they don't seem to mind the tar oil tinge and I wonder whether later, when he sprays arsenic of lead, he gets cases of poisoning. The hedge round the orchard has been recently cut, it is kept fairly high as a wind-break.

Further down the road, the orchard ends. I now note that the hedge has been left uncut for seven or eight years. Across the hedge

is a good white clover pasture. I climb the next gate which is obviously too tightly wired for me to get through any other way, and have a look.

Kentish Wild White is an indigenous clover and it is supposed that the strains in the old pastures which have survived the haphazard grazing of Kent, the stiff weald clay and the ice-cold winters must be able to stand up to anything. The seed is consequently more valuable than that of newly sown clover which has not stood up to these severe tests. For the same reason, Kentish rye grass has its followers. I knife out a plant which seems extremely promising, but find it poorly rooted and lacking many root nodules. These lumps on clover roots are caused by bacteria which store up nitrogen. They are therefore important, for when the pasture is ultimately ploughed in, the stored nitrogen is available for the next crop. Later, I find out in conversation that the pasture has been newly planted, but am told there is a system which prevents the seed being sold as vintage.

The farm buildings are simplish. There is the oast house, one of the characteristic landmarks of the district—just a cylindrical tower with tiled roof culminating in a ventilator rotated by a rudder. These cowls are always painted white; at least, I have never seen a Kentish hop kiln without a white cowl; so much does fashion or custom rule an agricultural district.

The oast house has a drying floor and is the pivotal point in the manufacture of hops—for there the flowers are dried artificially.

There are near the buildings a couple of ponds, fringed by the tall stems of the great Reed Mace, a plant condemned eternally to be called Bull-rush, the name of an entirely different species, and to decorate the fireplaces of boarding-houses with a background of crinkly pink paper.

My host and I now look at the cowshed. The tiles have showered off the roof while the wooden pillars, for aeons dipped in rotting manure, have themselves rotted—so the shed has a list to port. It is dark inside and heavy going on the rough cobbled floor. The cows are, at the moment, tied for milking in wooden stalls ingrained with dung. I feel that flies at a later season of the year will be extremely happy in the warm rich atmosphere. A Jersey cow stands in the small yard outside, udder deep in slushy dung. We have a look at her because my host says that she milks over the 1,000 gallons—although the cows are unrecorded.

In the haystack, just far enough from the cowshed to make carry-

ing laborious, the hay has fermented considerably in processing and it now shows a rich brown where the hay knife has sliced it; but a handful smells good and there's no doubt it is palatable feeding.

My opinion is asked on a number of North Devon steers who are housed in half a shed and a simply fenced yard. I think them leggy and say so, but say also that they are 'good topped'. The dung made by the steers will be mostly used in the hop gardens, but some of it is used on the open air tomatoes, of which they harvest good crops, either staked or trained over straw. The latter manner, they say, is 'from the Dutch', but I have not seen tomatoes grown that way in Holland.

The fields, my host tells me, are not ploughed up to the edges 'for transport'—a simple explanation of which I ought to have thought; remembering that bar the entrance road, there are no others. I ponder on the possibility of remodelling the whole farm with proper roads, but there are difficulties—the contour of the ground, the shape of the fields, hedges, ditches and chestnut cleft fencing. Alterations, besides being expensive, would upset the system of cropping for several years, a serious matter with far-reaching effects.

The hop garden is surrounded with a high hedge, carefully pleached. It is only four and a half acres, there being a hop quota limiting the acreage of hops in order to keep the price profitable and to prevent gluts. There is a tank outside for creosoting the poles. The 'Hop garden' is a good show, with the plants between 'check-placed' poles. It has a wire foundation which makes it semi-permanent ; a stringed garden would require more labour, but the poles can be taken out in the winter and this prolongs their life by preventing them from rotting at the point where they enter the ground. It is obviously one of those alternative methods which depend on the price of poles, wire, labour and the value of the crop.

Adjacent to the hop garden is a copse of Spanish chestnut stools, cut in regular rotation. A copse is a usual accompaniment to a Kentish farm and the manner of dealing with the copse wood is well understood—the chestnut shoots are cut and split with exceeding deftness and the quartered splittings are subsequently wired to form one of the finest fences in the world. Alternatively, the stools can be grown on to form hop poles. The copse generally gives a sufficient supply of firewood for domestic purposes.

The agricultural worker in Kent understands his job well. He uses a number of local instruments suitable to the purpose of his work

with considerable dexterity. It is customary, presumably owing to hop garden technique, to plough with horses tandem instead of pair, and this often requires an extra hand to steer the leader.

On the way homewards, we kick up a clod from the ground; very tough clay, wheat and bean land farmers would call it. I reflect that with alternate pastures, lime, more stock, dung in enclosed yards and heavier implements, it could be mellowed to grow anything. They could make roads, produce more milk and short ley the pastures to slacken the clay. And yet the Kentish farmer seems to have found his formula—the hop garden and the copse, tomatoes and orchard. All form an economic pattern. As I say good-bye to my host I ask him why everything on wheels in Kent is called a Bodge : he answers frankly that he does not know.

Perhaps you have read a book called *Cold Comfort Farm*; well, that is the sort of farm we are going to. It is by no means exceptional, nor would I like to hazard a guess how many English farms get mighty close to it.

The first thing I noticed as I left the main road was the ingenious way the farmer, having found the proper avenue impassable, carted at first to the right and then, when the ruts got too bad, to the left of the original thoroughfare. Finally, when both sides became unusable, the carts were driven with complete *laissez-faire* all over the field. The terminus of this network at the farm buildings was also the exit of the milch cows. All the mud of last-war France put down on the beach at Southend would have nothing on this entrance. One would see a cow raising a leg, with a pop like a champagne cork, and slip it back until one wondered if it would ever reach bottom. As my host said 'It's hardly worth going through the mud to see the buildings,' he added, 'They aren't much anyway.' They were an indescribable muddle of hovels, regarded by some people as picturesque. The tragedy was that in the dim past somebody had built them and planned them with care according to the latest fashion of the day; and stalwart red-faced men had flailed the yellow grain with amber flagons of cider at their elbows. One couldn't get any cider now; there were four trees three-parts dead, one down and eighteen mounds covering stumps. 'Make good firewood,' he said; and so it does, for if you have not smelled apple smoke, you have not smelled romance.

Amongst the mud and straw there were hens of a mixed breed, some slightly Rhode Island red, others nearer Light Sussex. They

scuttled in and out of broken doorways. 'Get their keep about the place?' He nodded, and added, 'Corn too, out of the granary.' On leeside of the remains of a barn, more hens were making dust baths, fluffing out their feathers and delousing themselves. They looked in excellent health and seemed to be enjoying life no end. They were not ringed to show their age, but my host told me that his wife 'knew hens'; and I believe she did, for they were laying an average of four eggs a week and looked to be doing their job willingly.[1]

Somebody had jammed up a doorway with chipped and rusty metal advertisements, which were held in position by rotting fence posts. Inside, a black and white pig was feeding an extremely healthy litter of eight. 'A Wessex?' I asked. 'Saddleback,' he said, which amounted to the same thing, the breed being called Wessex Saddleback. I knew the piglets would do well, for there is an unmistakable look about thriving pigs, a pinkness and a perkiness and a lushness of fat, a silkiness of hair; and there's the way they play games and burrow under the straw and scamper. I know because I keep pigs and have seen them wilting in their silver sties in spite of the dunging passages and the paper yellow barley straw and the weighing-machine with the chromium-fringed dial and the rationing. I have seen them grow long-haired and look ratty with drooping tails. Of course, I have seen them pink and gay too, or I wouldn't be keeping pigs. But the ratty ones linger in my memory long after the pink ones have gone. Now here is a curious unscientific observation; the best pigs I have seen have lived in slum homes. And so too with hens. The most purposeful hens have lived under the most haphazard conditions.

Cows are different. 'It's a bit dark here, mind your head.' 'Milk by lantern?' I ask. 'Often.' Still, stuffing the window with a sack seemed unnecessary as it was so small anyway. 'Sort of Shorthorn,' I say, growing accustomed to the light. 'Sort of is right if only because 'Lily' is showing the whites of her eyes. I talk to her before going any nearer. I know she is 'Lily' because her name is painted on a board over her stall. But my friend tells me she's 'Mayflower'. Lily has been gone many years. Mayflower and I get on terms and I find she has a bad quarter and that there are six warbles on her back. 'Do you ever squeeze the warbles out?' He is lighting his pipe as he answers. 'No, I don't worry.' I light mine; it is the etiquette of

[1] Later in this chapter will be found a description of more than one type of poultry-farm.

the farm. Never smoke in anybody else's buildings unless you see him do it first, or he gives you permission. I do not remark on the udder because I have seen something. There is a large hole in the wall blocked up by boarding from the outside and in this hole are numerous empty medicine bottles. As we pass slowly by; I think I have spotted every cure advertised in the farming press during my lifetime. I believe we are both relieved to get outside into the fresh mud again.

As we walk across a field, I ask if the War Agricultural Committee has asked him to plough up much ground. 'Not much,' he says, 'you see I am dairy.' We look at a field of oats which he claims the wire worm have taken. But I think the real trouble is that the old turf has not been consolidated enough. I tell him that, personally, I believe these old pastures should be made to grow good grass before they are ploughed in. If they are growing nothing, ploughing won't make them grow any more. He does not follow this reasoning but says emphatically, 'You can't beat permanent grass.' The hedges, of course, have not been cut for ages. No doubt the isolated thorns must look very pretty and smell mighty sweet in the spring. However, something has been done to make the hedges round the field of the root crop stock-proof. Heads and tails of disused beds have been inserted. The mangolds are a good crop, but the kale has for some reason or other been got in too late and we both agree that it will have a job to catch up.

In another field there is an old bath used as a drinking trough. The sight of a bath and portions of bed on a farm upset me—though I could pass stooks of corn all the way down Piccadilly without turning a hair. This, however, is that sort of farm!—the type of farm where one might find an old railway carriage or the passenger part of a tram.

As we reach the farm again, I notice the pastures contain a number of good grasses and an abundance of white clover, but they have been terribly poached by stock in the winter months and, in early summer, have not yet recovered. The terrible 'no-man's-land' round the farm itself, where generations of cattle have stood hock-deep and hundreds of cart wheels have squelched, extends in a minor degree through all the fields.

A phrase comes back to me as I tread my way over the ruts—'You can't beat permanent grass'. My host has always been accustomed to permanent grass and this haphazard type of farming. I wonder

what he would say if he saw the real thing—but 1 believe I know what he would say: 'You can't beat permanent grass.'

The business man turned farmer at once sees the possibility of mass producing some definite produce. He will always turn his eye to something which can be produced in standard quantities, and as the pig fits the bill, several business men have turned their attention towards the mass production of pigs.

The modern pig is, during its youth, a fairly delicate animal; when matured, however, it gets much stronger and will stand up to fairly harsh treatment. A system can therefore be devised whereby the pig is raised almost entirely indoors. This lends itself to the introduction of a number of labour-saving devices and of easy checks for weight and growth which not only eliminate the bad doer, but also leave an accurate record to guide the choice of breeding stock.

A gentleman of considerable business aptitude started such a farm a few years before the war. From a tentative beginning he developed what I should imagine must be one of the largest pig farms in the world. The turnover in pigs per week was staggering and each stage of the pigs' development had been thought out meticulously.

A special central feed plant was available to grind and mix tons of barley and fish meal for feeding; even more sensational On an English farm, a special chemist was installed with a well-equipped laboratory to act as resident vet and to do research work. This man discovered many interesting things.

The farm on which this venture was situated was a place of five or six hundred acres, dotted from end to end with pig houses. The enterprise was of considerable interest to me. For if it is possible to produce pigs by the thousands on imported foodstuffs, why should one not establish a pig town of millions of pigs on the coast with suitable docks, grain elevators, shipping lines and curing plants synthesizing dung plants, etc.? There are several tangible reasons against such a step.

The chance of disease becomes enormously intensified when large quantities of animals are kept together. An isolated seedling of oats in a hedgerow is a different plant from the oats covering a whole field. Apart from ordinary diseases, there are the nervous diseases. On this question of mass nervous complaints, I become decidedly unscientific: that is to say, I am dealing with a law which has not yet been tabulated scientifically and is, owing to its unorganic charac-

ter, difficult to explain logically. We have seen how modern warfare and artificial ways of living bring out numbers of nervous complaints such as duodenal ulcer and others which have not yet been classified. I believe the medical profession are agreed that what we used to call 'shell shock', and is now known as neurasthenia, is not caused by shells but by the brain being unable to assimilate a complete change in the manner of life. My theory is that all these nervous complaints are caused by an unnatural condition of life to which the body has not the fundamental powers to adapt itself. The massing of domestic animals in large herds under artificial conditions seems to result in a lack of bloom. There is nothing specifically wrong with the individuals, they are healthy enough and fatten quickly, but they are just a bit 'off'.

I have seen herds of several hundreds of cows magnificently housed and correctly fed, but yet without polish. The same may be said of this vast pig farm; the pigs were superbly managed, luxuriously housed and scrupulously clean, but they lacked lustre. It may be they lacked the individualistic treatment which domestic animals often receive, and which perhaps compensates for their artificial life. Nobody is going to try to understand the individual psychology of thousands of pigs. But perhaps it lies deeper than that. I believe the grouping of immense quantities of livestock under artificial conditions in close proximity to each other sets up a nervous condition which affects their health sufficiently to make them a little off colour. I believe also that what we call vitamins are linked up with this bloom of quality. This theory is based on observation rather than proof. Personally, I believe that if a plant or animal is not 'blooming'—and by that I do not mean ill or suffering from malnutrition—this may possibly be because it is not 'making' vitamins. When such a plant or animal is cut up and eaten, we will be the poorer.

Walking round the pig town, I was struck by the small quantity of labour employed. Yet this is misleading because the distributive network through which the supplies must be brought in, may involve a great deal of labour; nor is the elaborate system necessarily more economical than the ordinary farmer's way of producing pigs. A farmer, for instance, who has a herd of cows can probably fatten a few pigs without additional labour, whilst he can utilize a number of products off the farm for their feeding which would otherwise be wasted. Moreover, he can order a few bags of protein meal to be delivered by the lorry which brings his cow food.

His pigs may be housed in an old building, that is to say, without additional rent or rates. Thus an apparently haphazard farmer may fatten ten pigs and his only cost be the supplementary protein meals which he purchases—possibly amounting to a quarter of their rations.

Supposing the super pig farmer spent in wages, rent and interest on capital, five shillings per pig, while the purchased food cost him sixty shillings per pig, their total cost would be sixty-five shillings. Haphazard Giles spends nothing on extra wages, rent or buildings; moreover, he provides three-quarters of the ration from products which would otherwise go to waste. On the other hand, the quarter ration which he buys may cost him 50 per cent more than the bulk buying pig farm. Even so, his cost per pig would only amount to thirty shillings. Two thousand haphazard Giles rearing ten pigs each would produce 20,000 pigs. This is £25,000 cheaper than the cost on the super farm, and (what is even more important) Haphazard Giles' pigs, thanks to their isolation, would be free from the nervous complaints associable with unnatural concentrations of livestock.

The mechanized farmer sees farming through machinery. Sometimes he comes of farming stock, sometimes he has graduated to farming through engineering, and sometimes he is a 'gentleman' turned farmer. His aim is to cut laborious traditional methods and to turn the farm into a modern factory. Now of course the farm has always been a factory, designed for the production of certain commodities, but restricted in method by the unavoidable factors which limit farming; by rotation of crops, disease, the weather and political whims.

At the most acute time of the slump of 1931 and 1932 several fanners started ranching wheat, that is to say growing wheat as a single crop. Now this procedure lends itself very much to mechanization. The ground is fallowed either between each crop or between each two crops so that the weeds are kept down. Fences and boundaries are as far as possible removed and big scale implements are used for ploughing, sowing and reaping. By using a combined harvester with straw dump, the straw is left in handy piles which can be burned on the field, while the grain is sacked off on the machine. The saving in labour of this system is awe-inspiring. A man on a caterpillar with a six-furrow plough can plough better than an acre an hour, while one man can sow an almost unlimited amount of acres

per hour using multiple seed drills. Rolling, harrowing and artificial manure spreading can all be done with teams of implements drawn behind tracklaying tractors, while a driver and a sack-tier are all that is necessary for a combine, or alternatively, the grain can be stored in a bin on the combine and shot off into a cart while the machine is going, reducing the operation of cutting and threshing to one man. Under present conditions harvesting may need seven or eight operations before the grain is threshed, and require a great deal of man-handling.

On these lines, a wheat ranch may be run with a minimum of labour. The mechanically minded fanner has managed also to a certain extent to ranch cows on mechanized lines, that is to say, he has a wooden shed on wheels containing a milking machine. This shed can be drawn around the ranch following the herd from pasture to pasture. A man and boy can milk and feed quite a large herd of, say, fifty or sixty cows. There is this advantage amongst others, that when the climate is warm enough to keep stock out of doors through the winter, a very large saving of labour is effected. For the student, however, a visit to such a 'bail' on a really cold winter's morning is educational. The cows shoot in and out of the stalls like rabbits chased by a ferret; the driving sleet finds its way through every crack; the numbed attendant slips on the dung whilst trying to put the icy teat-cups on to the frozen teats.

We must now make the acquaintance of the mechanized farmer himself. He has had to stand up against a considerable amount of criticism. In spite of his intelligence, his ingenuity and his daring, not all of his ideas have succeeded. He is therefore a little nervous about showing his work to practical farmers. There are usually one or two little failures about a mechanized farm that would not be apparent to the layman, but to the farmer's eyes, stick out. The mechanized farmer has a considerable and pardonable pride in his work and is by the nature of his calling a 'wishful thinker'; thus he will often exaggerate when a truthful answer would be more helpful. It is frequently of more interest to the inquirer after truth to know of failures than successes. I think where he makes a mistake is in condemning all past methods, for the future is not possible without the background of the past. If he only knew, the all-out mechanized farmer need have no feeling of inferiority, for the practical farmer wants to simplify his business just as much as any other business man and is anxious to profit by the enterprise of the mechanized pioneer.

On a mechanized farm you will see implements everywhere in various stages of breakdown, for the soil is hard on the elaborate machine and the exigencies of farming often make it difficult to get machines in out of the weather, whilst repairs are sometimes held up for lack of spare parts.

The unmechanized farmer—who is really mechanized up to the hilt—used to laugh at this pioneer who is, after all, breaking the ice for him. It is sometimes forgotten that if Tull had not invented the seed drill and opened the way to growing turnips, we would still be a completely poverty-stricken race, with our land lying unproductively under fallow, while every autumn we should have to kill and salt down a lot of our stock as we would have no winter feed for them.

The reason why the mechanized farmer and the ordinary farmer don't hit it off may be that as a rule the mechanized man has no eye for stock, and perhaps none of the feel for growing things which is known as a green thumb. His crops and stock seldom have bloom—that indescribable quality akin to happiness or flavour.

I don't know who thought of the idea of poultry farms in this country, but they have had their vogue. They are often started by people who have a certain amount of capital and a wish to lead a happy country life, although, after the first rush of putting up the equipment, the remainder of the hen farmer's life is usually an unhappy one.

Poultry are, in fact, difficult things to make pay. The hen herself requires the best of everything and is hesitant about returning the good food in eggs. A small percentage of hens about a farm which are definitely not playing the game result in financial loss, and the poultry farmer has to think out methods whereby the unthrifty can be spotted and removed. This requires labour. The turnover per hen when weighed against the price of feeding is alarmingly small, and this turnover has to pay for wages, rent, capital outlay and running expenses. The difficulty is got over by having a lot of hens. Now a lot of hens can cover a considerable amount of ground, the hen being a bird which likes to spread itself, and a lot of ground not only requires a lot more money, but also a lot of chasing around after hens —which means more time and, therefore, still more money. So the poultry farmer has to devise schemes to keep his birds handy and this means shutting them in some sort of pen. When one congregates

animals, every sort of disease sets in, partly because at short range they infect themselves with greater ease and also because cooping the birds up permanently induces weakness. Once an animal is weak, it catches everything that is going.

The price of eggs is governed by certain unwritten laws which tend to float them temptingly just beyond the profitable zone. For instance, if the price rises, the consumer turns his attention to other and cheaper foodstuffs, while the foreign producer, attracted by the higher price, slumps the market. The clever housewife moreover knows the cheapness of eggs in the spring, the natural breeding season, and will preserve them to tide over the expensive times of the year. Again, the distribution of eggs is infested by middlemen who all have to live. (At the moment, to stop the black-marketing of eggs, the producer receives a higher payment than the retailer! but this is not a lasting condition; nor does any honest farmer wish to live such an 'Alice in Wonderland' existence.)

The whole-time poultry farmer has, therefore, insurmountable problems to face. Only the best organizers manage to push through and these men usually turn their attention in the end to getting a better price for their produce by selling day-old chicks or stock birds.

I have had to explain these niceties so that you will understand why egg-producing farms are usually quite new or, at any rate, not more than a year or two old. It is best to visit 'a new farm' to see the poultry farmer at the beginning of his career when he is full of ideas; filled with *joie de vivre;* keen to show you everything. Later disillusionment will set in and he will take you past expensive brooders rotting on the ground without even a shrug or the excuse, 'We were so busy after the hatching season, we never had time.'

In its declining years the poultry farm is like the remains of a routed army. The rats run openly in and out of their holes under the runs; the concrete floor of the feed house is so thickly carpeted with meal that it feels under foot like the foyer of a cinema *de luxe.*

Amateur egg farms are usually started by certain types of people; some are started gaily by the newly wed. Unfortunately, it happens that the collapse of the farm coincides with the most difficult period of marriage—the fatal third year. It is not unusual to find, as one goes over the farm with the dejected owner, that his wife has just gone back to her mother. Type Two is the man who has run away with somebody else's wife. I can imagine no conditions more unpleasant than living in sin on an egg farm. Type Three are the old

ladies, and I believe, if statistics were compiled for amateur egg producers, the old ladies would be found the most successful. They are not so overburdened with the labour-saving complex and thus they do not have so much equipment to keep in repair. Furthermore, they are not so ambitious and get to know some of their stock individually. Again, as they cannot effect repairs as easily as the male, a proportion of their stock is permanently loose and finds for itself worms and other health-giving and economical delicacies. The old ladies give in at last but they hold out for a long time. Type Four is the 'ex-army officer' who usually wears a tweed coat and grey flannel trousers tucked into gum boots and he is more systematic than the others and keeps books, not only starts them but keeps them much longer—perhaps for two years. I went over such a farm once. It was going down with the flag nailed to the mast. My host did not show me everything nor would I have asked to see all, for out of the corner of my eye I noticed the dumps where the pens were filled with grass and some terrible tragedy had happened. The rest of the farm was clean and well kept and I should have thought the White Leghorns were healthy enough. At any rate, we looked in the nest box and it was filled with small white eggs. I thought at the time that he had worked things out well, worked them out so well that the hens were giving him more than he was giving them; but he still had to get a wage and as I looked around I realized there were not enough hens to do that. A tidy man keeps a house neater than any woman, and the spick and spanness was a pleasure to see as he gave me a drink. In the living-room I noticed account books in the shelf besides ordinary rather old-time books like *Happy Go Lucky* and *Infantry Training,* Parts I and II. A man like that would probably get through all right, transfer to day-old chicks which he would make pay, and so by easy stages find his way into professional farming and the country proper. I say the country proper, for intensive poultry farming is a sort of semi-urban industry which has got loose in the country. There was a friend of mine who 'got chickens'; he had unlimited capital behind him and he believed in doing things 'slap up'. He created the best intensive poultry farm that I have ever seen. It started with a mammoth incubator; from this the chickens progressed to heated wire-netting pens, called 'battery brooders'; thence to slat-floored pens, and from these to portable outside runs which were moved daily. Alongside these runs pipe lines were laid so that even water was at hand. Eventually, the fowls ended up in wire-

floored houses where their egg-laying activities were strictly supervised. Books were carefully kept. The total sum of this endeavour was that two boys and a girl earned comparatively small wages—a slight interest was paid for capital, no rent and very little towards upkeep, whilst my friend himself received nothing.

A new era has come to the poultry keeper with the 'battery laying-pen'. The hens are shut up in individual wire pens tiered one on top of the other. Anybody who has been to a poultry show will know the effect. The netting floor is sloped somewhat to the front so that the egg rolls out clear of the pen. It thus remains clean and the hen is unable to eat it—a habit to which some birds are addicted. The droppings fall on to a movable belt and so labour is reduced to a minimum. Unlimited food and water are always on hand and the bird can eat as much as she likes provided she lays in return. If she declines to lay, you take her out and wring her neck. This system keeps such a simple check on the birds that, provided the price of food is in a suitable relation to the price of eggs, it must pay. However, there are difficulties; the pullets before imprisonment must have free range to store enough health to stand up to the battery, while the first cost of the equipment is very heavy. I have not seen a battery farm in full going order, though I have seen several just starting and more just stopped owing to lack of protein in war-time.

I tried this system out before the war to see how it worked; it made money. We had a hundred birds and kept them from November until April. We bought the birds, the equipment and food, and kept careful accounts of labour. The results were, therefore, relative to what an amateur poultry keeper might expect, but they would have been more profitable to me if we had used hens off the farm and our home-grown feeding. After the hens were sold for boilers, we made a profit of five pounds. By this reasoning, a thousand hens would pay for a wage of two pounds a week, for their food and for interest on capital and provide a bonus of fifty pounds. I doubt, however, whether the scheme would pay in the summer when eggs are normally cheaper and I am not sure that it would always be easy to buy a thousand pullets at a reasonable price, or whether it would pay if the pullets were reared on the farm; for immediately one starts rearing, one enters into a host of difficulties connected with commercial poultry keeping.

I know two professional arable farmers who definitely make good money out of poultry as a side line and have done so for a long time

and who both pay labour to look after their hens. One is run on the traditional poultry-farm lines with runs, brooder houses and all the other devices and paraphernalia employed in the classical British poultry farm. I was quartered on the other farm at the beginning of this war. The farmer had several fields laid down to temporary grass and grazed rotationally by beef cattle. He had two or three wooden houses on runners of a size that could easily be drawn by a horse. The hens roamed around the field usually laying in the hen houses though not always, for I remember one laying in my tent. A pleasant oldish man looked after them and he seemed to have a knowledge of hens. It was his habit to drive the water to the field twice a day, scatter some food and collect the eggs, and also to bury any hens that died. At intervals he hauled the houses into another field, so that the ground never became fouled. After the field had been rested the cattle were turned in; in this manner, the hens and the cattle were rotated around the farm. No effort was made to order the hens about. They looked in first class health and laid well. It seemed to me a reasonable and profitable way of keeping fowls. The hens, moreover, found numerous grubs and worms which the cattle would not have eaten.

The farmer's wife took a hand at the chicken rearing. The birds were ringed for age, the policy being to let them live two years and then liquidate them, but an eye was kept open for frivolous or vicious birds and these were eliminated on sight. I imagine the majority of the hens were pulling their weight and providing for themselves a good quarter of their feeding out of the ground. In harvest time they went to the stubbles and for nearly two months received practically no feeding at all.

There is still another method of farming hens worth noting and that is the system in which they are kept in light movable runs with small houses attached. These runs are moved in sequence across pasture so that every available yard is eaten and manured whilst the flock are constantly going on to new ground. They have also the opportunity of eating a certain amount of grass and finding a few worms, grubs, etc., to help the feeding bill and their own health. The disadvantages are in the amount of labour required, in the cost of the pens which don't last long, and in the difficulty of placing the long runs on uneven ground in such a manner that the hens don't escape. And nothing escapes quicker than a hen. I have tried the system and in my opinion the game is not worth the candle.

Before the war a great number of our eggs w6re imported from Denmark and it would seem not unreasonable to suppose that there must be a great number of specialized poultry farms in Denmark. Moreover, it seems probable that these farms are run on more economical lines than our own because, although the standard of living in Denmark remains fairly high, they could yet export eggs to this country at a remunerative price and more cheaply than a poultry farm could produce them here. On visits to Denmark, I have looked, therefore, for large magnificently run poultry farms, but I did not find them. At length, I discovered the truth, there are not any. Every Danish farmer keeps a few as a sideline. The intensive poultry farm is mainly a British enterprise. I must conclude the story of the hen by quoting an old friend who works on one of our farms. 'Hens,' Alan says, 'die in debt.'

Chapter Two

TOUGH FARMING

DrovesandCruives—CoupCartsandGrieves—TheStilly Ban

There are many farms in Lincolnshire, for it is a big county with different kinds of land and consequently different forms of farming. The most interesting are the silt and the black earth farms. The one I am taking you over is about two thousand acres of some of the richest land in the world and the best farmed. A farmer can walk over that whole two thousand acres without finding anything wrong with one solitary foot of it.

My host, the owner, is one of those delightful people who see things clearly. Perhaps the quality which I admire most in him is the manner in which he has trained his mind to concentrate on the parts of his business which matter. That is to say, on the growing of cash crops. The Fen Land is far too valuable to mess about growing grass for stock. About five persons are employed to the hundred acres. The capital value is enormous, while there is a heavy contribution to the public drainage scheme—an elaborate network of ditches with pumping stations by which the water-table is maintained at a suitable level.

The Fen farmers are the only fanners I have met who have apparently eliminated all the snags of farming and in that, of course, I do not include the weather, virus disease, or political and market whims. These factors are beyond their control.

Tractors were rather slow to take hold in the Fens, partly because it is traditionally a horse breeding district, partly because at certain seasons wheeled tractors damage the fluffy soil, and have not been found altogether successful in dealing with some operations in row crop work. Now however that the track laying type of tractor is obtainable, it has become a standard implement on the larger farms.

The droves or roads presented a problem, as at the tail end of the sugar beet harvest they become impassable through mud. My friend has overcome this difficulty by making concrete roads. The Fen farmer does not grow crops in religious sequence; his land and overheads

are too expensive to grow fodder crops for cattle and he must have a sequence of cash crops. The big three are potatoes, sugar beet and wheat—with many subsidiary crops, such as peas, mustard, celery and carrots, depending somewhat on the wetness of the land. Asparagus, too, is grown as a field crop. Having said there were no snags I now remember there is one. The black soil, which is the remains of water weeds, consists of a layer over a clay bed. With cultivation, arable land tends to grow lighter and consequently, to decrease in volume, and in certain parts of the Fen country, the clay is coming through the black soil. Excellent Fen farmers, however, know this and how to avoid it. They must add humus to the soil. Humus, which is the basis of agriculture just as agriculture is the basis of life, is a black, rich-looking mould, the outcome of rotten vegetation. It contains a large proportion of bacteria and other organisms which have a considerable bearing on plant life; exactly what that bearing is, has not been ascertained, but recent discoveries all suggest that the influence of these soil organisms is very great indeed. Now humus has the effect when added to heavy soil of making it lighter and, when added to a light soil, of making it heavier. Furthermore, it prevents water washing through a soil; it also sponges up water for the gradual use of plants. In parts of the United States where the soil has been farmed out of humus, the whole surface soil blows away; intensive Lincolnshire might blow in the same way if it were not for men like my friend. He grows a crop of clover, takes an early cut of hay; when the second crop is succulent, he puts on it as much farmyard manure as he can and ploughs the whole lot in. The clover being green and well inoculated with bacteria from the dung rots quickly and in rotting does not take anything out of the ground, but rather adds a great deal of humus and plant food. This is rather an important point. If my friend had waited until the clover was dead and had lost its 'power', the ground would have had to give it 'power' to rot it, and the soil would have been that much 'power' less. By this system a good Fen farmer is able to keep enough humus in the soil to prevent it blowing and to stop the clay coming to the surface.

As we go along the concrete roads, I ask what sort of cattle he buys to make the dung. 'I don't know, just cattle.' You remember what I said; directness—crops, not cattle are his job. The cattle are there to make dung. They can be anything from Shorthorps to Highlanders. If he allowed himself to become cattle-minded, he might

get the idea of breeding, and then he would need grass and expensive buildings, and the cash crops would go into the background. It is constancy of design and purpose that makes agriculture profitable. The way the cattle are kept is a lesson to us fancy farmers. They are bought in the winter and enclosed in an open yard called a 'cruive' (pronounced 'crewe'). The cruive consists of a high mustard stack arranged on three sides. The fourth side is taken up by a simple post and rail fence and a wooden trough, the sort of erection a reasonable man could knock up in two hours. Inside this square, the cattle are kept to fatten. The cattleman besides feeding, keeps pitching down the mustard straw for the beasts to tread in. By the end of the year, there is a nicely rotted heap of dung just where it is wanted, in the clover field. The strange part is, the cattle look quite happy in spite of this casual treatment and a Lincolnshire winter can be cold—if you think of treeless plains at North Sea level, you will know how cold. You must remember the cruive. As we go round various farms, I will show you buildings that cost thousands of pounds to erect. On one farm I have a cowshed which cost £20 per cow. And here is somebody keeping cattle successfully with a couple of pounds' worth of fencing and a trough.

Every effort is made to grow the last potato which the ground will hold. Thus, apart from the dunging I have mentioned and a tidal wave of artificials, the potatoes are chitted, that is to say, sprouted inside glass houses; this process is said to make a difference to the bulk of the crop. It may be that the potatoes in this way get an earlier start and are thus able to be a step ahead of the multitudinous diseases which beset them. For early potatoes the value of the method is obvious.

My friend, knowing I am fond of entomology, says laughingly, 'I will show you some butterflies.' In the implement shed he has two—the lesser and larger celery plough. The large butterfly splits back the earth towards the end of May when the celery plants, twenty-five thousand to the acre, are hand planted, while the smaller butterfly is used for earthing up which takes place at the end of July and beginning of August. There is a packing shed on the farm where the celery stalks are graded, neatly boxed and wrapped in cellophane paper.

A certain amount of oats are grown on most Fen farms to feed horses. The ground being so rich, the corn does a 'Jack in the Beanstalk' act, rushing up into such an immense jungle that it often has

to be harvested by hand. The wheat crop also is fantastic; the farmer's main thought is to take enough out of the ground with the preceding root crops to prevent the wheat going flat.

Now the Fen farmer has a horror of buildings. Whether from tradition or because the land is so valuable, he hates to clutter it up. Although stock are housed in a light-hearted manner, the Lincolnshire fanner looks after his implements well and will see that they are out of the weather and receive an occasional coat of paint.

Before we leave the farm, I have a look back the white concrete roads, the dark green of the nitrogen-full potatoes, the great sea of wheat, the hundred-acre fields and the black earth which holds the warmth of the sun. There you have arable farming at its finest.

A belt of fertile land runs up the east coast of Scotland which for many years has been excellently farmed. Holdings are large, 500 or a thousand acre farms being not uncommon, while it is exceptional to find farms below a hundred acres. Parts of East Lothian, Midlothian, the Carse of Gowrie and Angus form the high spots of the belt. Indeed, these districts contain some of the most fertile land in Scotland. They are, moreover, easily accessible, being criss-crossed by a network of railways and good roads.

The Scots are a self-reliant race of individualistic people; No one I have ever met is so individualistic as the Scot and I say that as a Scot myself. We have a history of struggle behind us and a record of considerable achievement. You will not be surprised, therefore, that when the English four-course rotation came in and swept through the country, these particular districts adopted a slightly different rotation which they thought more suitable to their land—a six-course rotation: potatoes, wheat, roots, barley (sown out), hay and oats. This provides three cash crops, barley, potatoes and wheat. The hay, roots and oats are in the best practice fed to bullocks which are bought in the autumn and fattened during the winter on home-grown feeding stuffs and purchased cake. They are sold off when fattened. These 'cattle beasts', as they are called, are fattened in enclosed yards, so that the dung from the farmyard manure is unweathered and exceptionally good. Incidentally, the buildings are usually slightly tidier than the open court type of farm. In the best practice, sufficient dung is made to manure both the potato crop and the root crop. I have seen dressings go on as heavy as twenty tons to the acre. The profitableness of the system obviously rests on the price received for the

fattened bullocks as practically half the farm has been emptied into their stomachs. This has often proved unremunerative, so that the farmer has had to cast round for an alternative. You will often find, for this reason, the rotation broken or modified to include sugar beet which replaces a portion of the turnip crop, whilst hay is sometimes sold off the farm.

On an intensive system of arable farming such as this, the soil will not stand so much being taken off and these expedients have weakened the system. Thus, the crops have to be maintained by artificial nitrogen, although originally excellent results were obtained by dung and lime alone. Once a farmer gets into the heavy artificial racket, he starts losing humus at an alarming rate. The future may, therefore, show the introduction of a rest period under grass.

The farmhouse is an expensive affair built of stone with a number of large damp rooms. The Scotch householders are rather fond of allowing a tree to grow right into the windows. A great many of the farms in this belt are let out on lease from a landlord, a system which suits the type of farmer, for several of the best farms are not fanned by farmers at all, but by business men who make a very good thing of it. There is a deal of buying and selling with this type of farming and in the old days before fixture of prices a good business man would make more money than a good fanner. Whether he be farmer or business man, the underlying motive of the venture is to make capital and, at a propitious moment, to retire to the villa on the outskirts of a town. To reach this goal such men are prepared to live fairly tight during the working years; you will realize that I am generalizing and that there are many exceptions to this type of man. Often the most instructive person to talk to is the 'grieve' whose job it is to run the farm labour. He has risen from the ranks and has a profound knowledge of the soil and the feel of growing crops. The business farmer would often be finished without him, but it is seldom a grieve will make a success of this type of farm as he lacks the necessary business sharpness. The other men on the farm range down in order of importance. The old allocation was a pair of horses and a man to every fifty acres, but with the wholesale adoption of tractors this now varies from farm to farm. The 'steadings', as the farm buildings are called, are usually most substantially built of stone with a slate roof. They were at one time very well looked after both by the tenant and landlord, but the slump has left its mark and a great number of estates will take years to come back to first-class condition.

An expensive threshing mill is practically standard equipment and to it are attached various conveyors for moving the straw and grain to their respective storage and for blowing the chaff into the cattle courts or wherever it is required. Farms of this type are very fully equipped with implements, but these are usually badly housed, as numbers of new implements have been recently introduced and little building has been done since the slump.

The stables are usually excellent and massively built; incidentally, nobody looks after horses better than the Scottish ploughman. Under the granary, one will find the carts in arched recesses, the shafts held clear of the ground by a chain so that a horse is easily yoked. Before tractors, there were two types of cart, the hay cart and the coup cart. The latter is a high-wheeled vehicle designed to tip roots or dung and in the days of horses was particularly useful.

Somewhere about is the bothy where the unmarried men eke out an especially tough existence on their own cooking, whilst not far away from the steading are the married men's cottages, often constructed in a long line and looking very grim. However, by now many have had an ugly boxlike shed stuck into the back which contains a scullery, bath and W.C.

The grid had hardly penetrated the country long enough before the war to serve many farmers with electricity, but there are a few already using it, while a number make their own light.

As one walks about the farm, one notices that a very high state of cultivation has been reached and that the crops are exceptional, though not as good as in the best English Fen country. Everything is under the plough except for a few patches of grass near the farm which are reserved for the milch cows. These are worth having a look at for nobody on farms of this type seems to have any idea how to look after a cow. One or two cows are needed to provide milk for the farmer and his men, and the usual practice is to buy cross-bred Irish animals at the local market. The Irishman is a splendid showman. So it often happens that these beasts have not been milked for several days when they wander about the sale ring with milk squirting from their distended udders; it is, therefore, difficult for the farmer to appraise them at their true value. Subsequently, when the purchased cow has been milked and brought home, she is put in charge of the cattleman. Now the cattleman is responsible to everybody else on the farm to make these cows produce abundant milk. In his anxiety to deliver the goods, he consistently overfeeds them until

they succumb to some illness or other. The farmer is often in a flat 'spin over the milk problem and rushes backwards and forwards to the market, occasionally giving up the cow idea and taking to buying milk, thus entering on a new series of difficulties—finding the new policy expensive, buying a cow, and so beginning a new cycle.

I believe these farms represent the top of the old arable system; they are good farms, well farmed and equipped by clever farmers, laboured by excellent men and heavily capitalized by conscientious landlords. In the last hundred years there has been a lot of money made out of them, but it has not been made by the landlord, the grieve or the ploughman; most of it has left the land for good.

The principal Scilly Islands are St. Mary's of sixteen hundred acres, followed by Tresco, St. Agnes, St. Martin and Bryher. After that they run into dozens without getting bountiful enough to support inhabitants. They are owned by the Duchy of Cornwall and leased on long leases to various farmers. Major Dorien Smith, for instance, has held Tresco in his family for several generations. This family have built up the island to be very productive. Like all islands, it is hard to grow trees so the Dorien Smith ancestors planted gorse which stands up to most things that blow. When that was established, they put in trees. The gorse gave the trees enough shelter to clinch their roots into the rocky subsoil and afterwards, fend for themselves. Once you have established shelter on these islands, you can grow everything, but shelter must come first.

The fields are divided by hedges of escallonia, veronica and euonymus. These hedges, or in the case of Tresco the trees and hedges, afford enough shelter to farm successfully.

Towards the end of the last century, the farmers of the islands changed over from early potatoes to flower growing. Now, in the flower trade the loss of a few days may be disastrous. The consumer has been chilled through the long British winter and is subconsciously waiting for the first signs of spring. He is, therefore, ready to snap the first flowers on the market and is prepared to put his hand in his pocket. Thus farms of a size which would be uneconomic on the mainland can be made profitable enough to give a reasonable standard of living.

The farms, I may say, are well farmed. Tresco and several others come up to the Dutch standard; in fact, it would be hard to say how they could be farmed better. The islanders as a whole have trained

themselves to deal economically with the flower crop; they have arrived at a satisfactory rotation between flowers and sufficient grass and forage crops to enable them to keep a cow or so and to provide them with most of their own food; the aftermath of the flowers comes into the scheme as it makes excellent hay on which the cows do particularly well; it would seem to possess mineral and tonic properties.

The fanners are in rather a peculiar position for flowers remain the crop on which they hope to get a livelihood, and the size of their holdings makes them dependent on the sale of this luxury crop at a high price. In some cases, bulbs are sold as well as flowers. At the present moment it is practically impossible owing to controlled prices to find any other crop valuable enough to replace flowers and give them a living.

It will be remembered that in the year 1943 in which I am writing, the government suddenly put a ban on flowers. The timing of this ban coincided with the Scilly Islanders' crop; the islands stood with the full harvest waving, in one of the warmest springs anybody has ever known, without a market. This is in most cases their only harvest and every minute ripens the more cheaply distributed crops of the mainland and makes the Scilly Islands' crop less valuable. While the government argue the pros and cons, the daffodils droop and die; the 'Scilly Whites' lose their perfume and turn brown and the vital moment passes.

In a plan for the future, it must be paramount that this terrible menace of political whim shall not jeopardize the prime producer. We cannot protect him greatly from the weather or disease, nor save his crops from wars and invasions, but surely we can formulate plans to protect him against whim. The ban on flowers was lifted, but in the meantime the mainland flowers were in bloom.

Chapter Three

THE FARMER AND THE OUTSIDE WORLD

Agriculture and Science—Sour or Sweet—Mineral Deficiency—From Mendel to Mutants—Synthetic Nitrogen

Science from being a comparatively simple occupation of keeping a few toads, a store of love potions and a stuffed owl, has developed into a vast ramification of different subjects, each one subdivided and resubdivided until to know all that is to be known about one subdivision (such as the bloodstream, for instance) might be a whole-time job. Such subjects may possess a library of thousands of technical books and papers. Thus, a scientist who is to understand his special work, must be so immersed in his particular branch, that he may have no time to know anything of outside affairs; or may even not be qualified to any degree of perfection in other departments of his own trade. A research worker will unwittingly become so bound up in his own research that he does not appreciate to the full the discoveries in other branches or their relation to his own.

To the outsider, science has come to resemble a complex and brilliantly coloured patchwork from which it is difficult to get far enough away to blend the colours into a uniform whole.

In this chapter I will discuss a few of the many scientific discoveries and theories, so important in their implication that no agricultural plan could be formulated without considering them fully. But before we discuss them, I must remind you of my own particular biases for unless you understand my mind, you will not be able to weigh my criticisms at their proper value. My intention is to offer a plan which will stabilize agriculture on a sound economic basis and which will organize the supply of essential vitamin foods to the public in such a manner that they will be economic and at the same time, be in the nature of a tonic, i.e. as fresh and as flavoursome as it is possible to obtain them. To accomplish this end, I put all other considerations out of the plan.

As regards personal bias, I look on plants as living things dependent for survival on natural laws, and I look on the human body not

as a depository for concentrated chemicals but as an immensely intricate mechanism also dependent on natural laws for its survival and as requiring a complicated food supply consisting of a multitude of substances and organisms to keep it healthy. I believe, further, that every time we break a natural law to achieve a desired result, we should be prepared to fight against the consequences, for we are pitting ourselves against a whole host of forces, which we understand only very imperfectly and many of which we are not even aware of.

As this view point reappears at intervals throughout the book (it forms the basis of all my criticisms and finally the bedrock of my plan), I would like to give you my conception of life in the hope that you will better understand the mentality behind the criticism.

I believe that this world was formed for a definite purpose. I can best describe the purpose by comparing it with a manufacturer who has a conviction that in some manner his process can be improved; so he builds a laboratory, equips it and employs numbers of technicians to work away at finding a formula for the improvement of his process. Thus I believe the world was created entirely for man in the hope that through thousands of years of thought we would arrive at some definite conclusion of value to the outside vastness; to carry out his research work, he has been provided with a perfectly equipped laboratory and a formula for keeping him alive; this formula I call the LIFE CIRCLE.

To explain my conception of this circle, I will liken it to a toy railway consisting of a number of curved rails joined into a continuous circle. This railway is powered from the outside grid over which we, who play with the railway, have no control. The power consists of visible forces such as the sun and invisible forces such as cosmic rays of whose existence we are only vaguely aware. For the use of our railway, this power is transformed in a box placed on the railway called SOIL. The transformed current runs along the central rail and is composed of different ingredients: BACTERIA, ENZYMES, VITAMINS, and other organisms (some still unknown). The current is exceedingly complicated; the different factors are associated with each other by complex relationships which vary as the current goes round the track. On the track, there are different stations in this order—PLANTS, ANIMALS, FOOD, MAN, SCRAP —and the transformer box, SOIL. In addition to this transformer box, there is another transformer plugged into the main supply and

linked by a connection with the transformer box Soil; the transformed current from this apparatus goes round the track on a separate rail and is called oxygen, hydrogen and carbon. The makers, when they designed the stations, attached to each a section of track, so that if one removes one of the stations, the train can't get round; and if one alters the current, the train won't go so well. Thus the only way in which one can improve the track is by polishing the rails and seeing that they are level. It so happens that the second transformer box is sealed by the makers and one cannot get at the works; however, one can remove the connection between it and the Soil transformer.

The boy from next door comes over to play with my train and after he has watched it go round a few times, he says 'Let's open up the Soil transformer and see if we can get some more juice through and get it to "rev" up a bit'. Now inside this box, we find an amazingly complicated mass of wiring, valves, condensers, resistances and so on. The boy next door knows most of them by name and the purpose of some of them, but he hasn't the faintest idea how the set is designed. However, he knows a resistance and he has it out, whips off some of the wiring, and shoves it back. The train goes off much faster than it has ever done before, but it has only done a few circuits, when a valve goes and it slows down to a snail's pace.

I hope this parable will give you my viewpoint and will explain to you why I think it so vital that the current should never be interrupted ; what value I place on the transformer Soil; and why I stress over and over again the importance of improvement by polishing the rails and by levelling the track and not by fitting in condensers, resistances and faders. I know that many will think my views very old-fashioned and will laugh at my criticisms of some of our brilliant scientific thought combinations. But this book is not a book of fashion; remember that, for I am going to take a running kick at a whole crowd of fashionable scientific theories. I say it is fatal to progress to follow fashion blindly: for fashion is not a real value. It is only possible because so many people are too lazy to think for themselves or are frightened of being laughed at, and prefer to buy their thinking 'ready thought' from the minority who talk or write or broadcast. A few people can cause a wave of indignation about the mental agony of the chased fox or the discomfort of a roach on a hook; while, with changing fashion, the same public can hear that the Germans have dropped bombs on a school or that we

have plastered industrial areas with 1;500 tons of explosive, and remain quite unmoved. Now it does not matter greatly to our life circle if men shoot pheasants or even, granted a prolific race, if children get bombed in schools; but it does matter very much if we rearrange the soil transformer so that it sets up a faulty circuit. If you think over what I have said about fashion and realize the possibilities of large-scale planning at the end of the war, you will see that the adoption on a vast scale of faulty current in our life circle might have very serious effects on our health, effects which it might be very difficult to put right.

This leads to the end of my philosophy and you will have to take this last thought rather slowly because being big it is somewhat difficult to digest. If man is working out a long term of research to find out an important mental formula, it would be in keeping with all we know about life forces that he is working out in competition with similar bodies (perhaps many) dotted throughout the universe. It appears that the universal law of progress is survival of the fittest and this applies from sea urchins to stars. . . . There would, therefore, be little loss to the giant laboratory if we extinguished ourselves completely by wars or ruining our life circle. With our present mechanical knowledge and by the possible clearing away (by this war) of racial barriers, we might be able to adopt a system of agriculture that would interlock smoothly with the other agricultural systems practised throughout the world . . . I believe that if such a world system of agriculture were based on the fashionable theories of scientific, political and agricultural thought, which are prevalent as I write, it would be based on practices (to my mind) detrimental to our life circle. By this, I mean that the current would be deficient in ingredients necessary to our health and consequently we would lose that vigour which is the power behind progress.

Chemists have made a scale and devised methods whereby the alkalinity or acidity of a substance can be ascertained. By the use of this P.h.[1] scale, as it is called, we can find what degree of sweetness is

[1] All right. You asked for it. The number of grammes of active or ionized hydrogen per litre of solution is known as the Hydrogen Ion Concentration. In order to make a standard for comparison of a great number of different solutions the concentration is taken as the Logarithm of the reciprocal of the Hydrogen Ion concentration; this is called the P.h. value (also written Ph) in which P means potential a'nd is expressed by an equation which I will not bother readers with here.

required in the soil to suit a certain plant; for every plant grows best or can only live in its appointed place in the scale. If it were possible to alter the soil easily in P.h. value, we should be able to grow each crop in the optimum condition of acidity or alkalinity. Scientists have found that lime neutralizes acidity and as lime is a natural component of soils and soils tend to grow more acid all the time, the application of lime where required would seem to be a natural way of obtaining the desired P.h. conditions.

Apart from its corrective value, lime has other valuable qualities; for example, it tends to bind loose soil and make heavy soil lighter.

To alter the P.h. value in the other direction, substances such as sulphur, aluminium or iron sulphate, may be used. In theory, therefore, farmers should be able to plant their crops in the correct degree of P.h. scale suitable to the crop. I say in theory, for it may require two or three tons of one of these substances to move the acidity value one point. Conditions are never likely to arise where it will be possible to treat fields with the exactitude of a scientist altering the value of his small experimental plots. However, plants themselves, alter the P.h. value of the soil. If you watch suitable uncultivated land, you will see it building up in regular rotation, one plant paving the way for the next until it becomes forest. Moreover, one root system makes the road easy for the next root system, while the leaves from the dead plants form a seed bed for the fruit of the living. Behind this process lie a multitude of natural laws which we could well harness for our own good.

Farmers, in their concentration on the soil, are apt to forget how much free nutriment a plant derives from the air. In the central belt of America there is a moss, known colloquially as 'Spanish Moss', which grows on trees. One would, in passing, condemn it as a parasite, but this is not the case. Since the introduction of telegraph and telephone it has found a congenial home on the wires, where it is impossible for it to derive any nutriment except from the air and rainfall. Curiously enough, analysis has proved that this species obtains minerals which are deficient in the rain-water of the district. It obviously doesn't buy them from the local store, so it must absorb them from the air (or from very fine airborne volcanic or desert dust). Spanish Moss is worth remembering! A few months ago I had a heated, or almost heated, argument with a farmer about supplying fertility synthetically. (He was desperately agricultural college in outlook . . . chemistry section). As I was leaving I noticed a magnificent

cushion of moss growing on the roof of one of his buildings .. . lush green with overflowing health____I could have said a lot, but didn't.

At the moment, the scientist is turned towards replacing natural methods by chemical ones. To this extent, he is right, for most of the plants which we wish to cultivate, will not stand high concentrations of acid. Lime is an easy method of reducing acidity. However, some of the chemicals we use as fertilizers increase the acidity of the soil and so a proportion of the lime which we spread in one season is actually required to counteract the effect of the chemicals which we have gaily sprinkled the season before.

Under laboratory conditions scientists have discovered what happens to plants when they are deprived of different minerals. Thus it is possible to correct deficiencies by adding these minerals to the soil. The earth, naturally, contains minerals, and plants which require these minerals would not grow on ground deficient in them. It seems natural, then, if we desire to grow these crops, to make the soil suitable for them by adding the missing minerals. It has been found that many diseases of animals are caused by the lack of minerals. By administering the deficient mineral to the animal, it will overcome the deficiency. This seems an unnatural way of accomplishing this cure, for the animal in a natural state would manufacture the required mineral from the herbage which it eats. And so, the proper method would seem to be supplying minerals through the plants to the livestock.

Scientists have also found mineral deficiencies in human beings and this appears to work back through animals to the lack in the plants. On this 'House that Jack built' thesis, the logical thing would be to make sure that the soil was sufficiently supplied with the necessary minerals and with the necessary micro-organisms to pass on to the plants.

We should, from time to time, analyse the soil so that we may add the deficient minerals, so the plants would always have a constant supply at hand for their manufacturing needs and so that we, via the plants and animals, would be able to take in our proper quota of minerals fabricated in a suitable manner for our natural assimilative powers. This is, obviously, the simplest way to maintain health in our bodies.

To give an instance of my meaning, anaemia is considered an iron deficiency and therefore it is customary to give the patient a dose of

iron. Under natural conditions, it is unlikely that human beings would obtain readily crude supplies of iron and therefore it might be conjectured that we possess, in our body, forces by which iron can be extracted from vegetable or animal sources. On this assumption it would follow that, by giving the body iron already processed, the ferric extraction factory already in the body would be left 'shut down'. A walk through the modern body doctored by crude chemicals, might be similar to visiting a distressed area, with hundreds of factories standing idle, their roofs falling in and the machinery in the last stages of decay whilst the workers and management, long without employment, are starved and dead, lying in rotting heaps around the plant.

From this imaginative description, it would not be hard to picture the building up of disease in these unused areas. Actually, my theories are not so peculiar as 'an addict' to chemical cures might imagine. Many doctors agree that our feeding is wrong and that numbers of our diseases may be attributed to this cause. Under this light, my argument in favour of producing food in a natural manner and giving it to the consumer in such a fresh and hygienic condition that a farm a hundred miles away might well be his own garden, is obviously sound and therefore, this plan which I am gradually beating out to you is not only of importance to the small percentage of our population engaged in agriculture, but to the millions of other people who consume its products.

The breeding of animals and crops through the combination of desirable characters has now reached the stage of becoming a complete science. Sufficient experiments have been made by competent workers to lay down a series of laws and exceptions by which it is possible to forecast breeding results on a considerable number of characters. Research development on the more obvious features such as inheritance of colour has been very rapid because it has been possible to utilize quickly multiplying species such as rats and flies; while our knowledge of characters associated with slower multiplying animals will take longer to acquire. The average breeder, however, is already making use of the Genetic Laws with considerable success and will be able to make use of new discoveries as they become proved, with advantage to our domestic breeds of animals and plants. In this way the scientist has proved himself of immense value to the practical farmer.

1 believe, however, agriculture itself could help greatly in the extension of our genetic knowledge by providing throughout the country thousands of practical research stations, and I have incorporated this idea in my plan in a manner which I consider will not only be of immense value to the scientist, but also profitable to the farmer, for his future commercial development and for his day to day cash takings. This laboratory plan will be dealt with in its proper place; we are in this chapter concerned only with scientific discoveries in relation to the commercial farmer and to see whether any of these discoveries might change our agricultural methods in the future to such an extent that they would seriously alter or modify the plan to which I am endeavouring to lead.

There is one genetic point still shrouded in speculation and theory which might make a great deal of difference to any future agricultural plan—mutation. If the ideas which I hold are remotely accurate, then mutation is extremely important in the preparation of a lasting agricultural plan. Unfortunately, my theories are exceedingly difficult to explain lucidly in a form readily assimilable by farmers, scientists or laymen.

All readers, I expect, are aware of the original Darwinian theory of the evolution of species. To a practical breeder this theory has one principal drawback. Theoretically, from a genetic point of view, we could breed rabbits in tartan colours or hares with six-foot ears, but by no known genetic process could we cross a hare and a rabbit together to produce a line of 'Harerabs'. The impossibility of such a cross is easily understood when one considers that the gestation periods between the two animals are of different duration. A leveret is born with hair and eyes open ready to move off at once, whilst a rabbit is born with eyes shut and practically furless, in a nest, unable to get about for several days. Thus an evolution theory has to assume that the hare-rabbit common ancestors were not only able by selective protectionate and climatic conditions to change their shape and colour, but also their internal breeding arrangements and that is asking rather a lot for selection to do. To my knowledge, no such complete sexual change has been observed. It is perhaps as well that breeders (who will take infinite pains to produce a bulldog of a shape so far removed from nature, that it has to be accouched artificially) have not discovered a system of changing the methods of reproduction. A number of biologists to-day, are now leaning towards the theory of mutation to account for such changes.

A mutant is simply a sport which suddenly appears in a pure line. I believe, personally, that there are three forms of mutation. The first consists in the sudden appearance of a new or latent character in an animal or plant. For instance, a distinct variety of pheasant suddenly appeared in this country (now named Melanistic Mutant). This pheasant was in every way a pheasant, but was of an entirely different colour, size and shape, etc. In the ordinary genetic way, by selection probably, we could gradually alter its form, but we could not produce a new pure breeding species suddenly in the way the mutant appeared.

The second form of mutation, in my opinion, may be caused by a plant or animal suddenly dropping one or more of its hereditary characters; thus, a flowering potato might suddenly mutate to become non-flowering.

The third type of mutation is the most interesting because we can only guess at it. This is the mutation which might have occurred in the production of the hare and the rabbit from a common ancestor, a mutation not only in form, but in sexual characters as well. As I have said, to my knowledge, no such mutation has been observed or has been historically recorded, and yet it would seem likely that such mutations must have occurred; for it seems against reasoning that one day rabbits and hares just happened from nowhere. In dealing with this third class of mutation, I am perfectly entitled to attach my own causation; for in our present state of knowledge no one can bring evidence to say whether I am right or wrong. I believe the cause of this third type of mutation (if such a mutation actually takes place) to come from the vast mathematical system under which the universe is working out a long-term, but minutely scheduled scheme, the purpose or destination of which we are not likely to discover. It is, however, conceivable that we may discover the machinery which might cause such a complete mutation; it is not very long ago that sound, cosmic and other invisible rays have been scheduled and these are possibly only part of a host of other invisible forces which together control the workings of our planet.

The first two mutations, however, do concern us; for it is perfectly possible that they are caused by well-known and controllable agencies. We might, for instance, maintain our livestock under conditions likely .to bring on waves of undesirable mutations which might be very difficult to eradicate and become very serious to agriculture. Although the two cases are not exactly analogous, let me remind

fanners, who may laugh at such an idea, of some of our modern diseases which from small beginnings have spread to an alarming extent. Grass sickness in horses, for example, was first noticed at Barry Camp in 1911. For some time it clung round the Monifieth district, then gradually spread up and down the east coast of Scotland, over to the west coast, and is now establishing itself in England. In spite of a considerable amount of research nobody has found out either the cause or the cure. It is, therefore, only common sense when planning a future to take into account possibilities which might have far-reaching effects. Mutation is undoubtedly one of these possibilities.

The first type of mutation which I mentioned—that of the pheasant—is, in my view, caused by climatic conditions. The pheasant was originally imported from various places in the east; no doubt its colour scheme was adapted, by some process of which we are ignorant, to protective resemblance to the foliage of its place of origin, while over here it was about as well concealed as an elephant in Ealing Broadway. A number of pheasants changed over and in colour became similar to grouse. That is to say, they acquired a new and necessary factor which they had not possessed before.

As to the hypothetical case I gave of the potato losing its flower, potatoes have been asexually produced for numerous generations from tubers instead of their natural seed and thus their flower- and seed-bearing characteristics are no longer of much use to them; Great Scott, King Edward, Arran Chief and Northern Star, for example, flower very seldom and have not been known to fruit. It is conceivable then, that under artificial conditions, plants or animals mutate suddenly and drop one of their hereditary distinctions.

If my arguments have been in any way correct, it follows that by keeping domestic animals for many generations under highly artificial conditions we may cause them to mutate either by acquiring characters or dropping them. These dropped characters may be very vital to us; ones which we do not wish to lose. On the other hand, the acquired characters may be ones which we do not want.

Until mutations are more fully understood, it would be desirable not to embark on any highly artificial method of keeping stock, because, if the theory of mutation I have been expounding is remotely correct, a mutant will not appear for many generations; thus we may keep, say, cows under some highly artificial method of feeding—and then, after many generations, suddenly find them 'mutating' all over

the country without their second stomach and no longer able to digest roughage.

One of the outstanding achievements of modern chemists is the synthesizing of nitrogen from different materials, some of which were at one time considered waste. By their use quick results can be obtained and large crops grown. If you talk to farmers, you will be surprised how many think this raw application of nitrogen is harmful, although they have no sound argument why they think so; their belief is partly intuition and partly observation. For my own part, I believe we are using synthetic nitrogen the wrong way and that if we continue to use it the wrong way, it will ultimately have a harmful effect on our soil, on our plants, on our animals and finally on ourselves.

You must realize that big business is behind artificial nitrogen, big •business which wishes to create new business and also to use up by-products. There is nothing wrong in that; in fact, it is praiseworthy. Now big business has employed generously the best available chemists to find uses for its products, to discover better means of manufacture and new outlets. This again is praiseworthy and, moreover, farmers owe a considerable debt to these men and to the firms who employ them.

Suppose you employed me at a high salary to find out further uses and benefits to be derived from sawdust. I, being an honest person, direct all my powers to find what uses sawdust can be put to. I discover, perhaps, it can when hot be very effective for drying silver; for putting at the bottom of parrots' cages with the addition of creosote as a moth scare, or possibly as a covering for tennis courts. In my researches, I have only experimented with one aim in sight, sawdust. I have, of course, found other data, but my brain is so aflame with sawdust, I naturally discard the other data. In the end, I do not really see that towels, sand, camphor or blaise are equally good for the same purposes. This is rather an unfair comparison, but it gives the idea. The main point is, the worms have not employed scientists to show what they can do, nor have 'Azotobacteria' or the nodule bacteria. Again, this is somewhat of an overstatement and somewhat unfair because a great deal of research work has been done on these very subjects both by unbiased chemists and by those employed by big business. But the fact remains that the big business chemists, by their cleverness and by the obvious truth of their assertions, sold

the farmer 'artificials': and artificials have got such a grip of us that a farmer to-day would not dare to withhold them lest he deprive the country of foodstuffs in her hour of need.

The clever industrial chemist has not only sold his chemicals to the farmer; he has sold 'the idea' to the scientist as well. Now scientists, like laymen, are guided (without knowing it) by fashion. As an example of scientific fashion: before the war, doctors would tell patients not to eat too many potatoes, 'Far too much starch'. To-day you will find qualified medical men writing articles urging people to eat more potatoes as the best food for them. In the same way an agricultural scientist will make up a chemical prescription for the soil believing that what he is doing is in the best modern practice and so it is—but it does not mean modern practice is right.

In the 'thirties of the last century, a tremendous controversy took place over the question of agricultural drainage and how deep the tiles should be placed. Deep tiles won; but a hundred years later we have found out that the tiles were placed too deep. At the same time Guano and Superphosphate made their début; considerable discussion took place and 'artificials' won. They are still winning. Scientists with formidable agricultural experience maintain they are the proper thing; that equally good or better results can be obtained by their use in comparison with straight natural methods. But there are also men of an equally high order of intelligence and practical qualifications, like Sir Albert Howard, who say artificials are wrong; who maintain that the forcing of crops by artificial nitrogen causes widespread diseases. While the artificial group is fashionable, the other group is growing in strength. It is moreover composed of persons with a certain amount of experience and technical knowledge; men of independent outlook who do not cross the street because everybody crosses the street. We still, however, have only hunch as a guide. The experiment in which two controlled groups were fed on natural food and on food produced by artificials, is not really conclusive enough to call definite proof but the fact that the natural food group remained free from disease while the others suffered is a strong pointer.

I think that our plan for the future must break the insidious grip of the advocates of artificials in the raw state. Although I would not go so far as to say I have any tangible proof that they are wrong, I would say that if we have to use artificials to produce increase of yield, it is because we have not utilized natural resources to work

really hard for us, because perhaps we have not tried hard enough to understand their power and importance.

Sixty years ago Darwin found there were 158 million worms in an acre of ground. Sixty years ago Darwin calculated that these worms moved ten tons of earth per acre per year. I don't know if anybody else has ever checked his figures or whether he was remotely right, for such calculations must be made on wide assumptions; but, to my mind, he had got something.

Soil will become fertile by itself. Look at the plants which establish themselves in a blitzed house; see the way lichens and moss will start building up on a tarmac road. There seems to be a great army of workers, always there, ready to push forward fertility, to break up substances so that plants can utilize them to store nitrogen, and man is deliberately killing these multitudes of workers who should be his friends.

It is not so many years ago since scientists found that the halibut was a vitamin factory; that he had the power of converting the vitamins contained in aquatic plants into a convenient solution of vitamin D. These plants are grown by ordinary natural processes. They extract the original vitamins from the sun by a system not yet fully understood. I believe that 'organisms' play a considerable part in this extraction cycle. If this is so, and if these organisms are banned by artificials and if we were able to turn the halibut loose to browse on plants which were forced by doses of raw chemicals, he would not be able to extract the same amount of flavour from them. I have dwelt on this point, because flavour forms the structure of the whole edifice which I am trying to build up.

Scientists have been on the wrong track before. Suppose they are now, suppose we farmers are deliberately killing off the vital cycle upon which health and life depend; *your* health and *your* life. For if chemicals thrown on the land in raw hundredweights are killing plant flavour, the animals cannot assimilate the health spark which *you* require to extract from their products. I therefore lay the first brick of my economic plan on the dung heap and the humus crop. We must start at that angle, we must get the scientist to turn his intelligence towards discovering how we can make our farmyard manure produce more of the right kind of organisms, so that we can inoculate our soil with the best builders of plant food. We must find methods to conserve the value of this vital manure and to apply it in such a manner that the elements are not lost.

Soil organisms amount to several million per cubic centimetre; some break down or rot while the others process the rotted vegetation to make it into plant food. They form one of the first links in our life cycle; eliminate them or poison them and the natural chain is broken, the chain on which our health depends. In parts of America where artificials have been used and no effort has been made to inoculate with organisms, the soil has died. Fertile cotton lands of the past are called the 'dust bowl'. I have known ground in this country which has died, ground upon which Timothy hay has been grown for years by the use of fertilizer. Fortunately, that ground can be won back; but to win back 68 million acres would be a different matter.

Having discussed the damaging practices of synthetic nitrogen, I finish by saying that you will find further on in this book that I believe use can be made of artificial nitrogen in helping out our soil organisms, and that when used for this purpose it will have far greater and more lasting effect than it has when used in the crude and dangerous manner of to-day. I mean by this, that we can use it to produce bulky green crop and subsequently, with dung, help the existing organisms to rot the green fodder down to humus.

Chapter Four

THE FARMER AND THE SCIENTIST

Plants without Soil—Spring in Winter—Boosting Seeds —Unwise Parenthood—To sum up

In order to conduct experiments on plants scientifically, a technique has been developed in which plants are grown without soil in a sterile medium such as water, sand or gravel. The advantages of this method of culture are that the chemical requirements of plants can be easily observed; for instance, if it was desired to find the optimum P.h. for a certain plant, one would grow the same species in a number of different pots supplying each with the same amount of nutrient, but grading the acid and alkalinity of each pot so that one would be able to study the plant and its reactions through all degrees of sweetness or sourness and thus see at what value it was most at home. In the same way, it is possible to trace the effects of mineral deficiencies or the response to different balances of nutrients.

A few years before the war various persons tried in different parts of the world to make the laboratory method into a commercial one. The idea caught on. A great number of amateur cultivators were attracted to this novel form of gardening long before it had received sufficient practical experience to find out the best methods of operation. A number of enthusiasts were ardent enough to claim much more for the system than is really practical or justifiable, and soilless culture has to a certain extent come into disrepute through too many colourful claims.

Amateurs would start off a water and nutrient culture system in the back-yard with the fixed idea that by some magical quality of the process they would receive crops four times as large as they obtained by soil cultivation. There is, of course, no logical reason for this belief; for under optimum conditions soil and nutrient solution will produce equally good crops. Nutrient culture is, moreover, far too troublesome for the average amateur gardener. If he loses his interest in his soil-grown plants or goes away for a

period, they will probably get along all right, perhaps better without him, but the nutrient solution requires regular attention to supply the right chemicals and keep the P.h. concentration at the correct mark. The changes in values in a small quantity of nutrient are much more sudden than they would be with a large volume of soil. Also, the process needs some form of mechanical or human attention.

It is necessary for the roots of all plants to receive a regular supply of oxygen. If one grows plants in water, the roots are completely sealed against air; one has therefore, to supply oxygen artificially, or remove and replace the solution at set intervals. As I keep reiterating, if one becomes artificial and breaks a natural law, one must be prepared to think and work hard or the natural law will beat one.

If you have not heard of this system, or of the wild claims made for it, you may wonder why it is necessary to review it so carefully, but persons in some countries have made very highly flavoured claims for hydroponics (the vile name with which the process has been christened). They have even claimed that it might replace the ordinary agriculture of the future. They visualize factory-produced crops grown by white-coated chemists turning taps and pressing buttons. As these claims may be restated after the war, it is necessary to consider the matter in cold blood and see if it has any place on the perfect British farm.

Anybody who has worked the system will at once realize that the expense of plant and maintenance at once rule out the ordinary commercial field crops, nor is there any particular significance or advantage in trying the system out of doors. It has, however, certain advantages for glass-house culture. There is the saving of labour in weeding, cultivation, and watering; a greater control for valuable plants is obtainable and results can be repeated with confidence. Plants can, to a limited extent, be forced or kept back to meet market demands, while flowers may have their colour better developed by judicious application of chemical agents.

Again, sometimes it is economical to utilize a glass house for the growing of one crop year after year and for this purpose, nutrient culture has considerable possibilities. In the future I would not be surprised to see the practice become standardized, in one form or another, for growing certain crops such as carnations, early roses, etc. I think so favourably, in fact, of this system for the special

purpose crop that you will find it included in the plan. Moreover, I believe there are distinct possibilities in raising seedlings by this method, which are to be transplanted.

It might seem that I have contradicted myself by condoning the practice of using artificial nitrogen in this manner, when I have previously condemned its use for the soil. The soil, however, is already equipped with a natural array of forces for producing nitrogen and I believe the crude product unbalances these forces. By the nutrient method, we deliberately defy the natural law, for we are setting ourselves the task of producing certain luxury flower crops without calling on natural forces.

In attempting to grow edible crops by this medium, I would, however, say we are going on to dangerous ground until we understand what part the soil organisms play in producing those vitamins of which we already have some knowledge and those enzymes and other forces of whose action on our bodies we are at present comparatively ignorant.

An ingenious adaptation of the nutrient solution has been tried out for producing fodder. The idea is simply to take an imported food such as maize and germinate it on the farm in a nutrient solution, thus increasing its bulk (approximately three times). On the surface, the theoretical advantages seem very favourable to the adoption of such a system. But in practice, the amount of capital required to erect such a plant and the cost of labour in manipulating it seem to be unprofitable in relation to results.

In the case of maize, 2 lbs. of the sprouted crop is more than equivalent to 3 lbs. of kale in feeding value. For the sake of comparison, we might say that maize cost 10s. per cwt., and 6 cwt. will produce a ton of the sprouted crop. Therefore, a ton of nutrient produced fodder would cost three pounds without costing for plant, labour or nutrient solution. The amount of kale required to equal the sprouted maize in feeding value would be say, 30 cwt. Thus if we can produce (under the same world price conditions) kale under 40s. per ton, it will be cheaper. We can.

Comparatively recent investigations have shown that protein in early spring grass may be as high or higher than 20 per cent. In addition to this valuable quality, young leafy grass contains a certain amount of carotene value. Carotene is the pigment which turns milk yellow and accounts for the yellowness of egg yolk.

Probably it has particular tonic and nutritive uses as well, but I think I am correct in saying that these beneficial qualities are so far not sufficiently understood to have been isolated and scheduled. However, there is such a marked human preference for carotene colour in butter that manufacturers use a certain proportion of dye to imitate the popular buttercup yellow. Where there is a natural desire for animals and human beings for a particular flavour or colour, there is Usually something in it. Until, however, we know what effect carotene has on animals or ourselves, it is impossible either to estimate its value or to know how much of this product it is desirable to produce.

Since Professor Woodman's research work on the protein and carotene value of spring grass, there has been a praiseworthy desire on the part of scientists, manufacturers and farmers to catch it. Research workers soon found out that grass could be preserved by rapid drying without a great loss of value and this led to the introduction of a number of clever artificial driers. However ingenious or scientifically designed these driers may be, they are confronted with two almost insurmountable difficulties. The first is simply that young grass contains as much as 85 per cent of water; for a ton of dried grass therefore, five tons of water must be evaporated. The efficiency of the various drying machines differs, but I do not think it would be an overstatement to say that on early spring grass, 2 cwts. of fuel would be required to dry 3 cwts. of dried grass. This fuel cost, without counting in' power, labour or capital expenses, would put the value of dried grass protein above the price of imported protein and there is nothing to show that dried grass protein is all that better than, say, ground nut cake. Thus the enormous difference in cost would have to be found by the value of the carotene content and we are not really sure, apart from its value as a dye, what value it is or if its tonic properties could not be obtained cheaper elsewhere. The second stumbling block is that the dried grass plant must under any form of construction be a somewhat costly piece of apparatus. The longer it is run, the lower will be the cost per ton of the finished article. This is, of course, by no means an unusual problem in industry; for example, the fish canneries of Canada have expensive plant and equipment to instal and maintain year in and year out, while the salmon may only run for three months. They have, however, an alternative; they can use, with suitable alterations, most of their

plant for other forms of pack such as pilchards or herrings in tomato sauce. The same, up to a point, may be said for the dried grass plant; it can be used for drying cereals, vegetables or fruit, although slightly different designs of plant would be best suited for these different processes. But there is another limiting factor; as soon as the early spring flush is over, the grass drops in protein value until it gets pretty near first-class hay. To make a sufficient amount of the early spring grass, a much larger plant would be required than is necessary for the alternative operations.

I have taken trouble to point out all these drawbacks because there is a great deal of discussion on dried grass. It is a subject which rather lends itself to the imagination of the person who dreams of a future in which we fly in a synthetic world wearing cellophane clothes. I have even heard the railway carriage reformer say, 'Of course you farmers ought to run your show on industrial lines, dry your grass in co-operative factories and turn the winter into spring.' It has seemed, therefore, necessary to point out the considerable drawbacks to the process in its present form. I do, however, include in my plan a grain drier and suggest its use for the conversion of the very best spring grass to form a tonic food for mixing with rations. In my view, dried grass has beaten the scientist in the first round, but the discovery of the value of early spring grass is still true and there may be other methods of preserving it. Silage you will find dealt with under grass, but again it has considerable drawbacks. The subject is far too important to let drop and in the future, we may find practical methods of conserving spring grass economically. This would certainly revolutionize our dairying methods, for undoubtedly the best food for cows is young spring grass. With older grass, however, it is possible to turn out a product equivalent to the artificial dried product by making alterations in our methods of haymaking and by using natural agencies instead of artificial; and the capital cost of the equipment is substantially less than an artificial drier with corresponding output.

About ten years ago, a Russian scientist gave the world a new theory for agriculture 'Jarouijatia' (Springification) which has been translated as Vernalization.

The idea behind the process is so novel in its implication that it might well be described as the most revolutionary train of thought

that has been put forward for agriculture since Darwin's theory of evolution.

In order that the whole process may be easily understood, I must remind you of a few facts about seeds which may have slipped your memory. A seed goes through various stages of development after fertilization. The first stage is known as ripening in which the seed breathes and certain (not yet properly understood) changes take place. In the next stage the seed rests; it scarcely breathes and may rest without harm for periods depending on the toughness of its structure. A very hard seed may live in a state of rest for hundreds of years or a soft-coated one die after a matter of months.

A rest period after ripening is necessary to most seeds. That is to say, a ripe seed will not germinate until it has had a certain period of rest. Attempts have been made to break the rest period, but the results have been negligible. Until something is understood about the purpose and physical movements that take place during the rest period, it is not likely we will be able to substitute an artificial process to hasten it.

Each variety of seed at the end of the rest period requires certain conditions to wake it up and prepare it for germination. These conditions depend usually on light, temperature, and moisture. Thus an alpine species may require frost or a tropical species sunlight.

A seed, however, having completed its normal rest period may lie for a considerable time dormant until the necessary conditions arise in which it can germinate. The story of growing corn seeds from Pharaoh's tomb I believe to be simply nonsense, but many buried weed seeds will germinate after thirty years or more of permanent pasture. The Flanders' poppy is an example of buried seeds coming to the surface and certain very tough plants have been found and germinated from geological formations which indicate their age as two or three hundred years old.

Professor Lysenko's theory of vernalization is based on the assumption that the growth of a plant and its fruit bearing qualities are not related. He believes that they are two entirely different processes going on at the same time. Consequently, if one can restrain one, the other may continue to develop. This is a stupendously interesting assumption, for, if this is the case, all sorts of new agricultural methods might be developed.

The procedure is as follows. After the seed has ripened and

completed its normal rest period, it is provided with the necessary conditions to make it germinate; in the case of cereals the application of warmth and moisture. When the seed has just started to germinate, the conditions which are usually required for bodily growth are withdrawn. In practice it is stored in a temperature of about 2° C, and the seed is kept under these conditions for a suitable period (seven or eight weeks). During this time, it is supposed that the sexual development of the plant continues although the bodily development has been stopped. It is claimed that when the seed is sown and the plant grown, ripening takes place several days earlier than it would normally; in other words, the sex part of the plant has a flying start and thus produces seed before the plant has reached the stage of development where seed would normally be produced.

One of the commercial advantages of the scheme now becomes apparent. Seed can be vernalized and sown in countries which would not naturally have a long enough growing season to produce fruit. It is claimed that this method is now used in parts of Siberia with complete success.

To my mind, however, the results do not necessarily prove the theory. During the last war, a system of electrifying seeds was tried out and gave good results. By this process the seeds were treated in a bath of copper sulphate through which an electric current was passed, in a manner somewhat similar to electro plating. After treatment the seeds were dried and sown. It was claimed that the electrical current had an unknown but beneficial result in the rapid growth of the crop and also in the heavy yields obtained. But it could equally be argued that the effect of the copper sulphate protected the seed against disease (a chemical until recently standard for protecting seed), while the water bath brought on germination. The fact that an electric current was used might have no bearing on the results. In the same way, obviously, it can be argued about vernalization that the effect of germinating seed and then retarding development might have beneficial results not through any retarding of growth while development of sex was going on, but simply because the seed had been brought to germination point and would therefore have several days' start over seed not so treated.

Personally, I have had very negligible results from the system although this is probably my fault and not that of the theory. I have, however, had results by bringing seeds nearer germination before

sowing *without* the retarding process. But the results have not been sufficiently spectacular to make a field trial worth while. A point I have noted from various seedling experiments is that a plant or seed artificially treated may start off with a rush and get considerably in advance of seed sown in the ordinary way; and yet, as the season progresses, the original spurt levels out until there is a very small difference between the two at harvest or sometimes one has caught up with the other. I do not wish you to think that I am trying to put cold water on such a brilliant theory by producing my own humble experiments as detrimental evidence. My aim is only to show you why I have not included the process in my plan for agriculture, for I wish this plan only to contain those modern or ancient methods which I personally know will succeed.

I do not have any doubt that this Russian scientist has hit on an important truth. Sex and growth are very probably controlled by different factors and if we knew what the factors were, we might be able to utilize them to our advantage. It is of course apparent that both sexual and bodily developments in plants are controlled by the obvious natural forces of temperature, light, and nutrition. By restraining these we may damage the life and productivity of the plant; a seedling after a cold snap, although it may recover, is never quite the same as a seedling without the cold snap. It is, however, more than likely that genetic characters control sexual development independently of bodily development and we might achieve this plan better by selective breeding than by mechanical interference.

Another scientific discovery emanating from Russia is artificial insemination. By its means it is said miraculous results have been accomplished. It would be well to consider such an important process in detail, for it might well form one of the rocks of a new farming deal in these islands. The process has now been recognized officially in this country and experimental work has for some time been going on. For those who are not familiar with the procedure and its history, let me explain that in Russia where it was first introduced, a peculiar position has arisen. Russia, as everybody knows, has attempted the difficult and romantic task of changing this enormous block of Europe over from feudalism to modernity, in a series of five-year plans. The vastness of this task can be appreciated when it is remembered that we took several hundred years of trial-and-error methods to make this change.

'In regard to agriculture, they desired to alter the feudal strip system to ranching on overseas lines. To do this, they liquidated the 'Kulak', the small peasant farmer, to whom the nearest approach in this country would be a smallholder. With the liquidation of the Kulak, went his stock. At first, this was not regarded as a great loss, for the early reformers concentrated on vast grain production in ranches as big as two hundred thousand acres or over. When Stalin took the reins however, he realized the hopelessness of the ideas of the early enthusiasts. I quote his remarks elsewhere in this book because we have seen, in his preparation for war and the pulling round of his country from the almost hopeless muddle left by Lenin and the idealist group, that his views are worth listening to and many of his ideas worth following; if we have the ingenuity to translate them from the vastness and primitiveness of Russian conditions to the smallness and civilized nature of our own country. Stalin wanted stock because he realized that stock is the basis of prosperous agriculture and he wanted it quickly. Now all he had left to start with was a nondescript muddle of crossbred and scrubby beasts. It must not be forgotten in realizing his difficulties that in addition to the liquidation of the Kulaks and their stock, there had been under the Lenin regime a big famine in Russia and consequently, a considerable killing off of anything edible. The position was such that only drastic methods would meet the case and so the idea of artificial insemination was thought up. That is to say, collecting sperm from notable sires and distributing it by thermos to be injected into the females of the various scattered herds, so that the best blood could be distributed to the greatest number. There are several hundred million spermatozoa produced at a single ejaculation, so the possibilities are obvious.

We are, however, not in the same need of good blood at any price, as Russia was. On the contrary, we have in this country, the best blood in the world; blood which a carefully planned agriculture might capitalize as a great national asset. For not only have we the ideal climate for the production of high quality stock, but we have the temperament to breed them. We are, in fact, undoubtedly the greatest nation of fanciers in the world and the most accomplished breeders.

To produce inoculations of spermatozoa from the best animals or from proven sires is a very tempting proposition, but in doing so we expose ourselves to the risk of inbreeding to an alarming extent. Our

best herds are inbred as it is, and would be more so, but for the reason that you can't send cows on heat by post. I think for this reason alone, we should not introduce artificial insemination. The danger of ruining our pedigree stock by too near-line breeding is too great. This stock has taken generations to build up and could be capitalized abroad much more than it is, and we cannot afford to play tricks with it. But the sale abroad of this commodity is another matter and one for which there is more than something of a future.

Before leaving the subject, I must express my own view of the process and I may say that my own view is, as usual, peculiar, so you must draw your own conclusions.

In a beehive, there are numerous drones who do not work, but are fed by the workers and allowed to lead a completely idle existence. One day, however, the queen leaves the hive and with her, all the drones. She flies higher and higher with the drones after her all on the same bent, each one trying to fertilize her. The strongest and fittest drone catches the queen and mates with her although this action causes his own death. The rest of the 'also ran' drones return disconcertedly to the hive, no doubt spinning hard luck stories to each other. When the winter approaches and the workers are sure they require no other queens fertilized, they kill off the drones, their use ended. Now, nature is bound by purpose; she is far tougher and far more relentless than we are. Moreover, the workers need not make so many drone cells; therefore, there must be a reason for the maintenance of all these useless bees. In the case of the bull, I assume the emission of four hundred million infinitesimal tadpoles is not in the nature of a joke, but has a purpose. The strongest, the toughest and the most intelligent of the spermatozoa gets up the vaginal passage and fertilizes the solitary female egg.

Let me finish with my old war-cry—practise *with* natural laws, not against them; break the balance of nature and you are up against it. Take away the fight of the spermatozoa or the drones to fertilize and you take away the selection of the fittest, the most healthy manner of reproduction—result, weaker stock.

The reasons which I have stated seem to me sufficient to exclude the practice from my plan, because there are doubts, and this plan must be based on what we know of agriculture to be right and not on what we suspect or hope.

A boy will take a watch to pieces, sorting the parts without noting the order of assembly or realizing the purpose of each part. When he

reassembles it, the odd forgotten pieces are left out. Artificial insemination is the same; we are playing with bits of the watch without knowing the inter-relationship of the whole. If in the future, the science of genetics were more full developed than it is at the moment so that all the characters which are needed for a dairy animal were card indexed, one could visualize a genetic magazine from which ideal mating for a particular cow could be worked out. One would then radio the breeder for a thermos test tube of sperm, and in this way build up herds whose production of milk at undreamed of heights in butterfat would make our present-day herds seem futile. But these are dreams, and while dreams formulate into plans, one cannot make plans of dreams in the raw state.

Apropos of insemination, I give the view of a friend who is a large overseas breeder of stock, not because it has any bearing on conditions in this country, but because it shows the direct manner in which a practical man will pick out a commercial drawback. He had not heard of insemination and when I explained it he smiled, 'How would I look galloping about amongst a herd of five hundred cows spread over three square miles with a thermos and a syringe looking for one cow on heat.' There did not seem to be any scientific reply to this question.

While discussing the question of trick breeding, I should like to mention the possibility of controlling the sex of the offspring. This would naturally be of enormous advantage to the industry, but it seems no one has hit on any reliable method of artificial control; although a theory has been put forward that male and female sperms might be subject to different P.h. values, so that by altering the P.h. value one might kill off the male or female sperms as required.

I do not know how the experiments on which this theory is based are conducted, but they must be exceedingly difficult. When one considers that all the sperms used to create all the mammals that have ever lived on this world would probably go comfortably into a matchbox!

My own view which I give as usual, to show my state of mind, is that male or femaleness is the result of a number of laws, all intricately inter-related and which are under certain conditions overruled by each other. But they are, each and conjunctly, definite laws and not chance. Thus the age of the parents might form one law combination; heredity, another; seasonal and temperature conditions, a third; a fourth may be based on some communicating link

between world or local supply and demand, while possibly the whole system of laws may be governed by cosmic influence.

If my theory is even remotely right, we are not going to do much good by injecting washing soda or sulphuric acid.

The scientist has by research obtained a great deal of valuable information on agricultural matters. A lot of this information, while very interesting and not contrary to natural laws, is not always of much help to the practical farmer owing to the conditions under which he works; it is impossible for him to use the knowledge practically and economically. It is immensely interesting for him to read a book on soil formation, but to alter his soil appreciably will take him a considerable number of years or it may be impossible.

The farmer is often accused of not following the scientist when sometimes it is impossible for him to do so. Again, a scientist working on a particular line, must, if he is to reach any decision, gradually lay aside a great mass of conflicting evidence which does not fit in with the result at which he is aiming. But this related data may all be necessary to the working of the scheme under field conditions.

There are a great many other scientific discoveries which I have not examined in detail, but which are of importance to the farmer. I will deal with them as they appear in the sequence of the plan, for many of them are no longer controversial and indeed, are standard practice.

It is most important from the farmer's point of view that the very high ethical code which the scientist has observed in the past should be maintained and perhaps even more strict observance kept on discovery whilst in its initial stage. I must say that the boosting of some discoveries which have not proved logically very satisfactory or economic, has not been the scientists' fault. The press, for instance, likes putting in startling headings. Again, a firm or a country anxious for results might snatch a half-proved theory away from the laboratory and blazon it around with propaganda. Thus the scientist is not always to blame if too much importance is laid on a process simply because it is new. As an example, I must mention a book which a friend lent me recently entitled *British Farming*, by Wilfred Willet, a plan for victory and prosperity. This intriguing title inspired me to read the book carefully, for every farmer looks for new ideas about his complex business. The book however is actually a treatise on class warfare and is not particularly constructive for the future of

agriculture. The writer has, obviously, heard of recent scientific trends; from these he deduces some amazing statements which I am sure would appal genuine scientists—about 'hydroponics', he says, 'One more example of what scientists can do when harnessed to help farming, must suffice, potatoes and tomatoes have been grown in water to yield 75 as compared to 7 on land and 217 tons per acre respectively.' For any person who has spent time and money trying out hydroponics, this statement is encouraging to say the least of it.

Dried grass, on which progressive farmers have spent fortunes, he dismisses simply: 'Possibly we will have to make a feature of arable grass farming so that young grass shall be cut and dried in electric silos.' Anybody who has paid the current account for electric light, can appreciate the bitter sarcasm of this suggestion. Again, he dismisses the practical and scientific work we have devoted to dairying by stating, 'The scientist will soon be able to give us disease resisting and longer living cows.' This, at the moment when nobody has found a cure for mastitis, bull dog calves or contagious abortion.

. I have cited these peculiar statements because people who know nothing of agriculture are apt to seize on half-proved theories and talk about them as if they were accomplished facts and draw the conclusion that farmers are very backward because they have not adopted them at once. The fact is that a scientific theory usually needs a great deal of modification before it can be made practical and when made practical, it is not always commercial. We have for the last hundred years, realized the value of liquid manure, but try as we may, we have not been able to utilize it as we should. The scientist is, however, even to-day, endowed by the uneducated with almost mystical qualities akin to those held by a witch-doctor in a primitive tribe. This belief is hardly fair to the scientist whose methods are not in any way mystical and whose mental equipment is shared by the majority of laymen. It is in fact the scientist who requires the practical experience and common sense of the agriculturist to make his theories workable.

I believe strongly, however, that the scientist could and should be placed inside farming to an extent he has never been before and his inclusion as part of the happy family will be of great benefit to the farmer and of equal benefit to the scientist.

Chapter Five

THE FARMER AND OWNERSHIP

Nationalization—The hereditary landlord—The amenity landlord—The investing landlord

There has been considerable discussion in the past few years concerning the advisability of the nation owning all our land. Adherents of this proposition have sprung from all classes including farmers and landowners. It would be unnecessary to give all the pros and cons as these have already been ably put forward by others. I would, therefore, touch only on some minor points which may possibly not have occurred to the reader, but which to my mind, are vital arguments against nationalization.

The land is owned by so many different persons that complete nationalization by force would be almost akin to starting a revolution. There is already a considerable amount of land owned by large bodies similar to the government and these are usually so tied up by laws and regulations that dealing with them is pure murder; and I can add without mentioning any names, that not all of these national estates are particularly well run. They are, however, the nearest approach to nationalization that we have and they are not a good advertisement. Nationalization is a complete alteration of our avowed democratic principles and a contravention of our professed future aims which include 'freedom from fear'; for once land became the property of the state, the bargaining power of the individual would be extinguished; for no individual can bargain with the state. Moreover, while the original nationalizing government might be just and fair, there is no guarantee that it would remain so. The history of governments is crammed with injustices; it is also filled with mistakes in the same way that the history of individuals is filled with mistakes. But the individual being an individual,, does not usually make the same mistakes *en masse;* he profits by the small mistakes of his neighbours to build up success. On the other hand a mistake of the government concerning the land (if the land belonged *en bloc*

to the government) might well be disastrous. By this I do not mean to imply that a government is more likely to make a mistake than an individual; indeed, if it is guided by the best brains, government should be less liable to fault. But far-reaching mistakes may be made without fault by the adoption of ideas which seem at the time to be complete and perfect and which afterwards prove to be based on incorrect data or insufficiently understood facts. We laugh now at the Romans building expensive water viaducts because they had not realized that enclosed water will rise to its own level, but future generations may laugh at us because we convey electricity by elaborate systems of wire. Our descendants may be able to pick it up by wavelength in the same way in which we tune our radio.

One can easily imagine mistakes the government might make with our land which would take many years to rectify. In this connection, I should like to tell you a story related to me by an employee in one of our overseas forestry departments, which I believe to be accurate. He tells of the troubles occasioned by forest fires, how the natives had for centuries let them run wherever they liked. His department organized fire-fighting units and at length conquered the fires, or at least kept them localized and under control. The rivers in the country constantly flooded valuable agricultural land; so the government designed elaborate embankments to control the river. After a considerable number of years, however, it was found that the forest fires were in reality a blessing in disguise for they destroyed large quantities of parasites, obnoxious insects and other creatures while they did not seriously harm the young green tree seedlings, but rather did them good for they cleared away the dry and dead litter, giving them freedom to grow and supplying them with easily utilized fertilizer from the ash. This proved beneficial to their growth, and indeed necessary for the older material was not sufficiently decayed to give them the start which they required. Severe floods washed away some of the concrete dams; in other cases it was found that the river,s constantly altered their course leaving dams high and dry and rendering the expensive works useless. It was in the end found advantageous to drive in stakes where required and allow weed and later drift wood to bank up to form a natural dam. It was discovered, paradoxically, that these simple breakwaters strengthened themselves in time of flood by collecting automatically increased supplies of flotsam and jetsam. Thus the department reverted after twenty or thirty years of very hard work and the expenditure of millions of

pounds in money to the methods which the natives had used for centuries. I relate this story for it is worth considering in connection with any plan for the future and also because it shows the best brains with the best intentions can sometimes make mistakes which on a large scale become very costly.

In this age of mechanization and grandiose planning, people will laugh at this point, but it is nevertheless one of the principal arguments against the national landlord. It is obvious that in any government plan certain fixed rules may be made for its administration. If small officials are allowed to give their own *ad lib* interpretation or take steps on their own initiative, the fabric of the whole plan might be so distorted as to become useless; even though some of these free-lance ideas might be improvements or necessary expedients. Therefore, it is the modern practice to standardize officials so that they will stick to the letter of the plan.

Now a good landlord, if he is to be successful, will often take steps which no national landlord could possibly allow; sometimes these steps are on compassionate grounds and there is no justification for them from the business point of view. A landlord may forgo a rent to help a good tenant from falling into debt because he knows there are circumstances which have hindered the man and which were beyond his control; although the circumstances would not be tolerated in a nationally run country. In the days of the hereditary landlord these things were not so uncommon as they are now with the infiltration of the amenity and 'take all' landlord. On nationalized land such a tenant might not be able to vindicate his claim and a good farmer might be lost to the soil—and the soil needs more good men to-day than ever. There have been some almost unbelievable cases of eviction under state powers where a little tact and judicious supply of capital might have turned a bad farmer into a very good one. Though, of course, a number of wicked tenants have been ejected by the state who never had any intention of trying and whom a landlord would have had out years before if he had had the powers to do so. Many readers will remember the press reports of the farmer who objected to eviction so much that he turned his house into a one-man fort and after shooting several police was himself killed. Perhaps one day the true story will be given by the responsible authorities and there may be extenuating circumstances. I feel somehow that a good landlord or agent would never let things reach such a pass even though he had to adopt completely unorthodox methods.

I am sure a landlord with tact could have made a good farmer of this unfortunate man.

I believe that if the electors of this country ever allow a nationalization bill to go through as a permanent measure, it will be a death sentence to the last of the pioneer spirit in this country, a spirit which every country must have if it is going to have life and progress; for the small man who has the guts to start up the tobacconist stand on the corner, and the labourer who pushes, borrows and scrapes until he gets his own farm, are the men who give our country its vitality. It was the yeomen bowmen whom the French feared at Crécy, the nation of shopkeepers whom Napoleon could not beat and the Scotch crofters who blazed their way through Canada. Man is eternally searching for freedom from man; he has basic instincts which can never be eradicated and one of these is to possess his own plot of land. He has fought hard for this right against kings and powerful noblemen; against invaders and against governments. It is a British characteristic. Rather than nationalize the land, it should be available for the small man to own either himself or in a co-operative fashion, but in a small enough way for him to feel it is his and to have the 'Father love' which makes him take care of it.

Who is the landlord? There are many types of landlord; first, the hereditary landlord, men who have owned land father to son for generations. There are not a great many of them left. I think their requirements are fairly stated in a 'Post-War Policy' pamphlet 'The House of Lords Committees' which is signed by representative landlords, men like the Duke of Buccleuch (who could hardly be described as a smallholder). They say they want to run their own business properly—which, to do them justice, they have tried to do. They want capital of course; everybody on the land does—bags of it. But they are sensible enough to realize nobody is going to lend a landlord capital and find that he has knocked down a dozen cottages to make a trout loch, or reared a couple of thousand pheasants for the farmers to feed; so they say, 'Inspect us and if you find we are not playing the game, take it away.' Well, you can't say fairer than that.

The second class of landlord is the amenity landlord who has made some money in industry (or his ancestors have) and bought a place in the country because it is 'the thing to do'. The difference between the hereditary and the amenity landlord is that the hereditary looks upon his property as a family trust while the amenity regards it as something he has bought and can knock the hell out of. It must be

remembered that there are white sheep amongst the amenities and black sheep amongst the hereditaries, but the definition is near enough. What does the amenity landlord want? Well, I presume he wants to go on knocking the hell out of it if he has enough money to foot the bill.

The third class of landlord buys land as an investment; he wants it to pay him a dividend and appreciate in value. This type of landlord is difficult to locate as he is apt to hide his identity: so I will content myself by saying that a man who buys or holds land purely for financial reasons, is not the sort of person who is likely to do the industry any good; for labourer, farmer, and landlord must possess an additional quality besides a desire to get rich at any price; they must love the land for itself. For this reason I think we should do everything to discourage the dispassionate type of owner who wishes to make capital from the land instead of trying to get a living from it. The type of person or company who desires to do that is not likely to care how his land is treated so long as it produces money, whereas a man who has the real interest of the land at heart, will hesitate before he does anything to rob or spoil it.

Many amenity landlords, however, do have tendencies towards 'liking' their land and a swing of fashion might make them into good farmers or excellent sheep ranchers, for most amenity land is not suitable to anything but large-scale sheep farming. It was, after all, fashion which originally drew them to buy land. Presumably, it was their business acumen (by which they made money to buy the land) that prompted them to run our simple country sports on business lines. In the future, they may be able to turn these valuable qualities of organization which changed fox hunting from a country sport to a cross between a cavalry charge and an exhibition of automobiles to ranching on efficient lines and we may see again our traditional British sports return to the category in which they may be called sport.

I have a friend who owns a property of perhaps forty thousand acres. I have noted that this estate has always been particularly well run; the buildings kept in a good state of preservation; cottage improvements attended to; while fencing and ditching are particularly good. I thought it would be interesting to find out the result of this care and organization. It is rather a delicate matter to ask one's friends the details of their private business, but he very kindly allowed me to inspect figures. These rather surprised me, because though

some of the land is fairly unproductive, it also contains belts of good soil and valuable holdings. During the period 1906-43 he and his family have taken nothing out, but have dribbled into the estate slightly over a quarter of a million sterling (in improvements and repairs) over the value of the incoming rent. But even more surprising is that the total rent roll was lower in 1943 than in 1906.

It interested me to note that although the differences of our businesses are as great as those of Messrs. Lyons and a Coffee Stall, our experiences of landowning are equivalent. In thirty-seven years neither of us, as landlords, have banked a penny!

I do not think the hereditary class of landlord can hope to get away with special grants to keep him alive. Without doubt, he has held the dirty end of the stick for a very long time and the crushing effect of death duties coupled with the many restrictive acts and periods of depression have put him in an impossible position, but I do not think he can claim to be relieved of taxes even if he says, 'You can inspect me to see that I am trying'; nor can I think he really wants to put himself in the position of a state pensioner. It is for him to alter his methods so that he can retain his land and make it pay. To do this, he must incorporate himself more into the agricultural web. Personally, I believe that the plan laid down in this book is his only hope of lasting survival and one which will restore honour to his class from which many of our greatest leaders and statesmen have sprung. He will, however, have to make his mind up to work and he will have to prepare his children suitably for the job.

If we could buy out the third class of landlord, the one who wants to make all he can, it would allow a great many farmers to own their own farms. The owner farmer and the hereditary landlord are the two best elements we have in land ownership and the ones we should encourage. A country which contains a mixture of landlords, owner farmers and tenant farmers, is one in which it is possible for men to rise by ability and one which contains all the best elements of a prosperous agriculture.

Note. I have written this chapter without using the phrases 'hordes of officials', or 'farming from Whitehall'!

Chapter Six

SELLING

The Consumer—Distribution—The Wholesaler—The Retailer

The consumer is a subject upon which several books could be written, for the consumer is you and I, and our desire to consume is based on thousands of complex factors which make up our characters in so many different patterns that no two characters are quite alike.

From the manufacturer's point of view, the best consumers are those who suffer from the greatest amount of complexes. The late Queen Victoria, for instance, would have been a good consumer. At the close of her long reign, it is said that she had several thousand objects of sentimental and monetary value treasured up; she was for ever acquiring things and what she acquired, she kept. This desire of acquisition, is the very quality upon which trade thrives. The more people who wants things, obviously, the more there is to manufacture, the more to sell and the more money to be made.

Gandhi, on the other hand, might be cited as the example of the hopeless consumer. He wants practically nothing; sometimes, he does not even want his food. His needs are made up spiritually and not materialistically. Thus Gandhi is practically a total loss to the producer.

It would seem psychologically, that this desire for acquisition is the result of several main complexes, fear, frustration and inferiority. Each of these main complexes may be split into a thousand more minor complexes. The Nazi Party have traits which make them fine consumers. They desire to acquire a great portion of Europe. If you read over again the complexes—fear, frustration, inferiority—and keep in mind these three you will follow my argument.

In this country, there are many people who live or have lived lice-ridden lives in slum dwellings, without a great deal of hope of getting anything much better. One would expect them to have an 'escape complex', to spend what money they have on escape and thus to be

good consumers for the movie trade and the liquor business. They are.

There must also be many people who are desperately afraid of illness, hence the sale of quack cures; while a great multitude of persons suffer from the complex that they are not 'good enough' and they fall easy victims to the producer of flash motor cars and other ostentatious goods. Apart from complexes, all healthy people have some sort of sex desires and these make fortunes for producers of cosmetics and other goods which appeal to the senses.

The producer has been smart enough to realize that most of the products sold in the world are sold to people with complexes and he has thus organized salesmen, advertisers and other forms of propaganda to stimulate these desires or jog the complex holder up sufficiently to make his desire find tangible proof by buying the article. A man who is clever enough to think of a complex demand which has not been thought of before and which is fairly universal can make a fortune if he exploits it judiciously. Most consumers respond to suggestion. In the old days, they could apparently be easily caught by the cliche 'fulfilling a long-felt want'.

There are other consumers who do not suffer from complexes, but from natural instincts. They desire to keep their bodies clean and to eat attractive food, also to run around and play games and express other natural instincts, desires which, however, all consume products. A clever producer can exploit these instincts; he can, for example, employ a first-class artist and five-colour blocks to picture his canned fruits. He is playing to the natural instinct of selection of food by appearance; for the appearance and colour of foods are natural selective qualities. A glance at a tomato will show whether it is ripe enough to eat; the consumer is prepared to pay for colour; he will also buy flavour. Thus when you get the two combined as in the case of aerated waters, the consumer's natural instincts are 'played up' to the extent that he is apparently prepared to pay a considerable sum for a product which is about 95 per cent water. The price which the consumer is prepared to disgorge for chemically coloured and flavoured water is prodigious. I can find no sales record of aerated waters in this country, but it must amount to millions of pounds annually. In the States, it is said, over a hundred million bottles a day of soft drinks are consumed. A normal man requires two to four quarts of water a day to keep alive. If he cares to take a chance with his inside by having it chemically coloured and flavoured and is prepared to pay the extra cost, that is his own business. The point

that interests us is that there should be a consumer's demand for flavoured water.

As regards foodstuffs, the consumer on the whole is prepared to eat more than he actually requires, provided he can pay for it and it is attractively enough served. His requirements are between two and five thousand calories per diem according to the amount of manual work he is doing. It was, however, ascertained before the war, that a considerable number of consumers in this country suffered from malnutrition, that is to say, they were not getting enough to eat or were eating the wrong types of food. The causes of this starvation are put down to lack of sufficient money to buy food or lack of suitable food to purchase; but there are other causes and to understand the consumer properly one must realize that the urge to satisfy some of his complexes may be stronger than the desire to give himself proper food. Thus he will spend money on other products rather than food. A girl might starve herself to get enough money to buy a party frock whilst a rich woman might starve herself to get into one; or a studious youth may starve himself to get books or candles to read them by. Starving for knowledge formed a feature of Victorian literature if I remember correctly; the novel of my youth upheld this complex as a virtue. Thus a potential consumer of those days might have been influenced by propaganda to malnutrite himself in favour of studying the teachings of Euclid or in order to learn how to translate the Latin poets.

The 'Guns-instead-of-butter' propaganda is so recent, that it calls for little comment, except that I met a middle-class German woman at that period who said she was actually going without food, so that she could give more money to the party funds. I need hardly add that she carried snapshots of Hitler and knew *Mein Kampf* better than I know my Bible.

Consumer complex and propaganda can thus override the consumer's natural habits. The producer need not be certain that if the consumers were given enough money to provide themselves with an adequate and suitably balanced diet, they would do so. A girl might spend her food allowance on chocolate, while a man might prefer the more concentrated type of feeding provided by alcohol.

The consumer shows another trait in his purchases; he is influenced by fashions (remember the woman before-mentioned, who buys a dress and starves herself to get into it). Fashion presumably comes from the natural desire for improvement, and most people are

frustrated from improvement by forces too strong for them, by wars or the hundred and one different factors which make progress so difficult of attainment. They are therefore sidetracked to anything new or offering a change, thus fashion acquires its great influence over consumer demand. Good examples of this have been cycling, ping-pong, diabolo, yo-yo, and to a lesser extent biff bat. Now these have all been good business for the producer, for fashion will swing a whole mass of consumers into an urge for a certain product.

There are other points which attract consumer fancy. It is much cheaper to buy salt by the sack and break it up as required, yet the process is troublesome and there is considerable capital outlay and consequently the consumer is prepared to pay more to buy salt as required in small packages. Again, to some the cooking of food is wearisome and they will pay a lot to get out of it; good cooking is almost in the nature of an art and requires careful organization. Stock pots have to be started long before the soup is needed; whilst in towns it is often not possible to get fresh or good enough food to create flavour however good the cooking may be. Thus the housewife is prepared to pay many times more for her prepared food than if she were a first-class cook. This handiness accounts for the great volume of tinned and other packed foodstuffs. To do the British cook justice, one must also allow for the time factor, for few British women have enough leisure to devote to good cooking. Another factor which renders packed goods attractive to the consumer is the ease and speed with which they can be bought while the standard quality saves waste.

Consumers, of course, differ in different countries. A French housekeeper will spend a whole morning in the market choosing the most succulent produce. But the French have a different value for consumption; they value a good 'cuisine'; they have also made an art of obtaining amusement cheaply; nor do they wish for numerous labour-saving gadgets or for elaborate forms of entertainment; they can have a very good evening sitting under the limes of the boulevard cafe discussing politics and sipping one grenadine. Our consumers would think the French way of life very slow and the American would hardly describe it as life at all. Still, in their less complicated way, they have made a design for their lives which includes happiness.

Most urban producers more or less understand the desires of the consumer; they have to or they would soon be out of business. Advertisers have capitalized the human tendencies and desires of the consumer into a science with definite laws.

Anyone interested in complexes would find the advertising in certain American magazines as instructive as a treatise by Freud; one is, for example, exhorted to purchase a gadget for removing hair from one's nose. A study of the advertising of any country, is as sure a guide to their massed complexes as their art or their sense of humour.

Farmers, on the other hand, being removed from the consumer by walls of middlemen, have not had to understand his desires and peculiar traits, and so they make their job unnecessarily hard and unnecessarily unprofitable by producing the wrong things at the wrong time and in the wrong quantities.

The most amazing case of isolation from the consumer's desires is the politicians; they do not seem to try to get the angle at all. We have read the utterances of dear old members of Parliament to whom the consumer is a simple person with a craving for a serious way of life. They look around and see children playing on chalked squares in the street. Their minds swell with the idea of vast playing fields with neat rows of swings and a concrete tank filled with sand (for sand castles). But children don't like organized things to play with, they get a lot of fun with bits of china making a house under a bush; they enjoy squelching their toes in a muddy pool or climbing trees or running round the corner of a blitzed house with a stick representing a tommy gun. Of course, there are numerous ways that children's lives can be improved, but the way is through studying their consumer instincts and their natural tendencies, not through thinking up what they ought to like. Again, the politician thinks he can cure malnutrition by giving people more money. He will stop starvation that way, but it does not mean that people will eat correctly or sufficiently. To my mind politicians create unnecessary trouble for themselves by going against natural instincts instead of using the natural way to reach their goal. It is useless to think of any scheme for the consumer which does not make allowance for his varying traits and fancies or does not incorporate the desires for which he craves fulfilment. Indeed to force consumers away from their natural tendencies is to create complexes which may be powerful enough to influence detrimentally the future of our country.

To conclude with the consumer, let us summarize his desires in connection with food. He is attracted towards colour, flavour and a variety of nutritive qualities, this is a natural instinct. His second instinct is to save himself labour and trouble. He is therefore drawn towards foods that are easily obtainable and easy to prepare for

eating. The third consumer desire is influenced by the thought that food is an ordinary everyday or three times a day occurrence. He does not want to spend unnecessarily on ordinary foods as he wishes to keep his money to purchase other commodities which he considers more amusing. The fourth characteristic of the consumer in relation to food is his complex reactions that make him desire foods which are difficult to obtain and expensive. You will see what I mean by considering the orange. When the Greeks landed at Rabat and saw oranges growing for the first time, they described it as the Garden of the Hesperides and truly the orange with its colour, flavour, and neatness of construction is the most perfect of all fruits. Yet oranges before the war were practically given away and no one appreciated them greatly. Now they have become a rarity I am sure there would be consumers willing to pay twenty times their value if only they could obtain them. The same is probably true of all our delicacies, oysters, caviare, grapes and so on; besides the excellence of these foods, there are instincts within the consumer which make him desire to possess them, because they are difficult to possess.

The agricultural lesson from all this data is obvious. We must not throw our flavour foods at the consumer's head and expect him to disentangle them and eat them to keep alive. We must, rather, present them to him in such a fashion and of such a standard that we stimulate all those complexes within him which makes him appreciate our goods as products of great delicacy. He must feel that he is on a good thing by getting such inestimable value at such a reasonable price. The whole process from purchase to final eating must be an evergreen tour of delight and he must be made to feel that flavour foods for himself and his family are the first call on his spending money.

We have now considered the consumer and what sort of products he wants, and we have also touched on the very complicated subject of why he wants them. Our next step is to see how he receives what he wants. This is the vital chapter of the whole book, for the reorganizing of distribution and selling is the agriculturist's main hope of having an economic future. I am safe in saying that, however cleverly he organizes his own business, unless he reorganizes distribution, he will never be able to become properly economic and will always remain dependent on charitable contributions from those members of the community who have organized their business economically.

From all available figures, the normal position in the past was that the consumer paid two and a half times as much for his home-grown food as the producer received for growing it. In cold figures, the cost of distributing farm produce in this country is annually 250 to 300 million pounds and the price paid to the producer in this country is about 150 millions (pre bellum figures). Before we can consider any method of reducing this cost, it is necessary to X-ray the distributive trade step by step.

In order to give you a correct view, I will have to mix agricultural produce a little with urban produce because the two products are somewhat interwoven and it would, therefore, be difficult to extract one entirely and still leave the whole framework intact.

In this country goods are distributed in different ways—by wholesaler, retailer, chain store, department stores, mail order, the market and direct selling, with a few minor intermediaries such as the higgler.

All these different methods of distribution have different overheads and by each method the produce is handled a different number of times. In the food trade, there is another aspect to be considered which is not present in most of the other trades. The produce is perishable and highly competitive, so that every step which can be taken to cut down handling and marketing costs brings the food fresher and cheaper to the consumer.

The wholesaler is an old link between producer and retailer. In the food trade he must have come into existence when towns grew large enough to be forced to go further afield for their produce and the primary producer became unable to deal with the retailer or market direct. The wholesaler thus established himself at the port or rail-head where he could more easily collect the bulk of supplies and split them into parcels of a handy size to meet the individual retailer's requirements. He had a further important function. A retailer running short of a line could call on the bulk stocks of the wholesaler for replenishment more expeditiously than he could with the far-away producer.

With the introduction of the motor vehicle a great deal of the wholesaler's fire has been taken away. It is possible for a producer to make his own bargain with a retailer and deliver him goods according to a pre-arranged time schedule and deliver them right into his shop. Thus the retailer can save the cost of double or perhaps quadruple handling. This in some measure compensates him for

unsold stock and for the necessity of perhaps buying more than he would when dealing with a wholesaler. It is obvious, too, that where the motor vehicle is used direct and the goods are perishable, considerable loss from wilting is saved.

The wholesaler of course is fully alive to this new development and employs motor transport himself and has in some cases further improved his service by grading and labelling the supplies he receives, so that they are more easily disposed of by the retailer.

The retailer for centuries stood as the final produce-consumer link and for the same time the independent retailer regrettably stood practically still. He was content to pass goods in and out of his shop without worrying a great deal about improvement of method.

Then came competition, the chain store and the department store —all rushing up with chromium-plated fronts and price-cutting tickets. It looked as if the small independent man's day had gone and some went, but the determined man stayed on. He had a new asset; sympathy from his friends and neighbours who harboured a slight resentment against the new methods. This rather friendly spirit probably kept him afloat until he could find out how his competitors were working and adopt their technique. Soon he was able to compete with them at their own game. What he lacked by their big purchase methods, he could combat by linking up in independent chains through his wholesaler. He could also push lines and give hot sales talk. Even the chromium-plated front was not beyond him.

In this way the independent retailer before the war was creeping up on big business and I have no doubt the smartest men left in would in a few years have passed ahead and the big store would have been thinking heavily. However, the war came and the small man has been handed a new and very difficult set of problems to solve. I would not know whether the encouragement of the chain store has saved the country distributive costs or not, or whether the knocking of the small man has released a large quantity of labour, but it is obvious, rightly or wrongly, that the many small independent retailers will have considerable difficulty in starting up again.

I fancy, however, that many people believe the small independent man to be a vital element of our nation and if he can be brought back again into the web of the future, we will be developing the country on those traditional lines which have made it successful in the past.

Chapter Seven

DISTRIBUTION

The Chain Store—The Department Store—Direct Sale—Mail Order—The Market—Look Back

The chain store movement started in the 'fifties of the last century. The backbone behind the idea of the scheme is that buying in large volume means cheaper prices.

The chain store has gripped this country right through and competition with the small retailer has been violently vigorous and at times quite ruthless. The chain store has been able to use its greater capital to acquire the best sites. They have also used advertising and consumer bait with considerable skill. By buying in large parcels it has been possible for them to cut a well-advertised line in the face of the small retailer. They have also been able to devise systems on the cut-line principle such as bonuses which the ordinary small man cannot put over convincingly.

For the most part they have relied on direct buying from the producer, but they have also been able to run their own factories and produce their own products.

We have had one great gift from the chain store, they have taught us a great deal about distribution.

The chain store, however, for some reason does not have quite the same appeal in this country as it does elsewhere. Perhaps it is that we are a nation that likes the personal touch and it is very difficult to maintain the personal touch in big business. A chain of stores is apt to reach a peak of excellence and popularity and then subside; the reasons for this may be the fickleness of consumer interest or the difficulty of keeping a large organization up to scratch.

How the chain store will survive the war is hard to foretell; the maintenance of their organizations, at all times a difficult business, will certainly be considerably strained. So long as the registration of customers continues in force they will be assured of their clientele, but as soon as it is withdrawn, the customers having for so long been

forcibly held, will doubtless in many cases look out for new shops.

Whether the chain store is a good thing or not in this country rests on many factors. The maintenance of the supreme organization on such a large scale is at all times difficult and depends on the concentration of able brains at the top. When a concern gets to the stage that the chains have in some cases reached, the organization becomes topheavy. The advantages of buying in bulk become neutralized by unwieldy distribution and pilfering amongst employees becomes a racket; while the very factories which the chains have built for themselves get out of hand. Thus the level of the concerns sinks and they become more of a stranglehold than a caress.

Against this, there are chains which are organized by brilliant men with the power of keeping things alive and of making far-reaching business deals. Thus an astute management might give a manufacturer an order for some commodity which would necessitate the changing of the whole of his plant and keep his factory at work for a year or so. At the end of the contract the manufacturer, having set himself to produce this particular commodity, would find it very difficult to change over to anything else; the chain being still the only customer big enough to deal with, he might be forced to reduce his price to ensure a repetition of the order. In this way the chain store could score either financially or use the line as ground bait for customers.

As regards perishable food, the chain is too large a medium for either its economic distribution or the maintenance of its freshness. There must be certain transfers between one shop and another to save lines from loss which react on the consumer in that they have to buy older food at the cost of new.

It is very difficult for a single farm to deal direct with a chain and for that reason chains are inclined to run their own farms. If this became common practice throughout the country, it might mean the control of agriculture by a few groups of big business. This might have the effect of better profits for the shareholders, but it would mean that the small man was for ever excluded from owning his own farm. Now, this desire of the small man to run his own shop or farm is one of the greatest characteristics of our country.

As you are by now well aware, the thesis of this book is the drawing up of a plan for agriculture which will allow the greatest amount of individual freedom and personal ownership, and at the same time will bind freedom by an economic fabric so that it will stand on its

feet economically as an asset to the country instead of a liability. I believe we can devise an agricultural marketing plan which will have all the advantages of the chain without the drawback of committing our country to being run by blocks of big business.

The Department Store is too familiar a means of distribution to need any description, it has certain obvious advantages to the consumer and certain perhaps not so obvious disadvantages to itself.

It is handicapped in the retail struggle by having to support a crushing volume of rates and a very heavy initial capital cost. To do this it must have a very much greater turnover than the small man selling the same lines in the back street. It fights for its life against the great network of chains as well as the private retailer.

It is a tribute to the cleverness of their direction that so many department stores have weathered this challenge. In times of depression they have considerable difficulties to negotiate as it is difficult for them to reduce their overheads suddenly or, if they do reduce them, it is difficult to pick up the threads quickly and compete again successfully when good times come round.

From a purchasing point of view, they cannot be in such a strong position as a chain for they represent a collection of fairly large shops all dealing with different lines. Thus they lack the purchasing power of a chain with many shops trading the same lines. From all these circumstances, it would seem that they stand in a more difficult position than either the chain or the small retailer and a slight swing of popularity or political whim might make them completely uneconomic.

Direct sale is clearly the oldest form of connection between consumer and producer. It is typically exemplified in the food industry in the sale of milk by the producer-retailer. There can be no doubt that for economy and a quick transfer of a perishable product this method has the advantage over any other, provided a milk round can be arranged from one door to the next and not here, there, and everywhere.

A great many other products are, or rather have been, sold in this way. I need not mention to housewives silk stockings and vacuum cleaners. As long as the products were good and the salesmanship on the same level, a great deal of trading was done, but before the war this form of door to door hawking had grown to such dimensions

that a very strong sales resistance had sprung up amongst householders, so strong that a survey is reported to have resulted in this finding. Of the one thousand householders canvassed, from one third no answer was received although the householder was at home; five per cent of interviewed persons said they liked buying over the doorstep; half admitted listening to sales talk; whilst 25 per cent stated that they preferred buying in ordinary shops. This survey would not seem to be encouraging for this type of casual sale.

Quite a number of perishable goods have been sold through the post; flowers, hams, butter, bulbs, shrimps, etc. The advantages to the consumer are that he can deal direct with a producer whom he knows grows produce of high quality and can obtain supplies which he is not able to obtain locally. He has to bear the heavier charges for distribution which are occasioned by such small deliveries, but these purchases are usually of a luxury type and therefore it is reasonable to pay a luxury price.

The producer has the advantage of obtaining a better price than he would through the open market, but he also has the disadvantage of the extra office work entailed and the cost of bringing his produce to the notice of the purchaser.

From a national economic standpoint, the system could be worked in another way with approximately the same results but with considerable reduction in unnecessary labour. I shall deal with this in the final selling plan.

I sell animals and produce regularly in markets, as they seem to me to be efficient, well conducted and easy to deal with, yet I believe their day is past. It is true, they form a convenient clearing house for the farmer's bulk and an easy method of acquiring stock, and they provide an admirable method of meeting other farmers or business men. In fact, they fill the double role of discussion centre and amusement palace.

In spite of these tangible advantages they have many great disadvantages. Stock suffer considerably in the process of being transported, driven in and out of pens, beaten about the ring and being re-transported. A pig, for instance, being naturally a nervous animal, will lose weight and condition through a market. Indeed the shock occasioned to all animals by this process must be detrimental to the quality of the final produce. There is also considerable risk through

this repeated mixing and beating up of spreading disease amongst animals which are to be resold.

It is often impossible for farmers to send in economic loads of stock, and they lose accordingly. The market increases the chance of boom and slump, that nightmare of agriculture and of the world generally. The sudden rise and fall of prices in any industry upsets the smooth working of the nation. Indeed, the Stock Exchange and the various forms of market are among principal unsettling causes of any country.

The system of marketing encourages cornering, buying on future panic and all the other nervous or greedy complexes which help to upset the balance of our life. For if a man makes money by a shrewd purchase or by holding back for a rise, somebody loses an equal amount and that person is probably just the steady type whom it is desirable to encourage.

A market makes it possible for a man to farm without a farm; he can buy and sell here, there, and everywhere; take ground temporarily as required. True, under the present conditions, such a man often fills a gap. For instance, a farmer can let a field of aftermath when it would not pay him to buy animals himself to eat it off. Or, not having the capital to stock his farm with feeding cattle, he finds it convenient to let his feeding facilities.

But the conditions for which a market is useful are conditions that we must do away with if agriculture is to stand permanently on its feet.

I do not know of any super markets in this country, but they have started a new train of distribution thought in America akin to a revolution. There are, actually, several different types of super market—'The Cash and Carry store', 'The drive in market' and others. But, for the purpose of clearness, I put them under one heading and give a composite description.

A site is chosen in a cheap locality, usually outside a rateable area; the building is economically constructed and is often a simple shed. At the entrance to the market where the goods are stacked the customer is provided with a shopping basket and after that she is left to herself to go through the market and pick from the different priced bins what she requires. Before she leaves the building with her purchases, they are checked, totalled, paid for, and then she is free to go home.

This type of shopping has a great deal in its favour, not only because it is cheaper to run than a store, but also because it caters for a number of the consumers' traits which the ordinary shop misses. There are probably more satisfied customers in the type of book shop which allows the customer to browse unhindered amongst the volumes, than in the type which has salesmen chasing around suggesting titles and putting over hot sales talk.

To satisfy the customer is a big step towards building up volume in business and the customer of the super market has only herself to blame if she is not satisfied. Apart from the appeal of being allowed to poke about and pick out what one likes, the super market forms a wonderful trap for the best type of customer—that is to say, for the person who through frustrated instincts has adopted a 'collector' desire to buy things. In a shop, this tendency is often brought up short by the customers having to wait in a queue or find an assistant to serve or through the full range of stock not being shown. Thus time is given to become bored or to lose interest in the acquisitive quest.

Again, the idea of helping yourself without counting the cost allures all those addicts of the hire-purchase craze, while the bargain atmosphere attracts those who blind themselves by fractional figures such as three and eleven three. They are the people who act without counting the cost and, without any salesmanship at all, they will fill their shopping basket.

The super market has therefore some very tangible advantages over any other form of retailing. It can buy on a big scale and it need not have elaborate salesrooms, for one of its appeals is to give reason to the bargain illusion. It can be removed out of the area of heavy rates. It requires the minimum of staff and these need not possess the rare and expensive quality of good salesmanship. It appeals to a host of consumers' complexes which are hard to satisfy in the ordinary shop.

After the experiences of war-time atmosphere, one may expect to find more and more young people saying, 'The customer is not always right'. Because of their increased education and independence we may find assistants adopting an almost 'post office' attitude towards customers. Without good salesmanship the retailer need not expect a quick turnover. But the super market can sell without any salesmanship at all.

The super market is quickly and easily organized in a blitzed

community for these reasons. I believe that adaptations of this idea will be the basis of British retailing in the future.

Before leaving the subject of distribution, it is interesting to see clearly how its expenses add up.

The truth is somewhat remote from the obvious conclusions. One might imagine that the distribution of a ton of potatoes was the same as the distribution of a ton of optical goods, yet, in fact it is very different. A ton of potatoes might be delivered for a 10 per cent distribution charge, whilst optical goods might cost the wholesaler 17 per cent and the retailer 50 per cent. The 57 per cent difference lies in the overheads, in expert salesmanship, in the cost of premises and in a slow turnover. Again, the wholesale and retail costs do not necessarily bear the same relation to each other and in some other line the wholesaler's cost might be 6 per cent while the retailer's distribution might run into 30 or 40 per cent.

There is also a wide difference between the distribution costs entailed by different methods of retailing. Food served in a cafeteria might carry a distributive charge of 10 per cent lower than it would in a restaurant with table service and this gap might be increased with additions of music and luxury fittings up to 30 or 40 per cent, or even higher. For this reason, the story of the Aberdonian who ordered for his family a cup of tea and five saucers and subsequently asked why the band was not playing, is not without appreciation in catering circles.

Again, certain distributive advantages may outbalance others. The chain with its huge purchasing power and organized distribution may be surpassed by the super market which is without such a great initial advantage but has a much lower final cost. The whole subject bristles with exceptions and difficulties. Fortunately, in this book, we only have to consider home-grown food and on that subject the best solution is fairly clear.

Part Two

THE PLAN: THE PUZZLE PUT TOGETHER

'I do not in the least underestimate the great revolutionizing of our State farms, but if we compare the enormous State sums which the State has invested in State farms with the actual results they have achieved up to now, we will find an enormous balance against State farms. The principal reason for this discrepancy is that our grain farms are too unwieldy. The directors cannot manage such huge farms; the State farms are too specialized; they have no rotation of crops and fallow land; they have no livestock element in them. Apparently it will be necessary to split up the State farms and make them less specialized."

—JOSEPH STALIN in 1934

Chapter One

THE STANDARD FARM

Differences and Difficulties—Slump—What should we produce?—The Size of the Standard Farm—Land Tenure —Finance

A single fibre of hemp is a fragile thing, snappable by the gentlest pull, yet many fibres spun together form a rope strong enough to hang a man.

Up to now, I have tried to show the fibres as they are individually, just threads. They vary so much in texture and colour that I have probably failed to show them in as clear and logical a manner as I would have wished. In fact, there is no logical pattern; the problems of agriculture can embrace such widely different conditions and subjects, and are ruled by factors so outside its control that from being the primary industry of mankind it has deteriorated to a back bench trade, sometimes encouraged and sometimes frowned on, at the mercy of the politician, big business, and consumer's fashion, always at the mercy of weather and liable to suffer from the suddenness of new discovery.

At one time, for instance, indigo was a profitable crop, but chemists found a synthetic dye which made it unprofitable. In this way the

outside world constantly demands changes of agriculture whilst to change the pattern of agriculture is a very difficult thing. It may take years to accomplish or may be impossible to undertake economically.

In the first two chapters of this book I took you round certain farms and tried to show you them just as they were when I saw them. I endeavoured to get you to walk round with me, not to view a specially tidied up show place, but a farm as it really is and talk to the farmer to see what sort of a man he is, what are his views and outlook. I would have liked to have taken you to many other farms. I know that each farm to which I took you, you would have found different and each farmer you would have found to be different, with distinctly contrary views from his neighbour's across the hedge.

Then I tried to show you the great differences in farming, how the terrain and climate and fashion of a district direct the method and policy of agriculture; I headed some of the chapters with local terms to show you how one farmer calls a pile of hay a haycock, another a pike and a third a cole. These differences of course, go much farther than dialect. One man will grow his roots on the flat, another on ridges. One man will keep his cattle in open yards, another in enclosures. A third will keep them in half and half; a fourth in a windbreak made by mustard stacks; and a fifth entirely in the open. Again, one man will plough by diesel tractor drawing a six furrow plough, another by spark-ignition tractor drawing a two furrow plough and a third by horse with a one furrow plough. The differences go through all the methods of farming. The size of farms alters from district to district and even within each district; the size of the fields varies from less than an acre to several hundred acres. The cost of practically every operation differs from farm to farm, from county to county and from country to country.

One of the drawbacks of differential farming is that every farmer requires slightly different tools to do his work economically. If we assume that the economic acreage for an unspecified machine is fifty acres, a farmer working forty-nine acres, or a farmer working fifty-one, will be at a disadvantage. The forty-nine man loses an acre on which he might have used the machine, whilst the fifty-one man gets caught by the weather so the extra acre costs him more money at each stage of the work.

In practice the difference would not be as close as one acre. Again, the economic size of the field is controlled by the method of farming, the kind of stock kept, the crops grown and their rotation. However,

there are factors which indicate a definite size of farm and a definite size of field for the economic production of certain produce.

If we could adopt a standard field and a standard farm and a number of standard crops, we could then devise the most economical and fruitful method of dealing with them. We could design machines of a standard size with standard parts and manufacturers could roll them out at much lower cost than has been possible before. The deduction in cost and the speed of output would enable farmers to scrap their machines oftener and the whole industry would benefit by a constantly-improving design. With farms of a standard size and method of working, we could come to standard agreements and grade each man on the farm to a standard pay according to his grade. We could also devise a standard bonus for each man from the profits of the farm. Thus the best and most able farmers could still obtain the best men, and men who wanted to get on in the world could by their work and ability get on.

I have tried to show you the devastating effect of political whim and slump on the industry. Although I have spoken the truth from the farmer's point of view, I have not put the case from the politician's point of view. The politician has, actually a very good case. He lives by the moment, tides of public opinion make him here to-day and gone to-morrow. The country has been faced with problems that for one reason and another are very difficult to cure individually, for it often happens that by curing one set of troubles some other section of the population is made uncomfortable. The politician is, in reality, in the position of a man standing below a bursting dam, slapping mud over each new hole as it appears.

Again, slump is often the farmer's fault as much as the politician's or consumer's. One particular produce pays and the farmer chases it until it is overproduced. Pigs are the best example, for gluts in this line appear in a steady rotation of slump—quiet—pick-up—boom—slump which obviously means that as soon as the quiet period is over and a pick-up begins, farmers rush into production, and so cause a slump later on.

Now the cure for the political change is to plan the farmer into such a strong and economical position that he is unchallengeable. Moreover, to make him so economically sound, that he is not for ever clamouring for subsidies and government help.

The amateur reformer will always quote slumps to show how badly the world is run and will always assert that by his system

slumps could be abolished. Supposing A wants to put over the idea of barter and nudism, he will say, 'Millions of tons of coffee are burnt in Brazil; by exchanging a tram for vegetable marrows this would cease and if we wore no clothes, we would require more coffee to keep us warm.' The arguments are just as silly as that.

The only cure for slump is to tie the producer and the consumer together in such a way that the farmer has no other outlet for his produce apart from the consumers tied to him. In those conditions he can plan production ahead, although he must slightly overproduce against bad years, but having nowhere to dump his surplus, he must accordingly plan to use it up on his own farm. At the same time, the amount of consumers tied to him will enable him to produce steadily and profitably. Again, having a standard farm and a practically standard consumer demand, he can foretell what imported feeding stuffs, minerals, etc., he will require, and firm negotiations can be entered into with other countries in regard to those foods both for man and beast which we cannot produce economically in these islands. So our friends abroad will in turn be able to plan their production tables economically, thus avoiding slumps and dumping. They will also be able to arrange and guarantee purchases from us which will stabilize our manufacturing industries.

The primary industries will through this process arrive at an economic price and wage rate. From this price and wage rate, it will be possible for the government to give all the social services an economic basis, so that instead of these services being thrown at the working man free (as if he had done some crime and had to be supported)—workers will be able to pay for their children's education, their insurance, etc. Thus dignity may be restored to the farmer and the worker who for so long have been given doles and charity. Their freedom will then be returned to them and they will be able to live an independent life with honour and proper pride. They will be economic units, able to earn their own and their families' livelihood —a position to which their productive work surely entitles them. You may have noticed during our visits to farms what a number of different crops are grown, and also how many different breeds of livestock are produced. Some of these have, in this country, certain unalterable factors against them which make them uneconomical as compared with world produce. The rearing of beef cattle, for instance, cannot compete successfully with the Argentine and many of our colonies. Our costs are very much heavier at every stage, **nor** is

there any particular point why we should feed and rear beef cattle in this country when they can be produced in excellent quality and very much more cheaply elsewhere. Moreover, modern chilling of meat is now so advanced that very little occurs in transport so that there is not a great difference to the consumer between the two products.

Again, we have colonies already producing sugar more economically in many respects than we can. These colonies might find it hard to replace their sugar industry with any other, and consequently there is little purpose in us doing them out of their livelihood by subsidizing sugar in this country.

There are also vast tracts of our Commonwealth where wheat can be grown under more favourable and economical conditions than are prevalent throughout the bulk of the British Isles.

Sheep, again, form the staple industry of wide stretches of the British Dominions and they are a crop particularly suited to large ranges of country. There does not seem to be any economical reason for encouraging them in any but the wilder parts of our islands.

Pigs and poultry are subject to quite different conditions and can be kept more economically when they form a sideline on a farm than when they are farmed as a one-product enterprise.

We have seen, when discussing the consumer, how large sections of the public are not obtaining sufficient or suitably chosen food and that this malnutrition was caused partly by lack of money and partly because the consumer preferred to spend his money in other ways; and we have noted how the British consumer, not having the same love of cooking as the Latins, merely wishes to buy his food in the simplest possible manner, practically ready to put on the plate. But another cause of this malnutrition is that in the past well flavoured foods were not always available for the consumer to buy.

Now this would seem the greatest opportunity for future farming to supply perishable foods conveniently packed, simply sold and at reasonable prices.

I think I can go further and be speaking the truth when I say it is the only chance the great bulk of British farmers will ever have of making their business lastingly economic.

Our weather conditions make grass the best crop for most parts of the British Isles. If, therefore, we developed 50 per cent of our farming towards the production of grass and if we devised methods of doing our arable operations much quicker, we would probably be farming in the most economic way as regards the weather.

To consume this grass, we rule out beef, cattle, and sheep from the best of our lands, so we are left with dairying, and this fits in with our plan of growing flavour food, for milk is the primary tonic food. We can also grow easily all the cows' requirements in maintenance and also provide some protein. Moreover, we are on very safe ground for there are very few places which possess such a good dairying climate as we do and favoured spots like New Zealand are placed so far from world markets that they are permanently limited to the production of butter and cheese. Furthermore, the present war has demonstrated that more milk could be consumed in this country than has ever been consumed in the past.

But, most important of all, national consumption of milk in this country (provided the milk was good) would be the biggest factor in stopping malnutrition.

The war has deprived people of their usual egg quota and from this a complex has arisen which will create a widespread desire to buy eggs as soon as they can be had. As eggs, too, come under the category of 'perishable flavour goods', so they will form another of our productions for the future.

We have only tapped at the door of the vegetable business in this country, while in the old days there were few growers who tackled the business thoroughly. A great many flung some lettuces in a sack covered with dirt, sent them to the local market and declared, 'There you are; vegetables don't pay.'

Vegetables do not stand handling or being knocked about. So pre bellum marketing was a very disheartening thing for vegetables, for the pocket of the producer and for the consumer who wanted them fresh. We must deliver our vegetables of top grade, packed in non-returnable containers, nets or bags, washed, correctly weighed and dated.

We must have a distributive system which cuts out all intermediaries and puts the produce at the consumer's disposal a few hours after production. We must cut our selling overheads down to the minimum. Then, we will be able to give real flavour foods to the consumer at a lower price than he has ever received them before and of a freshness undreamed of.

Under these conditions, vegetable growing will pay. It will retain a large amount of labour on the land and it will give that labour as good wages as they can obtain at a factory.

Later on we will discuss the details. At this stage, let me remind

you of the standard vegetables which the ordinary householder should be eating regularly in their appointed seasons—artichokes, asparagus, beetroot, brussels sprouts, broccoli, beans, cabbages, celery, cauliflower, carrots, celeriac, leeks, onions, savoys, spinach and sea-kale. Yet the only vegetable most householders see is a potato. Besides the standard vegetable, there are a great many cold-frame crops which, if distribution and selling were reorganized, could be sold at a much cheaper price to the consumer and yet give the grower a good profit. There are main crop tomatoes, melons, and cucumbers, to mention three.

Lest it be thought that the few names I have given exhaust the possibilities, let me say they only begin to touch on it. There are numerous delicacies the consumer is hardly aware of. It is only of recent times that tomatoes crept into prominence. A short while ago it was purely a luxury crop, whereas now it is steadily leaving the luxury class. The lettuce also is just beginning to be taken seriously. I remember once completely failing to get a market for young carrot thinnings and having to dump them. We had many acres of thinnings amounting to thousands of bunches, but after a telephone battle to all parts of the country I gave in, having found no one to take the slightest interest in them. Yet young carrots really come into the luxury class of vegetable. If the consumer realized how good they are and how beneficial to his health, they could be made into a steady trade.

As an out of the way instance of unknown delicacies, how many countrymen, let alone townsmen, know the value of the cultivated dandelion as a salad plant? Yet they are very good eating. I do not know what vitamins or nutritious quality they contain, but I do know that young turkeys do better reared on dandelions than any other plant while rabbits go crazy about them. In France they are considered an important ingredient in a salad. Owing to lack of supply and salesmanship there are many herbs of which the names now convey nothing to the average consumer, although they were at one time used regularly.

You must not get away with the idea that I am a vegetarian crank, I am not, although in happier days I have wondered at the quantities of meat consumed by people who are not engaged in manual work. It is said that Mr. Bernard Shaw has never touched meat, yet it does not seem to have affected his brain, nor apparently has he flagged with the passing years. Furthermore, I believe a great number of

consumers are prepared to eat much more sanely if they had an easier opportunity of obtaining the right sort of food packed in a time-saving manner.

I hope these brief remarks will show you what a future there is in vegetables if they are properly handled. Naturally, farmers will not take kindly to growing crops with which they are not familiar, but if they want to live economically and stand on their own feet, they will have to grow them.

The flavour farm could use its horse dung for growing mushrooms, a crop which would sell itself. There are also numerous fruits which grow well in this country. These fruits have suffered at the expense of imported fruits from bad packing, bad distribution and bad salesmanship. Under a new deal for farming every farm could have its fruit orchards and bush and ground crops. These would be very small, but bulked and distributed properly they would provide ample supplies of flavour fruit.

The organization which I am outlining would include central plant for manufacturing preserves and jams in sufficient quantities to provide the customers of the group of flavour farms. This would work with the general plan and although the factory would be very small compared with an industrial plant, yet it would have certain advantages which an industrial plant cannot have. The same skilled labour would always be on the spot from one year to another as the estate employees would be permanent. The preserving department could therefore be planned to utilize the labour from other duties, a lot of the fruit would be a by-product and transport would be cut to a minimum. While the workers, being all, so to speak, in the same family, would have more interest in their job than the occasional industrial labour and, finally, the possible trade being known and the market being assured, a great deal of overheads could be cut down or completely cut out. There would be, for instance, no need for a multitude of travellers, bad debts, overproduction or idle stocks.

Before the war, the freezing of fruit and vegetables was making rapid strides over canning and it only needed quick distribution to replace canning for a great many products. The flavour farm groups would be ideally placed to tackle this type of preserving, while the great number of small factories, which this plan would create, would have the power to buy up the patent rights and have standard equipment organized which could be mass produced and used throughout the industry at a considerable saving in cost. In addition, the system

commends itself to fairly small-scale units. I expect many readers will have seen fruit and vegetables frozen in this manner; if they have not, I can assure them that these products are a revelation compared with the older methods.

The standard farm would find it profitable to feed a quota of pigs and these could be used to clear up waste products. There would also be a surplus of bull calves from the dairy business. These would be unprofitable to fatten for beef, for two reasons; firstly, that good dairy animals make bad beef animals and secondly, that beef does not pay in this country in comparison with foreign production. However, they could be used for stock to make first-rate bottled soups and these soups would be a real blessing to the housekeeper who would obtain excellent soup by simply heating the bottle.

I believe that we farmers are missing a big thing by not encouraging the consumer to use more flowers. I do not think I have ever met anybody who did not like flowers and I am sure this latent desire could be swelled to form a large trade all the year round.

With flowers, fruit blossom, beans and clovery pastures, the bee would fit in economically and much more could be done about honey production than has been done in the past.

This would account for all the things that can be grown economically by the bulk of farmers in this country. Some of them, of course, are very small trades indeed, but when they are linked together, they would make an extremely profitable chain.

Unfortunately, the reorganization and arrangement of farms to the maximum economical standard is not going to be enough if present methods of distribution and selling are to continue as they are. These will always be a severe drain on the producer and they will not supply the foods fresh enough in an easy enough pack to wean the consumer from other and more easily handled victuals. Therefore, a new deal for agriculture without a new deal for distribution and selling is not going to get the farmer anywhere or improve our foods for the consumer.

At this point let me mention the aim of the flavour farm. It must be of standard size, worked with standard tools and producing standard products. A glance out of a railway carriage however, will show that the creation of a farm of standard size is an impossibility. There are so many geographical and artificial features which to a certain extent ordain the size which a farm shall be.

I **put** the standard farm at 150 acres. The reason why I do this, you

will find later on when we consider the plan in fuller detail. But I allow that in a group often farms, one or two may go up to 180 acres, while some may be double or even treble, 260 or 520 acres; but although actually treble or double, they would be worked as two or three standard units. I also envisage adding to the group three small mother farms of six to twelve up to a hundred acres. Thus the scheme remains practical in spite of the geographical and artificial limitations. For the standardizing is only necessary in regard to the size of the fields, the equipment, the crops and the stock units. This standardization remains flexible enough to be applied to existing farms, through the farms being grouped into estates, the natural topography of the country can be taken into account in dividing out the farms. The changeover, of course, would be difficult; but the point is, if all the bricks of my plan combine to make agriculture a profitable and comfortable house for those who depend on it to live in, then it is worth their while concentrating on laying the different bricks correctly—so that the house may be built to last, even though some of the bricks are a little against the traditional farmer's preconceived ideas.

If you remember, I dealt with the landlord and nationalization but I did not give you the greatest argument against nationalization. That is quite simple under present conditions. Agricultural land does not pay to own, nor has it paid any remotely logical return for capital for a very long time. What holds good of the individual, holds good of the nation. It would be unfair to burden the taxpayer with another liability and yet in this country some sort of landlord is a necessity. The best form of land ownership is undoubtedly that of the owner farmer. To create a flourishing agricultural state, we require a mixture of landlord owners, farm owners, tenant owners and (a new thing) co-operative farmer owners. If you did not have this sifted mixture, you would shut the door on the small man ever getting up, and have no goal for the ambitious man to strive for. It is through the small man getting up that a successful and healthy country is kept healthy and successful; the survival of the fittest is still the strongest and most unbreakable natural law.

I have said that the farmer must be made economic, so must the farm labourer and so must the landlord.

I divided the landlords into three classes. The first, I labelled hereditary (though this is a sweeping statement) meaning those

who stood by and for the land as a complete life. The second class, I called amenity landlords and the third I called business landlords.

There is no place for the business type of landlord, that is to say, for the speculator who buys land and hopes it will rise in value.

Many of the amenity landlords could be reformed or. could carry on their activities in parts of the country not required for the standard farms or the use of practical agriculture. A number of amenity landlords own what are known as sporting estates, tracts of land covered by heather, marsh, gorse and water. Some of these estates would never fit into an economic scheme of small farms. Yet there is no reason why the landlords should not run them profitably as ranches in the overseas sense of the term. If such a plan as I am outlining ever came to pass, I have no doubt they would, for the amenity landlord is influenced a great deal by fashion. When one landlord started foresting deer instead of sheep, all the other landlords with similar ground followed suit. Incidentally, it is very doubtful if the average deer forest is profitable as a sheep ranch—there are several insurmountable technical difficulties—and it may be that deer or goats would be the only possible stock. The amenity landlord has always been swept by fashion; landscaping, covert shooting and barrack houses have all been the rage through amenity circles. Thus it is more than probable, if this type of landlord has any money after the war, that ranching will become the fashion. There will be, however, a great deal of amenity land for sale and the various urban councils will indeed be crazy if they do not snap some of it up for the holiday use of their population.

The small standard farmer will be useless and uneconomic by himself and thus I plan for his grouping into an estate, that is to say, into a standard group often flavour farms, co-operating with a main centre from which they draw their life. Again, I plan to make this estate group standard for the same reasons for which I planned to make the individual farm standard—because equipment can be more easily built and at cheaper rates *en masse* than for different-sized units requiring different-sized plant. Thus the first or hereditary landlord has a very good chance of surviving if he has the energy to seize that chance and turn his property into an estate group. Moreover, the large landlord can pull his estates round by grouping them into standard estates run by agents. There is no particular operative advantage of one person owning more than one estate, and, if the present taxation continues on the same ratio, there will be no

financial advantage either. But there are many large landlords still left in the country who have run their estates excellently through many unprofitable years and it would be very unfair if they were not given some tangible chance of recoupment for their endurance of the lean years during which they lived up to their ideals; while urban magnates made considerable fortunes in businesses in which it was much easier to acquire profits.

The manner in which these estates would be run, I will detail when we come to their appointed place in the plan.

We discussed at some length the consumer and the various ways produce is distributed and sold to him. From this data I have constructed what I believe to be the most economical plan for distributing and selling flavour goods. The estate centre would be tied to a shop and the shop tied to the estate. The shop would serve from two to three thousand customers and would be like the other pieces of the plan, standard in design and based in conception on the supermarket principle. You will find the exact methods of organization in their appropriate places.

To try to make the plan as clear as possible, I will remind you again of the bones of the scheme. First, the flavour farm; secondly, the estate; and thirdly, the shop. Linked with the estate centre are various outside organizations—those farms for instance, which do not come inside the flavour group and which for one reason or another can run economically by themselves, such as the super farms of Lincolnshire, the early flower and vegetable areas, the specialized fruit grower or the possible ranches of the amenity landlord or the civic holiday park. The estate would buy for its group—feeding stuffs direct from the docks, fertilizers direct from the factory and machinery direct from the maker. The shop would receive additional supplies of foreign fruit and certain produce from abroad through the existing channels. But special packs and standardization (which in many cases already exist) would be required for this produce.

As regards ownership, there would be throughout the country three main systems and mixtures of these systems.

1. Shop, estate, farms all owned and run by one body or person.
2. Each element separately owned but co-operating.
3. Shop owned by one person, estate and farms owned by another and let out.

The variations would be completely unlimited so it would be

possible for a person desirous of getting into the racket to buy the whole system *en bloc,* or a single farm, or rent a farm, an estate or a shop; thus there would be more chance for the ambitious than ever before. By this organization the devastating ruin caused by death duties would be avoided, because estates could be split and sold, or half split or half sold, without affecting the smooth working of the whole scheme.

It may surprise some readers that I should countenance death duties at all as every agricultural policy has, I believe, asked for their removal. But I wish to plan a future for agriculture which will make it as economically sound as, say, the manufacture of tobacco or the brewing of beer. I see no logical reason why it should not be made as sound as these industries and as profitable, capable of paying just as big wages, receiving from it as large profits and therefore, able to stand up to any taxes the government have to impose in the ordinary course of their proper business of providing security and maintaining necessary social services. Naturally, if the government wish to go beyond the powers for which they were created by competing with the private person in his own line of business, using capital wrung from the private person in taxes, then the private person would not be able to pay and the usual circle of slump would start again. But I have to suppose that if such a scheme as I am outlining were adopted, it would be merely one of many, reorganizing all our industries; and this reorganizing of industry from the inside would automatically relieve the government of any necessity to dabble outside their proper province; and thus, by the general prosperity of the country and the high rate of wages, we might expect that many of the social services would pay and that taxes automatically return to an economic standard, allowing every trade to flourish and the general level of prosperity to rise in a confident and permanent fashion.

The last point of the plan is its financing and that is really the simplest. It only means the making available of capital to all persons connected with the scheme at an easy rate of interest coupled with repayment. It would be fairly easy to arrive at the economic figure necessary to start a standard farm or a standard shop or a standard estate. That is to say, the cost of land purchase, the cost of buying off tithes or other existing encumbrances, the cost of drainage, the cost of providing suitable buildings, the cost of stocking, the cost of machinery and the cost of running for a couple of years until the place could have time to organize itself to be a paying proposition.

The total would form the maximum amount loanable for the various enterprises or enterprise. It would, of course, be also payable to those producers outside the flavour farm group but allied to an estate, shop or shops. It would also be available to the man who wanted to ranch the outside zone. He too would, of course, be tied to various shops and have to pack his butter, mutton or beef in an approved manner and work to a schedule of deliveries arranged by the shops.

The existing agricultural committees could, as their last earthly task, approve applicants. They could also help in arranging estates and farms economically (exchanging fields, etc.).

The investment of money in a plan such as I am outlining is as gilt edged as it is possible for an investment to be. In fact, it is easy money for the lender. I should, therefore, fix the interest rate at 3 per cent, of which 1 per cent would be used in repayment of the loan. Thus the lender would receive 2 per cent on a radium edged security and he would be amply paid at that for his services.

As to the question who the lender should be, this could be left open for competition between the government, the banks and the private investor. The banks and the private investor would doubtless see that the property was properly looked after and run, while the government would have the power of inspecting and looking into the business as long as they held a mortgage on the venture, to ensure that it was not being turned into a snipe bog or run as a road house and golf course.

The result of this method of financing would mean that the general public outside the farming business were not asked to pay out a single penny for subsidies.

In order that the plan might be carried out properly, it would be a condition that loans could only be made to persons who had undertaken to work strictly in accordance with the plan. Again, a farmer might already have sufficient capital to run his business properly, yet he might borrow to the hilt at 3 per cent (1 per cent repayable) and invest the loan in 4 or 5 per cent stock. Thus a condition of the loan would have to be that borrowers were not allowed to buy stocks after the money had been loaned, or during the time it was on loan.

The loan would be repayable or part repayable, at any time during its run; nor would it be advanced to persons, although in a flavour-farm district, who would not join in a co-operative or other estate. There would be no subsidies of any kind. The only government

control would be in examining products, testing seeds from mother farms, inspecting abattoirs, dairies and machinery (under the Factory Act) and in fixing prices and wages.

To summarize, the scheme means to the farmer that in many cases he would have to alter his methods. It also means considerable increase in rural employment. It cuts drastically at existing distributing and selling services. It means to the landlord that he will have to take more responsibility or go out. To the consumer, it means he will receive better and slightly cheaper supplies than he has done in the past. To the agricultural worker, it means a wage rate comparable with whatever the townsman is getting and a much better chance of rising in his profession than he has ever had before. But the basic advantage of the whole scheme is that it means lasting prosperity for agriculture; or rather, it means that if the townsmen are prosperous, the countrymen will be equally prosperous, for it links the consumer direct with the farm and does away with all unnecessary transport and all unjustified profits.

Finally, for the first time in agricultural history, it would give farmers something definite against which to gauge their production and the eternal dumping and slump would have a good chance of being eliminated.

Chapter Two

THE FLAVOUR FARM

An Exact Policy for the Farmer—The Right Size for a Farm—Standard Equipment

Without fixing a definite standard size (because the ground owing to natural topography is hard to standardize), I would give 130 acres as the minimum size of a holding, with 150 as the optimum and 180 as the maximum. But the size of the field I would standardize to ten acres as nearly as possible; as I have found this to be about the right size for the rotational grazing of forty cows followed by ten dry cows and young stock. This size of herd is the economic ideal. It can be machine milked intelligently by two persons; so that a staff of three allows for a day and a half a week off. Dairying is a seven day a week job, but we must make it possible for the persons engaged in the industry to have the same rest periods as they would in any other business.

At the same time, I would say that the running of a herd of fifty cows and followers by three persons, receiving their proper rest days, requires careful organization. It necessitates considerable capitalization in buildings and in labour-saving equipment if the herd is to be mechanized and organized and if there is to be sufficient time to look after the animals properly. Taking everything into account, I do not think it is practical to run a herd more economically with less labour. This team of three will suffice with the services of an extra girl or boy to enable them to get annual holidays apart from their day and a half rest periods.

With regard to the disposition of the ground, the minimum size of farm (130 acres) would be divided into thirteen 10-acre fields fenced electrically or permanently and served by water and good communicating roads. Sixty acres of this holding would be in temporary grass (twenty hay and forty temporary pasture). In planning the standard farm for so much grass, I have taken into account that this country has the ideal climate for grass and can grow this crop better than any other country in the world. Therefore, we should use grass as our trump card. The remaining 70 acres would be under the

plough; I believe it practicable to run this arable land with two men, given the right type of implements and the occasional help of other members of the farm and seasonal labour from outside sources.

I do not say that all farms would initially be able to support 40 cows, 10 dry cows and followers on 40 acres of grass and 20 acres of aftermath hay, but if the system which I am outlining was carried out long enough, they would in time be able to support such a herd.

In giving an idea of the general details of a 130-acre standard farm I have included a rotation. This rotation, however, must not be taken as fixed; it depends on what the estate (where the supplies are bulked) requires from the ground and also on the climate and the views of the farmer himself. With two grass shifts in the rotation, it is considerably adaptable.

10 acres	Hay—aftermath fed off or silaged.
10 acres	Grazing grass—treated with phosphoric manure.
10 acres	Grazing grass—before breaking up, heavily dunged, artificial nitrogen ploughed in.
10 acres	Roots—kale: mangolds: swedes: turnips: 3 acres early potatoes—limed and liquid manured as necessary.
10 acres	Oats.
10 acres	Beans—cultivated in drills.
10 acres	Barley—sown out.
10 acres	Hay—as first crop.
10 acres	Grass.
10 acres	Grass—before breaking up, heavily dunged and artificial nitrogen ploughed in.
10 acres	Potatoes—potash, liquid manure.
10 acres	Wheat.
10 acres	Oats—sown out.
3 acres	Orchard—small fruit, vegetables and flowers.
Stock	One pair of horses, 1 odd horse, 52 dairy cows, young stock; 100-400 pullets and first-year hens, depending on consumer demand; 100-200 pigs (fattening), depending on demand; bees.
Extras	Mushrooms, tomatoes or melons and cucumbers followed by flowers, grown in potato-chitting house.

Labour	Dairy	3
	Pigs and Poultry	1
	On farm	2
		6

Occasional family labour or hired help.

All crops, except fresh potatoes, fruit, vegetables and flowers, fed to farm stock.

Imported feeding stuffs—Sufficient to make up rations, mostly protein.

For those who like comparative figures:

Before the war	*My Plan*
1 man to 33.8 acres	1 man to 22.5 acres
, 1 man to 10.3 animals	1 man to 45.2 animals

Result—more labour on the land, more stock, greater production, increased fertility and a higher living standard.

Having spent a great deal of time collecting and working out figures to show how many flavour estates would be required; how much the scheme would cost; what produce the different unit farms would produce; having typed and retyped the whole mass of information several times, I read it carefully over and without hesitation destroyed it; for all planning figures are based on a morass of 'ifs' which can only solve themselves in practice.

I can, however, say that a standard farm of 130 acres in good heart, feeding a proportion of imported protein could hold a stock of 52 cows and these might average 700 gallons. It would be able to provide 10 tons of barley meal, a proportion of bean meal and a considerable quantity of waste products which could with the addition of imported protein fatten 200 pigs a year. By using the wheat grown on the farm, some of the oats, a little bean meal, a small amount of imported protein, by giving hens access to grass and gleanings on stubbles, such a farm could produce forty thousand eggs annually and provide at least 200 boiling fowls. From the ten acres of potatoes with the manuring, I have described, it would be disappointing if it did not average 100 tons of potatoes. The three acres of new potatoes might easily produce twelve tons while the farm might supply the estate soup department, twenty-five bull

calves and have a dozen heifer calves and a young horse for sale. It is possible to produce 900 lbs. of mushrooms from the manure of one horse. They should have no difficulty in supplying their required quota of flowers, fruit and vegetables and it is to be hoped they would average 2 or 3 cwts. of honey in a reasonable season. I believe these figures are fairly easy of achievement on a well run farm in good condition, but how long it would take to average them over the whole country or whether, they could be averaged over the whole country, I honestly do not know.

They would require from outside probably 25 per cent feeding stuffs, of which this country would supply a certain amount, fish meal and other products. Ten tons of lime, 2 tons of artificial nitrogen, a ton and a half of bone meal, half a ton of potash. They would also need an unspecified amount of tractor fuel, electricity, etc.

I believe that, as the farm increased in fertility, the amount of artificial and imported protein would gradually diminish until only lime and a certain amount of protein were needed. The latter would always be required, as stock, to give the best results, must receive a mixture of protein and we cannot produce a sufficient variety for this purpose on our farms in this country.

It is tempting to go on and work out how many farms, estates, and shops would be required, but that would be basing far too much on unproved theory. The figures which I have given are practical, but I have given them reluctantly because to reach such an average might take a great many years. I can say definitely that the system of flavour farming which I am outlining would produce more of the desired products than any other system (excluding completely artificializing the stock and importing unlimited feeding). Moreover, the plan of farm grouping and shop Unking would provide the foods fresher and more economically than any other plan.

I base the flavour farm on the continual and intelligent use of farmyard manure. Later, you will see how I believe this could be used in a much more beneficial manner than that in which it is used at the moment. I believe, also, that it is best to house the stock in damp weather in permanent farm buildings because I do not think open-air systems of dairy farming, pig and poultry keeping are likely to be permanently successful all the year round in our climate. Thus dung in large quantities will be made and have to be carted; this factor is the first limiting point in the size of our flavour farms.

If you have a farm of a thousand acres and it is necessary to dung ten acres at twenty tons to the acre in an outlying field one mile away from the buildings, this means (at a ton a load) carting four hundred miles. But if you have a farm of one hundred acres and your journey to your outlying field is only a quarter of a mile, you save yourself three hundred miles, thus you will be, mile for mile, that amount better off, and at a speed of four miles per hours you will be seventy-five hours further on with your work.

The next limiting factor is the size of the field. In Denmark they tether their cows in the field. This procedure saves them making expensive fences, and the crops can be eaten systematically; but there is an objection to this system. The constant handling requires more man-hours per cow for the same amount of milk, which means that either the wage standard is that much lower or that milk is that much dearer. Our best system, therefore, is one in which cows are allowed free range in enclosed fields. In order, however, to graze these fields bare, it is necessary to divide them up into fairly small enclosures and graze these rotationally with a fairly large herd. In this way the fields can be rested at intervals and allowed to recuperate while the cows can, to a certain extent, be rationed by the manner in which they are turned out on to the different fields. Now, if the farm is large and some of the fields consequently far away from the buildings, human nature, the weather and all those other 'gremlins' which surround the farmer conspire to ensure that the far-away fields do not get grazed as much as the near ones. An outsider will say this is pure defeatism. I have heard learned men, lecturing on the subject, condemn the farmer for his sloth. But the wise farmer knows that when a theory won't work out in practice, it is better to leave it alone. On a small farm the rotational grazing system becomes possible because the fields never get so far away from the homestead as to allow the weather and other bugbears to intrude themselves sufficiently to prevent the cyclic grazing of the different fields.

The third limitation in size of holding concerns stock.

We must mechanize the hen, the cow, and the pig, but the very process of regimenting and controlling these animals requires more individual knowledge and attention than it does when they are kept in a natural manner. Moreover, the risk of disease and loss of bloom is intensified the larger the flock or herd. For these reasons I stake for small herds carefully looked after.

The last of the size limitations arises from the question of management.

A factory in this country averages twenty-seven people to one building; while a farm averages ten workers to the square mile. In a factory work is more or less constant from day to day, but a farm depends on the weather and the schedule of work may have to be changed several times in a single day. A farmer, therefore, has to make quick decisions and alter his programme of work at a moment's notice. It is not politic for a farmer to allow his men to work too much on their own initiative for the most economic farm work is done by an organized team. If the men are encouraged to work on their own initiative, while the work may be necessary and conscientiously done, it may break up the team organization which is such a desirable feature of farm management.

There is no doubt the best supervision is maintained when a farmer can work with his men, or at any rate work some of the time with them. On a large farm this is quite impossible; in fact the whole trend of modern farming is taking the farmer further and further away from his men. He has elaborate books and costings to look after, supplies to purchase, machinery and spare parts to order, produce to sell, and besides other office work he has the considerable volume of government routine demands. On a large farm this may occasion the employment of a considerable office staff, and require for management a man with a different training and outlook from those of the type of farmer who best understands stock, crops and the management of small groups of men. In actual practice, a large farm requires to be run by a man of exceptional ability in certain methods of business while it represents a very small income for a colossal expenditure of capital. Thus men of suitable type are drawn to more lucrative forms of business, and the supply of men who can run large farms and are willing to do so is relatively small. So there is an overpowering argument from an economic standpoint in favour of having small farms run by owner farmers, tenants or working managers with a share in the profits. There is, moreover, an equally strong case for linking these small farms together in groups so that the small farmers are not worried by bookkeeping, purchasing, selling or other business.

There can be little doubt from these arguments that there are very conclusive limitations to the economic size of holdings devoted to intensive flavour food production in this country.

I do not rate my abilities sufficiently highly to say that my details of organizing a standard farm are in any way final; I have merely grouped the factors which we already know into a conservative scheme which will work. However, we have accumulated enough knowledge in agriculture to be able at least to detail a scheme which contains all the methods which are at the present moment practicable, likely to be economical and at the same time to improve both the quality and flavour of our productions and the fertility of our land. It is, however, more than probable that in the future many improvements of method will be devised and these can be incorporated in our agricultural practice. For instance, 'the jeep' is one of the great mechanical discoveries of the war, and it seems possible that it might prove satisfactory if adapted to the needs of the small farm. It might even prove for carting and row crop work more economical, and readier in action than horses, but this is obviously visionary talk. We have no adapted 'jeeps'[1] to compare with horses or our existing makes of tractors, nor can we foretell the future price of fuel.

I believe that the limiting factors of economized produce, size of holding, size of herd and preference of grass over other crops will not alter. They will remain the cage inside which our agricultural methods will have to be for ever confined.

We will now consider these limitations, and afterwards each aspect of the flavour farm in detail.

It might be thought by the layman that huge fields and large instruments could be made to save a great amount of labour. In certain countries, where conditions are suitable for their use, big machines have proved very successful, but in this country we are limited by climate. There are not many parts of the country, for instance, where one could speculate on a sufficiently long harvest to make a mammoth combine pay its way, while with a small combine there is not enough difference in results between big or small fields to be worth worrying about. It travels slowly and a good operator will keep it cutting all day in a ten-acre field nearly as easily as he would in a hundred-acre field. On paper there is a big advantage in ploughing big fields against small ones owing to the turns at the headlands, and this is correct between fields of say 1,000 acres and five acres, but on the ordinary British fields the differences are not so

[1] The proper name of the vehicle is 'peep'. The 'jeep' is larger. I use the misnomer as the public think of 'peeps' as 'jeeps',

noticeable. I have checked the time on an eight-acre field and on an eighty-nine-acre field, ploughing each with the same caterpillar tractor and our-furrow plough. I was surprised to find the difference in time was very small. For practical purposes, in fact, it did not matter.

Before leaving the subject of cultivating machinery, I must break off to discuss one aspect which I have not seen discussed in farming literature,[1] and that is whether we are right to plough at all. Under conditions of nature the soil is never inverted in the manner we plough it. The natural process is to keep it in relatively the same position of layers, aerating it by earth worms, etc., manuring it by annual applications of humus from the dead vegetation of preceding crops. In eastern countries the same practice is followed, merely stirring the soil with wooden ploughs without altering its relative position. I think the answer in the conditions of this plan is to plough the grass fields when they are broken up in such a manner that the ploughed-in turf and applied dung is buried, and at the same time to take the opportunity of breaking the pan, which forms in grassland with a sub-soiler. In the case of cereal crops not sown out, I believe it is worth making long-term experiments stirring them to kill off weeds (as soon as harvested), breaking the subsoil to keep them from going soggy in the winter, but not using the plough on them at all. However, this is experimental, and I only mention it in passing as worth thinking over.

Taking the average season, the optimum time in which to complete the necessary operations on the land is very short, sometimes only a few days. The time available to put in a catch crop after harvest in a dry year may be two or three hours! Very few farmers ever manage to do their work at the optimum time, and so we pile up difficulties for ourselves all through the season. This often means that we are not in a position to do the job that is waiting to be done . even though the weather is right, because we are still working at the one before.

Even in the worst year I have ever seen, when half the crops were practically lost and all lacked quality, even in a season like this, the right days were there to do the job, and a man who had much more equipment than an economist would think necessary could have grown and harvested good crops.

For these reasons I am sure that the small standard farm should be very heavily equipped.

[1] Since writing this an American book has been published on the subject.

It would, of course, have a tractor, and with regard to tractors my experience is that for ploughing especially, and working on the land in general, the track-laying type of tractor is better than a horse. The ordinary wheeled type, especially when equipped with rubber tyres, packs the soil and if it is asked to do anything in the wet loses half its power in wheelslip; while the spiked iron wheeled tractor is ruin to the farm roads.

Several types of modern farming machinery, at certain seasons of the year, press the soil so tightly that drainage is choked while the particles composing the soil are sealed, making the earth airtight. Now Nature never packs the soil.

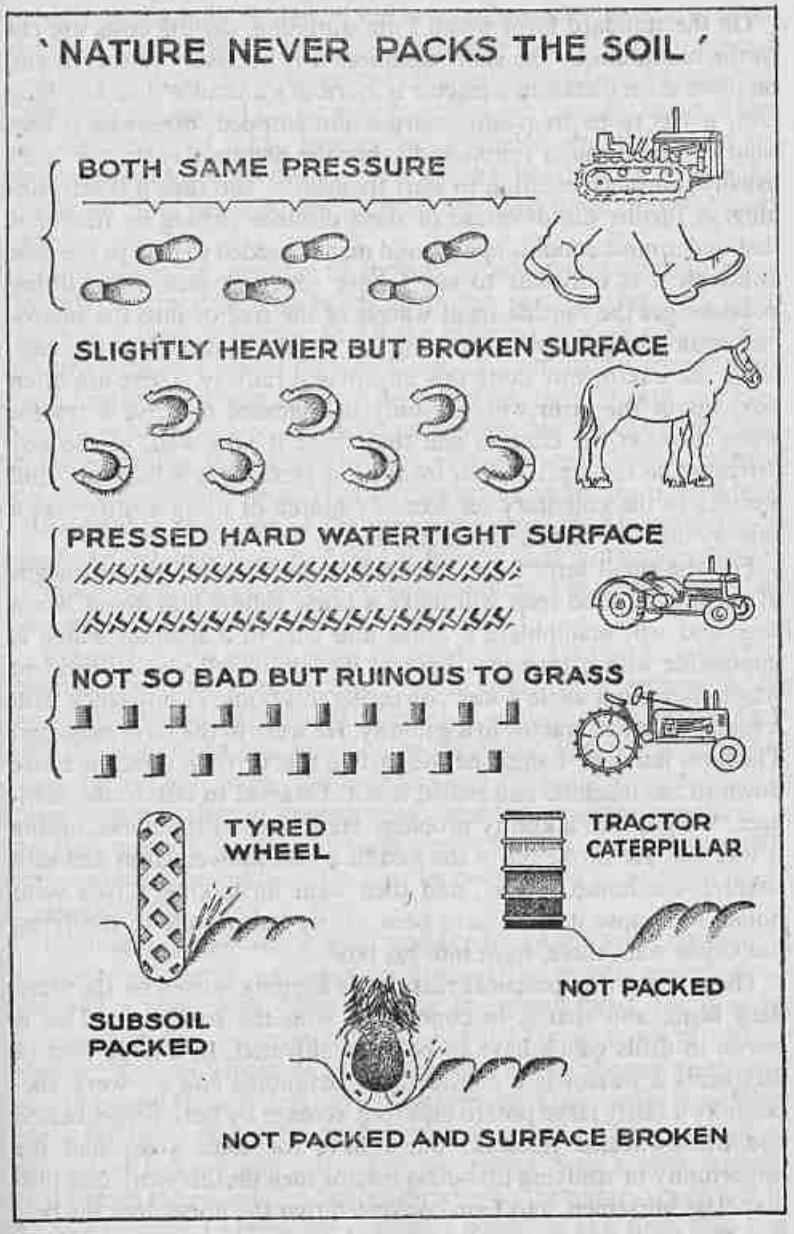
Animals cannot survive without plants so they must co-operate with them. The hoof of the horse breaks the ground and promotes aeration, the cow helps the tendrils of clover to spread while the sheep will consolidate light land in such a manner that it remains porous. If it had been necessary for plant growth to squeeze the soil into a pan, animals would have had rubber wheels.

A glance at the illustration will demonstrate the effects of the various methods; it proves, I think, that our nearest mechanical approach to the cloven hoof is the tracklaying tractor.

With regard to power for the tractor, the diesel type is immensely superior to paraffin or petrol for farm work. One would think it possible after the war to make a standard diesel tractor of the track-laying type suitable both in size and price for the 130—180-acre farm.

As regards row-crop work, in small fields and carting short distances I believe horses are best. The planned farm should have, therefore, a pair of horses and possibly an extra horse, which might be a mare from whom the farmer would breed. Although the average horse will not take such a heavy load from a field as a good tractor,[1] the heavy load is in itself a disadvantage as nothing knocks up ground more than heavy carting. The tractor will, of course, transport heavy loads long distances much more economically than the horse and cart, but under these circumstances it is necessary to use rubber tyres, and where heavy loads are carted by tractor at an appreciable speed with rubber tyres the wear is very excessive and expensive renewals write off the obvious advantages. It is much more economical to use a proper lorry for this type of work and load up off the fields.

[1] A pair of good draught horses on granite blocks have moved eighteen tons.



On the standard farm which I am outlining, carting costs are cut to the minimum by the short distances it is necessary to travel, and on these short distances a tractor is more of a nuisance than anything else; it has to be frequently started and stopped, otherwise it uses a lot of fuel through running idle, but the present-day tractor takes usually too much exertion to start frequently, and thus it is left running. A further disadvantage of short-distance carting by tractor is that under most conditions a second man is needed to load in the field although it is only fair to say I have seen our men when lifting potatoes get the outside front wheels of the tractor into the furrow and walk along the side throwing the potato baskets into the cart, while the tractor ran along this improvised railway. There are often boys about the farm who are only too pleased to drive a tractor when they get the chance, and they drive it very well, so the boy drives while the tractor-man loads; but farming is a business, and trusting to the voluntary services of children or using a furrow as a railway are very haphazard methods.

For the small farm I am convinced a horse is the easiest means of carting. A good man will make a horse follow him about like a dog, and will manipulate a horse and cart in a manner which is impossible with a tractor. I have to deviate to tell you an incident which happened while I was correcting this book. A boy stuck with a rubber-wheeled tractor in a gateway. He went to the farm manager. The farm manager unhitched the cart he was driving, took the horse down to the machine and pulled it out. I started to talk to the manager. We got into a knotty problem. He looked at the horse, noting it was hot. He broke off in the middle of the conversation and said simply, 'Go home, Clyde', and then went on talking. Clyde went home. I suppose it must have been nearly half a mile to the farm, but Clyde went there, right into his box!

There is another practical reason for keeping horses on the standard farm, and that is in connection with the root crop. This is grown in drills which have to be intercultivated. In a large field of fifty acres a tractor is a considerable advantage and we work successfully a fairly large potato and root acreage by both four-wheeled and three-wheeled tractors; but I have for some years had the opportunity of studying first-class tractor men on this work and also first-class horsemen, and I am convinced that the horse does the best job. Besides, a horse stepping on the plants does not do so much damage as the wheels of a tractor. On the standard farm there will

be only ten acres of roots and ten acres of potatoes to cultivate and the work occurs during a part of the season when there is not much competition from other farmwork. It would, therefore, fit economically with the plan of the farm to have this job done by horse. There are objections to horse keeping on a purely arable farm as the animals have to be fed during the week-end, but on a dairy farm this occasions little extra bother as the cows have to be milked in any case.

It is, of course, possible to replace horses, even on small farms, entirely by tractors. The handicap in the past has been trying to make one type of tractor fit all ,the different jobs—a task akin to making a pair of skates do for ski-ing and curling on the principle that they are all winter sports. I do not think that on ordinary land we will ever go back to horses for ploughing, but for light jobs there is no advantage in replacing a machine which can be bred on and fed off the farm by one which can only be bred and fed from outside.

Remember the fable of the optimistic sparrow. He rushed to a motor-truck every time he heard it hoot. I have grown good crops of mushrooms and vegetables from horse dung, but nothing yet from the carbon monoxide from tractor exhausts.

It would not be out of place to say at this point that to make this scheme economic manufacturers must either get together, or be brought together, to standardize as much of their equipment as they possibly can. Bolts and nuts can be simplified to a few sizes of the same thread and pitch. Drive-chains can be made interchangeable from one machine to another and from one maker's machine to another maker's machine; wheels can be limited to a few varieties, and various other parts could also be constructed so as to be interchangeable.

It would be, however, a great mistake to try and telescope manufacturers into large combines, or attempt the ghastly expedient of running a mass production firm by the government, for it is by competition that progress is made. But the laying down of certain standards, from which the manufacturer was not allowed to depart, would in reality help their several businesses. They would have their costs further reduced by dealing with groups of farms instead of individual farmers and instead of dissipating their profits through middlemen they would be dealing direct with the estates which would be in a position to order ten or twenty machines at a time. Types of equipment also would be designed and manufactured with confidence

that they would be in demand, because instead of dealing with every condition under the sun they would be dealing with a limited number of crops in a limited size of field. Thus what might at first seem a restriction would in the end prove advantageous to both parties. Moreover, the standardization of essential parts would not hinder design. Remember the number of articles a boy can make with a Meccano.

Chapter Three

GRASS

Variety of Strains—Balance and Fertility and the Short Ley—Silage—A Cow's Rations

The first and most important crop on the standard farm is grass.

To the man on the road grass does not seem to be a crop at all, it appears to him that 'it just happens'. As a matter of fact, it is only within comparatively recent times that farmers themselves have become grass-conscious.

The importance of various strains has been recognized in this country very largely owing to the work conducted at the Welsh Plant Research Station under the direction of Sir George Stapledon, who was one of the first persons to grasp the significance of grass in these islands as our most economic crop. He has, too, been an advocate of the short-term ley—for its increased yield, for the rest period it gives to arable land and for the fertility which can be ploughed from it into the soil.

The short ley has for many years formed the policy of a great number of farms, especially those on light marginal land, but strangely enough the mass of farmers seemed quite unaware of its existence or of its possibilities until Sir George publicized it. Now, however, it has devotees even in parts of the country where permanent grass has been the practice for generations.

The temporary ley depends for its success on the breeding or standardizing of a number of strains of grass and leguminous plants which establish themselves quickly, but much has yet to be done before this system becomes fool-proof.

The Permanent Grass Purist is beginning to realize that the laying down of long-term pasture does have a detrimental effect on drainage. We still have to spend hundreds of millions of pounds on drainage before it may be said to be sufficiently reclaimed to allow the land to yield of its best. It is important (if only for the money that has been spent) that the ley should be very temporary indeed, otherwise a great deal of money spent on drainage will be lost.

Permanent grass, moreover, which has been down for a long period, takes a considerable time to rot down sufficiently to be beneficial, while a short ley will rot readily and yield up its nitrogen and humus quickly. I believe, therefore, the standard farm which requires immediate fertility should limit the ley period to a year or two, extending it slightly as the ground becomes serviceable.

For one-year hay we are at present more or less limited to strains of Italian rye grass and red clover as being the only species which will establish themselves quick enough or give a bulky crop. On the subject of quick maturing herbage there is a lot of work to be done, the standard farm (in the making) wants to go 'in and out' of grass with considerable rapidity, yet one of the principal quick formation ingredients, red clover, cannot be used frequently without danger of clover sickness, a take-all disease to which this species is liable when cropped too often in the rotation.

I believe that we have been too grass and clover conscious and that we might introduce a number of herbs into our short-duration pasture. Cows look for herbs as medicine just as a cat will take a dose of grass as a purgative, or a dog will lick your hand for salt. Cows probably have a better internal mechanism for utilizing these herbs than they have for using raw chemicals, and it would seem highly desirable to give them a choice of herb salad in our pastures. I mentioned in describing a farm on the Scilly Isles how beneficial the daffodil hay was supposed to be for cows, and without knowing the truth of the matter, I was not surprised because I have often watched cows on wild pastures and noticed what an amazing variety of vegetation they seem happy to consume. There are an enormous number of indigenous British herbs, some of which have mystical properties attributed to them and all have medicinal qualities. Their uses have come to us wrapped up in the jargon of the old herbalists and alchemists, but the subject is clearly far too important to dismiss as old wives' tales, and one of the needs of post bellum Britain will be to study herbs and to seek out the true benefits of the herb both for agriculture arid for our own consumption.

It is to be hoped that the pastures of the standard farm will be in such a state of balance and fertility that it will be unnecessary to give them large doses of synthetic nitrogen. But it will be necessary to supply the land occasionally with phosphoric acid either in the form of basic slag or by bone meal, and the best time would probably be at the establishment of these short leys. The latter is probably the

more suitable as it yields itself up gradually and is better able to keep the ground supplied throughout a rotation. There is a popular belief amongst farmers and scientists that basic slag promotes the growth of wild clover by its gradual release of phosphoric acid. Personally I am not convinced that this is the reason. Although clover responds to phosphoric treatment, however, it seems to respond equally well to an application of any finely ground rock. You may have noticed how well clover grows on the roadside where it is bathed in the finely ground stone dust from the road surface which gradually gets washed to the sides. I mention this fact in passing as I have not seen this theory challenged before, and I believe the unbiased agriculture of the future should check all the assumptions of the past in case they have been unduly influenced by the chemists of Big Business (remember my fable about sawdust). It might, for instance, be found that the beneficial effect of basic slag is only partly due to the release of phosphoric acid and partly to its being finely ground. Thus we might be able to effect the same result by utilizing substances easily obtainable locally, or even off the very farm, which when pulverized would give us equally good results, while the return of bones from our farm animals might maintain the phosphoric balance; the central unit should be able to supply a considerable amount of bone meal from the processed animals.

A difficulty arises when land is intensively grazed from the animals' droppings which are unevenly spaced in too large quantities; they result in a rush of grass in certain spots which for some reason the cows will not eat. It would be necessary to devise a simple machine to spread the droppings evenly during the rest period, as soon in fact as the animals leave the field. Such a spreading of manure might quite easily be found to compensate for the chemical nitrogen which we have been using to force grass in the past.

In laying out our intensively grazed ten-acre fields we must arrange to have movable water troughs. A field may be very badly damaged by having a water trough in one place. With a movable system, however, when the ground goes back to arable the troughs can be moved to the next field. Thus it is possible to plough right into the fence and keep down weeds. Movable watering means a pipe system with a number of alternative connecting places. I have been experimenting with a trough simply hooked on to the fence, and this would seem to have distinct possibilities as it can be moved about the field with ease. What goes for troughs goes also for gates. A gateway

can get into the most terrible state, a fact even purely urban people notice. I remember a girl from the city asking, 'Why do they put gates in the muddiest part of the field?' It should be part of the standard farm practice to provide alternative gateways and also a method of keeping the stock from making a walk round the edge of the field. For this purpose I believe the electric fence might prove satisfactory. It has the big advantage that it is lightly moved as it does not rely for its powers of enclosure on its strength. Unfortunately, I have not found it stock-holding enough to replace the ordinary fence for all purposes. However, there is a lot to be said for it as a temporary measure. I have used the term 'fence' throughout because I believe there are not sufficient advantages in a hedge to warrant the very heavy costs entailed in proper maintenance, and a wall, unless already erected, is a very costly affair.

This seems an opportunity to mention the importance on the standard farm of suitable nesting facilities for wild birds. It is only necessary for anybody with normal intelligence to watch the rations going into the nest to be convinced that our wild birds are a very much better investment for 'Insect Control' than the most poisonous spray ever brewed. All insectivorous birds (warblers, tits, etc.) are of immense value at all seasons; while the seed-eaters, even sparrows, feed their young almost entirely on insects in the nesting season. The farmer who tears out a sparrow's nest in the spring is sacking a good worker; he should wait until the autumn when the friend becomes a foe and needs control. There will be shrubs and other growths around the farm centre and cottage gardens which could be planted to supply good nesting. As I have said, the actual farm lands are better stripped of hedges and trees, but the boundary windbreaks would be in different stages of growth, and would provide nesting for many friends. There are several useful birds like robins, which are strictly territorial, and the hedgeless fields will tend to localize them, but this cannot be helped. As in so many other agricultural problems it is politic to choose the lesser of two evils.

Farmers often complain about crop damage at harvest time but it is for us to make our methods more efficient and not to blame the birds. Rooks although useful at times do considerable damage and must be limited to controlled colonies. Of course, the average countryman knows the truth and importance of these remarks, and relies on wild birds to control insects in the same way as he relies on frost to break up his soil.

But there is a new type of agriculturist springing up everywhere, who, for some unknown reason, would rather poison off insects with expensive sprays, or put a fast one over the frost and pulverize the land with some form of implement without giving it a chance!

I am personally opposed to barbed wire. I hold the view that the man who invented it should have been rolled in it. The stock of the standard farm will be valuable, and there is no sense in exposing valuable stock to be torn and punctured. Cows are pugnacious animals, and sooner or later will butt each other into a fence. Sometimes animals get cut to ribands on barbed wire, completely ruining their hides and upsetting their nervous temperament so that they may be put off milking for the rest of a lactation.

The fence itself may be post and rail or post and plain wire depending on the amount of timber available in the district, or possibly 'temporary electric'.

This disposes of the planning of the rotationally grazed temporary ley. I have not touched on seed mixtures for sowing it out because I do not think we have reached any degree of finality on the subject. My own observations point to the value of encouraging local strains. For instance, on a certain estate I have seen a local strain of grass called Meadow Foxtail (A. pratensis, not Agrostis), establish itself really well amongst imported mixtures. I have seen it grow and tiller at considerable speed and look exceedingly edible. Moreover, it seemed to be relished by stock. The suppression of such a grass, which is already indigenous to the district and likes the conditions so much that it will establish itself without being sown, seems absurd. On the contrary, one would think it better policy deliberately to isolate characteristic leafy strains and try to build them up into a first-class grass.

On the standard estate, therefore, it would be the policy of the headquarters to breed and propagate local grasses on their seed farm in addition to strains obtained from the central seed farm to which groups of many estates would be linked.

I will now make a statement which might seem to contradict everything I have said about chemical manure. At the end of the ley, after the stock have grazed it for the last time, I would give it a dressing of nitrogen out of the bag, as much as it would take. This application of artificial nitrogen would raise a dense crop of herbage in the shortest possible time. When this herbage was at the 'lush' stage, the farm would spread on it all the available dung, and with

the dung more nitrogen from the bag, and plough the whole lot in as quickly as possible. Special care is needed in this operation, to leave the covering soil in such a state that oxygen can percolate to the green crop below—the plough therefore on heavy land should be 'disced' in the autumn and ridged in the winter.

I mentioned when discussing artificial nitrogen that I believed very strongly that we were using it in the wrong way, that we were using it wastefully and in a manner against nature. This is the moment to make myself clear, and to explain how I believe nitrogen should be used. The totally mechanized farmer who uses tons of artificials will tell you that he keeps his ground supplied with humus by ploughing in green crop. To my mind he is wishfully thinking himself to believe what he wants to be true. He does not want to be worried with stock or carting dung, so he shuts his mind to any other reasoning. He has up his sleeve very strong cards, for experiments to test dung versus artificials have been conducted successfully, in which artificials have held their own. But in my view the reason why artificial nitrogen has been able to hold its head up against dung in these experiments is that dung has been applied to the land in the wrong manner. I believe the man who says he can maintain humus and fertility on a synthetic farm by ploughing in green crop is wrong. To a layman my reasons for holding this opinion may not appear as important as they really are. In the first place, how does a farmer propose to grow his green crop? He may say by sowing crimson clover or some other quick maturing plant with his cereals, and ploughing it in after harvest. By doing this he loses a valuable opportunity to cultivate his stubbles and kill weeds—and no opportunity of killing weeds should be lost on a farm—or he may grow it as a special crop in the rotation, if he has a rotation. If he does this he is not using his land to the fullest production, and this is uneconomic. A ploughed-in green crop requires various substances from the land to decompose it; these include nitrogen, bacteria and micro-organisms. The lusher the green crop when it is ploughed in, the less it will require. Thus straw at one end of the scale will require practically everything the land can give to rot it, while the young green grass may require very little.

By including grass in the rotation you automatically have a green crop ready to use for green manure any time you require it, without going to the expense and trouble of sowing a special catch crop for the purpose. In order that the ground may be left unproductive for as little time as possible, I suggest applying artificial nitrogen to the

grass prior to ploughing in, to get a quick growth. On this new growth the dung is spread *plus* more artificial nitrogen, and immediately ploughed in. In this way one is giving the helpful bacteria and other organisms contained in dung an abundance of grass as a medium for them to multiply. By adding artificial nitrogen to the grass at the time of ploughing in one is ensuring that it will not have to draw on any supplies of nitrogen already contained in the soil. This, I believe, is the correct way to use our artificial nitrogen and our farmyard manure, and by this method the fertility of our soil could be increased beyond the dreams of the most optimistic farmer ever born.

There is a story which I should like to tell of a system somewhat analogous to this process which may linger in the memory of the artificial manure man although he discards the reasoning I have given.

'Once upon a time!' in the 1880's, described as gay, a man had a smallholding on the fenlands of Lincolnshire, and he did not harvest his hay crop. Think of it, he grew his clover hay and when all the other farmers round about were putting their hay into neat stacks he was dunging his and ploughing it in. Of course, they all laughed at him and thought he was crazy. Now it so happened that he fell in love with a neighbouring farmer's daughter, a man in a large way of business with a five-hundred acre holding. Her parents did not think that he was good enough—a ninepence a bunch smallholder, who was, moreover, crazy, ploughing in his hay without cashing in the crop. 'He won't go long,' they said. But he did. He bought the big farmers five-hundred-acre farm, the holdings of neighbouring small farmers, married the girl, developed his little holding into a big farm, and put each of his sons (he had many) into big farms, so that the family are probably now the most influential farmers in the country. Moral! he did all this by dunging and ploughing in his hay. This is actually a true story. You can see now why I base my plan on natural methods and use science to encourage nature but not to kill it. That is the secret of farming, and unless a farming programme is based on this principle it won't succeed—remember this story, and also the story of the dams and forest fires.

Before leaving the question of the temporary ley in relation to the standard farm, there is another point to be considered—whether it is possible to conserve any of the grass on these fields in addition to the hay crops and grazing. Although the fields will be very heavily grazed indeed, there will be a period in spring (if the farm is in a

proper state of high fertility), when there will be a slight surplus of herbage. The first grass of the year rushes up at such a speed that our standard herd would not be able to cope with it, for the secret of grazing is not to allow the grazing to get out of bounds, that is to say to reach a stage when the stock tread in more than they eat. When one sees stock turned out on a 'high' grass field, I always think of a remark which I made as a child, 'Look, the cows are walking about in their food.' One should keep the cows' food short so that even if they have to walk in it they won't beat it down. Besides, short grass means more protein. To use up this spring surplus I think it would be economically sound if the headquarters plant were to dry grass for, say, the first three weeks of spring. They would, of course, only use the very best of the available pastures and would treat the ground grass product as of considerable value, probably storing it in airtight containers and incorporating it in the rations as a medicine. By taking care only to use superlative grass and to dry at the correct temperatures, I think the result would be an asset to the plan, especially as the grain-drying plant and labour would be there anyway. It would also come at a time in the year when the granary staff were not fully occupied.

There is another manner in which this early spring grass may be conserved, and that is by making it into silage (with molasses). Recently, a lot has been claimed for this method as a means of supplying home-grown protein. The remarks which I have made about 'spring dry grass' apply equally to silage—to get the best results you must make it at the right time. Of course, the surplus on the small acreages which I have described would not make nearly enough protein for the standard herd. To do this it would be necessary to increase the acreage of the farm and grow a special young grass crop. What I am about to say is against modern fashion and against a great deal that leading agriculturists have stated and that they believe. I do not think it would be good policy in a peace time plan to increase the acreage of the standard farm in order to grow this young grass silage crop, nor would it be a good thing for international trade if Great Britain could become sufficiently self-supporting in feeding stuffs to turn down imported cakes. Although I have tried every known silage method and sometimes produced excellent stuff, we have never got anywhere near the results in the milk yield that we did when we incorporated imported protein in our rations. We have recorded our cows for over a decade not only through the herd

societies but privately as well, and can trace from day to day increases or decreases in milk yield, and thus usually put our finger on their causes. My view is that young grass silage is too bulky a ration; that is to say, enough Y.G.S. to give the required protein for a heavy yielding cow would be more than the cow could eat.

In order to make this statement clear to the layman, I must explain how a cow is fed. She is first given a maintenance ration. By that expression we mean that she is given a sufficiency of roughage to keep her alive according to her weight and individual feeding requirements. This may consist of hay, roots, kale or ordinary silage. She is supposed to supply, besides keeping alive, a gallon of milk on this roughage. For each additional gallon she gives we allow her 3½lb. of a highly concentrated protein mixture. You can appreciate that if this 'production' ration is bulky, she will not have room in her stomach to hold it as well as her maintenance ration.

This feeding plan is the outcome of a great deal of independent research by scientists all over the world and it would be a great pity to alter it; but if one tries to replace the concentrates (grain and cake) by young grass silage, one is not, in my experience, getting enough protein in comparison with the bulk to avoid having to give a very large quantity of fibre as well. It could be argued that this additional fibre could be used to replace the maintenance ration, but it is too expensive to do that. The grass for high protein silage is cut when it is young and leafy and the yield per acre is therefore comparatively small, infinitesimal compared with, say, mangolds or kale; so the bulk which is not protein but maintenance is far more expensive than any other maintenance crop grown on the farm. If, on the other hand, the grass were left until it gained weight, it would lose protein, the very commodity we are trying to catch.

Before we leave the question of silage I should like to mention another school of thought, according to which we should cut out roots and kale and substitute silage not grown especially for protein, but as a maintenance ration. The argument is that the growing of root crops is essentially expensive, while the maintenance silage can be hashed in any old way even in bad weather, and thus weight for weight is a cheaper crop. The silage enthusiasts are not new. Silage has come into fashion at periods coinciding with labour difficulties or slumps, and there are memorials to the idea to be seen in most parts of the country, some of them forty or fifty years old. There must be some strong objection to maintenance silage, otherwise why

have there been periods when silos have stood empty and unused in spite of the fact that a silo of concrete may cost several hundred pounds to erect? Yet in Canada and the Northern American States a silo is as much a part of the farm as holes are part of a golf course; moreover, these new world silos are filled regularly. The answer is, crop and weeds.

The new world farms make silage from maize, but there are very few parts of this country where we can grow flint and dent corn successfully. It requires a lack of late frosts and a very hot ripening period. I am told that in Iowa, the centre of the corn belt, summer heat can rise to such a temperature that it is scarcely necessary to light the kitchen fire. Indian corn is, unfortunately for us, the ideal silage crop, it has plenty of bulk to the acre, its feeding value is good and it requires no further treatment than chopping and tramping. Beans and mixture, our best silage crop, are a very poor second.

The other reason is weed control; whatever the cost, there must be a period in a good rotation where the field can be cleared of weeds. There are two methods of doing this; by 'fallowing', i.e. missing a crop and cultivating continuously to kill weeds or by growing roots in drills so that the weeds can be exterminated by machine and hand. A fallow is unproductive farming, while the growing of the ordinary broadcast silage crop does not leave any means of getting at the weeds. With Indian corn it is different. Corn is usually cultivated even when grown for silage and there are very excellent means of doing this which leave the weeds open to attack mechanically (the cheapest and best way of approach). The corn, for instance, can be planted by means of a 'check row planter'. A wire passes through this machine on which are spaced buttons. As the machine passes backwards and forwards across the field, the buttons release the seed so that it is planted in 'hills'. The wire is moved with each traverse of the field and the buttons kept in alignment, thus the finished corn is checked, i.e. equally spaced from every direction. It can, therefore, be cultivated east and west, north and south, so that without hand labour the field can easily be kept clear of weeds, an impossibility with our broadcast silage crops. I trust this rather bald description of maintenance silage has been sufficient to show that there are several very good reasons why I have not included it in a farming plan for the future.

To my mind, there is no real economic future in getting our protein from either dried grass or young grass silage as a special

crop. We should not, of course, waste the early spring overflow. I have mentioned previously that some of it could be manufactured into dried grass by the central granary with their existing drying plant. The rest could be utilized as silage on the farm; even though only very small quantities were made, it would be change of diet at the end of winter—which is known to dairy farmers as the hungry month.

I would not consider the plan complete if we did not study the most economical method of manufacture, even though only small quantities are made. Since the outbreak of war, and indeed before the war, many forms of silos have been designed. I have tried several of them. One of the most ingenious is constructed of wire netting and waterproof paper. Successful results can be obtained with it if proper care is taken, and, of course, also with the more expensive types such as the wooden or concrete. The difficulty of these silos is that the grass has to be forked into them and trodden down and this requires a considerable amount of labour; and whilst theoretically these silos are foolproof, in practice little things go wrong. Someone inadvertently puts a fork through the paper, or else uneven building or tramping causes the silo to go crooked. There is also considerable work in covering them with earth or finding alternative covering to keep out the air. Throwing a few tons of earth twelve feet or so is no joke, and if badly done it may spoil the whole silo. It is precisely difficulties of this sort that one wants to avoid in farming. I have found the simplest method of silage-making is to dig a long pit in the ground with sloped ends and fork the grass out of a tractor or cart driven through it. The tractor wheels or horse compresses the silage without further trouble, and covering with earth (originally dug out of the pit) although it does take quite a lot of work, is much easier than in the tower-type silo. The results from this form of silo seem just as satisfactory as from the most expensive types. On the standard farm I think it would be worth while having a few of these 'dug-outs' to save odd crops, and it would probably be quite economical to make them permanently of concrete and use a tarpaulin to cover. If flooded with water during the early stages of settlement, this would make an airtight seal and would not be so laborious as an earth covering. It may seem rather petty to deal with every little point in this plan, but unless we find a formula for doing every job on the standard farm in the simplest and most economical manner our product will cost more and our rewards will

be less. It does not seem reasonable to ask the consumer to pay more for the final product because the farmer and his men had to move twenty tons of earth twice a year or fork thirty tons of silage over a twelve-foot wall. The removal of the silage from the pit which I have described is simpler than from the tower silo. It also has this advantage, that less of the silage is exposed to the air at a time. In practice the pit is opened at one end and the silage cut out with a hay knife as required and spoilage is less than in most of the tower silos.

While the crop of young spring grass silage which might be harvested on our standard farm would be very small, there might be in some seasons a quantity of autumn grass which could be silaged rather than lost. This would come principally from the twenty acres of hay. Normally, the aftermath of this hay would be required for grazing or to help out the forty acres of temporary grass which by the end of the summer would be getting fairly tired. But in certain wet seasons it might be found that there was sufficient grass on the grazing fields, while if the weather was too bad to make hay of the aftermath on the hay field, rather than mess the aftermath crop by turning cows into it knee deep, it would be better to convert it to silage. I think the pit method of silage-making which I have described reduces the labour and capital outlay to the value of the product, but the cutting and filling of carts is a laborious process, especially with short young grass. Often, in fact, when the work is done by hand a quantity is wasted. It would, therefore, be as well to have equipment ready to do this mechanically. There is a standard machine already available to cut and elevate silage into a cart, but the cost of the machine is far beyond the capacity of the small acreage and infrequent use, nor would it be practical to have one machine to work between a number of farms. If, however, mass production methods were used, it would be possible to supply a cheap attachment to the existing grass mower for this purpose.

This concludes my remarks concerning grass. There are many more points that I could have mentioned, but to have done so would merely be to reiterate the teachings of Sir George Stapledon, who has already seen the subject with such perspicacity and has combined his scientific work with a practical outlook. Moreover, he is imbued with the correct feel and love for the soil. Whatever plan agriculture adopts in the future, it would be a very bad thing for our country if the Stapledon teachings were not incorporated in the fundamental ingredients of our new house,

Chapter Four

HAYMAKING

VariousMethods—AnAmericanSystem—Baling

The next step to be considered is the making of hay, the most important crop of the rotation.

The standard farm grows twenty acres. One day these twenty acres stand ripe for cutting, containing everything a cow could desire, equivalent to the richest plum cake. A few weeks later it sits miserably in a stack equivalent to a dog biscuit, for its value is dissipated by our manner of preserving it.

The Finns, Norwegians, and Swedes succeed in making a sweet-smelling hay of high protein content by using a drying fence in the middle of the field and having an adjacent hay barn. The secret of their success is that they get the hay cured quickly and out of the weather before anything can happen to it, and that is the only way to make good hay. Our weather being what it is, hay is the hardest crop on the farm to produce correctly. The problems which arise in the making of good hay are numerous. Even the old proverb, 'Make hay while the sun shines' is only a half truth as too much sun will reduce the value. Hay must be handled with care. Grass is covered with a waxy, protective coating, and once this coating is damaged the water is readily let in and decomposition takes place. As I said, prolonged exposure to the sun bleaches out the vital green colour, but exposure to the damp is even worse. Making hay quickly under the right conditions, however, secures an end product equivalent to artificially dried grass. The acquisition of such a product by the standard farm is a very vital point in the production for the consumer of high quality, economic, flavour goods.

Hay is made in a number of different styles throughout this country, and in describing a few methods known to me I have left out several variations.

In the south hay is usually cut with a mower, left lying until cured, then swept to the corner of the field by a hay sweep (a tool composed of wooden fingers pushed in front of a tractor or an old car). On arriving at the stack the tractor or car is backed, leaving the load behind. This is usually forked by hand on to an elevator which con-

veys it to the top of the stack where it is distributed and tramped. The hay thus made, usually heats considerably, often sufficiently to turn the starch into sugar. Sometimes it is necessary to ventilate the rick by boring holes into it, or, in extreme cases, to pull it down and rebuild. When fermentation is complete and the stack settled, it is customary to thatch it with straw to keep out the weather.

In the middle of our country and often in the west, hay is usually made into small haycocks by hand forking. The haycock is next made into a small stack in the field from which it is carted and elevated into a large stack.

In parts of Scotland a different method is used, and one which makes better hay. After cutting and tossing, wooden or metal tripods are placed in the field up to which the hay is pushed by a form of hay sweep. It is built up round the tripod so an air space is left in the middle, the whole being kept in place by esparto ropes. When the hay is sufficiently cured, a special form of cart is used which draws the whole stack, or 'cole' as it is called, on to it by means of ropes and a ratchet wound windlass. Alternatively, a large tripod on wheels is drawn over the cole and the whole elevated and dropped into a cart. At the other end the hay is elevated into the stack either by elevator or by a special fork which is plunged into the hay and raised by horse; a pull on a release cord drops the hay where required.

Alternatively, and this of course applies to all parts of the country, the hay after curing is elevated and conveyed into a permanent building known as a Dutch barn for some obscure reason, for barns of the type used over here are not common in Holland.

There are, of course, objections to all these systems. The Scandinavian with his 'fence curing' undoubtedly makes the best hay, but the labour required is excessive. The tripod method comes next, but leaving the coles in the fields means that in bad weather a great quantity of the outsides and bottoms are ruined, while their removal damages the aftermath crop and also leaves bare patches in the field where the coles have stood. I can see nothing good about the middle system, nor can I remember seeing first class hay made this way. The southern plan of stacking straight up has considerable labour-saving advantages, but the final product of fermented hay is not what the flavour farm should aim for.

I must now describe a comparatively new system, originated in the States some years back, which uses a special machine to pick the hay off the ground and bale it. I imagine the original scheme was in-

spired by the idea of labour saving, but the plan has a much greater significance than that. Almost perfect hay can be made by its use. I have worked the system experimentally alongside the older ones, and I am convinced that it can be made into the standard system of the country, and by its use much better hay will be made than ever before and waste will be eliminated. There are, however, a few improvements which would need incorporating in the standard scheme. These we are unable to make at the moment owing to the various difficulties and restrictions of war-time agriculture, but I have included these slight improvements because they should form part of the final scheme.

The hay would be cut by horse-drawn machines, and for this end a portable petrol motor could be attached to the mower to work the knife so that the duty of the horse would be simply to draw the machine along. This method of cutting is more economical than by tractor, as there is a limiting factor in length of cutter bar and this makes the optimum size too small for a tractor to work economically. A long cutter bar not only sets up considerable mechanical troubles, but its length does not fit the contour of the ground and leaves an uneven cut. In order to make up for the small length of cutter bar multiple machines can be used or the tractor driven faster. In either case the job is not so well done. The tractor-driven machine is best placed behind the tractor and this in a heavy or tangled crop necessitates an extra man to keep the mower from choking. On the horse machine the driver is in a position to look after the machine. The only drawback to the horse machine is that the drive comes off the wheel and this occasions troubles when the horse does not go at an even pace and on corners, but the difficulty can be got over by the addition of a petrol motor. After the hay is cut, it would be important to keep it exposed to the air. For this purpose there are two types of machine available. One, the 'Swath turner', has a system of rotating forks which turn the swath over, and it can, alternatively, be made to put two swaths together into a wind row. The second type of machine has oscillating forks which kick the hay up making it fluffy and exposing it to the wind. Both these machines work well. But for the pick-up baler a different type of machine is required, one which will lift the hay off the ground, turn it over and leave it fluffed up. With such a machine behind a tractor the hay could be turned constantly and a complete cure effected without losing colour or flavour. An eight-foot machine of this type hitched behind a. good

tractor would turn five newly cut acres in an hour. Thus the farmer could regulate the drying of his crop very accurately. For instance, when the day was really hot, it might be necessary to stop baling and run the tosser through the crop to keep the hay from drying out disastrously. Alternatively, in showery weather with wind and no sun, the crop might be harvested in perfect condition by judicious use of this instrument between showers on small portions, the baling being done wherever a portion was dry enough. Again, hay which has lain out all night even in the best weather picks up moisture, and this could be eliminated very quickly with a machine of this description.

The important point about baling is to choose the right moment. When this is done, really remarkable results can be obtained. The baler itself consists of a fairly heavy machine with an engine attached which picks the hay off the wind row and elevates and bales it into neat bales of an average weight of 100 lb. There are two methods of tying, that in which wire is used by hand and that in which twine is used automatically. The wire is somewhat costly and requires in a heavy crop three people on the machine to tie. On the other hand, it makes a perfect job, while the strings on the automatic baler are inclined to break and the finished job is much rougher. The baler can, of course, be driven off the tractor instead of having its own engine, but this slows down the output. The pick-up attachment works exceedingly well, leaving the ground remarkably clean, but it would be an improvement if the pick-up were constructed wide enough to remove the hay without having to wind-row it. Once hay is in a wind-row, nothing much can be done about it and, if bad weather sets in, it is very difficult to make it by any system. However, when lying loose over the field even after two days of heavy rain, it can be shaken up and dried in an hour or two and be ready for storage. It would, therefore, be a considerable advantage to pick up without wind-rowing. The bales can be collected easily off the field and carted to the storage barn, but it is vital that the bales, once they are made, should not get wet. In the standard system, therefore, a cart would be towed behind the baler on which a man would receive the bales and stack them neatly on a frame. When the cart was full it could be taken to the barn and the whole pile of bales elevated and put into position without further handling. The supporting frame could then be drawn out and the cart go back to replace the next full cart. Two horses would be sufficient for this

method to keep pace with the baler. The stack of bales in the barn is a very different thing from an ordinary haystack. There is a space for air to get round and through, so that any heat which is given off can escape and thus the stack does not reach the same temperature as the ordinary rick.

In a shed designed for keeping baled straw and hay there should be a grid resting on brickwork at the bottom, so that no hay or straw is on the ground while the air has room to get well underneath and up through the whole pile of bales. The baler should be designed to lift the five acres in six to seven hours, in order that the best time of the day could be utilized.

Anybody who has seen one of these machines working properly and viewed the hay when the bales are opened in the winter, will be amazed at the improvement of this method over any other. There is a systematic and clean way in which the job goes forward which is very inspiring, and under reasonable conditions hay can be made which is superb in colour, aroma, and protein value. The objection is the cost of the machine for the small acreage of twenty acres while in this country we have not a long enough hay season to work large acreages. I have baled a hundred acres with one of these machines, but it hung the job up too long, and we lost quality on the last twenty acres. Last year, which was as bad a hay season as I have seen for some time (and that is saying a lot in Scotland), we managed to bale fifty acres ideally, but to do this we worked shifts so that the machine was never idle, and shifts for haymaking are not a good practice for they require a number of extra hands for a very short time which is not economic. Moreover, they involve working before and after the best hours of the day for haymaking. Twenty acres of hay with the outfit which I have described would ensure getting a good harvest in the worst season. The machine could also be used for ten acres of second cutting hay, and for the forty acres of straw a baler is a revelation in harvesting to anybody used to the ordinary methods. By the method I have described the straw is only touched by hand once (when the bales are stacked on the cart) instead of perhaps nine times by the ordinary method. If you have ever stooked a field of barley on a hot day, you would be very glad to see a machine do the work. Against the cost of the machine it must be remembered that if such a national plan were adopted, manufacturers would have a far better market than they had ever dreamt of before, a market in which assembly lines could be put up. Thus the cost of machinery would be substantially lower.

Chapter Five

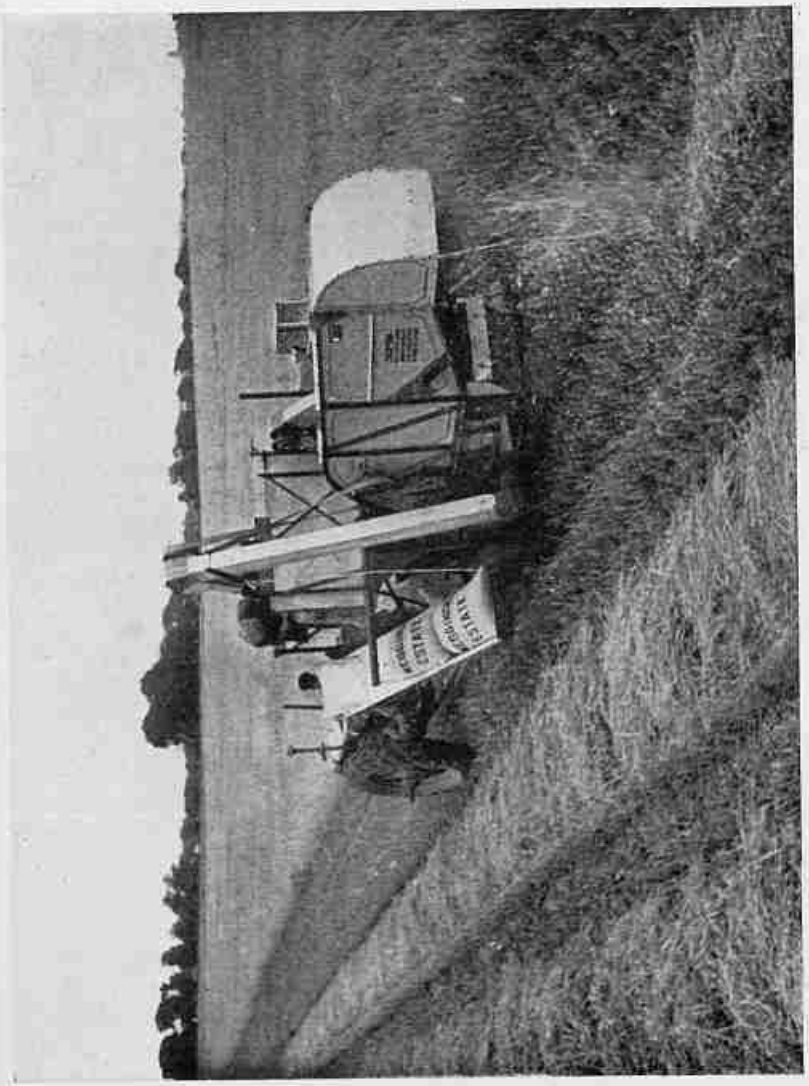
CEREAL CROPS AND ROOTS

Seeds and the Moon—The Combine Harvester—An Improved Seed-distributor—How to thin out—A Danish type of Cultivator—Harvesting Roots

The mother seed farm will supply the seed dressed and ready for sowing. The owner of the flavour farm will have, therefore, the advantage of obtaining better seed supplies than he is likely to produce and process himself. I have suggested a rotation for the minimum size of farm. The rotation of the standard 15-acre farm would be as follows: Pasture. . . . . Potatoes. . . . Wheat (sown out with clover hay). . . . Hay. . . . Oats (sown out with three-year pasture mixture).... Pasture.... Pasture.... Pasture.... Roots.... Oats (sown out with clover hay). . . . Hay. . . . Beans. . . . Barley (sown out for pasture). . . . Pasture. . . . Pasture. . . . .

This bold use of grass and clover ensures fertility. It will be noted there is fourteen years between potato crops and six years between the two clover crops.

The seed would arrive on the flavour farm by estate lorry from the mother seed farm. It would be stored in the loft until the best day arrived for sowing. The tractor would first harrow down the plough; but it might happen on some of the farms on the estate that the land was too heavy to make a good seed-bed or had not received sufficient frost, and in this case the farmer would hire a heavy tractor from headquarters with large discs or a rotary tiller attachment to break it down to a good tilth. He should, under normal conditions, be able with his own outfit to harrow three acres an hour and sow two. This would mean that having got the right weather, he could sow one of his ten-acre fields a day. The sowing of a field when soil conditions are exactly right is vital to good farming, under this system of mechanization he would have time in hand and be able to wait confidently until the right day came along. He would use a standard type of drill with harrows hitched behind. To drive the seed sacks and help to **empty them into** the drill, the services of one of the other farm hands



Combining oats in central Scotland

Pick-up-baling oat straw after combining

would be required. Later on, the grass seed would be sown amongst the oats and barley, and this could be done with a light grass seed drill in five hours per field. Thus, again, the very best moment could be taken for the operation. The sowing of the grass seed would be done by horse, as this is less likely to damage the crop than the tractor, while the tractor would probably make the best job of the rolling. There would be now nothing further to be done until the harvest.

In connection with the seeds, you must allow me to side-track slightly so that we can consider the effect of the moon on the sowing of seeds. I rather fancy some of you may have read that last sentence over again, because you may have thought that my mind had slipped a few generations and that I had put on the mantle of the old-time astrologers! yet that is what I said. The moon and its effect on plants. There is a trend of thought to-day which doubts that the moon has any powers over the earth at all, and the effects of the tides is merely attributable to lunar influence because it so happens that the phases of the moon coincide with the variations of the tides. This is, of course, quite a reasonable idea. An onlooker noticing that a certain man got up at 6.30 every morning of the week and at ten o'clock on Sunday might associate his habits with a train that passed this man's house at seven every morning of the week but on Sundays passed at ten-thirty; yet the man's habits might be attributable to the fact that he went to work at seven-thirty on weekdays and lay in on Sundays and have, in fact, nothing to do with the passing of the train at all.

There is, however, another viewpoint which associates a great deal of influence with the moon, and this is in keeping with our oldest recorded beliefs which not only connect the tides with the phases of the moon but lunacy, the weather, the planting of seeds, and even our own destinies.

Fairly recently a book has been published under the title *Moon and Plant Growth,* by L. Kolisko. The translation of this book has already run into several editions in this country. Nor as far as I am aware has the materialistic scientist produced any bulk of evidence to refute its implications. The book is written in normal scientific language, and gives details covering several years of research with illustrations and graphs which connect the influence of the moon to plant growth, and infer that there is a very tangible connection—a connection of considerable commercial importance. An interesting point about the experiment is that definite results were obtained from

the very first moment experiments were begun in 1926. To the ordinary farmer the most interesting point is the preciseness which is claimed for these influences. Thus Hungarian maize, sown on 25th May 1926 (two days before full moon), was on 10th July nearly twice as big as Hungarian maize sown on 27th May 1926 (at full moon). I have not myself tried to investigate these experiments because under my present farming organization it takes me many days to sow my crops. If I found out that they were influenced by the moon to the extent that a couple of days one way or other meant the loss of thousands of pounds it would be extremely worrying, and I have plenty of troubles already, but my mind is perfectly open on the subject. I know also how important it is to sow seed at the correct time for season and weather, and that correct time in this country may be only a few days. For this reason I have planned the hypothetical farm of the future so heavily mechanized that sowing can be carried out in the shortest possible time; my plan would have the added advantage that (the weather being suitable) the farmer could get his crops in under the best lunar conditions. Incidentally, Mrs. Kolisko is inclined to the belief that the efficacy of the moon is interlocked with prevalent humid conditions. So that even if we could plant on the right days it might not necessarily be successful. This is so similar to my farming experiences generally that I am inclined to have a warm corner for the experimenters on lunar influence.

I am of the opinion that it is only a matter of time until the combine harvester becomes standard in this country. But I do not believe combining or pick-up baling is a complete answer to our harvesting problems, although a definite step forward from our present methods. In various ways neither binding nor combining quite fits the British picture. I do see the solution, however, but there is no sense in upsetting the practicalness of this book by including visionary hopes! While it is possible to cut and thresh in the same conditions under which the reaper and binder will work, our climate will not reduce the moisture content of the grain sufficiently for storage, thus the grain must be artificially dried. In the grain belts for which the combine was originally designed the moisture content at harvest time is sufficiently low to allow for immediate grain storage in large elevators at the rail head.

On the other hand, the advantages of the combine harvester are considerable; the labour saved is immense, while it will harvest more out of a fallen crop in a bad season than is possible with a binder or

by hand cutting. Under normal conditions, if the machine is working correctly, there is a saving of grain over ordinary methods. I have worked binders and combines and both give a lot of trouble, but the binder has had sufficient time for makers to have washed out the troubles, and they have not been able to do so. In fact, the task of cutting, collecting and tying sheaves of a tangled crop is impossible for any machine to do. The combine, on the other hand, does not mind in what mess the crop goes into it. It is, therefore, a simpler machine to design and it only needs modelling to suit the heavy rather damp crops which we have in this country, and a new step in our harvesting struggles will be established. But whatever happens to combining the 'drier' is here to stay.

The standard combine for the perfect farm which we are discussing should be the type that goes under its own power and has the cutter bar fitted in front, thus eliminating waste in the small fields and the troublesome work of cutting roads to make room for the initial cut. It need not have any elaborate screening device fitted to it, but deliver the grain, weed seeds and chaff into a tank and afterwards into carts travelling beside it. This would add to its simplicity and lightness while the mixed product would be sorted out at the central depot by machines properly bedded and driven. In wet weather, the weight of the grain tank would be too much for the soil and might damage young grass in sown-out fields. In this case the grain would have to be sacked on the machine and the sacks dumped on the ground for collection. The combine would arrive on the farm and cut straight ahead from field to field. Arrangements amongst the staff could be easily made so that shifts took over from each other, and it was thus able to cut continuously as long as the weather was suitable. A standard farm would grow forty acres of cereals. The combine which I have described should manage about sixteen acres per day. It should, therefore, cut four flavour farms in a ten-day harvest, which is about the longest time it is safe to allow in this country. A ten-farm estate would be equipped with three of these machines so that even with a serious breakdown of one or two of them the harvest would still be possible. With the machine redesigned for our heavy crops, breakdowns ought to be rare and repairs from standard parts easily effected. Two carts and horses would be available on each unit, this would be ample to cart the grain as threshed to the farm buildings. When we get to these farm buildings, you will see that I include a granary and elevator; this

would enable the grain to be temporarily stored until the central grain stores could receive, dry, and store it. By spreading out the rush period slightly, the central granary could instal a smaller and consequently less expensive drier. The grain would, of course, be turned while on the farms. There would thus be no chance of it being damaged by heating, it would in fact go through a process of drying similar to the natural way with this big difference—it would be safe, showers of rain would not damage it, and anybody who has watched tons of rain pouring down on stooked corn in the field will know what this safety means to the farmer. The farms near the estate centre would, of course, send their grain straight into the drier as cut.

When the combine left the farm it would leave the straw in rows on the fields and the job of the farm would be to get the straw under cover without further delay. I will not, however, go into details of this process again as they are similar to the ones described in my chapter on haymaking, for the same baling machine would be employed for the two processes. Suffice it to say that under the methods I have advocated, each farm would have its grain threshed and straw put under cover within six days. Now this point is very important, for one can grow the most magnificent cereal crop and can have it spoilt completely during the two to six months it is usually exposed to the weather both in the field and the stack. There is another very strong point in favour of this system; the cereal fields which I mention are mostly sown out with grass, the most vital crop on the farm, and leaving stooks on the ground for several weeks may well injure patches of this grass permanently, while on the fields which are not sown out the early clearing makes a good opportunity to cultivate the land and bring up a crop of weeds and kill them off.

After grass or, as I prefer to call it, herbage comes the root shift. We have seen the preparation for the crop—increasing the existing grass by the aid of artificial nitrogen and ploughing it in with a very heavy application of dung and more artificial nitrogen. We will now consider the root crop itself, step by step, and the initial national standardization which will help to make an economic success. I say initial, for a plan is only made to improve.

The root shift is, of course, ten acres, but when the ground is really fertile not more than seven acres will be required for forage, the rest will be available for vegetables. It should be possible on fertile land

with good tillage methods to grow fifty tons of mangolds and ninety tons of kale off four and three acres. With hay, straw, and a little silage this would be more than enough to maintain stock through the winter.

I have said kale and mangolds, but I should explain that while kale and mangolds go well together for dairy cows (one being used up to Christmas and the other after), mangolds are not always the best root to grow throughout the country as they depend on the rainfall. In some districts it might be best to grow kale and swedes, in others kale, swedes and yellow turnips. Or in a third kale, swedes, yellow turnips and mangolds. In all cases kale for dairy cows should be standard produce.

The ground has been ploughed in the early autumn and thus the winter frosts should have broken it up by spring to fine particles, so that the tractor harrows would be sufficient to make tilth. In the case of heavy land, however, there might be some of the farms on the unit which would not be sufficiently advanced in fertility to make a good enough tilth, and for this purpose the services of the headquarters' equipment with heavy discs or rotary attachment would be available. I should here say that discs heavy enough to do a real job would be too expensive an equipment for the 130-acre farm, nor would it be economical for them to have a tractor powerful enough to draw them. If, however, the land were sufficiently friable to be broken up by light discs, then ordinary harrows would do the job well enough.

The next question is by what method the roots should be grown. Let me say at once that there are two methods, both with their devotees: in England the traditional method of growing on the flat is the custom, while in the north roots are grown on ridges. The disadvantage of the ridge method is that the soil is more likely to dry out than it is on the flat, but against this drawback the cultivations are very much easier and special machines can be used which reduce the cost so considerably that I think the northern method of ridges should be the standard method.

There is some advantage in sowing on varying dates so that thinning of the whole crop is not required at the same moment and can thus be more easily attended to. It would, therefore, be the practice to till and sow a portion of the field in, say, two-acre blocks with an interval between blocks. The tractor would, therefore, make the seed-bed followed by the horses with a drill plough, that is to say a

plough which pushes the soil up into ridges. The next step is to sow, and for this purpose a drill which takes two ridges at a time is used. It forms part of a chain of instruments and moulds the ridges into a standard form so that the subsequent machines can keep the track it has made. The standard machine consists of a seed distributor with coulter followed by a pair of shaped rollers. I believe a considerable improvement and much better germination could be obtained if a portable petrol motor were attached to this sower driving flexible tines. These tines would make a dust-like mould exactly opposite the place where the seed was to be sown. The establishment of a fine mould round the seed is the vital factor in growing most root crops, and it is sometimes impossible to establish this mould over a whole field, though a good enough mould for the subsequent growth of the plants can be fairly easily made. This often accounts for failures; therefore, the little attachment I have described would be of considerable value as it would plant the seed in ribbons of fine tilth. There is a considerable advantage in a light spray of diluted liquid manure soon after sowing, and this could be applied with a barrel and sprayer similar to those standardized in Denmark.

The next cultivation required is when the seedlings are ready to thin. One of the reasons for which I am so much in favour of the ridge method of cultivation is because it is now possible to clean up the crop in a manner which one cannot achieve so simply by the flat method. This is done by a simple horse-drawn machine which contains four discs and a couple of split rollers. The machine tracks in the path of the sower and cuts out all the weeds leaving a narrow central band where the young seedlings are. This is a big time saver and makes a good job. Where the crop is sufficiently thick this machine could be advantageously followed by a blocking machine. This appliance has a number of revolving hoes which cut out the line of seedlings leaving them in perhaps two-inch bunches. This is as far as we can go in mechanizing the crop, and it is now necessary to get all hands in the farm to thin; that is, if the crop has been blocked, to pull out the unwanted plants leaving singles. If it has not been blocked, the crop has to be singled by hoe and blocked at the same time. The hoe method has this disadvantage; it is a severe strain on the seedlings and cannot be done when they are very young, so they have to suffer undue competition in the early stages of growth. For the purpose of thinning it would be good policy to pay piece rates to anyone or everybody on the farm whether they were being paid

wages or not. It is vital to get the job done at the proper time and the quicker the better. It is a laborious job and a good piece rate, with deductions for doubles and bad work, gets everybody going. Besides this, there would be a number of dependants on the holding, wives and families, and it should be part of the policy of good management to give them a chance of earning every extra penny they can.

At this stage, I should mention that various schemes have been mooted to cut out thinning by hand, but for one reason or another they have all failed. There is the suggestion to transplant, and this has the advantage that it can be done by machine, but unfortunately mangolds, sugar beet and swede turnips all seem to suffer from transplanting. For several years I have tried every method, even going so far as to use synthetic root encouragers, but they all result in the same thing, 'fangy roots'; kale and yellow turnips transplant quite easily, and I have done this on a commercial scale, but I do not think there is any great advantage over sowing and thinning. The method has also the disadvantage that the best time for planting out comes at a period when we are apt to have a dry spell of weather, and a dry spell is death to transplanting.

The other alternative which has been suggested is to plant single seed in hills. This has the disadvantage that the weeds are not prevented growing between the hills and have to be removed by hand. It would require also a very high germination factor for turnips, while mangold seed often produces clusters of plants.

The only method which holds out any prospect of success is check-row planting with a buttoned wire, a method I have mentioned previously in connection with the growing of Indian corn. However, on the ten-acre fields, only seven of which are required for roots, the methods 1 have described should be economical enough. It is hard to see in fact how they can be greatly improved.

I believe that subsequent cultivations could be made with the horse and manure barrel on the Danish principle, the liquid manure cart going down the rows; it has a 'duck-foot' type of hollow cultivator which scrapes away the weeds and applies a dressing of liquid manure just below the surface. Crops, by this method, can receive liquid manure throughout the season, and thus they have a continuous supply of nutrient to draw upon instead of one great rush as is the case with artificial fertilizing. At the same time, the ground must be freed from weeds so that the two jobs dovetail in together. I think a pair of discs to protect the plants would be an advantage on this machine.

Before the plants were fully grown they would need a further hand weeding between them in the row, and this could be accomplished on the same basis of piece-work as the first thinning. By the end of the summer the foliage has met across the drills and further cultivations are unnecessary, though with shields it might be possible to give a farewell dressing of liquid manure.

The harvesting of roots is an expensive and laborious business, because it involves the handling and carting of several hundred tons of water. As I have said before, that is one of the reasons which make the shorter driving distances of the small unit more economical than the big one.

The mangolds or other roots must be stored in good weather. They can be pulled, topped and tailed by hand on piece work, but on the whole I think it is more efficient to mechanize the process. The best manner is one devised in Sweden in which the workers are equipped with an ordinary hoe to which is soldered a wire ring. They walk down the rows slicing off the tops which are caught by the ring and put to one side. The next appliance is a wooden sledge drawn by a horse on which the driver stands. The sledge has two blades attached to it which slice off the 'in ground portion' of the root while two strongish springs roll the roots together and leave two lines in one. The process is extremely simple, yet effective. It would, of course, be possible to design a mechanical digger sheer and elevator, but the cost of such a machine could never be warranted on so small a farm. However, I believe a pick-up elevator could be designed behind a tractor to elevate the roots from the lines into a cart travelling alongside. Part of the farm buildings would include a root cellar from which they could be taken out as required, and into which they could easily be tipped from the carts.

Kale is best cut and dumped into a cart, and any form of machine one might design for its use would probably be not so effective as ordinary hand work. The roots cleared, it should then be possible to plough the field. Mangold tops make quite good feeding or silage, but they are troublesome to collect and have a habit of becoming excessively muddy. It would be better for the ground and the farmer's temper to plough them in. Following the practice of manuring, they could receive a light application of dung and artificial nitrogen and be turned in immediately after the roots were carted off.

Chapter Six

POTATOES AND BEANS

Disease and Prevention—A Twelve-Year Interval—Seed —Machines for Planting—Clamps under cover—Beans and the Drier—A Standard Bean-huller

The plan which I have outlined would be very suitable for the continuance of this crop in this country.

Every year our diseases increase. It is true that as new diseases appear or are appreciated, scientists usually manage to find a remedy. That nothing so catastrophic as the potato blight of 1846 has appeared in this country is largely due to the fact that disease has been checked by the introduction of immune varieties. But black leg, scab, corky scab, dry rot, skin spot, black scurf, sprain, silver scurf, verticillium wilt and pink rot are all diseases for which, as far as I know, no actual cure after appearance of the disease is known. Some of these diseases are comparatively slight, while others are very serious indeed. Diseases have a habit of coming and going in importance, and there is no guarantee that any of these maladies might not suddenly burst loose over great sections of the country causing widespread and serious loss. Apart from the diseases I have mentioned there are a host of virus diseases of which the significance is only now being appreciated. All these diseases, even in a mild form, affect the yield and quality of the tuber, and there can be no doubt that prevention of potato diseases is of national importance and a national policy is needed to prevent them getting completely out of hand.

At the moment cure seems out of the question, and the only alternative is prevention. The first and most successful step is the breeding of immune varieties, but as diseases increase or become known, so more and more immune varieties would have to be found. Thus one enters a vicious circle while choosing of stocks for their immune qualities limits considerably the development of the tuber for prolificness or increased palatability. What I am now going to say will be unpopular amongst large growers, but it is nevertheless

true. We may be certain that if potatoes were not grown in large acreages and not grown at short intervals on the same ground, the risk of wholesale disease would be practically eliminated. There are, of course, other factors which could be introduced to reduce disease, and these we will go into shortly.

You must realize that most potato growers will crop their ground at least once in six years, and this is about the longest rest period in any purely arable rotation. I know of many growers who also crop once in three. Thus a man with a three hundred acre farm would have a hundred acres in potatoes. This practice must provide diseases with a wonderful propagating ground.[1] I feel a traitor to my own side for saying this, as I have a great many friends who are intensive potato growers, but this book is written without prejudice and I have forced myself to say what I believe to be true rather than what I want to be true. I know that if farming is to be improved we must base our plan with nature rather than against it.

As I have so often said, if one congregates a large enough quantity of anything, from pigs to potatoes, one must sit back and wait to be shot, for one loses bloom; that is to say, one forms a breeding ground, not only for the animal or plant you are trying to propagate, but also for a million parasites that go with it. You are challenging these parasites to a total war by thinking that you will be smart enough to keep your stock or plants healthy enough to resist them. Sooner or later you will lose, for the more potatoes or pigs you grow the more chance your enemies will have. In fact our chief weapon against these enemies is isolation and resting the ground.

Before the present war we had to pay the government five pounds an acre for any additional acre of potatoes we grew over our quota. To-day they pay us ten pounds for every acre we grow. It is for this reason fairly obvious that our normal potato requirements are a fraction of what we are growing now. Therefore, a plan for the future must visualize a considerable curtailment of this crop if a slump is to be avoided. Furthermore, the system I am outlining would grow enormous crops. The mere fact of reducing disease would in itself act as a considerable stimulus, while potatoes on fresh ground, especially when followed by the heavy natural manuring I have suggested, yield in a manner which is almost frightening. I believe on this system an average yield of fifteen tons to the acre

[1] This does not apply to early potatoes as they are harvested before the most troublesome diseases are 'afloat'.

could be obtained in time. Thus the petty little ten acres of the standard farm would be equal to thirty acres of average ground to-day and to a great deal more of bad ground.

My system would be to grow one of the rotational fields in potatoes, so that it would be twelve years until they were grown in the same field.

The potato responds readily to artificial manure, although I am convinced growers often give phosphates in wasteful quantities, while too much nitrogen as supplied by ammonium sulphate has, not only in my opinion but in the opinion of a great many other people, a bad effect on the flavour of the potatoes. Farmyard manure, however, is a complete fertilizer, that is to say, it contains the big three—nitrogen, phosphoric acid, and potash. The best crops of potatoes have always been grown by its use. I would, however, give a good dressing of potash although it is apt to retard development, especially on light soil. Thus the farm would get a dressing of potash once in twelve years, and constant small natural dressings of animal manure. Phosphoric acid, of which there should be sufficient available, would have been supplied with the previous crop.

Nitrogen has been supplied with the turning in of the young grass and dung, and there should be plenty of dung on hand to apply another heavy dressing in the drill at time of planting.

It would not be possible in the early stages of the scheme to standardize cultivating machinery for forming the initial tilth as quite a number of units would not be possessed of a typical potato soil and would require much more breaking down than others. In course of time, however, the large amounts of humus which would be added by this system would bring the soils themselves to a standard texture; for humus has the quality of lightening a heavy soil and thickening a light one until a neutral point is reached, where further supplies of humus make no difference to the texture. By adding humus the Danes have made their group of islands with its variation of soil into a standard texture, and they have done this without adding a quarter of the humus this plan would add.

With regard to 'seed' in a national plan, mother stock seed should be grown high up near the sea or in the far north. It should be grown under conditions of extreme vigilance and care, so that the greatest immunity from disease is obtained. This 'super-mother seed' would be purchased by the unit and grown under the watchful eye of the seed farm. Stock 'seed' grown from this special mother 'seed' by the estate seed department would be distributed to the

different farms in the group. The standard farm would have a small glass house for chitting the 'tubers', so that they would get a flying start and be established before many of the disease spores were afloat. This would finish the life cycle of that particular batch of seed—the small farm annually drawing batches from its satellite seed farm, and they drawing from the mother seed farm. The standard farm would always require the same quantity of seed and this steady demand would enable all the necessary transport and other organization to be arranged in advance; and this would effect a big reduction of incidental charges to the trade.

Numerous machines have been invented for planting the sprouted seed. The inventions fall into three categories: those which raise them with spikes, those which raise them with cups, and those with a special conveyor fitted with cups which grip the tuber. For this last method it is necessary to have persons sitting on the machine placing the potatoes in the cups. All these machines have this advantage that with them it is possible to open and close the drills at one operation, while the potatoes should be better spaced than they are when hand planted. Some of them also have facilities for applying fertilizer at the same time. However, they have disadvantages as well. Types one and two are not suitable to sprouted potatoes as the mixing about in the hoppers tends to knock the shoots off. Type one by spiking the seed is liable to inoculate every tuber with disease, while type two can only deal with potatoes of approximately the same size. The third method has distinct possibilities, but is costly for the small acreage covered. However, with a standard policy such a machine could no doubt be made at an economical price for the work. As to incorporating a device for sowing artificials at the same time, only potash is applied in my scheme, and that in small quantity. There is also this drawback. Artificials have a corrosive action on metals and it is decidedly risky to endanger an otherwise valuable machine for the very small benefit of doing two jobs at one time.

The subsequent cultivations would be made by horse with implements which for many years have remained practically standard for the purpose. But I believe that the use of the liquid manure barrel would help the crop and the same apparatus could be used for spraying against blight. Sometimes, however, this spraying does a great deal of harm in breaking down haulms and in spreading disease from plant to plant. With the isolation and careful seed preparations I have described it might be found to be unnecessary.

There are a certain amount of pros and cons on the question whether the haulms should be killed off artificially or await a natural or frost death. It would seem that artificial killing is only of value where the crop is grown for seed, and it is consequently desirable to restrain growth at the moment the tubers have reached the correct size.

As I have mentioned before, all seed would come to the standard farm from the estate seed farm. Thus the potato crop would be all for consumption. It would be graded as required, weighed, washed and packed in a net bag of a weight and style to be standardized throughout the country. The date of packing would be stamped on the bag, while some of the crop would be manufactured and packed by the estate into potato crisps. The surplus would be fed to the pigs.

The lifting of ten acres of potatoes would require seasonal labour in addition to the ordinary farm staff. However, on free working soil it should be possible to design a standard machine to lift the whole crop and elevate it into carts. Such machines are already available, but so far they have not been practicable for large acreages owing to their slowness and they need alterations to deal with extra-heavy crops. The point to remember is that there is usually one ideal week for the performance of this job. Although we often lift potatoes for nearly two months, during those seven or eight weeks there are probably not more than five days in which soil, crop and temperature are at the right point to make a perfect job. Losses through gathering at the wrong time are very considerable. Expenses can vary 30 per cent owing to weather conditions. So the perfect farm should have labour or equipment ready to harvest the crop in, say, six days; they would, therefore, be very unlucky if they did not get the ideal conditions for the work.

This last paragraph may sound like an overstatement, but it is indeed the case. With a large acreage to take up before frost and an expensive labour squad, the farmer must hash on, right or wrong, or else lose the lot, and that is just the sort of conditions a good agricultural plan should avoid. The aggregate loss to the country of these slap-dash methods is very considerable. It also causes a loss to the farmer and the lowering of wages for the worker.

For this reason and for the saving of labour, I think the standard farm should have permanently constructed clamps into which the harvested potatoes could be tipped and kept safely and be graded under cover in comfort. In bad weather the present method of work-

ing grading potatoes from pits in the fields is not only a needlessly tough job, but also wasteful. Besides the obvious discomfort, there are other objections. The pit or clamp messes up a portion of the field which is often not cleared in time to take the same crop as the rest of the field, and has to have a catch crop sown afterwards which upsets the harvesting of the main crop. These pits require good sound straw or thatching which could not be obtained from the combine. This would mean that a portion of the wheat crop would have to be harvested with a binder and threshed carefully. There is quite a lot of unnecessary work, earthing and unearthing the clamps. Stacks and pits in fields form harbours for vermin and pests. With large fields time would not permit the extra cartage distance; so our rule has to be to get the spuds under cover as quickly as possible, and this means pits in fields. But with the small potato acreage on the standard farm and the shorter cartage distances the permanent clamp would be warranted. In fact, the labour and trouble caused by pitting would be soon saved, while the winter grading and packing of the crop would be a pleasant and more or less cosy occupation.

The standard farm would grow ten acres of beans.

With land which is in good heart or in heavy soil, they are a comparatively easy crop to grow, but a very difficult crop to keep clean. (Peas would be of course substituted on light land.)

It would be best to standardize the growing of the crop to the same method that is used for roots and kale. The same machinery could then be used and cultivations be continued until the crop was too far advanced to cultivate without damage. The growing of beans in drills allows the light to penetrate and encourages them to pod down the stalk; and these pods are more likely to ripen evenly with the top growth.

It is not possible to harvest beans with a combine harvester; the only machine available is the reaper and binder unless the work is to be done entirely by hand. But harvesting by hand would bring the costs up so much, or the living standard down, that it might even be cheaper not to grow beans at all and to buy more protein from abroad instead.

The binder is by no means ideal as the rough heavy stalks cause trouble and the violent action threshes out a very large proportion of ripe beans. It would be necessary, really, to develop a special machine for this crop; such a machine need not be drastically

'austerity', as the bean harvest can be conducted over an appreciable time and one machine could tour the bean fields of a whole estate. Such a machine would pull the beans, tie them in bundles and deposit them in a cart.

It is usual, first to shock the beans and, when they are dried, fork on to the carts and again fork into stacks. During these processes a very large quantity of the crop is lost, and beans are liable to deteriorate unless exceptional weather is encountered during the whole harvesting period. I believe a better method for the standard farm is to put the bunched beans straight off the field on an arrangement known as a 'drier'. This sounds a more formidable piece of machinery than it really is. It is simply a frame of wood laced with wire and covered by a light roof. The crop is laid on the wires so that the air can percolate through it, and remains there until threshed. There is considerable labour in filling such a shed, but this would be cancelled out by the saving effected in double handling instead of quadruple.

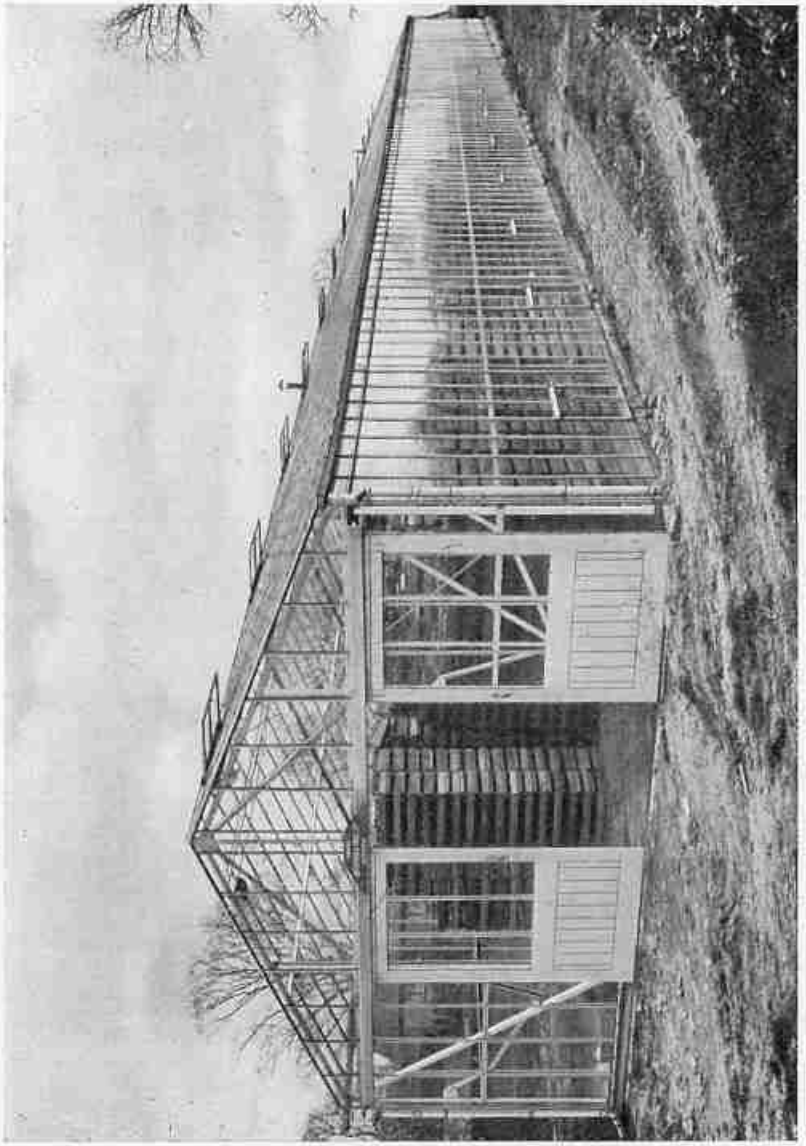
Beans are usually threshed in an ordinary grain thresher. I do not think it would be necessary to have such a machine on the estate as the combine supersedes it. Moreover, 'the mill' is not by any means suitable for threshing beans. A better policy would be to have a standard bean huller similar to a pea huller, a machine now used by many canneries; this apparatus would be owned by headquarters and would tour the farms during the winter. The straw would naturally be left for feeding and bedding and the threshed beans elevated into a cart for drying and storage at the central depot. I think, however, that it would be also advisable to save the chaff; there is considerable feeding value in bean chaff, and this could be ground into meal and incorporated in the rations of the young stock and pigs. The central plant would be designed to handle the chaff automatically, using practically the same plant they would have already for other operations. There should be time after the bean crop was removed to cultivate the field and have a 'weed cheat' before ploughing. This would be another advantage in taking the bean sheaves straight off the field.

Chapter Seven

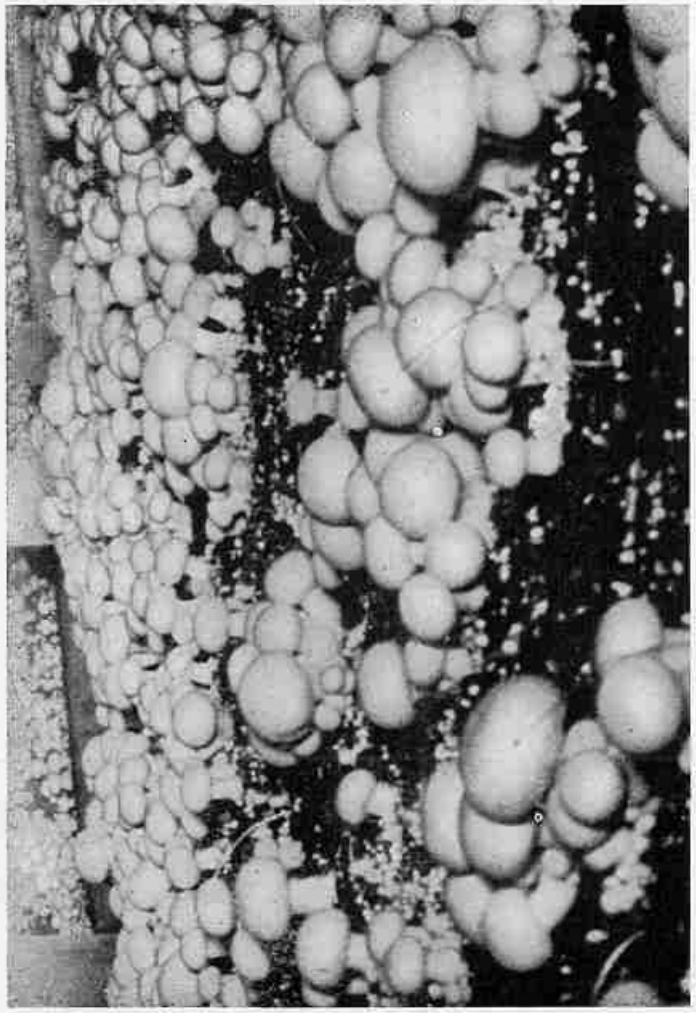
DUNG

Making Dung in a Cruive—The American Dung-spreader —Bio-Dynamic Thought and Practice—The Importance of Access for Fungus, Bacteria, etc.

I have reiterated that my plan is based on dung, and now I come to write about it I find myself in difficulties. To write about dung would require a book in itself. Such a book would be very uninteresting to anybody not inside the farming racket. Now I am trying to keep the book human enough to catch the attention of the person outside farming, for the outsider represents the bulk of the nation. Until we can gain his sympathy and understanding of our problems we will have no certain future. Another difficulty arises. Not only are there two opposing camps—artificial and dung. The artificial camp is fairly solid, but the dung camp is split amongst itself. Those interested in dung can be divided into ordinary farmers who make dung in the ordinary way, and 'Composters' who believe in converting any waste materials into humus. The 'Composters' are again subdivided into the 'Indore group', who have worked out systems of compost factories on commercial lines, and the 'Bio-Dynamics', whose compost activities are bound up in a spiritual form of thought akin to a religion. Now the objection to the Indore group is that their methods are only possible where there is a plentiful and cheap supply of labour. It has been practised on tea plantations and other tropical ventures where labour is as easily obtained as flies in honey. To repeat the process here would not be possible without lowering our standard of living or raising the price of our product. I believe, however, we could mechanize the 'Indore' process and it would prove a far better manner of making natural fertilizer than the way we make dung at the moment; but I haven't mechanized it personally, and while I think it could be done I don't know, so it seems dishonest to put such an untried process in my plan. I am, therefore, keeping to ordinary practices although the future development of our policy could alter these practices with advantage.



Glass house for sprouting potatoes used subsequently



900 lb. per horse

MAKING DUNG IN A CRUIVE

Our first step then must be to make dung in as large quantities as possible. Now the cheapest way to manufacture this commodity is in a cruive (pronounced 'crewe', see page 29)—that is to say, to build up a stack in the required field to form a temporary court and keep forking it down for the beasts to tread until the dung is made. But there are considerable objections to this method in our climate. For the obvious advantages are offset by the not so obvious disadvantages. Dairy stock before they can manufacture milk must manufacture enough heat to keep themselves alive, and keeping them out of doors in the worst months of the year adds considerably to the food bill. Again, the cruive may be situated at a distance from the farm. Finding one's way to it across fields in the snow and in the pitch darkness of a winter's morning is not all that funny, nor are milkers thus treated likely to be able to do justice to the animals in their charge. The next alternative is the covered court, and this is undoubtedly the most labour-saving way of making farmyard manure. However, it has also these disadvantages, the 130-acre farm would not grow enough straw to keep the court properly bedded, while there would be no chance of adopting the new compost ideas as these require aeration and building and unbuilding of compost heaps in a regular cycle. The third method is the removal of dung daily from stall-tied beasts, a system which I shall mention again. Taking it all in all, it would seem the correct policy to leave the question of dung-making open until the battle of artificials versus humus has been fought out and while improved methods of dung-making are being experimented with. However, a machine which should be made standard is the American type of dung spreader and this machine would be of value whatever system of dung-making was adopted. The only disadvantage of the machine is that it is not so easy to gauge the correct amount to apply to the acre from the available stock, the dung once spread being spread for good, whereas the old method can, if required, be manipulated so as to cover the field. However, the quantities of dung which the standard farm would produce should be so large that a field would get a good all-round share even though some parts were spread a little thicker than others. In any case there should be a system of drains connected to a super size of storage tank for liquid manure. I have already described its use on the farm; a simple form of sump pump operated by an electric motor would be required to fill the liquid manure cart. I must mention, however, that there are thousands of farms all over

the country with liquid manure tanks and pumps standing idle; many have indeed found their way to the scrap heaps. Yet I believe if they had been operated mechanically and distributed to the growing crops in the drill by the system I have already described, they would not have helped the scrap campaigner but would have been a valuable asset to our war-time campaign for more food.

As I said at the beginning, we are on the threshold of a new era in farming and in the creation of healthy foods. There seems to me a considerable chance that the enlightened farmer of the future will be able to organize his business so that his crops and stock will interlock to produce his selling products without purchasing from outside anything at all except power.

These remarks open the way to a discussion on a closely linked subject, 'Bio-Dynamics'; a very interesting trend of agricultural thought.

To understand Bio-Dynamic thought you must realize that there is nothing new about it. Until the era of machinery and materialistic science everybody thought on Bio-Dynamic lines. That is to say they took for granted the forces X. These forces were the motations of life of which they knew nothing except that they must be there or life would not exist. Their knowledge of natural processes was very incomplete, filled from end to end with gaps. These gaps they fully realized, but they lacked the mental equipment or the desire to try and find out what they consisted of or in accordance with what laws they were formed.

With the introduction of modern processes the world quickly drew away from this form of 'Gap thinking' because the mechanical and chemical forces, which now replaced our original natural or spiritual forces, were easily classified as regular and fixed causes and tables of mathematical laws—laws which were so simple that they could be quickly grasped by anybody with rudimentary intelligence. One could as an example combine several mechanical laws to construct a series of machines into which tobacco leaf could be automatically fed at one end, and which would produce finished cigarettes, counted and packed, at the other. Alternatively one could arrange tanks, percentage solutions of chromic acid, lead anodes, definite current densities to plate metallic articles with chromium. The influence of these simple laws has drawn man into the belief that Life is a known, or easily known, series of causable happenings, and from this assumption has grown the new materialistic outlook

as opposed to the old spiritual outlook. Agriculturists have naturally been influenced by this new trend of thought to regard their business in the same light that the controller of an aeroplane factory regards its problems, i.e. that he can by organization, attention to detail and planning arrange it to turn out a definite product in a definite time.

Now the Bio-Dynamic school of thought is entirely different. It disregards the modern materialistic thought altogether and looks on the gaps which our ancestors called spooks and acts of God as very real forces. It demands for its adherents an entirely different outlook on life, and, therefore, the Bio-Dynamic teachings are difficult to assimilate to-day unless one can direct one's mind into spiritual channels as opposed to materialistic. I do not believe I am qualified to expound the Bio-Dynamic proposition adequately, because my mind is too fixed to allow myself to become entirely imbued with this very divergent train of thought. Although this school hold many of the ideas and beliefs that I hold, they dislike raw chemicals in any form, they lay great stress on compost, they believe in herbs, they consider materialism wrong, and above all they believe in farming as a complete life. Up to this point we go hand in hand, beyond that they go beyond me and I have not been able to throw my mind into their viewpoint sufficiently to agree. Some of their preparations are extremely like spells. You add, for example, a certain herbal preparation to rainwater in an earthenware container and stir for an hour with a birch broom; before the lapse of three hours you walk with your partner across the field to be treated holding the container between you, using your free hands showering out the preparation with brushes. I am afraid if any of my neighbours saw Sandy Hodge and me walking across a fifty-acre field with a mammoth flowerpot between us spraying the ground with lavatory brushes they might use the old Scotch expression 'is he wise enough'.

Many of the Bio-Dynamic theories, however, I know to be definitely true—the others may be also, I just don't know. The theory of growing mixed crops is obviously right, for under natural conditions wild land is seldom filled with one crop. There can be no doubt that the different lengths of root system of the various plants all help each other out. Under modern conditions there would be drawbacks to mixed crops on the grounds of extra labour, and that is where my brain will not follow the Bio-Dynamic teaching for I urge the adoption of methods to decrease our labour and increase our standard of

living; for I believe our brains should enslave machinery to work for us, and that is where, perhaps, Bio-Dynamics get away from a science and become a religion, or is becoming a religion, as considerable manual labour enters into all their processes. There is no thought of saving labour for 'sweat and toil', all enter into the scheme. This deep affiliation with the soil enables the mind to comprehend the mental outlook of the process.

I do not think the materialistic group of scientists and farmers will worry much about Bio-Dynamics, but I believe the half-way group like myself could gain much from its teachings, for we are sufficiently on the fence and sufficiently open-minded to take anything practical from either side. Bio-Dynamics has an ever-widening public and its teachings are spreading throughout the world. We may hear much more of it in the future. I can understand that its disciples would gradually grow less and less materialistic in thought, that they would in fact develop powers of 'natural appreciation' which would draw them into a spiritual world outside ordinary men, while their methods might not produce the bulk of the ordinary commercial farmers, nor would they pile up riches by using their brains in ordaining machinery to work for them. But I think they would form a simple pattern for their lives which would give them peace.

I have mentioned before that in the case of the minimum-size farm there would not be sufficient straw to bed courts for the whole herd, so the milk cows would have to be tied and the dung removed daily. Unfortunately this system requires the services of an extra man whose work in the cowshed is more or less unproductive in the final result. Unproductive work means an increase in price of the final product or a decrease in living standards of those employed in the industry, so that it is not a good thing to encourage or plan for. However, the system of removing dung daily opens up the possibilities of improving the dung by using some of the methods of the compost enthusiasts, for the dung can be carted to the field where it is ultimately to be spread and there in a fenced-off corner be built up into a compost heap on the approved lines, with layers of quicklime and inoculations of rot-promoting substances. Moreover, it is ready in the field for mixing with the green crop and ploughing in. In the autumn this handiness would make the job easier and more quickly done—a point of considerable importance. For it is vital that the green crop should be dunged and ploughed in in the early part of autumn, because the weather is at that season naturally propitious to rot

vegetation; it is the time appointed by nature for the manufacture of humus from the summer vegetation which is no longer required, and this process can be conducted more speedily then than at any other time of the year.

There is another point which the compost school consider very vital, and that is the establishment of the heap on the bare ground, thus' making easy access for fungus, bacteria, micro-organisms, worms, etc. Personally I believe the production of these desirable elements should be studied by ordinary laboratory methods, so that the farm could inoculate the dung heap with the necessary growths and these cultures could by trial and error be worked up so that only the most active and beneficial were used. The day may come when a pedigree flock of active worms will be as valuable to a farm as a pedigree herd of cows. In any case there seems no reason why we should not devote considerable research to the improvement of our worm stock.

Chapter Eight

LIVESTOCK

The Artificialized Cow—Breeding for Two Purposes—The Right Aims for the Breeder—Yard and Cowshed—Milking by Machine—Where to Milk and How—The Cow'srations—LowlandSheep

To appreciate the problems of developing and planning livestock, you must realize that we have bred our agricultural animals for special points without regard to the fundamental law which I call the Balance of Nature.

When we break the balance of nature we find ourselves in a host of innumerable difficulties and unforeseen problems which subdivide themselves and multiply, so that success becomes increasingly difficult the further we break this balance.

A cow was not originally intended to give its calf five gallons of milk in a single day. It has been bred up to these heights of milk production remarkably quickly, and with this improvement in milk yield have come a lot of troubles. Mastitis has raced through our herds to an alarming extent, and although practically every possible combination of chemicals has been tried, a certain cure has not been discovered. It will have to be bred out, and in the process of breeding out we may have to sacrifice some of our heavy milk yield. Owing to the artificial nature of the present-day cow, a modern dairy herd requires very intelligent handling by people who take an interest in the animals and have considerable knowledge of their individual personalities and habits. Hundreds of cows being milked by shifts of men or girls and fed by different men or girls may be good organization. But it is not the best way to get the best from the cows; for this reason the herd must be fairly small and intelligently looked after by people who understand the stock individually and can give them sufficient attention to spot disease.

What I have said for cows applies to other types of stock.

The hen is being asked to be particularly artificial in her habits. Her natural instinct is to roam the country in the spring, make a nest,

lay her eggs, hatch them out and teach her chicks the science of good hencraft. But we require that she shall lay eggs throughout the year on penalty of death. To achieve this aim, we have to concentrate on eggs and ignore several other physical requirements. In the same way we are forced to keep our animals under unnatural conditions in order that they will conform to our required schedule of production. I remember the remark of an agriculturist looking at some electric brooders we had designed: 'That can't scratch for them'.

Apart from the natural desire to breed faster horses, bigger bullocks, four thousand gallon cows or quadruplet producing sheep, fanciers breed for other points. Occasionally these points are fantastic, such as breeding short faced tumbler pigeons, so short faced that they cannot feed their young. At other times the points are merely contradictory to pure commercialism.

A number of years ago a circular was posted to persons who were supposed to have the interests of agriculture at heart, asking them for subscriptions to keep alive a noted herd of park cattle—the descendants of early British, Saxon or wild cattle, I am not sure which. I asked a friend if he was going to subscribe and he answered, 'Those broken-back long-horned brutes? Subscribe to have them shot, more like.' I mention this because it is true that our love of traditional things and our fancier spirit have combined to breed and preserve animals for traditional or fancy qualities; such as the long hair on the heels of certain breeds of cart horses, fashionable colours, long or peculiarly shaped horns and other characters.

These points are not quite so illogical as you would imagine. There is often vague reasoning behind some of the selections. Particularly strong horses may have been observed to have long hair over their hoofs. There may have been possibly at one time a demand for powder horns and the memory perhaps lingers on. I am not immune to these fancies myself. Yellow, for instance, is a colour that I am not favourably inclined towards in animals, and this prejudice I am strong enough minded to have traced to its roots. I have known certain yellow coloured dogs such as Golden Labradors to have fits of hysteria or to be constitutionally weak. 1 have found herds of Guernsey cattle suffering from contagious abortion. These vague observations from probably isolated cases have fixed in my mind that I don't like a yellow colour in animals. From probably equally haphazard selections I have seldom found a really bad grey horse. Light Sussex poultry have proved successful with me, while a cross

between a White Shorthorn bull and a Galloway cow resulting in a blue grey seem to be particularly good doers and are often favoured by butchers, and so I favour grey as a colour in animals. I mention these rather childish points because there is often some subconscious reasoning behind fancies which at first sight seem absurd.

For the standard farm we must wash out all unpracticable points. The disadvantages of cows with horns far outweigh the advantages, whatever the advantages may be; they constantly do each other serious injury, while a savage cow may permanently disable an attendant. It would be impossible to keep cows in the covered court system with horns, while in the stalls they often get themselves tangled up and even in the field they have a remarkable habit of catching up odd pieces of wire. Far from giving points for horns at shows, anybody exhibiting a cow with horns should be severely penalized. Dishorning is not difficult. In polled breeds there is nothing to worry about, but in horned breeds a rub up with a caustic stick at an early age effectively stops their growth. It is not a particularly difficult job, nor does it seem to inflict much pain on the animal.

We have a great many breeds of cattle and a great number of them, one would think, could be eliminated, but practically every breed has certain qualities which are valuable. It is advantageous for example, in beef cattle to maintain quality breeds such as Aberdeens and Shorthorns, which do particularly well on excellent feeding, and also tougher breeds which will scratch up a living in most places, and austerity breeds like Highlanders and Galloways which will do well on nothing at all! Again, there are breeds like Herefords which stand up to dry countries.

In dairy breeds, we have also strains which are suited admirably to different conditions and surroundings. Thus they all have their uses, but, unfortunately, there are breeds which aim at beef and milk—dual purpose breeds. Now, a man who wishes to breed for two entirely different types in the same animal is asking something—in my opinion too much.

The danger is not in having distinctive breeds for different purposes, but in breeding these animals away from the characteristics which make them valuable. I thought of putting down a list of breeds that we could well do without, but then, by doing this, we would be killing our foreign market for blood stock. Surely our plan should be to stock a shop in which the foreign buyer can find the best of everything in a variety to suit all tastes.

It would be better for the breed societies to get together and revise their list of aims limiting them to the strongest commercial points of the breed.

It is now proved genetically and borne out in practice, that first crosses between two pure lines build vigour. A litter from a cross between a Large White boar and a Wessex Saddle Back Sow will mature twelve to fourteen days quicker than the pedigree stocks of sire or dam. It is, of course, only the first cross between two pure lines in which these qualities are observed. To continue breeding from the crossbred progeny would be fatal. It would seem commercially desirable that the standard farm should be stocked by first-cross cows. Unfortunately, this would mean that numbers of heifer calves would be useless crossbreds from which it would be undesirable to breed. There seems no way round this difficulty, for the standard farm would need a great many replacements as it is necessary to cull the bulk of the herd every six or seven years. However, nearly the same effect is obtained when two pure lines of the same breed are bred together and this would be comparatively easy as each separate herd on the estate could be closely line bred and the pure lines crossed. The combination amongst, say, ten herds is obvious while, of course, new blood would be brought in from other herds from time to time.

I am of the opinion that freak records from cows are more detrimental to a breed than otherwise, and the aim of the breeders should be to produce an animal that will stand up to their local climatic conditions comfortably, be free from tuberculosis, contagious abortion and mastitis, be of bright and healthy disposition and produce on reasonable feeding an average of three gallons daily at 4 per cent butter fat.

For poultry and pigs I would advocate the same policy of breeding, firstly for health and secondly for improved production.

I have already mentioned that an economic unit is fifty-two cows, that is to say, approximately forty cows in milk.

The question arises where and how are these animals to be housed during the period when they are not on pasture. Keeping cows out permanently through the winter does a great deal of damage to the grass, there is little for them to eat and consequently they require more food to keep them warm, and in cold weather their milk yield drops considerably; the cows are also required to make dung.

I have tried various systems of cow keeping and at the present time I use different methods on different farms. It is thus easier to know which is the best, and by the best I do not mean perfect, for no system is perfect. I am inclined to think, taking everything into account, that the best way to keep cows is in covered yards, where they can be quite loose and can go where they like. I find they keep themselves cleaner untied than they do tied, provided they are bedded with lots of dry straw and the court is adequately bottomed and drained. The cost of this method of keeping dairy cows is very much cheaper than that of any other indoor method both for labour and in the initial cost of building. To keep a herd of fifty cows clean in a cowshed where they are tied is a whole-time job for one man and his labour is completely unproductive, merely an extra charge on the price of milk. Cows look neat and tidy in a well-constructed cowshed with concrete passages, neat metal stall divisions and an overhead trolley to take away the dung. I have such an outfit and I know. But they don't give any more milk for all this care and trouble, they don't keep themselves any cleaner, in fact the reverse. In a well-bedded yard they are much cleaner for they have freedom to lick themselves all over. I have found also that I have got better bacterial tests from the yard cows than the palace-housed cows. There would seem to be a much greater risk of disease in a yard, but not necessarily. Cows tied in rows are always breathing into each other's faces and the conditions are unnatural. It is true that in a yard the litter on which they walk is filled with bacteria and every type of organism, but so it is in a field under natural conditions. Unfortunately this system will not be possible on the minimum-size holding as there will not be enough bedding produced. However, in many cases it will be possible to import peat-moss litter and industrial by-products to make up the deficiency and these will help the farm fertility; but where this is not possible the cows will have to be tied in stalls.

When it comes to milking, there are considerable drawbacks to milking in a cowshed. In fact, advanced dairymen take their cows out of the cowshed into a special building designed for the purpose of milking. Thus all the expense and labour of keeping the cowshed spotless is to no purpose, they might just as well live in a yard and go from there to the special bale.

A good hand-milker will make a better job than a good machine, but good milkers are rare—they are born, not taught. It is much easier to make a girl or a man into a good machine-milker than into

a good hand-milker. Admitting that there is a loss of milk between the two processes, there is a considerable saving of labour by machine-milking which outweighs the loss. A first class hand-milker will manage ten cows an hour, so that for a herd of forty cows in milk (hand-milked) one would require four milkers. To give them a day and a half off a week one would need the services of another man and a bit of a man (for five people require seven and a half days off and there are only seven days in a week). With a machine two people will milk forty cows and thus three will do the job and provide rest days. In theory, two operators will milk forty cows in a four-unit plant in forty minutes. I say in theory, because cows are individuals and no herd I have seen will milk to the optimum time of four minutes each. Hand-milking will take longer because few men can keep up the intensity of the work a machine does, so that one man by machine-milking will milk twice as many cows. It has been said in arguing between the two systems, that disease is spread more readily by machining. I do not altogether agree; disease is spread quickly by both methods. If you touch bacteria and then give your hands a really good wash, much more of a wash than a hand-milker ever does, you would still be able to plate out several bacterial colonies from your hands. The same applies to machine-milking, a casual dip of the teat cups in disinfectant is very little use. The real cure for both methods is to have a small enough herd and men with sufficient interest and time to spot disease and to isolate before it spreads.

This method of milking cows away from their living quarters has spread in popularity by leaps and bounds—so much so that it may now be described as the standard practice of the future. We put in our first 'milk parlour' about ten years ago. During these ten years one or two spirited manufacturers have ironed out the faults of the system, so now it is as foolproof as a machine can be, and in fact works 730 milkings a year with very little trouble. We have had bacterial counts with the machine as low as 500. It is very rare to get any bacillus coli in a count so that the system seems as clean or cleaner than the best hand-milking. Since the war and the rubber shortage, however, we have had higher counts and this is due to a desire to make the rubber parts of the machine last as long as possible. Too much steam and rubber don't go together. It would seem, therefore, that the only real improvement possible on these machines is a substitute for rubber which will stand up to repeated steamings.

Having discussed the various aspects of modern cow keeping, let us see how the herd on the standard farm should be housed and milked. First, then, the buildings contain several courts covered from the weather, amply lighted and ventilated, with sound floors and a drainage system leading to large liquid manure tanks. They contain an ample supply of water and are fitted with feeding troughs and hay racks. Similar courts are provided for the dry cows and young stock. Adjacent to them is the hay barn, root store, silage pits and indoor accommodation for temporary storage of kale. They are equipped with a root- and hay-cutter driven by electric motor, and a rubber-wheeled barrow to transport this maintenance feeding and tip it into the troughs.

Attached or adjacent to the court where the milk cows are kept are the milking buildings, consisting of the 'parlour' where the cows are milked. This room is done up in a manner making it possible to keep it surgery-clean, anything unnecessary to the purpose being cut out, whilst the walls and ceiling are smooth coated and should be designed to resist constant damp. There would be six metal stalls and a milking point situated between each two stalls. These milking points are equipped with the teat cups, an automatic clock for timing the milking, a sponge with water connection for washing the udders and a recording jar which automatically shows the weight of milk from each cow. In this way the herd is recorded once a week. A weighing device is arranged for measuring the amount of production ration the cow receives. (Very heavy milking cows cannot eat their ration in four minutes and thus remain longer in the machine.)

At the commencement of milking six cows are placed in the stalls (they go there without being told, the job is to get them back to the court). The two operators wash the cow's udder and draw off a few drops of milk from each quarter to see that everything is in order. They apply the teat cups and, synchronized with this operation, the timing clock is started. Thus the operators see how long the cow is being milked, it being desirable to try to get cows to give up their milk in four minutes. While the cow is being milked she eats her production ration; this, as we have noted, is weighed according to her needs and tipped into a trough in front of her. While one cow is being milked the operator washes the next cow and gets her ready for milking.

The milk is drawn off, goes along a stainless steel tube to another room, separated from the parlour, where it passes through a filter,

over a cooler and either into cans or maybe bottles or straight into cartons. It is thus never handled or exposed to hairs or bacteria dropping off the cow, which is often the case in hand-milking.

The object of rapid cooling is to prevent the bacteria in the milk multiplying and this immediate cooling has a very big effect on the keeping qualities of the milk.

The operator in the milk parlour, if he is any good with animals, knows each of his cows' peculiarities and how long it is necessary to milk her. When she has finished he transfers the cups to the waiting cow, so that the machine is never run idle.

We have tried disinfecting the cups after each cow has been milked, but if the disinfectant is strong enough to do any good the risk of flavouring the milk increases, nor have I noted any increase in the purity of the milk from disinfected cups, so the practice would seem to be unnecessary.

While his second cow is milked the operator draws off the last drops of milk from his first cow by hand to be sure that she is dry. The first cow is now finished and is released to wander back to the portion of the court temporarily divided off for the milked cows. At least, that is the idea. Most cows prefer to hang about trying to snoop out of their neighbours' trough, so usually there is. a certain amount of pushing. A new cow is now let into the empty stall to be washed and so it goes on till the herd is milked.

At the end of milking the machine is cleaned by turning on various taps to run water (cold and then hot) through it. After the morning milking the machine is dismantled, and all parts are thoroughly brushed out and sterilized with steam raised to a temperature sufficient to kill bacteria. This washing operation is conducted in a third room which contains sinks, sterilizers, etc. A fourth room accommodates a boiler and fuel for raising the steam, while a small compartment should contain the air compressor and driving motor, and also a water pump if well water is used for cooling. It is desirable to have a refrigerator stage after the water cooling and also to have a cold store in which to place the churns.

Three boxes would be supplied for calving so that the calving cows could be isolated from the herd, and the boxes would naturally be disinfected after calving to prevent any chance of disease. There also would be accommodation provided for the young calves who would graduate up in age groups through the courts. Bulls of dairy herds are usually unsafe as they get on in years, and there have been so

many incidents with savage bulls that it is desirable to keep them safely housed after they reach riper years. Such a house would have an outside run whilst the communicating door would be made to open and shut from the outside so that the box could be cleaned or a cow served without endangering anybody. Two bulls, preferably a young one and an old one, would be required for the standard herd and, consequently, two boxes. The young bull could, however, be given liberty until he showed signs of getting uppish. There would also be an isolation house.

We have dealt with the question of stock. It only remains to touch on the food question. The cows would receive two distinct rations—a maintenance and a production ration. The maintenance would consist of proper proportions of hay, kale, mangolds, swedes or turnips in their appointed season, while the young stock would have the same ration but oat straw instead of hay. The production ration would be made up into cakes by the estate, roughly 50 per cent consisting of oats, 25 per cent of bean meal and the remaining 25 per cent of minerals, dried grass, linseed and imported protein. For young stock a cake would also be available and this would not be so high in protein; bean chaff could be utilized to replace some of the ingredients. Molasses would be used to bind the cake and also to make it more palatable. Calves would be provided with a specially blended meal to gradually replace their original milk diet.

As regards sheep—while it is certain that mountain sheep farming will continue, and will probably develop on larger and larger scales, it seems possible—though I would not like to say definitely—that the economical day of the lowland sheep is past. It certainly is if we can use other stock to take its place on light farming, and for my part I think we could. In the main, the sheep does best and is most economical on large ranges. There are already parts of the world where land is of infinitesimal value and where the conditions suit sheep admirably. Some of these lands are in our own colonies and I believe our policy should be to encourage the import trade rather than grow sheep ourselves, always excepting our rough grazings which could with advantage be ranched on a larger scale than we do at the moment. I would not, however, go so far as to say that we could use our deer 'forests' for sheep grazings. I know the character of my brother Scot fairly well, and I do not believe he would change over from foresting sheep to foresting deer if there had not been sound economic reasons for doing so. Since this historical changeover occurred, sheep are much

more intensively looked after; they require, for example, periodic 'dippings' and to accomplish this on a 'forest' might be quite impossible. Without dipping the whole country might suffer from the spread of disease. Again the average forest is not even able to support deer entirely naturally, and a deer is a far tougher and less fastidious feeder than a sheep.

Chapter Nine

PIGS, POULTRY, ETC.

Farm Pigs and Garden Pigs—Grading—Breeds—Poultry on Grass and in the Battery—Fed off the Farm—Some possible demands—The etceteras

The flavour farm would rear its quota of pigs. These would be bred in a mother pig farm on the estate and distributed to the different farms after weaning.

Pigs make a terrible mess of the ground, and they are more easily managed and fatten quicker indoors. I think, therefore, it would be advisable to keep them housed. On the mother farm the breeding stock and the piglets whilst with their mothers would have plenty of fresh air, while in-pig sows and those gilts kept for breeding purposes could run outside in an orchard attached to the mother unit.

On the individual farm, however, it would be best to have a standard building. For this purpose the ordinary Danish type of house with dunging passages and separate pens seems well designed, and moreover has been the means of bringing up the best of our bacon. The whole system of weighing and rationing has reached the stage when nothing much can be done to improve it. The only thing we could do in our plan would be to standardize the fittings and design of building so that the greatest economy in plant would be effected. I think it advantageous to include a straw loft over the pigs, as this helps to maintain an even temperature without resort to too much artificial heating. Providing fattening pigs with sufficient warmth so that all the food will go into development is the key to successful fattening.

The war has shown us that pigs can at least be kept alive on foods we would not have thought of using in more prosperous days. It would be the job of the headquarters to utilize everything they possibly could which might otherwise go to waste. There would be the whole of the ten acres of barley to be transformed to meal, the milk residues, a certain amount of green stuff, the chaff from the beans and the remains of the potato crop. To this would have to be

added a proportion of purchased protein, and for this purpose the fish-meal industry is already available.

Swill is certainly a messy business, but it does give results. On units where swill was obtainable it would be advantageous to use it. In far-off rural districts the plan could well include a sty in the garden of every house into which the householder could tip his swill with a certain amount of meal purchased at cost price from the estate. These garden pigs could eat up the surplus of the garden and provide considerable manure. All the straw on the farms would be baled, so it would be easy for the householder to cart down a few bales of barley straw and provision could be made to store this in the sty to provide warmth. When the garden pigs were fattened, the householder could have the option of cashing in the pigs or getting them cured by the estate curing plant for his own use.

Whether we should stick to the old Danish grading system or not is a matter of some importance. Personally I believe we should increase it slightly. The feeding I have described is on rather austere lines; that is to say, the pigs are going to be asked to eat less concentrated food than they have before. Now a pig so fed does not really start shooting up until he is sufficiently mature to be able to cope with this type of feeding and that period roughly coincides with the time when he reaches the present bacon weight. Thus the pig is being killed at the very moment that he is best able to utilize scrap.

The Scandinavian races developed an ideal type for bacon, a long lean pig which cures out to a good flavour. We have, in this country, developed the large white pig on similar lines until it has become a first class bacon pig. However, the pig on the standard farm will be needed to clean up the by-products of the farm, chat potatoes, vegetables and bean chaff, etc. It will thus be eating a bulkier ration than on the old Scandinavian system, even though a portion of purchased protein such as fish meal or soya bean meal were added to the ration. The result of this use of waste food in the ration would mean that pigs fattened at a slightly older age than in the old days, and therefore it might be better policy to breed for a type slightly differing from what was required for the ten score pig of the Danish type.

We have besides the large white a great many other breeds of pig. I have already pointed out the beneficial effect of crossing on early maturity and therefore it might be a mistake for this country to concentrate on one breed, for by doing this we would lose the valuable economic possibility of the first cross. However, according to the

plan I am outlining there would be no place for pork and thus the tendency would be for the various pedigree lines to concentrate more and more on the bacon type, while the purely pork pig would drop out.

The breeders of this country being the breeders they are, we might expect to see the development of several different breeds of pig of excellent bacon quality and of a type suitable to use scrap. These breeds would form a wonderful selection of blood stock for breeders all over the world. I have mentioned already how light coloured animals will not do in tropical countries, and the white pig is a typical example of this fact. A standardization of large whites might, besides doing away with the possibility of the pure line cross, have the effect of limiting our foreign sales of blood breeds and these foreign sales must not be lost sight of in any agricultural plan for the future.

To reduce this preamble to the terms of the plan, it would be desirable for different estates to adopt different breeds and for some to use crosses of these breeds. If this were done, we might find pedigree strains of Large White, Wessex Saddleback, Large Black, Tamworths, over the country, while in their traditional localities might thrive longer and more bacony Berkshires, Middle Whites, Welsh, Gloucester Old Spots, Lop Eared Whites, Lincoln Curly Coats or Cumberlands.

Output, as with other forms of produce on the estate, would be governed by the demand of the consumers tied to the estate through their shop, and also by the amount of bacon bought in under contract from farms outside the group or from abroad. For instance, a 2,000 consumer group demanding one pig per head per year of bacon products would necessitate the annual production by the mother pig farm of 2,000 pigs. Each one of the ten flavour farms would be required, therefore, to fatten 200 pigs and the estate bacon factory would be organized to cure 2,000 pigs annually. Thus all departments could be dovetailed in to work economically with each other, and could eliminate the usual pig cycle of boom and slump. (The figures I have given are probably excessive. They would mean approximately 4 lb. of pig products for each consumer per week—the present rations are 4 oz. per head for civilians and 1 lb. per head for the Army.)

I have tried to show, in Chapter I, what practical difficulties

there are when poultry is kept intensively. Egg production is beset by difficulties as a single track occupation and requires a masterly business brain to make it even remotely profitable.

The only way to combat these difficulties is to establish a steady demand, to fix prices in relation to production costs, and to run the hen as economically as possible. On the standard farm labour can be saved by having a central poultry breeding farm run by experts. Keeping the flock on the individual farm at constant level by intakes from this centre, the standard farm would not have to concern itself with the intricacies of breeding or know any more about hens than how to collect the eggs, to tip-feed out of a bag, and how to wring the neck of any fowl that did not appear to be pulling its weight. These simple operations could be accomplished by the farm staff in the ordinary routine rounds, and thus no extra wages would be incurred on egg production.

I could not lay down the exact size of a flock, as this would depend on local conditions of climate, soil and average demand, but about one hundred pullets and one hundred one-year-old hens would be ideal. I should say that from the experience of the past, one could lay down a definite standard of equipment and procedure governing the method of keeping.

The hen in these islands does best in the summer on really free range, whilst during our winter she pulls her weight best indoors. My plan, therefore, would be to keep the hen out in the summer and in the winter to keep her indoors. In the summer she would have a standard type of house to lay and roost in, which could be easily transported round the farm and would, in fact, follow the dairy herd round the rotationally grazed fields, ending up the season with a good scratch on the stubbles. Apart from her laying house she would be entirely free. The only objection to. this plan is the spread of avian tuberculosis. However, this must be already spread by the vast number of rooks, starlings, sparrows, and other birds which visit our farms. This is, of course, no excuse for aggravating the disease by keeping hens. I do not see why immune breeds of birds could not be selectively bred in time which would be probably all the healthier for the absence of this disease; indeed I rather think an immune breed had been found at a research station which I once visited in Denmark. Certainly the system I am outlining would be ideally suited to keep the hens free from tuberculosis, for it is the dark, wet, winter henhouse that starts the trouble. During the hens' winter in-

carceration in the laying pens it would be possible to test each fowl for T.B. and reject any reactors. This test should be sufficient to keep the flocks free from disease, and the resulting eggs could accurately be described as 'from tuberculin tested hens'. But the extra trouble would necessitate a slight rise in price; I would estimate that a penny a dozen would cover the cost of examination and the loss through rejected birds.

The hens on this system would be allowed complete *laisser-faire* although it would be advantageous as the farms grew in completeness to net the various enclosures so that the hens were confined to the field on which they were required. They would draw their water from the same supply as the cows and their ration would be scattered by the man or woman who collected the eggs. With this system and the constant moving of the hens from field to field, they would never have time to make the supreme mess hens like making, nor could rats and other vermin have time to make elaborate networks of holes under their houses, nor would the houses themselves kill off the herbage in weed-producing squares. Moreover, the hen would have the grass left short enough by the cows to make easy eating and their droppings would help the general soil improvement.

In winter the flock could be conveniently housed inside a battery layer in the loft of the farm buildings (again of standard design). These laying pens can be mechanized to such an extent that there is very little labour left for the attendant, and they have the advantage that a complete record of the hens' activities can be accurately obtained. Thus all bad doers would be spotted annually and removed. With electric light, heating and constant food the hens would supply the maximum amount of eggs during the winter months under the most sanitary conditions. As mentioned the system would enable the control of T.B. It is true that the hens would be deprived of exercise, but anybody who has seen a hen sitting knows that she is mentally and physically equipped to deal with this situation, so the system is not so drastically unnatural as one would imagine.

The flock would consist of pullet and second-year birds; after that age they would be culled as older birds are not usually profitable. Age could be identified with rings. Once the correct numbers of the flock had been established, the unit could draw on the central breeding farm for intakes to keep their flocks up to the standard: thus the farm poultry department would remain constant, and be more or less equally divided between old and young birds.

I do not think it would be advantageous to record laying when the hens were out on grass as it would entail unnecessary work and the winter period in the battery brooder would be a complete check on the whole flock. Moreover, pullets starting their career in the battery layer in the late autumn would be under observation for a long enough period to discover whether they were going to be profitable or not.

At all times the attendant would be on the look-out for sickly or unprofitable birds, and when these were discovered they would be eliminated at once. The whole-time poultry farmer is often tempted to doctor birds for various reasons. He wants to pull them round; or perhaps he does not wish to reduce his stock; or he has had a difficult time in rearing with considerable losses and thus his remaining birds seem very valuable. With this system these desires are eliminated as he can draw fresh recruits from the mother hen farm at will.

This reasoning is perhaps not very clear, nor is it easy to clarify the universal tendency to hold on to things at a loss and to be incapable of cutting out dead wood, for it arises from a variety of mental reactions and natural complexes. A film producer is usually a bad cutter, he clings on to bits of his films which he fancies or which have been laborious and expensive to produce. A writer forms pets of some of the chapters in his books or of certain phrases. These men are unable to separate themselves from their brain's children. A fresh cutter or reader has no associations, he sees the play or the book clearly, the diversions merely annoy him and he cuts them out, and so should the man who draws his hens from an outside source. The poultry scheme which I have outlined overcomes most of the economic difficulties of poultry keeping. There is no extra charge for labour; or, if there is, this is only a slight extra payment to someone already employed and not payment for a whole-time job. The birds have, at the proper time of the year, more freedom than on any other system, they have the run of the ground which being in a perpetual state of rotation is never sick, they are presented with the maximum opportunities of feeding themselves, so the summer ration is reduced to the minimum. During periods of bad weather they are put in a position which frees them from having to utilize' their food on keeping themselves warm or exercising themselves, and enables them to devote the bulk of their food to producing eggs. Moreover, in the cages of the battery laying plant they are cleaner and more likely to keep healthy than

with any other intensive system. There is a very reliable and trouble-free method of weeding out the unproductive hen—in fact, there cannot be unproductive hens on this system, while it is probably the only method by which T.B. can be accurately checked. The bulk of their food is home-grown on the farm and produced under conditions of extreme economy, i.e. the cheapest method of growing and harvesting cereal crops, while the system of the farm ensures that these crops will be maximum. All the feeding stuffs, home-grown and purchased from outside, are manufactured by the estates cattle cake machine into pellets, and this is the most economic method of feeding food to hens. I do not think it possible with our present available knowledge and climate to produce eggs by a healthier or more trouble-free system.

About breeds I need not say anything, for the remarks that I have made about other livestock apply to hens. Personally, I like active hens which forage about looking after themselves and lay good-sized rich-yolked brown eggs, but these are only personal preferences and have no place in an attempt to draw up an unbiased plan.

There is no doubt at all that sufficient eggs could be produced by an estate to give ample fresh supplies to their customers. Clearly, the figures depend on individual data, and are impossible to calculate or to arrive at without working the scheme in practice. For instance, an estate might find that their hens each averaged 200 eggs per year and that their consumer demand was approximately four eggs per person per week, that their best selling line for the culled two-year-old hens was chilled chicken pie manufactured from the breasts of the hens, while they had a demand for chicken soup made out of a stock composed of wings, legs, etc., and that for these purposes they required 1,000 hens a year. Such an estate would aim at keeping 200 hens on each farm and culling 100 a year. They might also have a demand for egg powder or preserved eggs and might find it better policy to tie themselves for this product to outside producers; or, alternatively, they might have a demand for cold roast fowl from second-year birds and find it fitted their scheme to raise more pullets for this purpose and use their spring egg flush for preserving before fattening for table. Or again, there might be a demand for a first quality table bird, and it would be necessary to produce, in addition to the stock egg producers, a game cross especially bred and fattened to fulfil this luxury demand. Perhaps there would be a sale for *petits poussins* and it would be advisable to keep cockerels for this purpose.

Again, the shop might find a sale for Christmas turkeys, geese or guinea fowl and these would be incorporated in the scheme in suitable quantities, or, again, some of the farms might have facilities for duck rearing or have a local demand for bantams. Thus the combinations and requirements, varying from estate to estate, would be impossible to estimate nationally. Suffice it to say that by the system I have outlined there should be sufficient fresh poultry produce for everybody in our country, although we would probably always have to import processed eggs for cooking purposes.

I have not given details of the 'mother hen farm', as this opens up a number of technical questions—such as whether chicks should be sex-linked or sexed by eye—and these questions would probably differ from estate to estate. Probably the mother farm would be linked in the same way as the seed farm to a special producing unit and this in turn would be linked to a grid of such units. Exceptional birds would probably be drawn back from the various estate farms for stock.

A small part of the farm should be put aside for vegetables, small fruit and orchard. This might be laid out in three one-acre plots—one for the orchard, one for small fruit, and one for vegetables. The small fruit and vegetables would be changed over every fifteen years and the orchard every thirty, forty-five or sixty years. The use of these plots would depend on the consumer's demands. As an example, a quarter of the vegetable plot might be under strawberries and these would progress over the acre every three years or so—they might be followed by celery in trenches, leaving the ground in good heart for intensive vegetable cultivation. The small fruit might consist of raspberries, black and red currants, gooseberries, loganberries and blackberries. Most of the cultivations could be done by horse. The labour employed would depend on the farm, but usually the work would be carried out by the various families assisted by the regular workers.

Concerning the orchard, in most parts of the country it would be preferable to grow cooking apples and toughish varieties of plums as our friends in Canada, The States, Australia, New Zealand and Tasmania are already producing very fine eating apples and have the requisite climate for this crop. Moreover, the more bottled sunshine we can import into this country, the better.

Cooking apples, on the other hand, grow very well in this country;

we have a suitable climate to create good keeping qualities and with suitable storage and with proper marketing our cookers would form a cheap and good winter food. I 'nap' standard trees for our little farm orchards, as the intensive production of fruit with bush, half standard or cordon, is a specialized business already ably practised by good growers in suitable districts; moreover, these methods of cultivation would spoil the ground for young calves, and the little orchards are just the places for the baby cow to play around in.

There would also be in time, as the land became fertile, part of the rotational field of root crops, and this could be devoted to three acres of early potatoes which would, like the main crop, be chitted before planting in the glass house.

The farm should be good grazing for bees; fruit blossom, white clover and bean flowers are there in rotation and costing nothing. Every farm should have its apiary. Whether these were the property of the farmer, his men or the whole unit would depend on how the supply of enthusiasts went round; some people are not bee-minded, but whoever owned them or tended them, they should be there.

Personally, I have plugged away at mushrooms for a number of years with mixed results. I have had, finally, to give in owing to the national urgency for austerity crops and the unpatriotism of using fuel for luxury produce; but I now know how to grow them, and when peace comes I will grow them in new houses built from the mistakes of the past—and I shall grow them with confidence. I believe we could grow 900 lb. of mushrooms per horse annually—they should sell at two shillings per pound or £180 per two horse farm. They should be managed under trained estate supervision by the ordinary farm staff.

The small potato chitting house would also produce tomatoes and a winter crop of chrysanthemums or a Christmas crop of bulbs in bowls.

When we discussed 'water culture' I expressed the opinion that there was a future for it in a mild way on the flavour farm. I believe we could on some of the estate farms have suitably designed troughs which could be put into the chitting houses the moment the potatoes came out, and in these crops of flowers could be grown. The advantage would be that it would not be necessary to break up the 'floor' of these houses which could be covered with concrete and disinfected before the potatoes were boxed in them. In this way the houses would be utilized to the maximum.

I know as I write my farmer friends will be laughing; 'What the hell is farming coming to, mushrooms, bulbs in bowls; he will suggest us growing truffles next.' My answer is, 'Why not? If they can be grown and the public will buy them.'

I have planned the farm to be heavily mechanized and fully staffed, so there will be time to grow profitable sidelines which the public want, and for which, by this plan, there will be a profitable sale. That is the whole design of the plan, to use a quantity of labour on the land in a manner to produce highly profitable returns for their labour. That is the only way that our agriculture will ever get a place in the sun. Intensive mechanized production by highly organized producing and selling groups! The layman who advocates large farms hashed over by expensive machinery to produce common crops is advocating a policy for an unpopulated country, not for forty-seven million people in Britain.

Chapter Ten

CROPS EXCLUDED FROM THE PLAN

Sugar Beet versus Cane—Milling Wheat—Flax and other Crops

Several factories have been started throughout the country for processing the sugar beet crop, and a considerable amount of success has been achieved in the industry. Moreover, the factory dries and resells the beet after processing to the farmer. This dry beet pulp when flavoured with molasses forms a palatable ration roughly equivalent in feeding value to kale.

The beet itself has a long tapering root which helps to open up the subsoil, while the method of thinning and weeding the crop keeps the land clean. Thus farmers on the old Norfolk four-course rotation have been able to substitute beet for roots and this has enabled them to carry on profitably at times when the feeding of sheep on roots has been unprofitable.

The price of sugar is the same whether it is derived from beet or cane, but the manufacture of sugar cane presents many economic factors which it will never be possible to introduce into the cultivation and manufacture of beet. The planting of the cane crop, which is grown from cuttings, is less laborious than the thinning of beet. Moreover, if it is desired, a volunteer crop of cane can be had the next year from the stools of the first crop and although this means a decreased yield, that yield is still often ahead of a sugar beet crop grown in the ordinary laborious way. Sugar cane may rise to twenty feet in height and under favourable circumstances has reached fifty tons to the acre. The beet crop is grown from seed, it is biennial in habit, and, therefore, gives ample scope for improvement by breeding. It has, in fact, been scientifically bred for a very long time. By selective breeding, the sugar content has been raised from 5 per cent to 17 per cent, a level at which it has stayed stationary for a considerable time, and one need not, in fact, look for any startling improvement. Sugar cane, on the other hand, has for generations been cultivated asexually from cuttings from wild original stock. **It**

is only in recent times that experiments have been devoted to improving the stock by breeding. Rapid strides are being made, and it is safe to say that the cane industry has a long way to go until it reaches any limit of improvement.

A comparison of yields per acre is interesting; the European beet yield has, under good practice with carefully bred seed, averaged one and a half tons of sugar per acre, while the cane average of Java from unimproved cuttings has yielded four tons to the acre—which means that some plantations must have been touching as high as five or six tons.

Sugar beet travels much better than cane and keeps for an appreciable length of time. The tendency, therefore, is for cane mills to be much nearer their supply, the heavy yield of cane per acre making this economically possible. Thus a saving in transport is effected against beet factories where the supply is often drawn from considerable distances. 'Megas', the crushed cane, makes excellent fuel and this by-product of sugar can be used economically to produce the necessary heat and power for production, an advantage which the beet factory lacks.

In the 'sixties of the last century the beet industry adopted a system of extraction by diffusion of the beet instead of crushing, a system which saves a great deal of labour and made possible the extraction of as much as 95 per cent of the sugar. The cane industry were unable to adopt the diffusion system, since cane is more difficult to slice up and the added water impairs its qualities as fuel. So for some time the beet became nearly as economical as sugar cane. It was not long, however, before the cane crushing mills had improved the efficiency of their plant up to 90 per cent extraction and over; they are able, moreover, to use surplus 'megas' in the manufacture of insulating board.

To summarize, it would seem that the sugar beet industry has got the end in sight both as regards sugar content and sugar extraction. Their only hope is for farmers to grow more beet to the acre, but this will not improve their position very greatly as transport costs are already heavy and will not get less for each additional ton grown. As regards sugar cane, it seems that improvement in yield of cane per acre and processing are reaching their limits, but they still have a long way to go in improving sugar content.

It would appear that the sugar cane is a vastly superior means of producing sugar than from the sugar beetroot. I have not mentioned

acreage increases, though it would seem that there could be considerable acreage increases in the sugar cane business.

There are also other sources of sugar, the sugar maple of Canada with about 11,000 tons annual production and the Palmyra Jaggery, a native Indian palm which is still comparatively unknown and undeveloped.

I have now given reasons why I do not think it would serve any useful purpose to foster the development of sugar beet, but that does not mean that in certain parts of the country, where conditions are particularly suitable and alternatives are difficult, it could not be produced economically.

In Denmark it is, or rather was, a paying proposition. In its natural state sugar beet is a seashore plant, hence its long tapering root. It therefore does best in light soil and requires a mixed grill of minerals. In nature it extracts these from the sea air and water. There are places in this country favourable to its economic growth, but as these districts only represent an infinitesimal amount of our agricultural land its inclusion in this plan would be misleading.

I have gone into the sugar question fully so that my reasoning may become clear. It would seem that the inequalities in the cost of beet sugar production are too great as compared with cane sugar for us to make beet an agricultural prop in a national plan. We have, also, a duty towards our own colonies and this should be a deciding factor in any future plan. It is not economic for them to supply us with fresh milk, butter or potatoes, but they can produce sugar cheaper than we can.

What I have said about sugar beet holds good for wheat; it can be produced cheaper elsewhere, and we have not, moreover, got a good climate for 'hard' wheat. There are certain favoured districts in this country where hard milling wheat can be economically grown in competition with foreign supplies, and these should be encouraged to grow it, while the rest of the country can, with advantage, use their soft wheat to feed their hens.

I have excluded flax from the plan although I think the growing of a small quantity of linseed on the standard farm would be an advantage. I have not included growing it for straw for the reason that I am not sure really that we want to grow it. Before the war the end of the table-cloth fashion had a devastating effect on the linen trade.

It sounds absurd that such a small fashion should influence a comparatively large industry, but it seems to have done so, and one must be rather cautious about including anything in a far-reaching plan which can be so easily blighted by such a simple cause. It might be thought that the table-cloth fashion could be revived again, but observations of the past rather go to show that fashion is not always influenced by propaganda, once an article has been discarded. Customs often die hard, but when they die they seem to remain dead.

There are besides the crops that I have mentioned several more or less local crops, such as hops and malting barley, which are already flourishing and can be made to flourish as they are drawing their money from the brewing and distilling trade who seem to be able to stand up to very hard knocks. There would seem to be no hardship and every advantage in protecting these crops against foreign competition as they are used for a luxury trade and one which is, moreover, in a position to pay well for its raw material.

Chapter Eleven

THE FARM BUILDINGS

The General Lay-out—The Farmers' and the Labourers' Houses—Fashions of the Past—Electricity—Sewage—Refuse and the Pollution of Water

The farm would contain buildings to house the equipment and covered courts to hold the dairy herd at different ages, or else, in the case of smaller units with insufficient straw, cowsheds, and boxes to house the calving cows and the horses. Some farmers will say a horse is better kept in a stall than a loose box, but I can see no advantage in a stable and the loose box gives a horse more scope for movement and rest. There is no great difference in the labour involved in cleaning out, and it is better for a horse's health to be free than tied in a stall. In the case of the flavour farm I have already mentioned the possibility of horse breeding, and the loose box is a necessity for foaling.

We have detailed the requirements of a milking parlour and other rooms in connection with the milk supply, and I mentioned that there should be a barn to hold the baled hay and straw, also suitable cellars for the storage of roots and potatoes.

Over one of the buildings there would be a sizable loft in which the battery laying plant would be used during the winter. It would be an advantage to use this loft also as a temporary granary, as it would be sometimes necessary to hold stocks of grain on the farm during harvest until the central drying plant could deal with them. In order to save labour for such a purpose, it would be well to instal an elevator and band conveyor so that the grain could be tipped in at the bottom and deposited where required, also to have a shute to take the grain out of the loft into a cart. During the period the grain lay in the loft it would require turning, and while this could be done mechanically it would be hardly worth while, as the existing staff could manage the work. It is interesting to note that it is possible by constant turning to dry off combined grain without any artificial heat, a process which I have adopted for grain to be used as seed and which would

appear to be akin to the usual drying of grain in the stack with the advantage that there is less waste.

I have mentioned in connection with potatoes, the small glass house that would be required to sprout the seed tubers and also that this house could subsequently be used for the production of tomatoes, cucumbers, melons or whatever the unit required. Moreover, during the winter rest period of the potatoes, a crop of flowers could be taken. The requirements of the pigs and poultry have been dealt with in their appointed places.

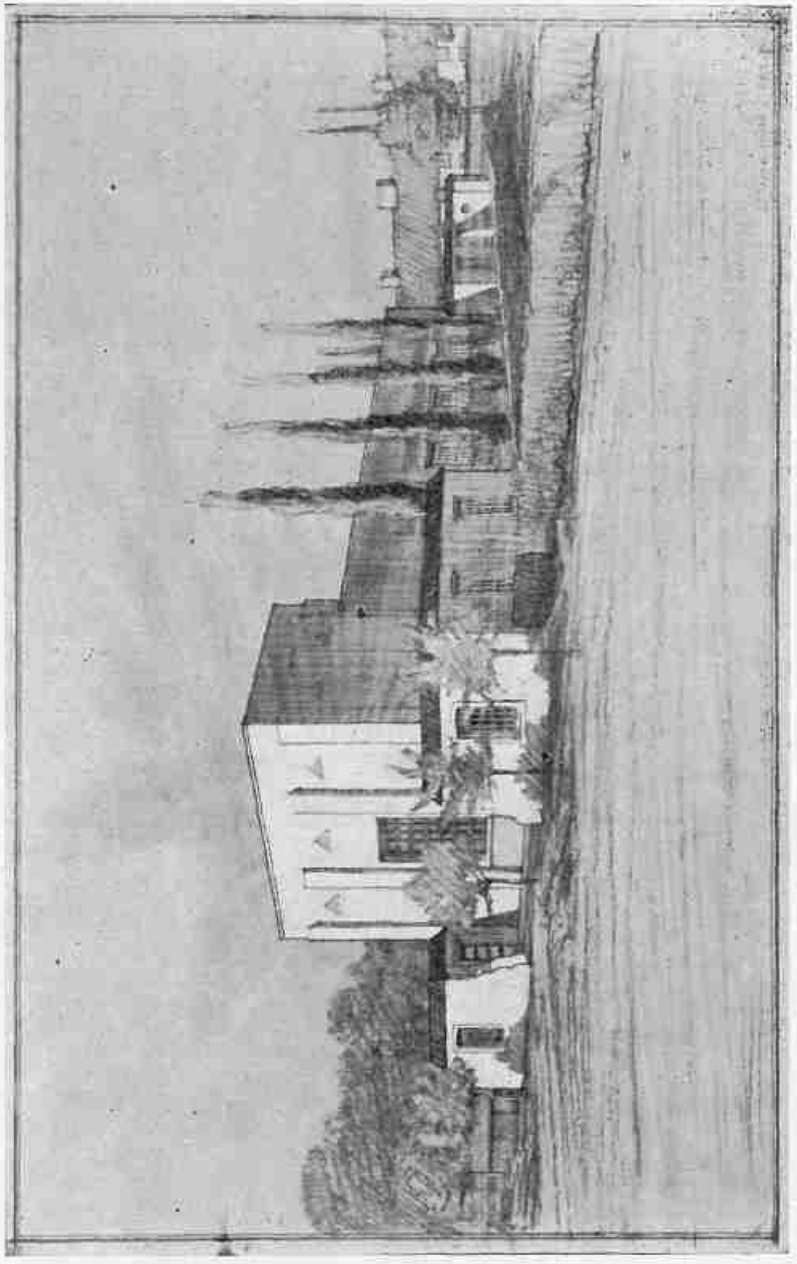
With regard to domestic housing, rural workers are probably more in need of good houses than anybody else in the country and in any plan a housing programme is a vital matter. It has been said that after the war temporary houses will be provided, so as to get a move on as quickly as possible, and also that experiments may be undertaken with the 'new materials' to know how best they may be used. That sounds all right if you say it quickly, but there seems no point in putting up houses 'deliberately temporary'; even a Nissen hut as a dwelling would require levelling of ground and the provision of water, light, and drainage. Why not go further and put up the right type of house at the beginning, even if it meant going without good houses a little longer? The people of this country are surely accustomed to out-of-date houses by now. The idea of putting up a house which you know is not ideal but makeshift, seems very half-hearted. As regards the argument that we don't know the best use of the new building materials—heavens above! we have been building houses for hundreds of years and if we don't know how to build a house now we ought to. Unless somebody has a 'secret weapon', the new materials are steel, concrete, asbestos sheeting, steel framed windows, concrete roofing tiles, prefabricated plaster board and synthetic resin fittings. Surely they have been in use long enough for us to know how to use them. There are, indeed, elaborate technical books carefully worked out for stress and design for all these newish materials. If on the other hand the new materials are to be hit and miss experiments and if we are to try and find an entirely new formula for a house, such as making them of glass, steel or doped aeroplane fabric, my prayer is that I don't have to live in one. I have no doubt that in towns there will be a big effort to prefabricate houses in factories, a system which already has been undertaken with timber houses in foreign countries. Possibly we could do the same in concrete, or it might be possible to transport practically entire houses in the same

way that Kaiser is transporting large slices of ships in America.

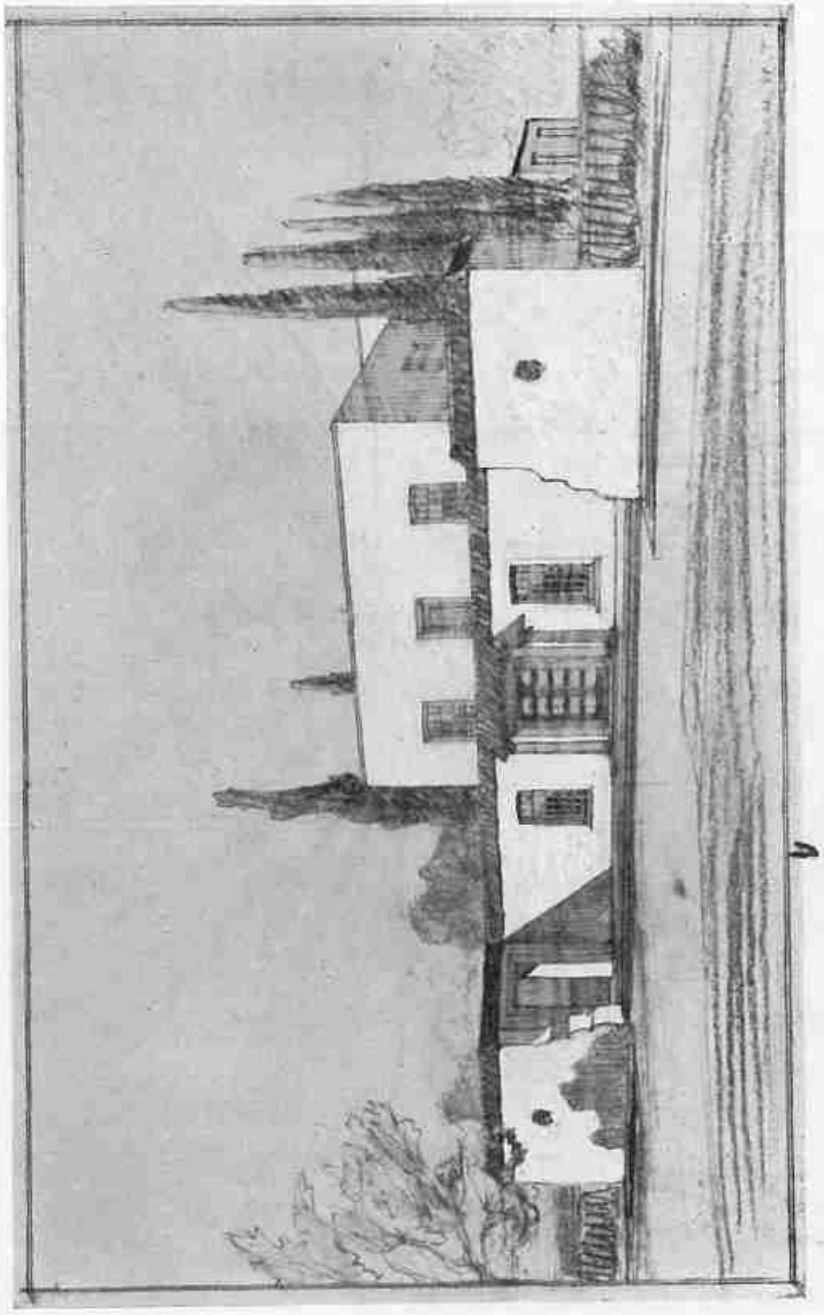
All these methods may be possible in a town, but in the country we could do far worse than stick to our traditional materials. We are not a forest country and therefore the timber house is not necessarily so economic as it is in a country where wood is as easily obtainable as dirt in a train. We have our brick houses in clay districts, our stone ones in stone districts and our half-timbered ones in slightly more timbered districts. I have lived in each of these types of houses and found them warm and comfortable. They are, moreover, naturally in good taste and artistic, for true art is the expression of beauty in the simplest way. I think the rural planner would be very ill-advised to give up these conservative materials. A steel window may, for instance, let in more light, but when it breaks it is not so easily repaired in a country district as a wooden one. Concrete, again, is of great use in building and the materials for the aggregate are usually easily found in any district; however, for walls it is by no means ideal, and where good bricks are obtainable they are a better material. Until the present era each successive 'progress cycle' found a formula for the construction of its houses, a plan which pleased people both in appearance and in general convenience. They fitted their houses to their methods of living and to their idea of beauty. Each fashion era developed styles of building and construction based on experience. The utilization of available materials and of standards of individual technical skill, and the combination of these factors created at the height of the cycle, perfect houses—so well constructed and designed that they lived on through the subsequent changes of fashion.

Our country bristles with the housing fashions of the past. Examples of Norman, Tudor, Stuart, William and Mary, Queen Anne, late Georgian, Victorian, Edwardian, Baroque and Scots Baronial may all be found with ease throughout the land. Many of them are still lived in, and if they are run in the manner for which they were constructed they provide efficient and comfortable dwellings. This statement is the key to future housing, especially rural housing where conditions change slower than elsewhere. A brougham is a very useful vehicle for the purpose for which it was designed. If one fits it with a combustion engine it fails as a good carriage or a good motor-car.

The masons laying the stones of the house in which I live were discussing the massacre of St. Bartholomew. They built a house completely economic for the purpose for which it was built and the



'It would be proper to have a good hall . . .'
Drawing by Grey Warnum



'. . . for dancing, cinema, theatricals, flower-shows and what not . . .'
Drawing by Louis de Soissons

customs of living prevalent at the time. To-day, because of my efforts to keep up with the changing fashions and modern design of living, it is thoroughly uneconomic.

I have spent many happy days in a Tudor farmhouse. The owners have had the good sense not only to leave the house exactly as it was, but to adopt the Tudor manner of living. The result is astounding. The main living-room contains a vast fireplace on which it is customary to burn three- or four-foot limbs gathered from the neighbouring woods. The fire is lit in the evenings and gives enough heat to warm the whole house; it also emits sufficient light to see comfortably by and at the same time provides ample heat to cook the one hot meal of the day. The roast is eaten practically straight off the spit, so there are few cooking utensils required or dishes to wash. When the fire burns low, the time has come to go to bed. It is amazing in these complex days to see how simply and comfortably it is possible to live.

You must not think that I am advocating a return to Tudor times, I am only trying to show you a point that I have never seen demonstrated before and one which I believe to be food for a great deal of thought in the present period of change.

I say again, men of every age except ours have found an economic method of housing themselves in accordance with their outlook and method of life. For a decade we have wandered in a circle without finding expression, we have chased after the habitations of the past endeavouring to suit them to our modern life. Now there can be no purpose in breaking good glass into small pieces and leading them into diamond-patterned windows. There can be no sense in building high Tudor chimneys to serve a twelve by ten-inch grate, or in making concrete look like stone.

Again, we have cast aside the natural idea that a house is the focus point of civilization, and it must, therefore, be as perfect as our hands and brains can manage to form it. Thus we have erected houses because they were cheap. Further, we have used new materials wantonly because they were new, putting in windows covering the whole side of a house because glass of that size was obtainable for perhaps the first time.

The point I believe we have all missed is, that you cannot design a suitable house for a method of living until you know what method of living one is going to adopt. At the moment we have not formed a design of life, we are still bubbling in a melting pot of aims and

ideas. Are we going on with family life? Are we going to become completely urban and completely rural or are we going to mix the two? What are we going to do with our leisure? Is it to be spent at home or away? It is not until these points are known that we are likely to design houses suitable to our needs.

Fortunately, in this plan my job is a simple one because I am putting the plan forward from one angle—how to make agriculture a complete and prosperous way of living. Therefore, I can say the house for this plan can be designed for a definite mode of life, which you may describe as family-stay-at-home. We can thus sketch out the house the right way. In structure and design it must not be standard, but suitable to local needs and conditions which have been discovered through generations of inhabitants, having tested out easily obtainable materials and designs of construction. It must vary in design and size from farm to farm thoughout the estate. It is uneconomical for a newly-wed couple to be let loose in a house designed for eight people. Again it is asking a lot of a large family to shove them into a couple of rooms, whilst an old couple might prefer a form of flat. It would also be necessary to provide accommodation for temporary workers or holiday workers, a type of worker we hope to see again after the war.

It is obviously impossible to cope with all these desires in a small farm, but by linking ten farms into an estate the houses can be arranged in suitable sizes from farm to farm. Thus the correct amount of labour can be housed comfortably whether it is supplied from families, by bachelor boys or girls, by newlyweds or childless couples.

The farm housing, for economic reasons, would have to be tied to the individual farms, but at the estate centre there should be a village which would combine free houses, rented houses and owner-occupier houses. Thus a man wishing to own his own house and not minding a good deal of walking to and from his work could do so, or he could retire to one.

There have been a number of suggestions that farm workers should run a smallholding in addition to their work on the farm, selling their produce as a sideline. I understand this is the case in collective farms in Russia. If you have followed this plan you will understand that such a step would not only undermine the whole structure, but would mean that the plan had failed, for one of the principal planks of the programme is to enable the worker to obtain more than a

living wage for reasonable and not sweated labour. However, in certain ways the individual householder could take a profitable interest in the estate.

I suggested raising a pig on scraps, they could also buy a few hens, cashing them in when they had passed their useful stage. The hens should be kept in a battery layer, for hens in backyard runs, when the run gets fouled, cause all concerned a lot of heartburning.

A man interested in plant experiments might be paid by the mother seed farm to try out some of their new species which required special care or isolation, whilst a flower enthusiast might go in for special flowers for which there was only a limited demand, such as orchids. In any case, the houses would have a large garden, a small glass house (yes, a small glass house), and a good shed to keep bicycles in or be used either for hobbies or as a domestic workshop.

The layout of the house itself depends on what sort of fuel can be used for heating and cooking; I believe if we harnessed all available water supplies and made electricity at the pithead, we could build up a grid which would supply everybody at an infinitesimal cost, and would in time pay. I believe also that we are wasting a great deal of energy in heating and lighting by creating rays which are of no use to us, but I have hope that we will devise more economical appliances. It is not so long ago that the gas-filled lamp cut down the consumption of the wasteful carbon, and to-day new gases are giving still more light for less current. There is also probably some method by which the waste of current in heating could be minimized. If only cheap electricity were available everywhere we could have an all-electric house of revolutionary design. For instance, chimneys as we know them would be replaced by ventilating and fume extracting ducts, whilst a number of gadgets would be incorporated to save a considerable amount of labour.

Let us hope that one of the first peace-time aims is to arrive at a universal voltage. It is so obviously one of those standardizations—like rules of the road and weights and measures—which must be universally adopted before any proper progress can be made.

The arrangement of rooms in a house depends to a certain extent on fashion and on custom, varying from district to district. Some people, for instance, like living in the kitchen and others prefer to have a parlour. I believe the question of parlour versus kitchen' is simply one of heating, it being expensive under present conditions to keep fires going in additional rooms. With the advent of electrical

heating the parlour would come into its own, but if we are to go on heating with solid fuel the house with a large kitchen will be the most popular because it saves labour and expense. Again, if cheap electricity were available, we should plan our houses to have hot water in every bedroom, while night and day hot water would be available for the bath.

The hostels for single employees could be designed on standard lines, and a lot could be done to make them more comfortable than the average one is at the moment. The hostels for single workers can be standard, but the houses must vary with the locality. A long train journey through any country will show you how houses alter in design according to climate. A standard design of house means that only those houses built in the peak zone of the design are comfortable to live in, while the others become increasingly unpleasant the further north, south, east or west they are built from the ideal zone.

There is one point upon which we must be careful, and that is the disposal of sewage. Before the war, in rural districts, we were putting in bathrooms, lavatories and sinks as hard as we could and disposing of sewage through a septic tank to a ditch or water course. The effect of this system is already apparent, our rivers are becoming more and more fouled and our ditches smell in the summer time. It is a practice so far reaching in effect that the planners of rural housing must face up to it and the problem of the isolated sewage system must be solved.

To my mind the solution seems to lie between two alternatives. The first is to experiment with a system of earth-closet and filter-sump which will convert the waste materials back into fertilization and at the same time be so arranged that it compares favourably for handiness and sanitary hygiene with the water system. The second alternative is to develop an improved sewage disposal plant which will be sufficiently economical to be used by the farm and its satellite cottages. I am not sufficiently qualified to say how these things could be constructed, but I know they could—and must—be designed.

No violent attempt has been made to stop river pollution on a nation-wide scale, but the subject is as important as housing itself. Before any further housing scheme is started the question will have to be decided. We cannot see river after river and stream after stream becoming polluted until to drink from any open water course in our fair land is to invite an attack of typhoid. The small house is not, of course, the only offender; the factory, contributes its waste. lt is the

old story of 'materialism'. We will plump for immediate gain without caring what sort of world we bequeath to our children and grand-children. To deal with this waste and pollution rural houses must have a 'Grid' for their scrap. We cannot allow generation after generation to chuck their tins amongst the wild hyacinths of our woods or let their used cycle tyres rot in our streams. The supplies are admittedly so great that they will see us out, but what of the distant future? It is outside the scope of this book to suggest methods of collecting, grading, processing and storing our scrap in standard ingots or bales, nor is it likely that such a plan will be put into action when hostilities cease. Rather with our day to day haphazardness will the woodland piles of tins return, while the roads and fields will be again littered with the coverings of cigarettes, the giant excavator will scoop out our mineral resources and the forests will be raped for their pulp. Yet salvage could be made a paying proposition and a new version of the old iron or rag and bone man appear, in the form of a special lorry fitted with weighing machine and tin press which would take the graded scrap from the householder at a fixed scale of price for weight. He could deliver to the process plant, and the scrap re-converted would be ready for the manufacturer. Thus we could eke out our dwindling raw materials.

Chapter Twelve

THE ESTATE

The Estate Centre—The Granary—Repair Shops—The Packing Factory—The Laboratory—The Sawmill—The Social Centre—The Manager—The Satellite Farms

The estate is, I think, a better name than group or unit to indicate the activities of the organizing centre and connecting link between farms and shop.

The estate will control ten standard farms and a double estate would control twenty. The extreme limit would be twenty, for after that point the difficulty of increased distances and the number of scattered components all tend to pile up against supreme efficiency; the economic value of the scheme would be lost and the standard of living, automatically, cut down. The estate therefore, can be a double or single unit. On estates where the farms are let to tenants or privately owned by individuals co-operating together, it is better to have two units, that is to say, twenty standard farms; but where it is run as one concern by one individual proprietor or company, it would be most efficient as one unit, that is to say, ten farms.

In addition to the ten standard farms, the estate would contain the mother farms for the stock supply of pigs, poultry and seed. It would also have a proportion of woodlands, while possibly portions of the estate property would be used for other purposes either because they were especially suitable for some particular purpose or because they were geographically difficult to include in any one of the farms. For instance, there might be marsh ground where osiers could be grown and used in the making of baskets. Again, there might be isolated portions of rich soil specially suited to the growing of flowers or early vegetables.

The centre might be entirely new or it might conveniently be part of, or arranged round, one of our many oversized houses. These private barracks may never find occupiers rich enough or desirous of spending their wealth on maintaining thirty or forty leaking bedrooms and several furlongs of draughty corridors. Alternatively, it

might be traditionally ranged round the smaller type of manor house in which the owner manager lived.

In a district where it was desirable to send the produce by rail, the estate centre might be situated beside a station or equipped with a special siding. In a word, the arrangements of the estate centre would be flexible.

In reorganizing an estate conditions vary so greatly that hard and fast rules are impossible and one can only lay down the principles. For instance the farms might be widely divided by hill lands or unproductive country which it was uneconomic to develop on intensive lines. It might pay to ranch country of this type for summer milk with a herd or two of cows and a milk bail or for running out a toughish breed of beef cattle which could find enough roughage to keep them alive with little attention.

The centre would contain an office which dealt with the affairs of the whole system. Such an office would save the country considerable trouble in collecting data from numbers of scattered farmers; for the required figures would be supplied from comparatively large units covering two or three thousand acres; nor would an eighth of the data now required be necessary. Each unit could give a simple yearly census of its activities taken from records which they would have made in the ordinary course of business. From these records, an annual report could be made of the whole country with more reliable data than is now obtained by the uneconomic employment of overlapping officials.

Attached to the office would be the general store for the estate, containing supplies, spare parts, tools, etc.; the office staff would act as storekeepers and this would make for simplicity. The store would keep in stock spares for all the principal machines used on the farms and would also service loan replacements. If a farm broke a seed drill or the timing gear of a milking machine, it could telephone the estate and have one along in a few minutes while the broken one would be repaired from the stock of spares and re-exchanged for the loaned service tool. If you think over this idea you will realize one of the enormous advantages this system of farming would have over farming in unconnected units.

The estate would also be a big enough unit to deal direct with suppliers and manufacturers without having to employ the services of middlemen and thus too a considerable saving in time and money would be occasioned.

The granary would hold the grain and beans from all the farms and would be large enough to house, in addition, stocks of imported feeding stuffs which would be bought straight off the ship; in this way delivery costs would be greatly reduced and wasteful handling cut to a minimum. An estate in full production would require approximately the same quantity of imported protein every year, and this would save a great deal of trouble to the importer and also to the foreign exporter, as it would mean a rock-steady demand from year to year which could be budgeted for accordingly. Moreover, the importer could arrange with the various estates which were his clients to take their bulk supplies at suitable seasons which he could dovetail into the policy of the shipping companies and the elevators or stores of the producing countries; these feeding stuffs would, consequently, proceed in a steady flow.

The simplest way to run an estate granary is to divide it into three compartments—the intake end, the storage bins or silos, and the bagging off or output compartment.

The intake end would include elevators, separators and drying plant so that the stock would be prepared mechanically for storage. If it heated in the silos or bins, it could be run back through the drier and replaced without any undue effort or manual labour. By this system stocks would always be maintained in prime condition, an impossibility with grain in a stack.

I have only the experience of my own granary, but we seem to have gradually got rid of our worst troubles and the plant runs satisfactorily, so I do not think anything very different is really required. We store the dried grain in bins holding about fifty tons each, formed of brick and cement, with a steel outlet shute at the bottom and a covered manhole at the top. The grain runs out of these storage bins into a conveyor situated between two lines of bins where it can be moved about as desired. Each of the bins has a thermometer and a slate close to it and if the contents of one bin show signs of heating, they, can be changed via the drier (in this case, used as a cooler), to another bin. The slate is used to record the weight of the grain in and out of the bin, so that the total held in the granary stores is always available.

During harvest time the granary runs continuously, night and day in two man shifts, but during the rest of the year it is looked after by one man.

It might, as I have said, be a good policy to use the drier for grass

drying during the flush, in which case it would probably have to be run during the grass drying period in shifts as in harvest time. I believe, also, the granary could be used with additional machinery to dry and grind the remains of the potato harvest which is sometimes wasted through the demand for eating the previous year's crop finishing suddenly with the beginning of the new crop and the supply of other vegetables. Thus there is, or should be, a surplus; so much so, that in some years I have seen cartloads of potatoes dumped in any handy rubbish spot. The potato meal would keep, I presume, for a considerable period and would be useful in making up the pig rations. At the outward end of our drier there is' a grinder which reduces the various stocks to meal, which is blown to the top story where it can be bagged off or put straight into a bin over the mixer. On the top story there is also a cake breaker for reducing imported cakes and a small mixer for blending the mineral addition to the ration. The stream of grain from the conveyors can also be diverted to pass through a crusher for preparing crushed oats for the horses. The resulting products of these operations are collected in bins over a mixer. Between the collecting bins and the mixer there is an automatic weighing machine and the operator can put the required quantities of the various ingredients into the mixer without handling anything. The mixed meal is discharged into sacks off spouts in the weighing room in which the finished products can be held, sacked at cart height to await distribution. From such a store the various farms composing the unit would collect their rations as they were wanted.

There are a great many advantages in this system over ordinary farm practice. The chief one is accuracy. The central department knows at once what they have grown on the various fields and what they have at any given moment in store. They can check according to milk yield what the various farms require and can prepare and deliver the necessary quantity. Thus they know without elaborate research, whether any waste is going on. Moreover, they save a great deal of loss associated with the old time harvesting methods and can utilize in the meal the feeding stuffs which formerly were wasted.

Although I have not myself yet reached this stage I believe the perfect estate of the future should process its mixed meal into 'Cakelets'. For this purpose the meal is mixed with molasses and cooked and pressed out into cubes by a special machine. The size of the cubes varies according to the stock for which they are intended, ranging from chick pellets to inch and a half cubes for full-grown cattle,

There are very many more advantages in this processing than one would at first sight imagine. I have been able to work out very roughly the wastage of meal on my own place through it sticking to sacks and feeding troughs and being wasted by the animals themselves. The total loss over a year on my figures shook me!

The addition of molasses makes the food more palatable, an important point in the case of a high yielding cow which has (in happier days) to consume a great quantity of concentrates. The cooking process, although it does not add anything to the nutritive quality of the feed, increases the flavour; furthermore rationing with cakelets is very much easier and more accurate than with meal.

The process of farming with the granary methods which I have described, approaches the practice of an urban factory as closely as possible, but the capitalization required on account of the drier (only used continually for a month in the year) is far greater than would be needed to produce the same value and volume of finished articles with a factory drier running for twelve months. However, with our climate and the various other factors which limit agricultural effort, I do not see how we can get over this and at the same time be able to produce our product up to standard year after year, good season and bad season, with the highest output per man. I have mentioned this point, for the plant which I have described would only deal with five hundred tons of home-grown feeding stuff and perhaps two hundred tons of purchased materials, while a grain elevator in Canada or the United States might, on a comparative initial cost basis, deal with four thousand tons. As I have said, however, our ranching methods are limited by the length of harvest and the intricacies of rotational cropping. It is this policy of rotational cropping which makes it necessary to grow cereal crops at all, in order to provide straw for dung; cereal animal feeding stuffs can, I believe, be grown and imported cheaper from abroad than we can produce them. Our only consolation for the larger capital outlay that rotational cropping forces us to employ in this country is that the grain countries are beginning to see the writing on the wall. Continuous cereal growing is getting played out and those who practise it will, during the next fifty years or so, be forced to take to rotational agriculture with much heavier capitalization per acre.

The estate centre would have a carpenter's shop, an engineering and blacksmith's shop and a mason's yard. To keep everything at

the highest level of efficiency, it would be necessary to have a permanent carpenter and assistant, a mason and a labourer, a blacksmith and a mechanic. These tradesmen could be used with great advantage in the original formation of the estate. When it was once running, it would have the precise and quick maintenance which is necessary to keep agricultural property in a high state of progress. These shops should be fully mechanized as the quality of the work and speed of output is greatly increased by the use of efficient machine tools. I would have, as standard, a band saw, circular saw, over-and-under planer and mortising machine in the carpenter's shop, while the engineering department would be equipped with a lathe, vertical drill, power hack-saw, forge, welding plant, shears and punch. If the estate was in a district where roofing materials had to be imported, I would instal in the mason's yard, in addition to his usual appliances, a simple machine for making concrete tiles. He could thus be employed for all seasons of the year while the adoption of a standard home-made tile on the estate means quickly mended roofs and saves the expense of importing slates or other roofing materials. The mason and labourer might also employ themselves in their off-building time by manufacturing many other useful concrete articles which could be made with simple moulds such as rhones and water pipes. There is a very real advantage in replacing where possible outside iron work by concrete, as cast iron work requires frequent coatings of paint.

The carpentry department, besides repairs, would work their ways over the estate with a paintbrush or sprayer. The mechanical department would be always busy with repairs to implements, horse-shoeing, and with keeping the various fixed plant up to scratch.

The next department at the estate centre to be considered is the packing factory. This plant is designed to convert the products into saleable form; it deals with foodstuffs and therefore, must be designed on hygienic lines. In each year the small factory I have in mind might deal with 1,000 to 2,000 bacon pigs, 250 or so bull calves and perhaps 100 tuberculin tested cows, all of which would be killed to make way for the younger animals. In addition they would cope with egg-grading and processing perhaps 1,000 two-year-old hens. For any surplus of milk, they would be equipped to make cheese, butter, and ice-cream. They would store and pack the cooking apples,

freeze fruit and vegetables and make the surplus fruit crops into jams, jellies, and preserves.

These various activities could be planned so that an efficient staff was kept occupied throughout the year, and they could also give employment to farm staff in their off time. There is no reason why a well organized and mechanized estate plant should not deal even more economically and hygienically with the various products than a large industrial plant; the resulting produce should certainly be of better quality than that of the ordinary urban factory. The country air would be cleaner while the animals and produce dealt with would be much fresher and would only be picked or killed as they were wanted. Pigs, for instance, lose considerable weight (from fright) by being transported over long distances. Cows and calves suffer intolerably by being whacked about through markets and by being trucked to abattoirs. Livestock must lose flavour and quality from these practices. I defy anybody to produce a watertight argument that it would not be much kinder and healthier to kill beasts (with a humane killer) where they live.

It would be well for people who think in terms of markets and large central abattoirs, to follow the adventures of livestock from the time they leave the farm until they are killed and cut up. I think that after such an experience they would agree that my plan, if its only good was to stop that barbarous process, would be worth trying. In my scheme, there would be a small slaughter-house on each farm. The slaughterer would arrive in his van, kill the beasts humanely, then bleed the carcasses into a container and take them and the blood back to the factory for processing. Arrangements could be made to dovetail the killings into the continuous system of the plant; thus it would avoid keeping animals needlessly in pens awaiting slaughter. The obvious possibilities of planning the whole process to fine limits would mean a much greater control and a more economical method than is possible by our present system of unplanned intakes of animals at central public slaughter-houses.

Pigs would be killed on the farm and transported at once to the plant by the estate's own van which would be fitted with hauling tackle so that dead beasts could be quickly loaded and unloaded. They would then be processed into bacon and ham whilst the various pig by-products would be made use of or sold by contract to outside firms. The bacon sides and ham after progressing through the plant would end up in a special store from which they would be sliced and

packed, in accordance with demand, in one-pound containers.

Bull calves would be brought in dead from the farms and processed to soup stock which would be bottled and refrigerated until sold.

The older cows would be reduced to sausages and these again, packed in standard one-pound containers.

Two-year-old hens would be manufactured to poultry paste or soup and suitably packed. The other products would be all processed to end up in a standard pack easily sold and easily used.

Part of the flavour plant would be concerned with waste and by-products. The blood from the various animals would be dried into fertilizer, the residue bones ground to bone meal, the skins despatched to the tanner under contract, and the offal removed for manure. There would be no waste.

The estate would employ a scientist, university trained and qualified in agricultural matters. He would be well paid and belong to a society of his profession, a society with a high ethical code. Although employed by the estate, he would, by his calling and professional honour, be apart from the estate. By that, I mean the council of his profession would have the power to outlaw a member breaking their code. These conditions of his training would make him reliable, above deception and loyal to the highest standards of the scientist.

He would have a laboratory; it would be part of his duties to see that no animal suffering from any malady went into the flavour factory. He would constantly test the finished products to make sure that they were kept at a consistently high level of excellence. He would act, also, as vet throughout the herds of various farms. He would test and analyse the soil; he would test the milk from the different herds and trace up anything wrong; his laboratory would examine the seeds of the seed farm for purity and help to look after, and to make observations of, new varieties; he would belong to an international and inter-estate exchange of literature that would keep him up to date and in touch with the other scientists of the world and their developments. In his spare time he would do research work on his own or for any special work which the estate required. I think he would be busy!

It would be a new opening and a new chance to provide a first class job for thousands of intelligent men and women. There would be this tremendous advantage over the scientists employed by the state who are by the terms of their employment merely fault finders

and who are too far away from the actual processes. The estate scientist, being employed in a commercial undertaking, would have to be thoroughly practical; he would in fact, be always teaching himself by experience and this would make him an infinitely better scientist than a man stuck down in a routine test laboratory. In the same way that a public hospital is a boon to our best research doctors, so the estate would be a blessing to agricultural science generally.

Between several dozen estates, there would be a government-controlled laboratory. This state department would keep a sharp look out by surprise analyses on the products of the different estates. They would inspect farms and premises and trace up complaints. It is hoped that they would be genuinely willing to co-operate with the estate scientist, the estate manager, the estate staff and the consumer in getting the very best results without using their powers dictatorially. I am glad to say this method of working 'alongside' has been well understood by many civil servants who have been of considerable help to agriculture; this government inspection body would telescope and combine the duties of a number of inspectors who at the moment hopelessly overlap each other.

To give an instance which is possible, even though it may not have actually occurred. A fleet of cars might arrive on a ten-acre holding, all in the same day at the same hour, each manned by different officials. They might contain the inspector of weights and measures, a public health official, an inspector from the drainage board of the Ministry of Agriculture, an inspector from the Agricultural Executive Committee, while to swell the crowd private enterprise might send an inspector from the Society for the Prevention of Cruelty to Animals. It would be tedious to give a list of all the officials who might arrive at the same hour on the same day on this hypothetical ten-acre holding. With the estate group farming system, all these officials could be combined into one small group of inspectors working together in one building and reporting to a well-organized central head office. These men could do a lot of work in compressing information for this central board. In a word, all the present wearisome machinery could be reduced substantially and become much more efficient.

It must be remembered that officials are only necessary as long as people will not 'play fair' and the formation of well run remunerative farming groups with standard practices and honourable direction

would do a great deal to do away with the incentive to play crooked. Well fed people don't often steal food; and the control activities could be gradually reduced through time to a small able staff of persons dealing quickly and sympathetically with a great number of estates.

There would be a certain amount of timber on the estate either in shelter belts or in woods planted in unadvantageous agricultural positions. There should, at any rate, be a sufficiency of timber grown to cover the ordinary fencing and repair needs of the estate; it would not be possible to conduct such a well-timed and economic forestry policy as a regular timber country, but a couple of men would be employed on the estate to plant, cut and attend to the fencing, ditching, etc. I mention 'plant' for the small strips or woods should be planned on a system which would produce a steady flow of economic sized timber. Producing standardized timber means economic costs for cutting, haulage, and conversion.

The maintenance of an amount of timber proportional to arable land is very important climatically; by this I do not mean tangled hedgerows with broken down elms or isolated oaks throughout the fields. I mean—to put the matter broadly—commonsense forestry, which should make a 150-acre farm look like a clearing in a forest.

For many years, however, the timber would be of all shapes and sizes, and it would be advisable to start the sawmill with a single-bladed reciprocating saw. This would be able to deal with large logs and would not be too costly when nails were cut through; it would be more economical in power and less wasteful than a circular saw both in power and cutting waste.

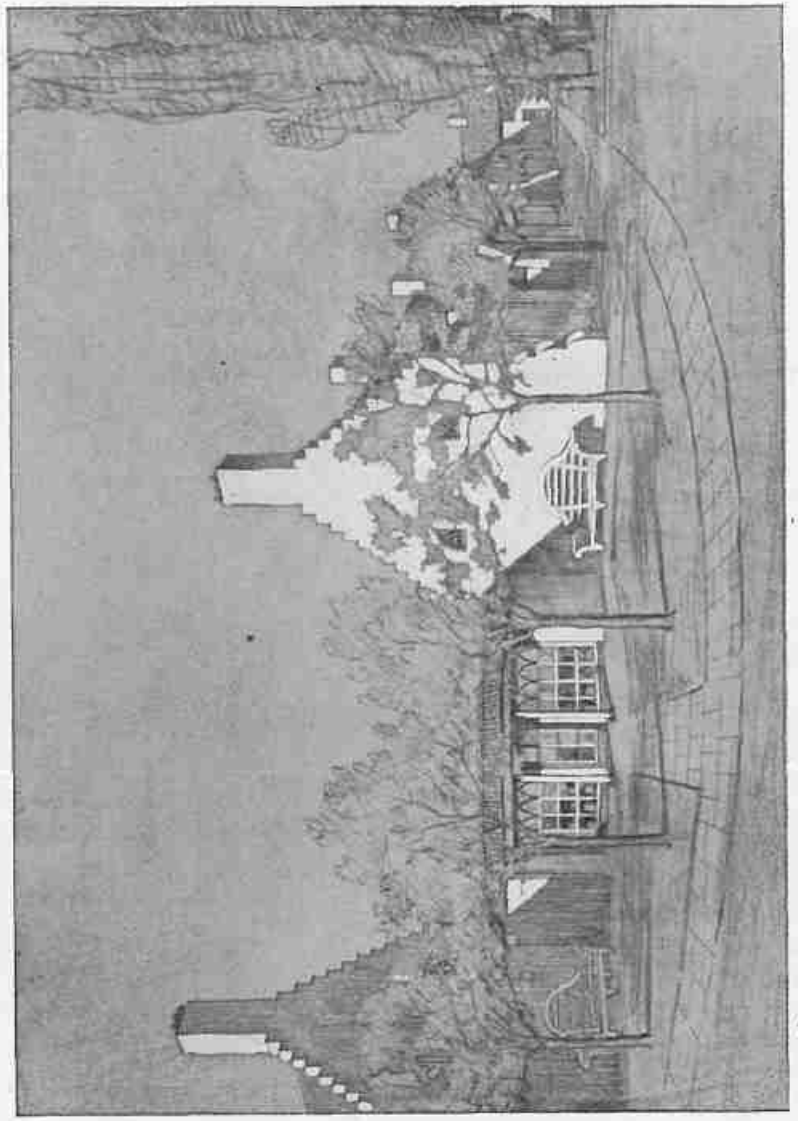
Such a saw is not usually used in the timber trade because it is too slow, but the estate mill would only have a limited number of sticks to cut each year and such a saw would serve the purpose excellently. Later, when the timber started to be felled in standard sizes, a more labour-saving type of saw could be employed. The sawmill would contain a drying yard and a creosote tank. It would be quite economical to drive a single-bladed reciprocating saw by electricity, though wood-fuelled steam or water would be better. However, they might be more costly to instal and troublesome to run and to maintain for the short annual period the saw would be in use.

The creation of a social centre will depend for its *motif* on how much the war has altered our outlook on social problems. Personally, I hope to live to see the end of the priggish, goody-goody synthetic highbrow atmosphere which has infected this country all my life. This smug hypocritical outlook is the basic cause of many of our complexes and every tissue of our national life is impregnated with it.

One is tired of being told that cottagers keep their coals in the bath or use the lavatory-seats as picture frames, and that working men, given the chance, will spend all their money on drink. If they do, it is only because the government poach such a harvest from it that a round amongst friends is equivalent to a capital levy. In any case, I can never see why we should deal with the drinking of alcohol as if it were the world's greatest sin and had to be conducted in the half-dark behind opaque windows, nor do I understand why such stringent and troublesome regulations should be in force about its consumption. These ridiculous regulations make the design of our public houses a cross between a safe deposit and an opium den. Nothing can be quite so absurd as the design of our average 'pub' with its private and public bars and the manner in which the customer is screened from public gaze. It is to be hoped that the social centre will have a new type of 'pub' not designed for the sole purpose of getting drunk in secret between fixed hours, but purely for social purposes where the consuming of wines, spirits, beers, coffee, tea, ice-cream, milk, etc., is only an accompaniment to a friendly gossip or an indoor game: it should be a place in which women could foregather.

There would be a cluster of houses round the estate centre, while the folk from surrounding farms would come into this hamlet for a chat or entertainment of an evening or when on a holiday. It would, therefore, be proper to have a good hall for dancing, cinema and theatrical entertainments, flower shows and what not. Attached to this hall might conveniently be situated a recreation park with a football or cricket pitch. In order that you may get some sort of idea of the social centre and shouldn't think of it as a row of council houses criss-crossed with cast iron rainwater and sanitary pipes I have included perhaps an overweight of drawings on the subject. But they do, I think, give some ideas of the possibilities and they are drawn by two of our leading architects, men who combine art with vision. To me these drawings are inspiring and give a feeling of better things to come. (They appear in print for the first time.)

The Social Centre



'. . . There would also be a village store . . .'

THE SOCIAL CENTRE

Millions of young people will be leaving the Forces at the end of the war, and we can do with them in the country. The estate farms which I have described can absorb many; why should they wrap their lives in misery? On the estate farms they would find hard work and at the end of the day, relaxation and pleasure—whether it is digging in the garden or dancing at the estate dance hall, or playing games or drinking a mug of beer below the chestnut tree, or viewing the sixteen-millimetre print of a slightly after-general-release movie, or in the winter seeing the plays from a neighbouring estate, or acted by a touring company of professionals on enlightened C.E.M.A. lines; whatever it is, they must have fun,

There would be a village store and this could, with advantage, be run by the estate and stocked rather better than the usual village shop. The profit from the shop and pub could go to the upkeep of the recreational amenities, or they could be let as a sinecure for a retired member of the group.

I have now said enough to indicate the central hamlet. There are people teeming with ideas on how to build rural centres and how to run them. All I pray is that the results will not smell too much of uplift or that peculiar synthetic patriotic-cum-snob sentiment which one sees in British films of rural life.

And let there be light! Hang coloured globes all around the trees, floodlight the hall, for after several years of darkness people will want light, and it is the finest evening tonic at the cheapest price.

There will also be in the centre a transport department which will take care of the conveyance of the estate's finished articles. It will have available a big tractor and implements to push on any farmer on the estate who gets behind or to fill in breakdown gaps.

The whole structure will be held together by the 'Manager'; the success of the enterprise hangs on him. He may be a rehashed edition of the old squire, more businesslike and up to date, or he may be the 'land-agent' type managing for a company or for co-operative farmers or for a private individual who has split up a large estate into several units. Whoever he is, he must have the whole affair at his finger tips, know exactly what is going on and how to stop rot in time. He must be able to deal sympathetically with the various component members in such a way that he gets results. He must have extreme experience, not only of his business, but of life itself,

the way in which men's minds move and their exact capabilities, for in a complicated and variegated business like this, it is fitting the square pegs in the square holes that spells success; but whatever other qualities he has, he must be filled with a genuinely idealistic code, a code which he himself lives up to, for it is his job to set the tone. I do not think that such men come from any particular class or section of the community, but it would be well if this manager could couple with his other qualities a sufficiency of knowledge to be able to understand the scientist.

There is nothing much to say about the satellite farms of pig, seed, and poultry breeding, for they would be run on orthodox lines, but the seed farm needs a special description. It would be the policy of estates to subscribe to a mother seed farm. That is to say, perhaps twenty estates would all co-operate to buy the produce of a highly scientifically run seed farm situated, it may be, miles away from the estates in a position chosen for disease immunity. This mother farm might be a private or a co-operative enterprise, supported and ruled over by the estates or made up by a group of scientists pooling their capital and running it jointly as a speculation. It would not be state run because then it would lose its competitive thrust and competition is the soul of progress.

There would, however, be a few state stations which would co-operate with the commercial ones in various ways such as in the distribution of imported seeds or the testing of new varieties: they would have slight controlling powers over the mother seed farms to be sure that everything was going easily.

The mother seed farm would produce certain strains of completely pure seed and they would experiment with new varieties and imported seeds. The estate's seed farm would draw from it stocks of complete purity according to contract. These small batches of seed would be grown for a couple of years on the estate seed farm and then issued ready for sowing to the flavour farms of the estate. The seed farm would also deal with new intakes of livestock; it would be quite small and be run by the most experienced men obtainable who would receive extra pay for the job. The result of this organization would be that the standard farm would receive remarkably good seed and a consequent improvement in the productivity of the soil.

This concludes my remarks about the estate. If you agree, as many people do, that we must concentrate on 'flavour' foods in this

country (milk, eggs, pig products and vegetables)'; then for the reasons which I have given, it is best to produce them in small farms of about 130—150 acres. I do not think that the arguments in favour of small farms in this country for these products can be refuted. If one agrees to the small farm unit, one must automatically agree to 'the estate' as the most economical method of grouping the small farms.

This brings us to the problem of distribution from the estate group and I maintain that the tied shop is the only solution. In the next chapter, I give the manner in which it should be organized.

Chapter Thirteen

THE FLAVOUR SHOP

Arrangement of the Shop—What it will Sell—How it will Deliver—How Milk is treated and how it should be—The Estate's System of Transport

In earlier chapters, I dealt with the consumer and the distribution of produce. We have now reached the final part of the plan in which I try to show how we can give the consumer what he wants in the way he wants it and to show, also, how distribution costs may be reduced and how a great deal of unproductive work may be cut out for good. The cutting out of the unproductive, selling, and distributive muddles would give us fresher food and reduce our costs, so that farming would pay and the consumer would receive his food at a lower price than he has ever done before. Let me remind you of these pre bellum figures:

The farmer received £650,000,000. The consumer paid £1,500,000,000. If distribution costs had been avoided, the farmer could have had double prices and sold to the consumer £200,000,000 cheaper.

If you stood at a ticket gate where hundreds of our people were passing through, and if, instead of taking tickets, you asked for appendixes and tonsils, you would be surprised how few you would get. On the other hand, if you asked for spectacles and false teeth, you would be amazed at the pile.

Now, I believe that the main cause of health troubles comes from not getting a sufficiency of fresh flavour foods and from this deficiency you can trace our health and nervous troubles. Therefore, the establishment of flavour farms, rapid distribution, and flavour shops, is the most vital problem which we have to face after the war. It is the corner stone upon which all our other improvements depend.

Each estate would have its flavour shop either owned by it or tied to it. These would be within easy reach of the consumers, each shop catering for the needs of between two thousand five hundred and three thousand customers. There are reasons why they should be of

this size. Firstly, a shop with this clientele would utilize the produce of an estate of ten standard farms. Secondly, this size would put the perishables within easy reach of its customers and, thirdly, moderately small shops are the traditional methods of retailing in this country and give opportunities for the small owner—a type of management which is interwoven into our national existence. (It is said that before the war there was a shop to every fifty persons.)

There is also a very strong reason why they should be of a standard size, as the cost of building and fittings could be reduced to a minimum by putting the flavour shop and its equipment on the mass production belts of different factories. They would thus be able to have much better equipment (or much more equipment for the same price) than would be possible by purchasing haphazardly.

I must underline again that to make agriculture lastingly profitable and slump-free the consumer must be tied to the farm. Probably the only possible method of doing this is to plan so that each shop has a definite consumer zone. The shops of course would not be allowed to receive competitive supplies from other sources, they would be linked firmly for the standard foods through the estate to its satellite farms. By this arrangement the consumer and the original producer would be tied and a more or less known 'consumer demand' established.

I have already expounded my reasons why I believe 'The supermarket' is the type of shop most suited to our new life. Let me now try and sketch for you a picture of the flavour shop as I see it. The shop has three compartments. The first is an arcade in which the customer makes his purchases, the second is a refrigerator in which the stock is kept, and the third is a delivery and receiving alley. In addition to these compartments, there would be a small shop or milk bar run on soda fountain lines in which one could buy soft drinks and other commodities over the counter. This small annexe to the main shop would be by no means standard, it being the aim of each retailer to make it as attractive as possible so as to get rid of the terrible 'fish slab' feeling of the ordinary milk bar. It should be his aim to make it into a cosy mixed club, a social place, the hub of local sociality equivalent to the soda fountain of the American dry goods store, a homely place where things are discussed and where jokes are made, not a 'dive in and run out' kind of establishment. A wave of afternoon tea snatching has flushed through the country, a tendency which had been dead for many years, but which has now retained. It might be possible to capture this fashion in the milk bar.

The selling arcade which is the main part of the shop would be standard and on super-market lines.

At the entrance to the arcade would be a token machine where the customer purchases tokens in the same manner that one can buy tickets at a tube station. If the customer is not supplied with suitable change, he can obtain change from the shopkeeper in the adjacent milk bar when it is open. Armed with a supply of tokens, he is free to buy what he wants. The best description of the arcade which I can give is that it is something like an aquarium. On each side are lighted exhibits of samples, attractively displayed within the refrigerator core of the store. These goods are obtainable in their standard packs by inserting the appropriate token in the proper slot and pulling the handle. The arcade has similar automatic machines for all the standard articles produced on the flavour farm, and also for certain imported foods, some from abroad and some comprising luxury produce from farms outside but connected with the estate group. All the produce is packed, weighed, and dated. In the automatic machines of the flavour arcade you would find milk, cream, butter, cheese, eggs, bacon, ham, bottled soup, pressed beef or sausages and endless different varieties of vegetables and fruit, some frozen in the pack and obtainable at a time of the year when the fresh fruit or vegetables were unobtainable. There would be small easily handled and consumed bags of potatoes of different varieties, or, if the consumer wished, he could buy potatoes washed and skinned ready to cook, or potato chips already cut and ready to fry with sufficient fat and salt provided in the package.

Besides the ordinary run of necessities, there would be tempting delicacies like asparagus, mushrooms, celery and strawberries, real 'cream ice-cream' in cartons ready to take home. Amongst the imported supplies would be oranges, grape fruit, bananas, lemons and so on, while good markets could be built up both for us and the producers of tropical produce which is at present practically unknown to the consumer, avocado pears, pawpaws and mangoes, etc.

The finest fruits in the world could be sold regularly and cheaply by this system—Granny Smith apples from Australia, Kings and Mackintosh reds from British Columbia, Gravenstein from the Hood River Valley, Coxes and Bramley seedlings from the estate flavour farms.

The good cook would obtain undreamed of herbs for her culinary efforts, herbs which only need to be understood to be appreciated,

herbs that have their flavour wilt away in the hot atmosphere of the greengrocer's shop, now fresh in the cold storage, packed ready for use in cellophane bags; mint, sage, watercress, garlic, chives, sorrel and dandelion, etc. There would be complete salads with suitable dressing ready to eat without trouble.

A visit to the flavour arcade would be a constant source of delight to the good housekeeper. All these excellent foods would be sold at a reasonable price because they would be produced, processed, distributed and sold in the most economical manner and thanks to the token system, there would be no bad debts; you could buy flowers also packed ready to take home. Owing to the automatic method of selling, the flavour arcade would be like a cigarette machine outside a tobacconist's shop; it could remain permanently open. There would be, therefore, no feverish rushes to get in rations before closing time.

By this automatic system, there would be a big reduction in bookkeeping ; the produce in standard packs placed daily in the automatic compartments is obviously very easy to check. Overdated produce would be returned daily to the estate for disposal to livestock. By this means both producer and retailer would work on a narrower margin than has ever been possible before, while the standard pack and automatic sale would mean a better product easily purchasable at the greatest economy of selling cost.

There will be numerous people in the district, however, who for one reason or another prefer to have some of their produce delivered on the doorstep each morning. For this service, they would have to pay increased prices. This is perfectly reasonable as the local distribution of parcels, perishable goods, newspapers and other commodities has long been very uneconomic. Retailers have been forced to give this delivery service owing to competitive practices and some trades cannot afford owing to the cut price of their produce to do so. The baker, for instance, would never make a living by delivering bread; at the price it is sold at in this country he has to rely for profits on other lines. Customers also have whims and fancies for different retailers. Quite rightly, but unfortunately, this practice means a network of criss-cross deliveries requiring a lake of unnecessary petrol consumption, and forests of unnecessary rubber, while the unnecessary traffic helps to choke up our already crowded traffic systems. Moreover, distribution by the individual retailer obliges him to become an expert on mechanical transport for which he may not have the aptitude or the time.

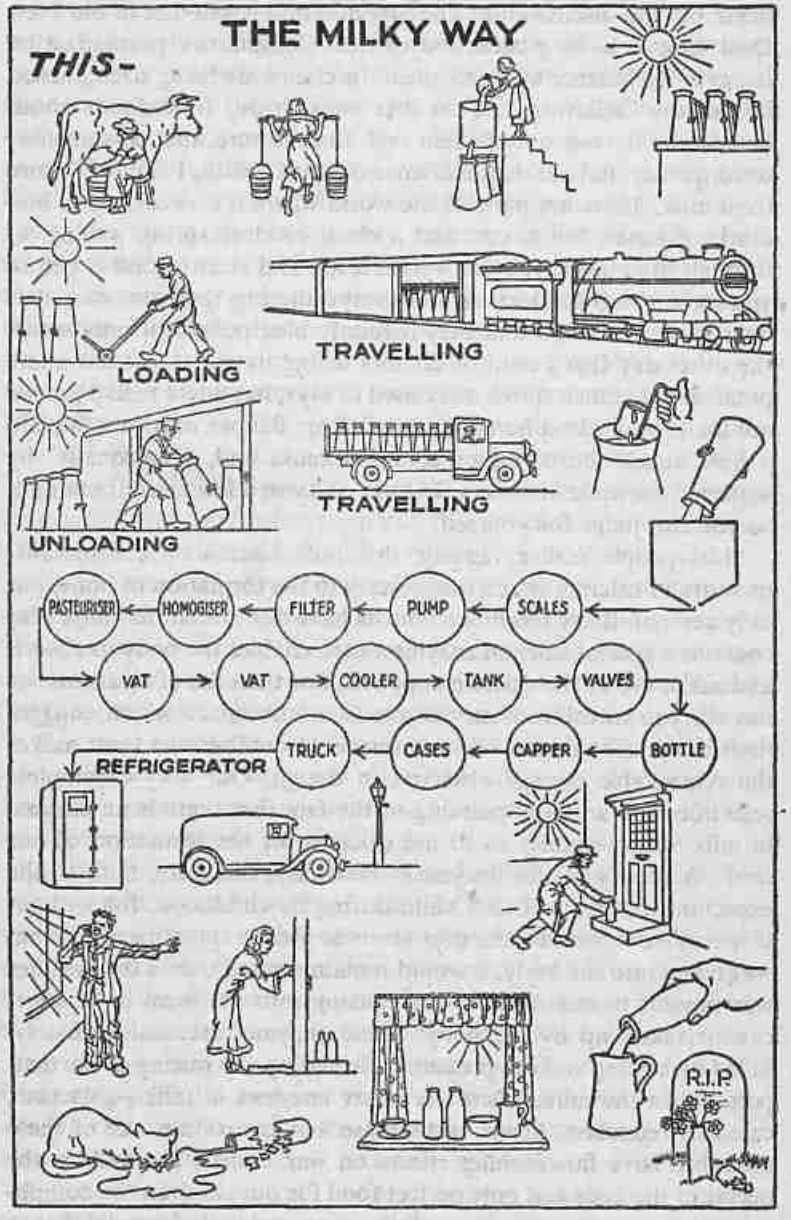
I would give over the local distribution of all articles to private firms of distributors organized with the sole purpose of local circulation. It is for these firms to fight out their own problems, arrange their territories, fix their delivery charge and undertake the hundred and one different problems of this difficult business. To give an example of the problem, Mrs. A of 'The Cedars' wants two pints of milk, a loaf of bread, a gill of cream and two newspapers delivered daily. She wants also her weekly grocery requirements delivered from J. Smith, and her bi-weekly purchases from the flavour food shop delivered as per her selection. She gets in touch with 'Mercury Deliveries, Ltd.', who have already the mail contract for the district or a rival delivery company if there is one. They quote her an all-round price; it doesn't matter to the flavour shop to whom she goes. They are open to sell their products to any delivery company at a standard price at set times of the day, morning or evening. The 'Mercury Delivery' people turn up at the correct time at the delivery compartment of the flavour shop and buy for cash or cheque, their bulk supplies, which includes Mrs. A's two pints of milk, and gill of cream. Later in the day Mrs. A of 'The Cedars', goes into the town and buys, with tokens from the automatic machines, a pound of tomatoes and a package of asparagus; she writes her name and address on her purchases and puts them in the locker of her delivery company, who pick up her parcels on their next call and deliver them on their next round. The economies to all trades by these delivery companies would be very real while the consumer who had the energy to carry her own parcels would be rewarded by not having her delivery charges to pay.

Will you come back with me to August 1939 and sit outside an ordinary middle-class dwelling? First of all, the milkman comes round, he carries up a couple of pints and puts them on the doorstep, he misses out a few houses and does the same thing further down the street. Later, the postman arrives and pushes some letters in the box, then comes the baker's boy on his 'tryke', he makes a delivery, later a boy shoves a couple of newspapers under the door, a van arrives and delivers groceries; and so it goes on. Perhaps a dozen people will walk up those steps during the day delivering something. Now a delivery firm could reduce all this to a morning and evening visit from house to house and this reduction would substantially reduce costs to the consumer.

Before we can get on with the details of the flavour shop, we must

break off and discuss milk. The first question is whether in our New Deal milk is to be pasteurized or not. Compulsory pasteurization hangs in the balance at the moment. Its claims are being strengthened by doctors. Believing as I do that messing our fresh foods about knocks the flavour out of them and, furthermore, that this unchartered quality 'flavour' is the essence of good health, I stand for pure fresh milk. There are parts of the world where it is necessary to boil drinking water, but if you find a clean or clear spring welling up through the gravel, you don't light a fire and start to boil it before you have a drink. Doctors are always altering their theories, it is only a few years ago that they regularly bled people; it only seems the other day that I read of doctors telling us not to eat too many potatoes (too much starch, they used to say); but now I read potatoes are the tops. I admit honestly, most of my flavour ideas are 'hunch'—but 'hunch' born out of common sense and, occasionally, by scattered scientific discovery. Let me give you a few facts about milk so you can judge for yourself.

Most people realize vaguely, that milk contains a considerable quantity of calcium which is necessary to the formation of bone, but only comparatively recently scientists have discovered that milk also contains a special calcium enzyme which enables the body to absorb and make use of the calcium supplied. For the sake of clearness, let me ask you to think of an enzyme as a 'substance' which engages itself in the changing of one 'substance' to another—as yeast makes the remarkable change observed in dough. Our very incomplete scientific data are now pointing to the fact that there is an enzyme in milk which enables us to use calcium for the formation of our teeth. A supply of this enzyme is necessary, therefore, both to the expectant mother and to a child during its childhood, for without this enzyme it would seem that however great a quantity of calcium was taken into the body, it would remain unused unless the medium was present to manufacture the calcium into the form in which it can be taken up by the body. These enzymes are, unfortunately, killed by boiling and are probably affected by any raising of the temperature in the milk. There are many enzymes in milk—galactase, catalase, reductase, lipase, lactokinase and peroxidase. All of these probably have far-reaching effects on our bodies, for milk is the nectar of the gods and only perfect food for our children; so complicated in its constituents, so carefully composed in its formula, that to play tricks with it is to pit oneself and the nation generally against a


THE MILKY WAY
THIS-
LOADING
TRAVELLING
UNLOADING
TRAVELLING
PASTEURISER
HOMOGISER
FILTER
PUMP
SCALES
VAT
VAT
COOLER
TANK
VALVES
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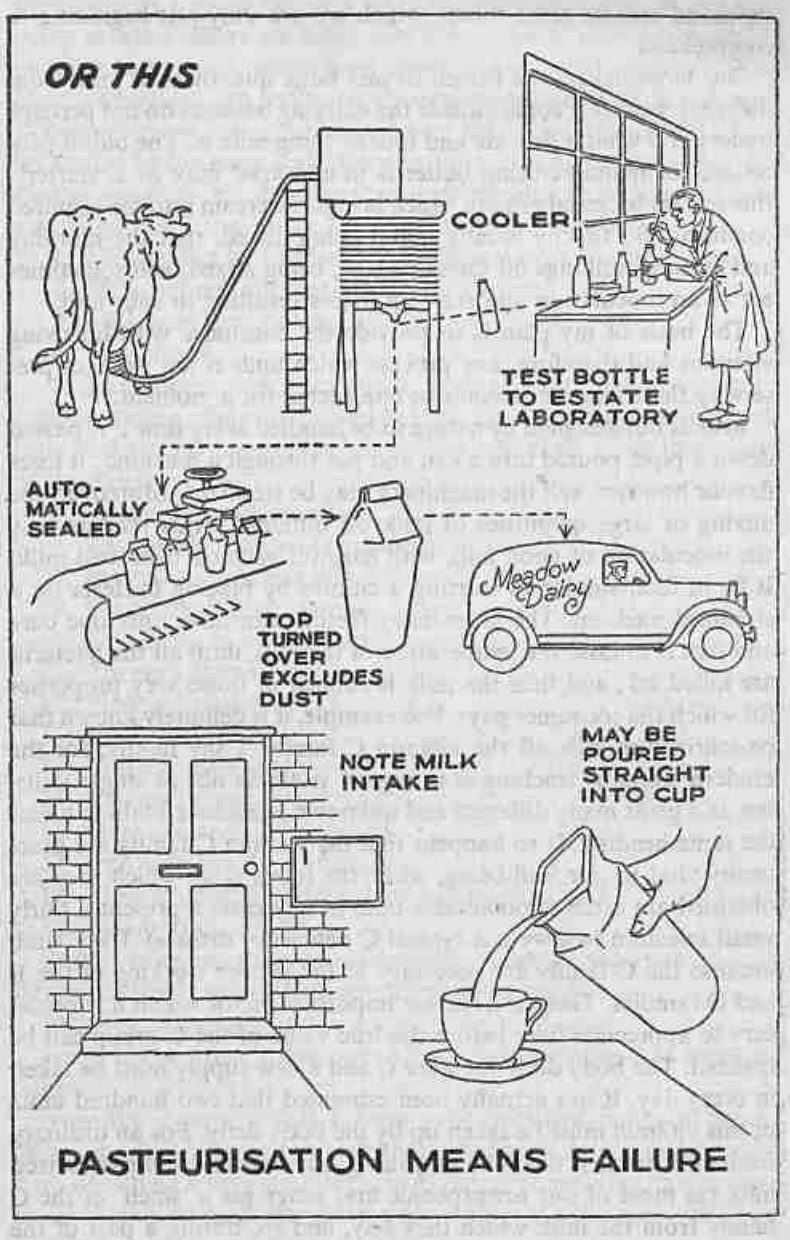
OR THIS
COOLER
TEST BOTTLE TO ESTATE LABORATORY
AUTO-MATICALLY SEALED
TOP TURNED OVER EXCLUDES DUST
Meadow Dairy
NOTE MILK INTAKE
MAY BE POURED STRAIGHT INTO CUP
PASTEURISATION MEANS FAILURE

thousand undiscovered forces which we are only just beginning to comprehend.

Our large dairies are forced to mix large quantities of milk from different sources. People outside the dairying business do not perhaps understand what a delicate and touchy thing milk is. The oldest procedure for manufacturing butter is to add aged milk as a 'starter'; this sets up bacterial growth which brings the cream into the required condition. So touchy is milk about being mixed, that the morning and evening milkings off the same cow, being mixed, will sometimes act as an inoculation and start up forces resulting in sour milk.

The basis of my plan is to provide the consumer with lifegiving vitamins and therefore, any process which undoes the work of preserving these vitamins cannot be considered for a moment.

Milk is not designed by nature to be handled every time it is passed down a pipe, poured into a can and put through a machine; it loses flavour however well the machinery may be sterilized. Moreover, the mixing of large quantities of milk off different farms renders easy the inoculation of good milk with harmful bacteria from bad milk. It is, in fact, similar to starting a culture by placing bacteria on a sterilized medium. The large dairy factory can have only one cure and that is to raise the temperature of the milk until all the bacteria are killed off; and thus the milk is robbed of those very properties for which the consumer pays. For example, it is definitely known that pasteurization kills off the vitamin C family. I say family, for the modern trend of teaching is to regard vitamins not as single units, but as a great many different and unknown agencies all falling under the same heading. It so happens that the vitamin C family are practically vital to our well-being, while the foods from which they are obtained are often unobtainable and, in any case, represent a fairly small selection (scurvy is a typical C deficiency disease). I say vital, because the C family are necessary to the proper working of the B and D families. There is a further important factor which it is necessary to appreciate fully before the true value of the C group can be realized. The body does not store C and a new supply must be taken in every day. It has actually been estimated that two hundred units of this vitamin must be taken up by the body daily. For an ordinary fresh milk drinker, this is an easy thing, but consumers of pasteurized milk (as most of our townspeople are) never get a 'smell' of the C family from the milk which they buy, and so, during a part of the season when fresh fruit and vegetables are unobtainable, they have

possibly only liver to fall back upon for their C supplies. In this way many urban dwellers are being cheated of one of the most desirable qualities in the milk which they purchase. They are in the position of a man buying a gin and tonic who is served a tonic without the gin.

I wonder how many milk consumers realize how much their milk is handled by the large-scale dairy business. It is a great tribute to the men engaged in this industry that their product is as good as it is. Let us go down the Milky Way and see what happens.

1. Milk, either by hand or by machine, into a bucket.
2. Milk poured into vat over farm cooler.
3. Milk goes over cooler.
4. Into churns.
5. The churns are transported from the farm to roadside or railway station; they are put on to lorry or train; they are taken off train and put on to another lorry: they are taken off at intake end of the dairy.
6. Tipped into scales.
7. Test bottle inserted for sample.
8. Poured from scales into vat.
9. Go through milk pump.
10. Up piping to homeogizer.
11. Through homeogizer.
12. Pipe to pasteurizer.
13. Pasteurized.
14. Into vat over cooler.
15. Through filter.
16. Over cooler.
17. Into vat over bottle filler.
18. Through bottle filling valves and machinery.
19. Into bottles.

Bottles to cases, cases to refrigerator, cases to van, van to your house, bottles to your door, you lift them in and:

20. Pour into jug.

Leave about your house open to air and anything that wants to fall in.

Now the system which I have just described includes twenty different containers with which the milk comes into contact and I have described a very straightforward dairy. Some large dairies have as many as four milk pumps in their cycle while the milk may pass through as much as 130 foot of piping.

If we intend to plan our future on the rock of giving people the purest and freshest flavour foods, this, to my way of thinking, should be the first consideration for a new deal and comes before housing, education and any other schemes. If we are going to do this, we must concentrate not only on the proper production of these foods but also on their rapid distribution without contamination. We must look at the question fearlessly and without reference to the interests of big business or of invested capital or of party politics. The plan which gives us the best food is the right plan. In attacking our present system of milk distribution, I am attacking some very large and well run firms who sterilize their equipment scrupulously, have able laboratory workers at hand and who have helped often to bring up the dirty farmer to a higher standard of efficiency; who have, in fact, done a great deal of good for the pure supply business. Quite so, but they are fighting against difficulties which, however tackled, will remain insurmountable. They will always have to blend different farmers' milk and different farmers' bacteria; they will always have to bring the milk into contact with a great number of foreign surfaces. And these, however cleverly and scrupulously they may be cleaned and sterilized, will still exist as potential contaminators. For these reasons there will always have to be some form of sterilizing method used on the milk itself and this will injure or impair its health-giving qualities.

My suggested alternative is:

1. By milking machine into vat.
2. Through filter.
3. Over cooler.
4. Into non-returnable paper carton.

Four foreign surfaces instead of twenty. The carton would be sealed, stamped with the date and kept in the farm refrigerator until the delivery truck calls. It is then placed into the refrigerated compartment of the truck. The truck goes to the flavour shop, is placed in a refrigerated automatic sales machine or else goes by a delivery firm's van to the customer.

Whether the customer buys in the shop or has his milk delivered, he checks the date on the carton to see it is not beyond the permissible time limit. The consumer must be encouraged and educated to keep the milk in the carton until it is used. Some customers like to use their own fancy jug; certainly a milk bottle covered with heavy advertising and slogans such as 'You can whip our cream,

but you won't beat our milk' grows wearisome as an ornament and upsets the artistic balance of the table decoration. Moreover, a milk bottle is not easy to pour from, but a carton is different, and it can be printed and designed to become a thing of beauty whilst it lends itself to constant change of design or pictures which could bring a daily interest into the routine of life. Furthermore, when unfolded, it has a corner which makes a good spout. Also it is easy to fold over the top when not in use and keep out foreign bodies. It saves the housewife at least 365 jug washings annually—about twelve hours' work. To perfect the plan, I would force delivery companies to have the bodies of their vans fitted with cooling devices and try to persuade the householder to instal a standard type of milk intake. This would be simply a small door in the outside wall of the house communicating with a refrigerator or other suitable larder for keeping milk. The delivery man (if delivery companies were employed) would open the door and shove in the carton of milk. This would save the endless bother of bottles getting broken or pilfered whilst the sight of milk on the doorstep incubating bacteria in the early morning sun is not a pleasant sight to the pure food faddist. It is, after all, just a matter of fashion; letter boxes are practically standard—why not milk intakes? It is to be hoped that our lessons of salvage saving will not be lost as soon as the war is over. One of the few blessings of this war is the increasing absence of litter. It would seem that the re-manufacture of materials must act beneficially to the economy of the nation and the world at large. The housewife should be encouraged to bundle her daily cartons and cash them in at the local professional salvage depot, or arrange suitable dates for the professional salvage men to take them away.

From this long and involved story about milk, the delivery side of the estate becomes clear. It is equipped with a lorry of standard proportions on which is placed a universally designed and mass produced 'box' containing some form of refrigerating medium and able to hold the total estate supplies for its 'tied' shop. The lorry first collects the various packed goods from the estate centre and afterwards tours the farms collecting the cartoned milk and other perishables. It then proceeds to the flavour shop and delivers its goods. Alternatively, where the distance between estate and shop is too great, the 'box' container would be run on to a railway truck at the local station and off on to a lorry at the receiving end.

The return load would consist of unsold goods which had passed

the safety date. I have already mentioned that these returns would be utilized for stock feeding, mostly for pigs. In case it might seem that the pigs are going to get nothing but sour milk, one must remember that the dating system of delivery and the manner in which the goods are at all times kept cold, would ensure that the returned products although they had lost their supreme crispness, from the ideal point of view, would still be very palatable; probably more so than the food which the average pigs get to-day.

The direction of the distribution would be done by telephone from the estate centre ;• this would link up the different farm supplies with the needs of the shop, and at times of glut plans could be made to store against scarcity. Eggs could be preserved for sale in winter at a slightly lower price. Jams could be made; milk processed to cheese; fruits frozen, and so on. This system would make a much less wasteful form of production than we have by our present methods of mass dumping, while the turnover profits could be maintained at a satisfactory level. I need hardly emphasize the enormous improvements through dating and marking the perishables, both from the consumers' and the producers' viewpoint. For any producer who is. worth having should hold the ideal of a perfect end product as his highest aim, nor should he be happy in his mind until he knows that his produce is as good as it is possible for him to get it. By the branding system faults are immediately traced to the proper quarter. Instead of using an uninteresting number as a mark, the different farms should have the courage to adopt definite badges for their individual farms; badges of which they should be proud. This trademarking would have the effect of interesting the consumer: 'Let's take the children out to "Blue Ridge" where our milk comes from."

Chapter Fourteen

THE END

The essence of this book like that of every book, comes from many sources; principally, from trial and error and from the knowledge of practical experience through the card index system of my brain. It also comes from the teachings of many friends and acquaintances and even from those unfortunates who are paid to teach others.

But a great part of this plan has been crystallized by the reading of many books, which I have studied for widely different purposes. I wanted, for instance, to find what happened to the schemes and philosophies which had been considered *dernier cri* and final at the time of their belief and I found that many of them were completely refuted within a very few years. Again, I wanted to know what was really new in the doctrines which we now consider ultra-modern, and I found many of them were old and had been suggested and tried out generations before. I wanted to get a picture of our modern beliefs and theories and to see whether they were any more secure than those of the past. I wanted to understand how the agricultures of the world really stood; how the scientists stood and how the philosophers stood. After buying, borrowing, and reading in libraries many hundreds of books, my mind, by the long process of intermittent thought, managed to form a picture of the fundamentals that were constant and upon which I could build this plan. By this study I have been able to sift out reliable figures and data that have been extremely useful, and also to find enjoyment, new ideas and a refreshing outlook—the purpose for which books are, or should be, written. I am naturally most anxious not to lay down my pen, as my writing friends of the past were always saying, without acknowledging my indebtedness to all the authors or publishers alive or dead. But here my task becomes difficult because the number of works which I have studied runs into a formidable library. Not being sure what I owe exactly to each, I have cut down the list of acknowledgements to all those books that have definitely given me something—either positive or negative. As I read the list over, I wish to thank some more specially than others; for they are more than books, they are friends

and some of them very old friends; but this would be rude to the ones I have not thanked—although some of them are not friends, but boring old humbugs.

I do not wish for instance, to thank the man who told me 'to give the calves chalk as it makes their flesh whiter'. But I must thank my friends and the various firms who supplied or gave permission to use the illustrations: Star Photographs, Perth, Messrs. Boulton & Paul, White Queen Mushroom Company, and the artists: Louis de Soissons, Grey Warnum, Teddy Martin, and my sister Frances.

The plan which I have outlined in this book will work over a reasonable period of time and it will put agriculture on its feet and make it more prosperous than it has ever been before. It will also leave our soil better off for our children and it will supply fresher and better foods than have been supplied in the past. I said 'will work over a reasonable period of time' because any plan is made to be improved—life never stands still, it goes forward or backwards. A plan is only made to be one day improved when sufficient knowledge has accumulated to make it out of date. We have had many plans in the world which were perfect and satisfactory for the state of development of mankind. Some were based on the giving of just laws or education or religion. They all gave happiness to some section of the people at least. To-day, we stand on the brink of a new era with more materialistic materials than any other builder has ever had the chance of using. For twenty years we have been standing still, playing for safety, damming up the leaks of the present, doing nothing progressive, but criticizing the past. Pointing out the faults of the Feudal system, the Victorian era and the eighteenth century. But these eras of development that we now run down, believed in themselves. The Victorians built ghastly slums and had a taste in art which we abhor, but they believed in it; they thought what they were doing was right. The Georgians formed a fabric of existence which suited the knowledge and fashion of their day and in which they believed. For as long as an era believes in itself, so a cycle or system goes on. To-day we don't believe in ourselves any more. We think we have been wrong, we think we are wrong now; we look back regretting the past, we are uncertain of the future; we don't believe in anything. We have reached the parting of the ways when we must decide what sort of cycle or fashion we are going to start.

This is a generalization for there are probably thousands like me who *do* believe in themselves. I believe in myself I am not ashamed

to say; I believe that my views are right. I see our proper agricultural future as clearly as a view on the veldt. I have shown you in my muddling way the bones, as I understand them, and told you how they can be put together by combining the best of the past with the best of the present, and by this combination prepare the way for a better future. But I realize what great alterations such a plan would require. A sheep makes a lone trail across the waste, turning here and there from trees or rocks or marshy ground; it is followed by other sheep. A thousand years later, the track is a road with farms and houses on either side, a road twisting mysteriously across the countryside. To make that sheep-architected road straight requires courage and purpose; it needs guts. I believe the farmers of this country have the guts, but I don't really believe they will use them—for they have a patched-up alternative—a plan which will enable them to carry on in comfort. The plan is simply to leave things as they are; not to undertake the necessary fundamental alterations but leave the industry derelict, make it synthetically prosperous by blackmailing the non-farming community to give subsidies to keep it going. This is the simple truth. The Royal Agricultural Society, the Farmers' Union, the House of Lords, the Conservative Party, the Land Agency Society, the Commonwealth Party and others have all published policies and in each policy, they confess that agriculture must be helped in one way or another by the Government—that is to say by those outside the industry. Suppose you went to a farmer and said, 'My film studio does not pay. It will never pay; will you subscribe to keep me in my business?' The farmer's answer would not be printable in this book. Naturally, so long as there are mugs about ready to give 'us' farmers, landlords and labourers money for nothing, we shall take it.

Now, in my plan, I ask for nothing from the outside public. To make the scheme work, I ask for agreement amongst those connected with the business: to reorganize it to a better working system, a system which puts under control of the grower the basic foodstuffs of this country. With this new power and with the improved organization which I have outlined, we of the land cannot fail. We can, for this plan, borrow capital with confidence; we may even expect a rush of lenders, for my scheme puts agriculture on a new footing. It groups us with the agriculturists of the world. We no longer play the tune of music written by somebody else—we write the music for everybody *else; for we fix the price of food;* we automatically suppress the

old gold standard and create a new standard—the food standard—because on the price of food, all the other wages and prices of the world's commodities will have to be fixed. And this is as it should be, for agriculture is the basic industry of the world. It is the only industry that really counts. Everyone turns to it in moments of austerity such as famine and war. At this moment the world is in our power, yet the agriculturist is prepared to lose the greatest chance he may ever get of independence; he is prepared to sell himself to slavery, to political whim, to big business—the conditions which have let him down time and time again in the past.

If you are in the agricultural business, read again this paragraph, think it over. Think over the plan as given in this book, visualize it as applying to yourself and your own individual problem. Think of it as something that once put in motion would be lasting, and remember that any subsidies given by the government may be withdrawn at a moment's notice—a change of party politics, a protest against taxation by the forty million people who are not in our business; and the whole fabric of subsidies might go overnight. Ask yourself where you would be then and remember my plan is possible and that there are enough pioneer spirits in this country with the imagination and zest to carry it out.

YES OR NO

It is interesting to know, after reading a book of this nature, whether one agrees with it or not; for this purpose I have tabulated my essential views. If you like, pencil 'yes' or 'no' opposite them, and the total will show you.

Agriculture is the basis of life. Food is the most important commodity. To ensure against malnutrition we should base our standards of wages and our financial standards on food, not gold. . . . . .

Our agriculture should not be supported by subsidies from outside, but be made to pay its own way. . . . . .

In the interests of trade and economy we should not grow those crops which can be produced more cheaply elsewhere (by the same wage and profit rate). . . . . .

The British are happier when they can work as individuals and not as a gang. . . . . .

Our health would be improved if all our foodstuffs were supplied as fresh as possible and dated so that stale food could be rejected. . . . . .

It is more likely that we will build up fertility on our ground by natural means than artificial. . . . . .

It would be more convenient and economical for the housewife to buy packeted foods at a day and night automatic market than by the present methods. . . . . .

A delivery system twice daily of all deliveries by one company would be better than many deliveries by many firms. . . . . .

The system of mixed ownership of land which I have outlined would give more chance for individual progress than any other system. . . . . .

YES OR NO

By the co-operation, use of machinery, distribution and selling which I have outlined agriculture would pay and give a wage-rate equivalent to that of the opposite number in the town. . . . . .

We will not be peaceful or happy until we drop the materialistic outlook and adopt a spiritual outlook. . . . . .

The plan I suggest does meet the criticisms and theories I have put before you. . . . . .

TOTAL . . . . . .

If you take the trouble to answer these questions you will see whether you agree with my ideas or not.

The last question I will answer myself! Is it possible for this plan to be adopted? . . . I don't know! But I hope so, because I believe the days of all-in materialism have passed and we should now think of forming a Charter for our land, not just for to-morrow, but for posterity.

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