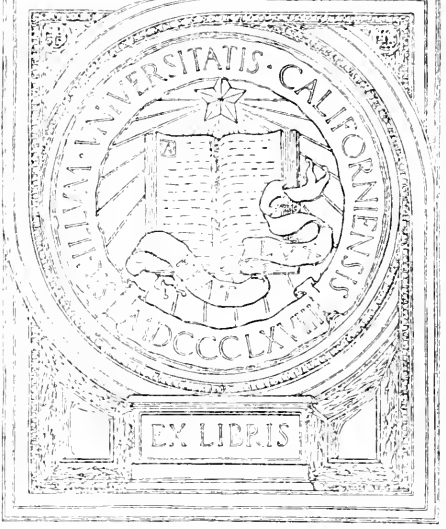

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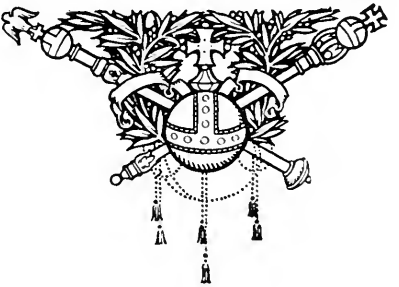
THE PRACTICAL SIDE OF SMALL HOLDINGS

James Low

SMALL HOLDINGS

by

JAMES LONG



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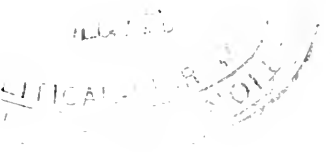

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INTRODUCTION

THE Author's earliest connection with the Small Holdings movement dates from 1880, when making an agricultural tour in Cheshire, details of which were published in the *Manchester Guardian*. On this journey he was enabled to see something of the work conducted by the tenants on the estate of Lord Tollemache, an ardent and devoted helper of small occupiers of land. It was owing to this visit and to subsequent correspondence with Lord Tollemache that he was induced to pay close attention to the subject; to see something of the practice in various countries on the Continent; and later to make a more extended inspection of the colonies of small holders established in England. This eventually led to the direction of attention to the lack of allotments, a matter in which Lord Onslow—one of the ablest and most

disinterested advocates of a system destined to become a power in the land—took a prominent part.

In 1902 the writer again paid a visit to Cheshire, on the invitation of the Right Hon. James Tomkinson, M.P., of Willington Hall, an enthusiastic supporter of the system. Subsequently visiting various portions of Lord Carrington's property in Lincolnshire, the colony at Swaffham, and the fruit-growers in Hampshire, he was fortunate in making the acquaintance of Sir Robert Edgcumb, who had founded a colony of small holders near Dorchester, and Major Poore, who had succeeded in accomplishing similar work for the benefit of others at Winterslow. Both gentlemen afforded valuable information which materially assisted the writer in founding the Small Holdings Association, of which Mr Tomkinson became chairman, and, subsequently, the Newdigate Colony. The latter is now divided into from thirty-five to forty holdings, the large majority of which are equipped with handsome homes,

although prior to the purchase of the property the buildings were confined to the homestead and a single cottage.

In 1904 the writer became a member of the Small Holdings Committee of which the Earl of Onslow was chairman, and travelled with him through Worcestershire for the purpose of inspecting Small Holdings and similar undertakings in which men were engaged in making a livelihood upon small areas of land.

Amongst others who became closely associated with this movement mention must be made of the Rt. Hon. Jesse Collings, M.P., who has for a quarter of a century exerted himself in the interests of agriculture; of Sir James, now Lord, Blyth; Mr J. H. Whitley, M.P., now Chairman of the Committee of the House of Commons; Mr Spear, M.P., now Sir John Spear; and Mr Samuel Whitley.

THE PRACTICAL SIDE

OF

SMALL HOLDINGS

CHAPTER I

GENERAL CONSIDERATIONS

ALTHOUGH public interest in Small Holdings has only been keenly aroused during the past ten years, the system has been established in various parts of England for a long period of time.

The author pointed out in a paper read before the Manchester Statistical Society in 1904 that in some parts of England farming was becoming impossible, that large areas of land were being neglected or abandoned altogether, while the country population were drawing a large proportion of their supplies of farm and garden produce from large cities, in spite of the fact that the quality was inferior and the prices exorbitant. We expressed our belief that the difficulty was partly educational, and partly that the younger men and women were dissatisfied with the humdrum routine of an unpromising country life—a dissatisfaction

which is fanned by their friends in the towns and by the glamour and fascination of the music-hall and other alluring forms of excitement.

As to whether there is a remedy for this state of affairs, we believe that there is, and that it lies in the natural desire of man for the possession of a home, of land, and of live stock, and that in order to acquire possession of the one or the other he will undertake responsibilities which demand unceasing labour and a simple and frugal mode of life. The lot of the agricultural labourer to-day is by no means a promising one. His only hope is in the receipt of higher wages, and this hope can only be gratified, as he believes, by obtaining employment in a town, where, however, though he fails to recognise the fact, his increased expenses absorb more than the increase in his pay. There are no prizes in the service to which he belongs, while his small wages practically precludes the possibility of his saving money.

Yet, what frequently follows migration to town? The young and vigorous countryman is gladly employed by those

who are in want of strong arms and steady nerves, at wages which are comparatively high, and, in spite of higher rents and more extravagant rations, life swings merrily along, and he is gradually drawn into the vortex by which so many fine fellows are overwhelmed. His robust constitution, however, his frugal training, and his native air have served him well, and he survives to marry and to settle in one of those dismal, gardenless terraces, involving a costly addition to his rent. Gradually he sinks into the usual type of overworked, unhealthy-looking town employee, struggling to rear a still more unhealthy family, with the result that one more group of human beings is added by the countryside to the still swelling town population, with its submerged tenth, its hospitals, and its workhouses. This is how human life—the very pith and marrow of our manhood—is being used up.

What will be the outcome of the Small Holdings movement? Among the results we look for are the following :—

(1) The repopulation of the country districts.

(2) The improvement of the health and

physique of the people. We hold that it is impossible for children to live among the green fields and to be fed upon milk, home-made bread, and fresh vegetables and fruit, without a change being effected in their weight, their size, and their mental and physical condition.

(3) The prosperity of a larger number of people. The existence of a colony or garden village will be accompanied by beneficial results to the working inhabitants of the district; and where, as is already the case in existing instances, the colonists succeed, it follows that prosperity is increased.

(4) The employment of an increased number of workers—(*a*) on the land, for the intensive culture of the small holder demands abundant labour; (*b*) in the building trade; (*c*) in road-making, well-sinking, brick-making, hauling timber and other materials from the railway to the colony, in the manufacture of building materials, joinery, metal-work, and a hundred other articles; (*d*) in the handling of produce grown in increased quantities on holdings of small size, and in the conveyance of this produce to the consumer or to the large market.

(5) The occupation and improvement of uncultivated, abandoned, and derelict land.

(6) It will contribute to a much larger extent to our ability to feed ourselves as a nation. So long as manure is obtainable, there is scarcely a limit to the capacity of a skilled man to produce food of many kinds.

(7) It will diminish the rates and taxes payable in rural districts by reducing the number of paupers and unemployed, and consequently the poor rate.

The motor has brought our villages nearer to the towns and the railways, and to each other, and it will, in our judgment, play an important part in the establishment of Small Holding colonies and garden villages. Experience thus far has shown that there are thousands of country-bred townsmen who are anxious to change their occupation for rural life, although it is probable that not more than ten per cent. have the means or capacity to make a start on the purchase system. Of the 1200 applications for land which were made to the writer in 1903, a small proportion consisted of those impossible persons, shopkeepers' assistants and clerks,

who have no experience of the country or of any rural occupation. Of one fact we are assured—that the rural labourer, with very few exceptions, is not the man who will occupy land, allotments excepted, either under the hire or the purchase system, except in a few particular districts; but that the man who really needs it is the country-bred townsman, who has never lost his attachment to the farm, and who has acquired sufficient business experience to enable him to combine with the labour of cultivation the capacity to sell his produce.

Our own ideal of a Small Holding colony or garden village is a compact and not too expensive property, situated in a district in which agriculture is not highly prosperous, and in which the population chiefly depend for their food upon foreign produce. The land should be of a substantial character, well supplied with water, adjacent to the village, church, chapel, and school; drained; its fields conveniently divided by fences and ditches, and all accessible from good roads. The houses should be at once substantial, simple, artistic—for most men take a pride in a prettily constructed home—and con-

veniently equipped for warmth, cooking, and all necessary domestic purposes. The arrangement of the land, whether adjacent to the house or not, is a matter for the decision of the occupier, and will be controlled by his system of culture; but, in any case, he should provide a garden of sufficient size to supply his own table, and this should include a poultry yard, a piggery for a breeding sow or two, and, in the absence of a cow, one or two milch goats for the provision of milk for his children.

A common or club room should be established for the use of the whole colony, and in some way supplied with newspapers, especially those representing farming and gardening, with technical books, some innocent games, and a few works of reference. There should be a co-operative society controlled by a committee elected by the colonists themselves, and intended for the purchase and supply of food—whether for the home or the stock—manure, seeds, implements and utensils, coals, and the provision of the more costly articles of farm equipment, to be used in turn.

The committee, too, should be charged with the conduct of the repair of the

private roads, and they should represent the whole body where cases of appeal are essential against local rates, and in such instances as may occur in which the well-being of the colony is threatened. Little difficulties which may cause personal inconvenience and disagreement should be referred to this committee. Co-operation, which has raised Denmark to the position of one of the richest countries in the world for its size, is the lever which is employed by peasant owners in every country but England. The position of Co-operation with us is owing to the small numbers of the men for whom it was primarily designed, and in consequence there are very few village banks, mutual insurance societies, local cattle-breeding clubs, and other organisations such as the Swiss, the Danes, the Germans, and even the Luxembergers have established for national utilitarian purposes.

We have no doubt that some of the many who are constantly asserting that small farming will not pay have commenced to believe their assertions to be true, they have made them so often; but we would point out that the profits of the soil depend chiefly upon labour and skill, and both are usually

rewarded. There are thousands of acres of land within sight of St Paul's Cathedral which do not return a gross profit of £5 per acre per annum, and yet within the same limited area there are market gardeners and nurserymen—the majority of whom are humbly born and imperfectly educated, but who by experience have become accomplished and skilled men—who are able to realise from £100 to £1000 per acre for their produce—in large part, it is true, by the aid of glass. If this is not farming in the accepted sense of the word, it is crop production, and the margin between the figures we have suggested is just as wide, and no wider, than the capacity which exists between man and man.

Great Britain is the only European country of agricultural importance in which Small Holdings are confined to a comparatively small area. The total number of persons employed upon the whole of the farms in Great Britain in 1908, inclusive of the occupiers, amounts to 1,340,000, of whom 324,000 are females. The number of agricultural holdings of land is 508,629, or, making allowance for those cases in which one farmer occupies more than one holding, we get, 'in

round numbers,'—to use the words in the official report—five hundred thousand persons. The number of holdings of from 1 acre to 5 acres in 1908 was 108,094; the number between 5 and 50 acres was 231,819; and from 50 to 300 acres the number was 151,002;

Size-group.	Arable.	Pasture.
Acres.	Acres.	Acres.
1–5	105,068	235,727
5–50	1,591,243	3,133,757
50–300	8,776,397	10,190,238
300–Over	4,322,809	3,856,147

while over 300 acres the number of farms reached 17,714. Thus, we have 339,913 holdings under 50 acres in extent, or considerably more than half the total number of holdings in the country. The total area of arable and pasture land included in each size-group of holdings, together with the total area of rough grazing attached to the

holdings in each group (1908), are given on pp. 20-21.

Thus it appears that if the rough grazing were included in the area of the holdings as classified into size-groups, the number below 50 acres in extent would be substantially

Total.	Rough Grazings.	Average Size.	
		Cultivated Land only.	Including Rough Grazings.
Acres.	Acres.	Acres.	Acres.
340,795	561,327	3·2	8·3
4,725,000	4,576,747	20·4	40·1
18,966,635	6,379,829	125·6	167·8
8,178,956	1,284,071	461·7	534·3

reduced, while the number between 50 and 300 acres would be proportionately increased. Apart from the rough grazings, the area of land occupied by small farmers—*i.e.* those occupying less than 50 acres—is, in round numbers, 5 million acres, as against 27 million acres occupied by farmers holding over 50 acres. Comparing the number of Small

Holdings between 5 and 50 acres in extent with 1885, we find that, while there has been an increase in the area from 4,481,354 acres to 4,725,000 acres, there has been a slight diminution in the number, the figures being 232,955 for 1885 and 231,819 for 1908. On the other hand, farms between 50 and 300 acres in extent have increased from 144,000 to 151,000, while farms over 300 acres have diminished from 19,364 to 17,714. Small Holdings, 5 to 50 acres, now average 20½ acres in extent, while the largest holdings average 462 acres. It is worthy of remark that of the 108,000 holdings between 1 and 5 acres in extent, 59,000 odd are pasture, while only 22,000 are mixed holdings; on the other hand, among the holdings from 5 to 50 acres, 93,000 are pasture and 104,000 mixed, while only 34,000 are arable.

The total number of horses upon holdings of from 1 to 50 acres is 391,000, the total number of cattle 1,548,000, of sheep 4,789,000, and of pigs 1,073,000. Thus, the small holders keep considerably more cows, pigs, and horses per acre than the large farmers; on the other hand, large farmers keep a larger number of cattle—other than cows—and sheep. Again, it is worth remarking

that, while the quantity of whole milk produced per 100 acres upon farms between 50 and 300 acres in extent was 2841 gallons, the quantity produced on farms between 5 and 50 acres was 3307 gallons per 100 acres. Small farmers were also much larger producers of butter. Thus, on farms between 1 and 5 acres in extent, the butter produced per 100 acres was 154 lb.; that produced on farms of 5 to 50 acres was 206 lb.; while on the larger farms of 50 to 300 acres the yield reached only 119 lb., the largest farms of all, those over 300 acres, producing only 41 lb. per 100 acres.

Poultry-keeping, again, is a guide to the productive powers of the small holder. On farms between 1 and 5 acres in extent the number of fowls kept per 100 acres was 946, of ducks 86, of geese 8, and of turkeys 7; on farms of 5 to 50 acres the number was 244 fowls, 21 ducks, 4 geese, and 3 turkeys; while on farms from 50 to 300 acres the number of fowls kept per 100 acres was 77, of ducks 7, of geese 2, and of turkeys 2; the poultry kept upon the largest farms of all being almost insignificant. The small holder, therefore, not only keeps

more stock than the large farmer, but he produces considerably more milk, poultry, and eggs, while he employs more labour. On the smallest holdings the number of persons permanently employed per 100 acres reached 13·4, on holdings of 5 to 50 acres 6·5, on farms of 50 to 300 acres 3·3, and on farms over 300 acres 2·6 persons per 100 acres. These facts are of great significance, for they point not only to the greater productive power of the small farmer, but to the fact that the extension of the Small Holdings system means a marked increase in the rural population.

In 1908 the estimated value of the farm crops grown in Great Britain was 125 millions sterling, but a very large proportion of this produce was consumed upon the farm—partly by the household of the farmers themselves, but chiefly by stock. The value of the produce which was sold for cash was estimated at £46,600,000. The total value of the produce of the year, including animals sold, wool, fruit, flowers, timber, dairy cows, and poultry, was estimated at £150,800,000, or, taking the number of persons employed upon

the land, either as occupiers or permanent labourers, at 1,673,000, a gross output of £90 per head. The area of the land from which this produce was obtained was 47,795,000 acres, which included 12,800,000 acres of mountain and heath land used for grazing. The gross value of the produce, therefore, amounted to £3 3s. 1d. per acre, or, omitting the woodlands, which are estimated to have returned 6s. per acre, and the rough grazings, which were valued at 10s. to 12s. per acre, a total gross sum of £4 10s. per acre on the 32 million acres of cultivated land.

Such is the result of the exhaustive inquiries and estimates of the Board of Agriculture. Great Britain at the commencement of the Twentieth Century, with the help of scientific teaching, improved seed, abundance of artificial manure of the most valuable character, the highest skill in cultivation, and the greatest market in the world, is unable to show a return of £5 per acre for her cultivated land, in spite of the facts which are revealed in the following pages, not only as to the capacity of the soil to produce infinitely more valuable crops, but of the ability of its occupiers. If we add to the gross value

of the marketable crops the value of the imports, less the exports—which reaches a net total of £178,349,000—we arrive at a gross total of £329,149,000, which practically represents the foodstuffs consumed by the population of this country, and the market in which these foodstuffs are sold.

CHAPTER II

CONDITIONS UNDER WHICH SMALL HOLDINGS MAY BE OBTAINED

A PERSON who desires to obtain a Small Holding must apply upon a form prepared for the purpose to the Clerk of the Council of the county in which he resides. Should he, however, reside in a County Borough, he must apply to the Town Clerk of that borough. An applicant may be either male or female, and conditionally upon his agreeing to cultivate his own holding he is not restricted to class. It does not follow, however, from the terms employed in the Act, that a small holder is compelled to dig his land; he may use it for poultry keeping or for live stock of any kind; he may plant an orchard or convert it into a garden for the production of crops; he may grow what he likes; and he is not restricted in the sale of his produce. A prospective small holder, however, must

convince the Council that he is in a position as regards means and experience to manage his holding successfully.

According to the Small Holdings Act a 'small holding' is an agricultural holding which exceeds one acre and is no more than fifty acres in extent. If, however, the annual value as based upon the income tax assessment does not exceed £50 a year, it may exceed fifty acres. A County or Town Council may either purchase or hire land for the provision of Small Holdings within or without the county or the borough over which they have authority. Where it is impossible to obtain land by agreement with the owner, a Council has power to acquire it without his consent, subject to certain restrictions. Thus, they cannot acquire compulsorily land which forms part of any holding which does not exceed fifty acres in extent. No land, however, can be thus acquired until the value has been fixed by an arbitrator, nor without the confirming order of the Board of Agriculture. A Council has the power to erect a dwelling-house and buildings suitable to the holding, and to adapt the land to the purpose required. Where a Council acquires land upon a lease or compulsorily, they can

let, but they cannot sell it; where land has been acquired by agreement it can be either let or sold to a holder. The rent which is fixed for a Small Holding must be sufficient to cover the cost of management and other expenses.

Where an arrangement has been made by a prospective holder to purchase land from a Council he must pay down one-fifth of the purchase money, together with the cost of adaptation; he may leave one-fourth of the sum on a perpetual rent charge, while the remainder, with the interest, must be paid in half-yearly instalments, which may be spread over a term not exceeding fifty years. A Small Holding purchased from a County Council must not be diverted from the purposes of agriculture for a period of twenty years, or until the whole of the money is paid. To this end a purchaser must agree to certain conditions, which are specially prepared for the purpose. Where a small holder buys his land from a private owner, he may obtain not more than four-fifths of the purchase money from the County Council who have the power to grant it. The sum must be repaid on the same conditions as are provided where a holding is sold

by the Council. Where registered associations are formed for the purpose of promoting Small Holdings, they may be able to acquire land from a County Council under certain conditions. Details of these conditions, together with information respecting the formation of such associations, may be obtained from the secretary of the Agricultural Organisation Society, Dacre Street, Westminster.

Obtaining an Allotment.

Persons residing in rural parishes and desiring an allotment, which may reach five acres in extent, must apply to the Parish Council, or where no such Council exists, to the chairman of the Parish Meeting. Where an applicant resides in an urban district, however, he must write to the clerk of the District Council or to the Town Clerk, stating what he requires, and especially noting any particular piece of land which is available. An applicant for an allotment can only rent the land; he cannot buy it, nor sub-let it. Where a tenant of an allotment has improved it, he is entitled on giving it up to compensation for the improvements which are unexhausted. Land, however, can only be let for allotments to members of the labouring population, male

or female. The Board of Agriculture explains the term 'labouring population' as including all persons whose main occupation involves manual labour. If, however, an applicant does not belong to the labouring population, and requires more than an acre, he can make an application to the County Council under the Small Holdings Act, as suggested above.

Although Councils are not compelled to provide allotments extending to more than one acre, they may provide them up to five acres. Where, therefore, a Council declines to provide a larger area than one acre, the applicant must apply to the County Council under the Small Holdings Act. Should a Parish Meeting or District Council, however, fail to satisfy the demands of those who require allotments, they may inform the County Council, who are empowered to provide allotments up to one acre at the expense of the defaulting authority. Should the County Council fail in the same way, the applicant may apply to the Board of Agriculture for redress. The local authorities already named have power to erect dwelling-houses for applicants of one acre and upwards. They can either purchase or hire land for allotment

purposes within or without their parish, district, or borough, and they can adapt the land for the purposes required. As in the case of Small Holdings, a Borough or District Council may purchase or hire land compulsorily under certain restrictions where they are unable to acquire it by agreement. Where a Parish Council or Parish Meeting is unable to obtain land for allotments, they may report the facts to the County Council, who may proceed at once to acquire land compulsorily on their behalf, conditionally upon the order being confirmed by the Board of Agriculture. The rent charged to an allotment holder, one-fourth of which the Council may require to be paid in advance, must be fixed at a sum sufficient to cover the expenses incurred in providing and adapting the land, together with the cost of management. Where a house is erected on the land the rent fixed must be sufficient to cover the cost.

CHAPTER III

THE ADMINISTRATION OF THE SMALL HOLDINGS ACT

THE administration of the Small Holdings Act is usually conducted by a committee appointed by the Council. To this committee full powers are given to conduct all correspondence, to make inquiries, and to negotiate for the acquisition of land. A committee, however, has no power to borrow money or to impose a rate. A Small Holdings Allotments Committee may be strengthened by the inclusion of non-members of the Council. One of the first steps taken by the committee is to invite applications by advertisement or by any other means which their judgment suggests, and to prepare forms of application, which should contain questions relating to the experience of the proposed small holder, to his possession of capital, and to his prospect of achieving success. Each applicant should

be required to state upon the form what area and class of land he requires, whether he desires to purchase or hire, whether he requires a house and suitable buildings, whether he desires any particular land, and whether he is already in occupation of land. The committee, too, will draw up a code of rules for the sale and letting of Small Holdings, which must be confirmed by the Board of Agriculture.

Applicants for land should be personally interviewed by the committee, or, better, by the sub-committee, consisting partly of the Small Holdings Committee and partly of members of minor public bodies and other suitable persons, so that each district or parish should be properly represented by men who may know both the land and the applicants. Although the Council will prepare rules by which applicants are rquired to cultivate their holdings themselves, there is nothing in the Act which excludes the use of hired labour to assist the holder, or to prevent persons who require land as an adjunct to their present occupations being prevented on that account. The Board of Agriculture suggests that the words of the Act should not be interpreted in too narrow a sense,

and that applications from persons who are already occupied in some other way should not be given a secondary place as compared with those of men who propose to devote the whole of their time to the cultivation of their land.

When a Council desires to obtain land, either by purchase or hire, the committee, through its officers, should make inquiries from adjacent landowners as to their willingness to sell or let, while attention should also be given to any announcements of land to be sold. One of the most important questions in relation to either hire or purchase, is that of rent. Complaints have been frequently made to the effect that small holders are required to pay much higher rents than farmers for land of similar quality, and that their prospects of success are in consequence diminished. It is not essential that the required land should be within the County Council's administration. The Council may acquire land under a scheme or not, as it chooses, but in the latter event it forfeits the right of claim to the repayment of a sum of money representing half of any loss which may be incurred, and which is irrecoverable. Where it is decided to adopt a scheme, a

contract must be prepared for the purchase or hire of the land, and this, with a report by the Small Holdings Committee, must be sent to the Board of Agriculture for their provisional sanction. The report must contain full details of the land, its rental and rateable value, together with its purchase price and the sums it is proposed to charge for each holding. When the scheme has been sanctioned it must be advertised, and then, should there be no objections raised, it will be confirmed, and the contract can be completed. Where it is proposed to purchase land at a sale by auction, the land must be valued, and the valuation, with a report upon it, sent to the Board of Agriculture. If both are regarded as satisfactory, the Council will be authorised to bid up to a sum named by the Board.

Where Councils are unable to obtain land for Small Holdings or Allotments, they have the power to acquire it compulsorily. Having selected the land which it is proposed to acquire, they must obtain the sanction of the Board to its acquisition, but it is important to notice that a Council must, as far as possible, avoid taking an undue or inconvenient quantity of land from one owner or occupier;

that they can acquire no land in this way which forms part of a holding of less than fifty acres, nor which forms part of a park, garden, pleasure ground, or of the home farm of a mansion, or which is required for the convenience of a dwelling-house. Where an owner of land which has been let to a Council can prove to the satisfaction of the Board of Agriculture that it is required for building, mining, or other industrial purpose, he may resume possession by giving twelve months' notice to the Council. No valuer, however, who is employed to assess the rent to be paid for land which is hired compulsorily may take into account any prospective value which may attach to it on either of these accounts. Thus land which has a prospective value, as for building, may be hired by a Council for occupation by small holders or for allotments at an agricultural rent.

A Council has the power to let out holdings, to fence, to provide roads, water, and drainage, and to erect houses and buildings, or to adapt such houses and buildings as exist upon the land, but they may not erect more than one house upon one holding. To enable a Council to complete its purchases, it is

empowered to borrow money from the Public Works Loan Commissioners at the rate of 3½ per cent., but it must obtain the sanction of the Local Government Board, which is prepared, as a general rule, to agree to the full term of eighty years which the Act allows for the purchase of land for Small Holdings. The Act of Parliament authorises the Board of Agriculture, subject to certain regulations, to pay either the whole or part of the expense incurred by a Council in such proceedings as they may take in relation to the acquisition of land. Under the regulations of the Board it appears that they undertake to pay the whole of the expenses which have been necessarily or reasonably incurred. The most important items under this head, however, refer to the cost of the report and valuation of land which the Council have under consideration, the cost of the proceedings for obtaining a compulsory order, the arbitration and valuation expenses where land is purchased or hired compulsorily, the cost of conveyancing, and of the registration of title.

When a Council sells or lets land to a tenant, the sum fixed must be sufficient to recoup to the Council the whole of their expenses

in its acquisition and adaptation, always excepting such sums as are repayable by the Board of Agriculture. Thus, the amount fixed should cover the tithe, land tax, repairs, management, and contingencies. The rent, however, should not include rates and taxes, which should be paid by the tenants. Where land is sold to a small holder, the Council may require the payment down of at least one-fifth of the purchase money upon the completion of the purchase. A sum not exceeding one-fourth of the purchase money may, at the discretion of the Council, remain as a perpetual charge upon the holding, the purchaser paying interest on that sum annually. The balance of the purchase money, together with the interest, must be paid by the purchaser half-yearly, and spread over a period not exceeding fifty years. Under given conditions, however, the Council have the power to postpone the repayment of instalments for five years. The purchaser of a holding on these terms, however, is required to agree to certain conditions, which last for twenty years from the date of purchase, or as long as any portion of the purchase money remains unpaid. These conditions are framed with the object of securing the

holding as an agricultural holding. The occupier, therefore, must commit no breach of his agreement which would render him liable to lose possession.

A great feature of the Small Holdings legislation is the fact that County Councils are permitted to encourage and to assist associations which are formed with the object of creating, or promoting the creation of, Small Holdings or Allotments. To this end the Board of Agriculture has made a grant of money to the Agricultural Organisation Society, conditionally upon the Board being entitled to nominate six members on the committee of the society. County Councils, too, may make such a society as that referred to a medium through which they may render financial assistance to local societies. Thus, a co-operative society may rent land from a County Council sub-divided into holdings which they may let to individuals at rents which are intended to cover the cost and at such risk as they may foresee. Thus, the association would collect the rents from the tenants, as they would be responsible, and pay them over to the public authority. It is obvious that by the adoption of this method the rent paid for a farm or a large area of

land intended to be subdivided into Small Holdings would be less per acre than the rent which would be chargeable by a County Council when fixed for separate allotments; an association, too, would prove beneficial to the small holders, enabling them to organise for the purchase of stock foods, manures, seeds, and other requisites, and for the sale of their produce.

This movement has already borne good fruit, inasmuch as 4000 acres of land were let by English County Councils to thirty Co-operative Associations during the first three years in which the Small Holdings Act was in operation. Thus, in Berkshire, the North Berks Small Holdings and Allotments Society pays £391 for 465 acres of land; the Waylands Society in Norfolk pays £300 for 285 acres. This land, which comprised a farm at Watton, and which is leased by the County Council for fourteen years, has been sublet to the Waylands Society. The farm is now divided into eight holdings, and is worked upon the four-course system, five occupiers earning their entire livelihood upon the land. The Mere Society in Wiltshire pays £380 for 452 acres of land. This farm, which belongs to the Duchy of Cornwall,

is rented on a twenty-one years' lease from the Wiltshire County Council. There are twenty-nine holdings, which vary from one to thirty acres in extent. The tenants pay rents varying from 22s. to 44s. per acre, the society paying the rates and doing repairs. The number of stock on the farm includes 142 head of cattle, 120 pigs, and 11 horses, showing a very large increase in the course of three years. It will be useful to add that the North Bromsgrove Market Gardeners' Society, which is really a limited company, rents land from the County Council of Worcestershire for the production of fruit and vegetables, of which the occupiers send 600 tons annually to Birmingham, where it is sold by a co-operative society known as the Federated Growers, Limited. We have had the advantage of inspecting several of the Worcestershire holdings, which chiefly extended to five acres, and of witnessing the prosperous character of the work. In one of several instances of a similar character the occupier had sold strawberries grown upon less than an acre of land in the Birmingham market for £80. The fact that so many of these societies based on the co-operative system are working successfully is sufficient evidence

of their value and of the importance of their extension. We have, however, but touched the fringe of the question, and only when such organisations number thousands shall we be able to compare advantageously with the results which have been achieved on similar lines in Luxembourg, Denmark, and Holland.

The conditions under which the Allotments Acts are administered by Councils are very similar to those which relate to Small Holdings. In first dealing with the question of allotments a Council, through its members or its responsible officer, institutes an inquiry with the object of ascertaining whether there is a demand among members of the labouring classes for allotments which is not satisfied. Where a Council decides not to provide allotments larger than one acre in extent, it is their duty to refer applicants who require more than one acre to the County Council. Where a Parish Council decides to purchase land for allotment purposes they should obtain the consent of the Parish Meeting, and then apply to the County Council and the Local Government Board for permission to raise the money. A loan can be obtained in accordance with the Act of 1894 for a

period not exceeding sixty years, or for the lesser period of fifty years, from the Public Works Loan Commissioners. The latter course is recommended by the Board of Agriculture owing to the probably lower rate of interest. The sum charged by the Commissioners at the present time is $3\frac{1}{2}$ per cent. for loans for a term not exceeding thirty years, or $3\frac{3}{4}$ per cent. for loans obtained for a period between thirty and fifty years. A Parish Council can raise money for general expenses in providing allotments not exceeding a rate of 3d. in the £, or, with the consent of the Parish Meeting, of 6d. in the £. These general expenses appear to include any annual charge, whether of principal or interest, in respect of any loan. When a Council provides allotments it may provide regulations dealing with the terms and conditions of their tenancy, but these regulations must be confirmed by the Board of Agriculture. The Council must also keep accounts showing the receipts and expenditure under the Allotments Act, together with the register showing details of the tenancy, acreage, and rent of every allotment, whether less or not.

A Council may also acquire common

pasture land on the authorisation of the County Council, to whom their scheme must be submitted, but the rent paid for this land must be sufficient to cover the cost of its acquisition. A Council may also acquire land for grazing, which may be attached to the allotments. Where a Council is unable to obtain land for those who apply for it, they may apply to the County Council, who may acquire it compulsorily, their order being confirmed by the Board of Agriculture. Where a County Council declines to accede to their request for the compulsory acquisition of land, the Parish Council may petition the Board. Where, however, a Parish Council or the Council of an urban district, not being a borough of the Council, fails to meet the requirements of applicants, the County Council must intervene.

CHAPTER IV

SMALL HOLDINGS.—I

SINCE the appointment of the Departmental Committee on Small Holdings, there have been various publications which were apparently intended by their authors to describe their own experience, or to indicate how a man may succeed in earning his livelihood upon a small area of land. We have observed that although some useful information has been supplied, there has been a general lack of initiative, which was in all probability owing to a natural cause. There are numbers of men who are thirsting for land; they are anxious to rent or to buy it, to purchase implements and stock and set to work in good earnest, but they lack experience. There are others, much less numerous, who are at work; some are failing to succeed, others are succeeding. We have received many applications for advice on this subject,

and never hesitate to reply that farming is a difficult business, and that it would be as reasonable to undertake it without experience as to start business as a watchmaker without the slightest knowledge of the trade. We have been told by men of great capacity that without any knowledge of agriculture they could manage a farm while sitting in their study chair, although there is probably no more complicated business than that of the farmer. We are anxious to say nothing to induce the reader to believe that experience is not essential, or that nothing is more simple than to dig the soil and plant the seed, and thus secure a paying crop, still less that stock can be bred and fed successfully, given the means to buy it and its food. If the crops on the farms of a dozen tenants were inspected, we should find that in spite of their long experience they were not all alike. In some instances they might be abundant, owing to the fact that the growers were blessed with brains, in others they would be more or less inferior, or absolutely foul. In no business or profession do men succeed alike, so much depends upon their grip of principles, their mastery of and their devotion to their work. Success

is not a form of luck or chance: it is the reward of honest work; and if a man is determined to take a Small Holding of land he must make up his mind that success rests almost entirely with himself, his acquisition of the requisite knowledge, and his power to put it into daily practice by the aid of his muscles and his brain.

Let us examine the class of work of which a small holder should possess experience, on which, indeed, his practice should be grounded. The first question which probably arises in his mind when he is ready to commence is: In what locality shall he rent his land? He must consider the cost or the rent, the method by which he will sell his produce, the means of its conveyance to buyers, the distance to a station, a doctor, a post office, a school, and the proximity to a place of worship—which may assist him to fight life's battle successfully. There are many districts within easy reach of a large population which may suit him very well; there are others which are too far from populous towns to enable a tenant, however energetic he may be, either to find time to call for orders or to deliver what he sells. The question of locality must be carefully thought out,

especially by those who engage in *petite culture*, where the produce is more varied and adapted for sale to private customers. On larger holdings where the cultivation is less intense, the produce consisting of the usual agricultural crops and stock, locality is less important, but the land should be within easy reach of a station and a market town.

There are some questions into which a small holder must look very closely if he intends to achieve success. He may deserve, but he cannot command, prosperity if these are absent or ignored. In the first place the soil must be sufficiently good for his purpose; thin chalk, sand, gravel, or brick earth must be left severely alone. Far better leave the land altogether and seek a new vocation than waste money, time, thews, and sinews on an impossible holding. Good work has been accomplished, and will be accomplished again, on poor soils, but it is not for men dependent for their livelihood to attempt what, with the means at their disposal, is impossible. The soil selected should be of medium character, deep, and workable in all weathers—the worst excepted—with a single horse, unless the farm is large enough

to maintain two. Its condition should be clean, and it should be carefully examined not only when the crops are ripe, but when they are in their early stage of growth. The soil will in this way show its hand; *e.g.* its freedom from weeds or otherwise, and its richness in plant food. The richest soils, however, are easily played out, and just as easily enriched by skilful cultivation and liberal manuring.

Where land is drained, care should be taken to ascertain if the drains are in working order, or it may be found essential to put them in repair. This would involve heavy expenditure where the land is purchased, or an increase in the rental if the owner undertakes the work. Land which needs draining but is undrained had better be avoided altogether, although there are occasional instances in which a skilled man may undertake the work himself with good results, but let us add that in no instance in which doubts arise as to the policy of acquiring a given field should a risk be taken unless a man feels himself to be master of the situation.

The position of a holding is important. If the altitude is too high, the crops may be

too much exposed, in which case the varieties to be grown will be restricted. This would prove too serious where it is proposed to cultivate garden plants or crops for the early market which require warmth. Land which lies on a gentle slope facing the south is much to be preferred, but it should not be exposed to the north or to east winds. In all cases, indeed, a wind-brake or shelter of some kind is desirable. In some instances growers of fruit and other crops which are so easily damaged by wind, first plant quick-growing evergreens to break its force. It is important, too, to remember that fruit-trees in particular should not be planted in low-lying soil, which is subject to the frequently recurring mists of early spring. These mists may be often seen in valleys by those who live on the higher ground, and whose fruit is saved in spite of the lower temperature to which the trees are exposed. When the fruit-trees are in bloom, the moisture is deposited on the delicately-constructed organs of the flower, with the result that if frost follows they may be destroyed.

As we have already pointed out, no trouble should be regarded as superfluous which is intended to ensure the acquisition of land

suitable for the purpose a small holder has in view. There are instances, more especially among the chalks, the heavy and the lightest soils, in which the crops are failures in a dry summer. It is important—nay, imperative—that there should be no possibility of failure from lack of moisture. A soil which is well stocked with humus, or decayed organic matter, not only contains more water than another, but it has greater power of absorption, while it loses less by comparison. It is for this reason that a garden soil so seldom fails; hence the importance of converting the Small Holding into a garden soil by manuring with large quantities of dung and heavy cropping. Humus materially assists in the improvement of texture, so that land is more easily and quickly tilled, while constant tillage, whether with spade or plough, and heavy manuring, increases its depth and productive power. If in his estimation of the value of the land which he seeks to take, a farmer makes a point of noting the quality, depth, and texture of the soil, its condition with regard to drainage, its altitude and aspect, the climate as suited to his stock

and crops, and the natural shelter which is afforded, he will scarcely fail to acquire what will most assuredly help him to succeed, if he is able to turn it to good account.

Let us next indicate how good land may be distinguished from that which is undesirable. The land should be flat or sloping to the south, not low-lying, but drained, clean, free from sponginess, deep in staple, rich in colour, dark brown or red being preferable—unless it be alluvial, warp, or fen land. The trees and hedges should be vigorous, the pasture luxuriant, a brilliant green in colour, and rich in clover. Where the natural plants in the land are tough and wiry, and daisies, mayweed, moss, sedge, and the creeping bents or couch abundant, or where the trees which prevail are those which are common to poor land, a holding should be left alone. It need hardly be added that the farm roads should be sound, the hedges or fences in good repair, each grass field supplied with never-failing water, and the buildings for stock, implements, and grain sufficient for the purpose of the tenant.

We propose to divide holdings under five acres into two classes, one relating to land which is practically a garden, with or without glass, while the other is adapted to a system of *petite culture*, providing those varieties of produce, the management of which the tenant understands. We take a holding of three acres as an example, chiefly for the reason that it represents a successful and going concern. The occupier, who is also the owner, was a gardener with experience in the cultivation of plants adapted for sale in the market. When commencing business for himself he purchased his land and built two glass houses to which he could turn his attention during winter, when, owing to the small size of his holding, he could otherwise have little to sell. His crops are restricted in variety, but they are managed with great ability, and manure is supplied in abundance. One of the houses—which are thirty yards in length—is devoted to roses, the other to tomatoes. In each house are climbers, including Marechal Niel, Niphetos, and Bouquet d'Or; while the main portion of the rose house is planted with dwarfs of those popular varieties which

Holdings under five acres.

realise high prices in the early season. These houses are equally adapted to chrysanthemums, cucumbers, and grapes, and such other plants as nurserymen grow in great profusion in the neighbourhood.

Outside the soil is cropped with apples on high standard trees, and roses, both dwarf and standard, in great numbers, the chief variety being La France, which are sent by hand to Covent Garden or to private customers in the early morning of the day on which they are likely to be at their best. The standard briers are purchased from men who cut them from the hedges and sell them at a penny each, while the dwarfs, which are chiefly teas, are grown from cuttings or grafted on briers grown from seed, both methods being far superior to that of growing on the Manetti stock. The Manetti is found to be too vigorous for the tea rose, which, so delicate in constitution, is more easily overpowered.

The rose may be induced by good culture to grow almost anywhere, except in the vicinity of smoke, if the soil is suitable. This should be of a rich, clayish

loam, or a rich loam of deep staple resting on a subsoil of clay. Where the soil is unsuitable it may be made in a glass house without much expense, and we cannot do better than recommend the process of the late Mr Baker, once a famous grower at Reigate, who in describing it, said: 'In preparing the beds, we measured a space of 4 ft. for the first trench, all subsequent trenches being of the same width; this affords plenty of space for getting sods, manure, etc., in evenly. The top spit, which consists of good old fibrous turf, was then wheeled to the farther end of the bed, and kept separate on one side; also the next spit below, so as to be at hand for filling up the trench. The bottom spit was taken away as useless, leaving a trench 2 ft. deep. This was filled in in the following manner: at the bottom was placed a layer of yellow clay, some inches deep, so as to retain moisture—the subsoil was gravel—on this a light covering of small chalk, and then about half the sods which constituted the first spit of the next trench, placed turf downwards, and loosely broken up; a thick layer of rotten cow manure was then put on, to which was added a coating

of chalk, coarsely triturated. The remainder of the succeeding trench was now used, broken up smaller, then the first sods covered with cow manure and fine chalk as before, and finally filled up with the second spit of the following trench, the bottom spit of every trench being dispensed with to allow room for clay, chalk, sods, and manure, as I have described.'

Among the best varieties for market use are, in addition to those already mentioned, Catherine Mermet, excellent under glass; Perle des Jardins, W. A. Richardson, Sunset, The Bride, Rubens, Devoniensis, and Reve d'Or. Some of the choicest hybrid Perpetuals are Charles Lefevre, which many experts place first of all, La France, General Jacqueminot, Captain Christy, Baroness Rothschild. It may be well to point out that good roses budded on standard trees can be sold at from 12s. to 18s. a dozen in their second year, while standards grown from cuttings or on briers equally pay their way. The standard should not, however, be the only form of rose, especially in exposed situations, where dwarfs are more easily preserved.

A small holder who proposes to grow roses should first learn his trade, unless he has already gained experience. As in the case of other plants, there are many things to learn, especially in relation to budding, planting, manuring, pruning, disbudding, marketing, and potting where roses are grown for sale in pots.

Although the cultivation of the tomato, the cucumber, and the chrysanthemum is quite simple to the expert, it is by no means so easy as it looks, and while our suggestion in relation to these plants are intended rather for those who have had some experience in garden work than for others, we may at least remark that their cultivation is worth the careful study of those who propose to occupy a Small Holding with a little glass, especially in those districts where tomatoes can be grown successfully in the open air, as in Cornwall, where in an instance well known to the writer a quarter of an acre realised over £50 a year in three successive years, and was followed by a crop of broccoli, which also paid a good profit to the grower. The chief points in the

culture of the tomato are the seed, especially as between the outdoor crop and that grown under glass, the temperature of the house, the treatment of the seedlings, manuring, ventilation, and management of the fruiting plants. All these points should be studied not only in practice, but in the light of experience, and to this end a few visits to experts will assist materially in giving a young grower a good grip of his subject, especially in the prevention of disease.

To the cucumber and the chrysanthemum these remarks will equally apply; no inexperienced man should attempt to grow either for the market until he has learned the way. The cucumber must be large and straight, and, like the tomato, be ready when prices are at the highest point. We would also recommend the vegetable marrow, which may be grown under glass in winter like the cucumber, and which we learn from one of the largest growers, whose crops we have examined, realises an excellent price.

Whether a garden of a more general character should be worked in conjunction with glass or outdoor roses and

tomatoes is a matter for each holder to decide, but it is a better plan to include in a cropping programme a few other popular plants than to restrict them too much or to grow too many varieties. An acre of early potatoes will make an excellent return if the land is well adapted to the crop, and this is especially the case if the grower understands his work, is able to use manure with liberality, and is within easy reach of a town in which good prices are obtained. Potato growing is a simple and successful way of cleaning and repairing land for better crops. Asparagus, celery, rhubarb, brussels sprouts, cauliflowers, and broccoli are all useful additions to a market garden, and if these are well managed they will seldom fail to pay.

Where fruit-trees are grown in the garden soil—for recent experience has shown, especially on the fruit farm of the Duke of Bedford, upon which experiments were conducted for some years by Professor Pickering, that they thrive much better than on grass, a fact which we have verified for ourselves—care must be taken not only to select robust varieties of apple in particular—and this

fruit should be preferred, but to obtain them from growers of high repute before the best trees have been selected by other buyers. Dwarfs are preferred to standards, as they produce fruit much earlier and are more easily pruned. Spraying for the destruction of pests is more thoroughly performed, and this should be an annual job. The varieties chosen should be restricted; it is less difficult to sell a quantity of a few good varieties at a remunerative price than a mixture of a large number of varieties of various sizes, some of which are dessert and others cooking apples. There should be no mixture of variety or size in a market consignment. Among the best apples for cooking are 'Golden Noble,' 'Peasgood's Nonsuch,' 'Warner's King,' 'Ecklinville Seedling,' 'Lord Suffield,' 'Prince Albert,' and 'Early Victoria'; while for table 'Cox's Orange Pippin,' 'King of the Pippins,' 'Ribston Pippin,' and 'Sturmer Pippin' may be preferred. It is, however, well to consult the most experienced gardeners in the neighbourhood in which it is intended to plant the trees, and to learn from them whether either of the fruits selected fails to

grow successfully, and whether others which have not been named respond better to the conditions which the locality provides. As in the cultivation of other plants, it is essential that a grower should know his business, or at least as much as enables him to plant, to prune, and to spray successfully. The finest trees, the best varieties, with ample capital, will fail if these essential features of the work are misunderstood.

Let us next suppose that an occupier of a Small Holding of less than five acres in extent has decided upon a plan, and that he proposes to cultivate one acre as a French garden. It may be well to mention that a holding cropped somewhat on the lines which we have indicated, with the addition of this acre, would require as much capital as one of much larger size when managed as a farm. In addition to the cost of the glass-house, the fruit-trees, and such plants as rhubarb, asparagus, and potatoes, we have to consider the cost of the equipment of the French garden. Here the object is to produce three or even four or five crops in succession within the year, and by the

aid of frames, with mats for their protection, cloches or bell glasses, and abundance of manure. Just as the crops grown in glass-houses are pushed forward by the aid of hot-water pipes, so are these which are planted in frames or beneath bell glasses grown by the aid of heat produced from decomposing horse dung. This is used so freely that with time the top four inches become an almost equal mixture of soil and manure, with the result that the heat created forces the growth of the unprotected plants as well as those in the frames. We take an example case: strong plants of the cauliflower are placed in hot beds under frames in December, and outside in groups in March, cloches being provided for their protection. On the soil around each group are turnips, carrots, lettuce, radishes, and other hardy plants, all pulled while small and tender, and selling at good prices. The secret of success which we noticed in Continental cities, as long ago as twenty years, is in the fact that these very young and tender crops are incomparably superior to the coarser produce of the later months, and coming in so early realise a much higher

price. It is quality, not quantity, which the buyer needs. There is no reasonable limitation to the varieties of garden plants which can be grown with profit in the French garden; the chief point is by using special seed and abundance of manure to grow early crops, having in reserve young plants for quick successions. All this needs constant labour and attention, for every square yard is cropped, while it may be necessary to move every light and cloche at least twice in the day's work for the admission of air and for protection against frost or cold winds.

With regard to the cost of equipment of an acre, much depends on the experience and means of the intending grower. A man with a thousand pounds at his disposal would find it none too much to cover the cost of a three acre holding, apart from the cost of land. An acre will accommodate 800 to 1000 cloches, and a hundred frames of 4 ft. 6 in. × 12 ft. 6 in. × 9 in. at the back, sloping to 7 in. in front. The cloches would cost a shilling each in quantities, and frames with three lights 30s. to 35s. The manure required in the first year would reach some 300 to 400 tons, sufficient for an average dressing of 30 acres of

agricultural land. The cost would vary with the cost of carriage or the distance from a town from 5s. to 6s. 6d. a ton. A shed would be required for packing and protecting tools, mats, and other requisite materials; mats to cover the lights, and a well-arranged system of providing water for the beds which would reach at least £50, or still more where there is no regular supply. Apart from these important items, there is the cost of seed, packages, tools, roots, and plants in variety, with which to make a start, as, for example, asparagus, strawberries, tomatoes, lettuce, celery, and cauliflowers. We should, however, prefer to recommend the French garden on a holding to be limited to a rood until experience is gained. It could be extended from time to time, and perhaps in directions which are not yet foreseen, when so much capital would not be required. The combination of a glass-house and a French garden would prove of great value to the latter, for many kinds of plants could be started in the one and transferred to the cloches or frames, and in some instances hardened off for planting in the open air.

The efforts which are made by many hard-working men to earn a livelihood by growing the ordinary crops of the farm upon too small an area have often failed, in spite of the assistance of a cow, some pigs, and poultry. The reason is quite obvious; for in most instances they are only able to obtain a single crop. The winter is too long, manure too costly, to permit of double cropping. When the harvest is completed the grower is compelled to wait twelve long months for his next returns. The addition of glass, or a French garden, would enable him to largely augment his productive powers without materially diminishing the area of his land. We have noticed that on one of the existing colonies of Small Holdings the tenants, chiefly farm labourers, followed the practice of the farmers in the neighbourhood, their chief produce being corn, roots, and potatoes, a few only possessing a small head of stock. The results were unfortunate, and we should hesitate in making any suggestion in the pursuit of this practice. The farm labourer may cultivate an acre of wheat or potatoes with material success when he is able to obtain the

assistance of his employer or another in that portion of his work which involves ploughing and other forms of horse cultivation. By this means he can supply his family with bread and potatoes, and still further, with bacon and eggs from his pigs and poultry; for not only is he able to find straw for his pigs, but a large quantity of potatoes in addition, his offal corn providing a portion of the food for his poultry. In some instances where opportunity presents itself, the acre proving a success, it is doubled or trebled, but it seldom happens that a man, however able, can see his way to abandon constant employment and depend solely upon himself, without a large holding of land.

In some English districts in which labour is scarce, farmers are often glad of the assistance of small tenants, and thus it is that with employment to hand when they want it, labourers are able to start for themselves and gradually to increase their stock and the area of their land. Once visiting an occupying owner in Touraine, we found that every labourer employed upon his farm was the owner and occupier of a handsome cottage and at least a

hectare—2½ acres—of land. When asked how he managed to spare them when they desired to till it and to gather in the harvest, he replied that having a large acreage of land himself they never asked him for time when they knew that they were wanted, while he never refused them time when they could be spared. It was in reality a matter of common sense on both sides.

We have endeavoured to establish the position that the success of a Small Holding under five acres depends upon garden cultivation, with a little glass, *or* upon the intensive culture of a variety of leading kitchen garden crops, and some fruits—apples and gooseberries in particular, to which in suitable instances strawberries might be added, for there is no class of fruit which pays better in the hands of a clever grower, when he is within convenient distance of a market. The alternative to glass is an acre under culture as a French garden, or a similar area devoted to the cultivation of garden flowers. Let us here remark that this suggestion is the result of an examination of a case of successful practice. With the increase in our town

population the demand for flowering plants for garden work is increased as well. Tens of thousands of individuals, town and suburban dwellers, like to see their gardens gay, but in few instances are they in a position to produce their plants. They prefer to buy, it saves both the trouble and the expense. No doubt in many instances the plants required are obtained from adjacent nurseries, but we believe the great majority find it cheaper to send their orders to country amateurs who make a special business of growing garden plants for sale and despatching them by post. We have taken the trouble to see how this work is done, and have found that it pays extremely well.

Here, for example, is a garden of about an acre in extent, with a small greenhouse which is used for growing seedlings and striking cuttings of those plants which require heat. Near at hand is a shed in which are tools, packages, and the various materials required for daily work. The garden is laid out in beds in which rows of many varieties of seedlings and other plants are growing, among them are pansies, wallflowers, canterbury bells, petunias, zinnias, asters, sweet

williams, stocks, polyanthus, phlox, carnations, delphiniums, lupins, and lilies of the valley. There are many others kept to name and colour, and in particular dwarf and standard roses, and herbaceous plants in fair variety. The grower caters for the many, and in consequence his plants are limited in accordance with their means. Beds in good condition, good seed, and knowledge of their culture, enable him—and in some instances the grower is a lady—to produce flowers by the thousand, and to sell them at moderate, yet paying, prices, with labels attached to each variety, on which are full particulars of their management and cultivation. Experience in the cultivation of annual, biennial, and many other garden plants is not difficult to gain, and in no instance with which we are acquainted can a portion of a Small Holding be planted more advantageously. We have been much astonished to find in a simple country garden so many thousand plants of named varieties, still more so to find so many orders filled to the satisfaction of the buyers. Once established, the grower advertises in various papers what plants he has to sell, and it

is possible to send post free quite a number of pretty flowers, such as sweet peas, nasturtiums, and lobelias for a shilling. It will be obvious to those who know anything of flower culture there is scarcely any limit to its extension, given the ability to do the work and to prepare descriptive labels and advertisements.

The present cost of a glass-house may be based on the following figures, which represent the actual charges by makers who supply nurserymen at special prices, and the payments made by nurserymen themselves. Where two or more small houses are built side by side the cost would reach 12s. per foot run, or slightly more for a single house. For larger houses, 27 ft. in width, with four rows of 4-inch hot water pipes, 21s. to 23s. per foot run, the saddle boiler being used unless the pipes exceed 1000 feet in length, in which case a tubular boiler is usually preferred.

The woodwork would cost for ridging, per hundred feet, $1\frac{1}{2} \times 7$, 16s. 6d.; capping, 1×4, 6s. 6d.; rafters and plates, $3\frac{1}{2} \times 4$, 17s.; purlin bevelled, $2\frac{1}{2} \times 3\frac{1}{2}$, 10s. 6d.; gutter posts, 3×3, 12s. 6d.; sash bars, $1\frac{1}{2} \times 3$, 6s.; gutter boards (pitch pine), $1\frac{1}{2} \times 11$, $4\frac{1}{2}$d. per

foot; plates (pitch pine), $2\frac{1}{2} \times 3$, 16s. per 100; two bar ventilators, $1\frac{1}{2}$ in., 4s; purlin posts, $2\frac{1}{2} \times 3$, 10s. 6d.; ventilator seats, $1\frac{1}{2} \times 2\frac{1}{2}$, 5s. 6d.

Sheet glass (box size), 12, 13, or 14 in. wide, 20s. 6d.; 15 or 16 in., 21s. 6d.; 18 in., 22s. 6d. —all per 200 ft. box.

Paint, ready made, 20s. per cwt., with cash discount.

Putty made with linseed oil, 8s. per cwt.

Rhubarb, early red, 4s., giant, 9s. per dozen, with substantial discount to the trade. By the thousand crowns the price would be much lower.

Asparagus, 5s. to 7s. 6d. at two years old, Colossal variety.

CHAPTER V

SMALL HOLDINGS.—II

We now come to another type of a five acre holding. In this instance live stock play an important part, and in consequence it is essential to supply them with as large a quantity of home-grown food as possible. Our suggestion is that two cows, a breeding sow, turkeys, and poultry should be kept, for the sale of milk, or butter—as may be preferred—pigs, eggs, and poultry. Two acres might be devoted to grass, one acre being reserved for pasture and the other for mowing in alternate years. As this area would be insufficient for the cows, we would add half an acre of lucerne in those districts where this crop will grow successfully, an acre of oats for straw and corn, with seeds consisting of a mixture of clover and suitable grasses, an acre of cabbage and roots, leaving half

an acre for potatoes, rhubarb, asparagus, celery, tomatoes, and other of the better class of plants of the market garden, or strawberries in lieu of these.

In this case the small holder would practically work on the system of *petite culture*, making every effort to sell his produce in his own locality. His first object would be to provide food for his cows, pigs, and poultry. It is essential to point out that on so small an area the land should be as highly tilled as a market garden. In no other way can a tenant hope for success. The grass which is mown for hay should produce at least two tons, thus providing ten pounds a day for each cow during seven months of the year, without resorting to lucerne or the clover mixture, a part of which could be converted into hay. The grass retained for pasturage should not be touched until the cows are turned out to graze in summer, when it should be tall and thick, especially at the bottom, and not quickly eaten down, as would be the case if they were frequently turned out for daily exercise. An acre would be insufficient, but if well manured it should go far to provide a

summer's food, supplemented as it would be by lucerne, clover, and cabbage. It is a common practice where pasture is abundant to rest satisfied with grass, but if a tenant is willing to be guided by experience, he will supply his cows with 2 lb. to 4 lb. of decorticated cotton cake per day. When grass is scarce and lucerne and clover are supplied, similar quantities of maize meal or desiccated grains, which should be soaked for 24 hours before using, may replace the cake.

It is the practice of the great majority of those of our dairy farmers who grow corn crops to use a portion of the oat straw as food. It is chaffed with hay and mixed with pulped roots, grains, and cake or meal, but in the case we are describing the straw would be insufficient for this purpose, as it would be required as litter for the cows and pigs; indeed it would be necessary to exercise the greatest care to make it last. The weight of straw grown depends very largely upon the variety of grain, but it may be increased by the judicious use of nitrate of soda, which encourages the growth of leaf as in the case of cabbage and mangolds.

It is of great importance that a holder of five acres should be able to distribute his labour as far as possible throughout the year. Milking, feeding the stock, sowing, hoeing, and harvesting occupy most of the time between April and October, leaving five months for other operations on the land. How should these months be spent? The cultivation of the arable land is alone a formidable task, but apart from the saving effected by digging instead of ploughing, and it might be necessary to plough twice or still more often for roots, cabbage, and potatoes, we must not forget the fact that where land is trenched or double dug, there is a much smaller need for manure, while the land is greatly improved.

Instead of stirring the subsoil with a subsoiler, it is turned over in its place and broken up with the spade or fork much more effectively, while the surface soil, dug as deep as possible, is simply turned over. A small holder known to the writer cultivated his garden on this plan in the first year of his occupation, and, entirely without manure, produced, and still continues to produce, large crops in great variety. The work is hard,

but it is the kind of work that pays, and time should be found during a long winter to complete it. Double digging confers two advantages at least; the subsoil is aerated, so that in the course of time the food which it contains in a latent condition is prepared for the use of plants, while it is rendered more porous, an important point in a heavy soil through which water passes with difficulty in a rainy season. The roots of plants, too, are more easily enabled to penetrate the subsoil, as in the case of lucerne, clover, and all deep-rooted plants, some of which, like kidney-vetch, yarrow, and Burnet, should invariably be sown in grass mixtures which are to remain down over three years in search of food and water,

Although spade cultivation may be regarded as the chief feature of the winter's work, there are many other items of labour which a tenant will find that it is important should be done. When digging or other work on the land is impossible, owing to snow, hard frost, or heavy rain, he will mend his fences, clean out his ditches and his drains, repair his buildings and his gates, limewash, tar, or paint where either is required; for if he is a handy man, as a

small holder with no capital to spare for paying tradesmen should be, he will learn to use such tools as are essential in rough carpentry, and in laying bricks or tiles.

Although it is the custom of the majority of farmers to cart manure from the stock-yard, or from a heap which has been built elsewhere, to the land when it is hard with frost, we may point out that it is by no means an economical plan. It has been shown repeatedly that manure, both liquid and solid, should be carried to the land when fresh, inasmuch as the loss is materially reduced. Where farm-yard manure is kept for a length of time, its volume is quickly diminished, and this is a valuable asset to the soil, owing to its influence in improving its texture. It also loses nitrogen during decomposition, and in the drainage which passes from it—especially if it is exposed to rain—a portion of its most valuable mineral constituents. Here, then, is further labour for the winter,

Turning to the live stock of the five acre holding, we suggest that two cows should be kept, but much depends upon the care with which they are selected. No man can afford to buy cheap cows; they should be young, gentle in disposition, broad across

the hips and between the buttocks, provided with lengthy heads, strong muzzles, fore-quarters sloping towards the back, well-sprung ribs, giving plenty of room for the vital organs, and a large udder, globular in form as in the Jersey, with a prominent milk vein, teats of good size, set well apart, and all yielding milk. No purchase should be completed without full knowledge of the yield and fat percentage of the milk. It is wiser to pay an extra guinea for the privilege of seeing each cow milked morning and evening, and taking a sample, than to buy a mere scrub which fails to pay her way. The success of a holding may depend entirely upon the contribution of the cows. Each cow should yield an annual average of at least 700 gallons, or if she is intended for butter production, 350 lb. Thus the milk should contain from 4½ to 5 per cent. of fat, and it can be found in dairy shorthorns, or cows bred between these famous milkers and the Channel Islands breed. It should not be forgotten that the calf of a big milker is always saleable at a better price than if it had no breed behind. When service is required, no effort should be spared to obtain the services of a bull of first-class milking stock,

and the owner should be asked for the records of his dam and the dam of his sire. In this way good milking heifers will be ensured; nor should the fee stand in the way. To use inferior stock because it costs less money is to fail, just as surely as if the cows were deprived of a portion of their food, or the land of the manure which is essential to the growth of a crop.

If the milk is sold to a dairyman, it should return, at an average price of 7½d. per gallon net, on the basis of a yield of 700 gallons per cow, £21 17s. 6d. On the other hand, if sold by retail in the immediate neighbourhood of the farm, this sum should be doubled. In this case it could be delivered twice daily by a lad whose remaining time would be available for other work. A farmer owning six to eight cows, and knowing his work, can feed and milk them himself and subsequently deliver his milk with the help of a horse, but he must be an industrious man.

In some instances small cow-keepers may find it advantageous to sell cream instead of new milk, and if they are able to obtain customers in sufficient numbers this will pay them quite as well. A hand separator

would be necessary, while the cream should be extracted at the rate of 10 per cent. This should be thick enough for any ordinary purpose if the milk is rich in fat, and a gallon would thus yield a pound, or four-fifths of a pint, which weighs 20 oz. The best cream is retailed at 2s. a pint, but if it were sold at 1s. 6d. it would pay extremely well, for it will be noticed that the offal, or separated milk, would be available for calves or pigs, or it might be sold at 3d. to 4d. per gallon. On these terms the price obtained for the milk would exceed 1s. 2d. a gallon.

Butter-making we should scarcely recommend upon so small a farm. Assuming, however, that the cows were yielding $2\frac{1}{2}$ gallons per day, or in all 5 gallons, and that the butter produced reached 2 lb., the daily returns, on the supposition that the butter realised 1s. 2d. per lb., would reach 2s. 4d., or with the separated milk, if this were sold at 3d. per gallon—about 4 gallons in quantity—3s. 4d. In some instances skimmed milk will fetch 1d. to $1\frac{1}{2}$d. a quart, but its sale at these prices can never be guaranteed, and the remark equally applies to butter, which, owing to close competition, might sometimes fail to reach the price suggested.

On the other hand, milk sells well in winter, when it is not difficult to realise 9d. to 9½d. wholesale, after paying the cost of carriage for a short distance; but should it happen that other producers are competing for the local trade, it may be found better to sell cream, butter, or, during the summer season, cream and curd cheese, the produce of new milk.

The reader will find detailed descriptions of the management of the cow, and the construction of the cowhouse and its fittings in some of the books named at the end of this paper, but we may remark that on many Small Holdings, especially in Yorkshire, we have found that a plain floor made of chalk and covered with beaten earth answers very well for the stalls. There are no racks or mangers; the hay is placed in front of the cow, and the prepared ration in a strong and well-painted tub, which is removed and cleaned after each meal. The stalls are short, so that the hind feet of the cow are almost level with the gutter in which most of the manure falls. They are warm, clean, and require less bedding than where they are larger and provided with a manger. It may be added that where the milk, cream, or butter

is sold to private customers, the cows should calve some months apart. One cow, for example, should calve in September or October, in order that there may be a good winter supply, and the other early in the spring; thus there would be a supply of milk throughout the year. Close attention should be paid to the time of rest—*i.e.* the period of at least six weeks between drying and calving—to calving, to milk fever, and other dominant diseases, to dangerous attacks like hoven, and to the rearing of the calf.

The Calf.

If a calf is not good enough to rear for sale or milking purposes, it should be converted into veal as rapidly as possible, drinking from the pail; if, however, it is a good one, in all respects, it should be reared on whole milk for two to three weeks, after which the cream may be removed in increasing quantities and supplanted with cod-liver or cotton seed oil, until, when the milk being entirely skimmed, the oil supplied will have reached four table-spoonfuls, or two ounces daily, given at four meals. The subject of feeding calves, however, is a study of itself. Various substitutes are used

with separated milk, as mixed meals, linseed cake meal, linseed meal, and boiled linseed. We cannot, however, do better than recommend the practice of paying visits to successful farmers and seeing how they do their work, and of reading the agricultural papers in which this and cognate subjects are frequently described. It is important, to add that the success obtained in rearing calves depends almost entirely upon the breed, careful and liberal feeding, perfect cleanliness, and freedom from disease, the worst of which is scour, or diarrhœa, which usually follows uncleanliness or careless feeding, or infection through the navel cord. There are instances in which it would be folly to feed a calf at all unless it were of exceptional value, as, for instance, when the whole of the milk is required for retail customers; but where a calf is a strong heifer, the produce of a first-rate milker and of a bull of equally first-rate blood, it is better to purchase milk for a few weeks for the supply of customers until it can be fed at a cheaper rate.

The pig is at all times a factor on a Small Holding, especially where the land is devoted to the culture of potatoes. It may be safely estimated that by good

management a sow will return a profit of 25 per cent. upon the money expended upon her and her litters. Thus, if the cost for food is £20 a year, the profit should be £5. This is the dictum of successful men, although there are times when this sum is much exceeded, while under bad conditions a year's work may show a loss. The breeder should not be guided either by the cost of pigs or foods. The practice of ceasing to breed or to feed when prices rise and of commencing again when prices fall is most disastrous. As in the case of the cow, great care should be taken to select good stock. A sow should either be of pure breed, such as the large white or large black, or a cross between these varieties, or one of these and the Berkshire, but in any case she should be large. Young pigs cannot grow into large ones if they are the produce of a small sow or an immature gilt, whatever the breed of the sire. She should possess great length of body, width of loin, great depth of flank, large hams, a head inclined to be long, with ears to match. Short heads and ears with short snouts which are dished or inclined upwards are indicative of aptitude to lay

Pigs.

on too much fat, especially if the collar is short. Opinions differ as to the hair, which in some animals is thick and coarse, while in others it is bare and thin and of a silk-like texture. The great point, however, is to secure a sow which has produced strong litters which have grown quickly into large size. If, however, a gilt is purchased, she should be of a prolific breed on both sides. strongly built, with a good constitution as far as can be judged. One of the most important features in a breeding sow is a good supply of milk, and in consequence the udder should be well developed and provided with sufficient teats to enable her to feed a good litter. The difference in the supply of milk by different sows of similar size and breed is so remarkable that whereas in one case a litter of ten may be large and fat at the end of nine weeks, in another the majority may be small and unthrifty, and quite unfit for sale. Small size in the sow not only diminishes the size and weight of the young pigs, but the number in a litter.

Whether a litter should be sold when weaned, fed for porkers or bacon pigs, the owner must decide. He should in consequence keep himself acquainted with market prices and note

the quantity of food required in each case, that he may the better realise which will pay him best. From time to time, as it may be found advisable, the best gilt of a good litter should be reserved for stock, but, as with a cow, service should be obtained elsewhere. On this point the greatest care should be exercised in selecting what boar should be used. In our experience many owners of a sow pay no regard to this point, but pay their half-crown to the nearest owner. Anything on four legs is apparently sufficient for their purpose, although the litter which follows may not be worth half the money it would have realised in good hands.

An important point in pig-keeping is to breed to time. A sow should produce two litters in a year, and in consequence the litter must not be left with the sow too long. A sow farrowing in spring should feed her litter off quickly, and after service graze on the pasture, grass being supplemented by garden produce, middlings, house wash and skim milk, where this is available. If she litters late, the pigs will have to contend against the coldest weather, while the litter of the following spring will be later still, and thus

breeding will be so much delayed that a litter may be lost.

In some instances small pig-keepers make a larger profit by killing pigs at home and retailing the joints, for which they have obtained orders. Where this plan is adopted the litter should be fed until they reach the porker size, one being killed at a time as orders are obtained; this form of dealing pays a larger profit than sales in the ordinary way. There are some persons who are glad to purchase sides or hams for curing, and these may be a little larger, but there is usually an objection to meat which is too fat. An examination of the choicest cuts at a good provision dealer's shop will help the feeder to realise exactly what the buyer wants and to feed accordingly. Where pigs are sold to bacon curers it is imperative to send the best, as if there is too much fat, or if the fat is the produce of maize feeding, it is usual to pay a lower price.

With regard to food, a great deal may be said, but while we refer the reader to works upon the subject, in which he will find a fund of information, we give a short outline of the best practice in feeding. Many pigs are fed upon butcher's offal; this should be

avoided altogether, for although a pig is omnivorous, she should be entirely restricted, with one exception—milk—to vegetable food, grain, pulse, grass, forage plants, and roots. When a sow is with her litter she should be fed on middlings, and in course of time the young ones will feed with her from the same trough. When they feed with regularity a separate trough should be provided in an adjoining pen which they alone can enter. The food supplied in this pen should consist at first of middlings, with the addition of a small quantity of barley meal, which may be increased, so that by the time they are weaned they will be fed upon a fattening ration. To barley meal, when middlings are abandoned, skim milk may be added by degrees instead of water, and steamed potatoes in small quantities, these foods forming the best ration, as shown by results. The practice of cooking grain is not followed by similar success. Young pigs should not receive house wash or garden waste, but be kept growing in the sty until ready for sale. If, however, they are intended for stock, they may be turned out for daily exercise, inasmuch as a well-fed animal is thus better fitted for reproductive purposes than

one which has been confined exclusively to the sty.

One of the most important questions relating to pigs is that of disease. No pig should be purchased from a herd which has been affected by swine fever or tuberculosis, nor should straw or any other materials be obtained from the farm. It is also obvious, and for the same reason, that there should be no communication with an affected farm either for breeding or for any other purpose whatsoever.

Turkeys.

Bronze turkeys will pay better on a five acre holding than a flock of sheep of the same number, if we leave out of the account the benefit which the farmer derives from their manure when the sheep are folded and fatted for the butcher on the land. The best cockerels of this variety reach 25 lb. in weight, or more, at Christmas, while old birds will scale up to 45 lb. The hens are relatively smaller, but unless the breeder is prepared to pay the price for the largest, and they should weigh at least 16 lb. apiece, he had better leave the breed alone.

A good start may be made with a cockerel

of 25 lb. weight—which had better be reduced by short feeding for a while, or he may damage the hens severely—and half a dozen hens, which have reached their second season. Details of breeding, feeding, and management may be found in the works suggested at the end of these remarks. We would caution the breeder against investing money in a flock of turkeys unless he knows exactly what to buy, and further, how to manage them successfully. Books which deal with this subject are of great assistance to the breeder when they are the work of practitioners, for after all actual experience is the only safe guide.

A small flock such as we have named may help the breeder to realise a hundred pounds, if he is able to obtain sufficient Christmas orders for all he rears, and he should make a point of reaching 18 lb. to 20 lb. at least for his cockerels, which should realise an average of a guinea each, and of keeping the largest and most healthy pullets for use or sale as hens, when he should obtain considerably more. Where turkeys are unusually large, as they may be if the stock is of the best, and the feeding good, many of the finest of the flock may be sold at enhanced prices

for exhibition breeding stock. Briefly, if proper care is exercised, we may look upon the turkey as one of the most profitable adjuncts of a Small Holding.

Poultry.

The poultry should be selected from those varieties which are prolific layers and useful—whether crossed or no—for table purposes. In the latter case the chickens should be fattened artificially in pens while still quite young, and sold before the main crop of the country is ready for the market. We would suggest that large gray Dorking hens in their second year be mated with a cockerel of the Indian game, if table fowls are required, for the reason that they realise the highest price. If, however, it is intended to provide eggs with less regard to meat, the white Wyandotte may be preferred.

One of the chief points in breeding poultry on a five acre holding is to obtain the chickens early, but this involves winter laying. A breeding flock should therefore consist of hens, or pullets if preferred, which were hatched in January or February at the latest. Under good management they should commence to lay by July, and continue for some months, when they may possibly moult, again com-

mencing and producing eggs at the required time.

For hatching purposes broody hens may be purchased either from neighbouring farms, or an incubator may be used. If it is decided to use this machine, it is essential to exercise great care in its selection. It is a good plan to visit a few poultry-breeders who possess an incubator and to see it at work, and to learn what results have been obtained.

The poultry-keeper will usually find it better to sell his eggs and poultry near home. The belief that London is the great emporium where high prices are obtained is a mistaken one. Nor would he do much better at hotels or provision dealers' shops. Private customers who know where the produce is grown will pay much better prices, for owing to the great facilities with which eggs and poultry are landed on our shores, they can be placed in the trader's hands fresh enough to sell as English grown. A small holder is seldom able to obtain more than a shilling a dozen for eggs, whereas the trader's prices vary from 1s. 2d. to 1s. 3d. a dozen.

Let us now suggest what prices should be paid for the stock to which reference has been made. Cows, £21 to £25 each; breeding sow, full grown, £5 to £7; gilts, 9 to 12 months old, £4 to £6; turkeys, cockerel (before Christmas), 21 lb. to 24 lb., 25s. to 35s., hens, 25s. to 40s.; white Wyandottes and Langshans, Dorkings, and Fleche, of large size, without regard to 'fancy' points, 10s. each.

CHAPTER VI

THE SELECTION OF A HOLDING

THE first point of importance to which the small holder will naturally devote his attention in making the selection of his land will be that which relates to the nature of his undertaking. If he intends to keep cows for the production of milk for sale it will be his object to obtain land, a portion of which is old pasture or meadow of good staple, which will enable him to produce forage, root, and other useful crops; to see that the water supply is sufficient for his purposes; that the holding is well drained and fenced; that the grass land is well sheltered from cold winds and driving rains; and that the climate is sufficiently mild and the aspect as nearly as possible south. Stock, and especially cow stock, are much influenced in their productive powers by genial climate, the altitude not being too high, and by the warmth

of the sun, which should not be excluded by hills, woods, or timber trees.

The profit derived by a small holder from the sale of milk depends very largely upon his proximity to a population. Land near a large village which affords an opening for his work, or within easy distance of a town, will afford him an opportunity for effecting sales. Where there is no chance of selling milk at retail prices the small holder will do well to turn his attention, should he keep cows, to the production of butter or cream. The wholesale price of milk after the deduction of carriage by rail and the cost of conveyance to the station being too low to enable him to realise a sufficient profit. In most Continental countries the occupiers of the land are chiefly small holders. The majority of these people keep cows, but they take advantage of the co-operative system which enables them to realise a higher sum for their milk than they could possibly attain by the home production of either butter or cheese. In France, Italy, and Switzerland the milk is collected and conveyed to a creamery or a cheese factory, the price being estimated on the basis of its productive power. We have had the advantage of inspecting numerous factories in these

countries, and are persuaded that the principle on which they are based is worthy of imitation by British small holders. In Denmark, where small cowkeepers are very numerous, the same principle is adopted, although the system is more perfect, butter being the chief article of produce, while pigs are fed upon the skimmed milk, and subsequently sent to the bacon factory, which is conducted upon the same plan. In Holland, although there are some instances in which co-operation has been invoked successfully, the majority of the small farmers make their cheese and butter on the farm. Our own experience of the work in Holland, however, leads us to believe that the profits realised are smaller than where the milk is manipulated in a co-operative factory.

Where milk-selling is impossible, and it is still determined to keep cows for the manufacture of butter or cheese, it is not so important that the holding should be so near to a town, for it must be remembered that the rent is determined very largely by the position of the land. Pasture and meadow land frequently realise £8 to £10 per acre when adjacent to a large population, while land of the same character can be rented at 15s.

to 20s. a few miles away. Experience has shown that the small holder will find it advantageous to select his land as near as possible to those who are following the same industry as himself, and however much he may object to be a member of a colony, he will find that by combination he will be able to save money in various directions and frequently to complete his work more quickly than if he were isolated. If we run through the holdings of these colonies of small holders with which we are acquainted we shall find that no two men work on the same plan; each holder appears to possess ideas of his own, and in some instances special gifts which enable him to carry them out successfully. From this point of view each man should select his land in accordance with his views. We take a few instances which will indicate our meaning.

In one case the occupier of a small farm had some experience with cows. In selecting his holding he took great pains to obtain the best grass he could command, together with a plot of arable land, in order to provide himself with roots, green forage, and straw. The holding he secured was

in the immediate vicinity of a small town, and in consequence he was compelled to pay a higher price. In this case a knowledge of the work and a well-selected farm have been followed by success.

In a second instance the occupier, an experienced gardener, was of necessity compelled to buy his land, as it was essential that he should remove the turf for use under glass. It need hardly be mentioned that, with this object in view, grass land could scarcely be rented. Owing to the necessity of spending almost all his capital in the purchase of his holding, this man was compelled to choose a plot of three acres four miles from a railway station, land more conveniently situated being too costly for his purse. His intention was to grow plants of two classes—those under glass, which consisted of tomatoes, cucumbers, and roses, while those outside chiefly consisted of roses and fruit. For his purpose, therefore, clay loam was selected, the turf from a large portion of the holding being removed as required for the benefit of his glass crops. In this case it was essential to consider the importance of a direct water supply from the main, the cost of the haulage of coal, and the

conveyance of produce to the railway station. All having been well arranged, and the work well conducted, the result was thorough success.

In a third case the holding was restricted to some three or four acres of land of a medium character, the object of the holder being the intense cultivation of a number of market garden crops which it would be requisite to send to market during the season almost every day. Here, again, it was important to secure a supply of water from the main, to provide for the conveyance of manure from the town, and of produce to the market. The land selected was three miles from a railway station, but although the holding was small, abundant manure, frequent watering, and a regular succession of suitable crops ensured an excellent profit.

We have seen that the area of a holding, as well as its position, its distance from a town and a station, as well as the soil, depends to a large extent upon the nature of the work which the holder intends to carry out. It should be needless to say that in no case should land be selected which is of too sandy, gravelly, or chalky a nature. A sandy loam,

although greedy for manure, is sometimes invaluable for given crops; but soils of all kinds, and especially chalks and gravels, which have a thin surface, should be ignored. The farmer, and, still less, the small holder, cannot afford to till soil which may fail him in a dry summer, unless he follows the modern system of market gardening. For this reason all types of soil which suffer from drought should be regarded as useless, and to those we have already mentioned may be added heavy clay.

It is important that there should be nine to twelve inches of surface soil, and that the subsoil should be deep. A good subsoil, although of little use in its primitive condition, may, by deep cultivation, be gradually added to the surface soil, the depth of which is consequently increased. By the term 'subsoil' we mean that portion of the soil which lies below that which has been cultivated and which has been practically untouched by farm tools or implements. Thus if, when ploughing to the bottom of the surface soil, a subsoiler is drawn behind the plough, the upper portion of the subsoil will be stirred or broken up and submitted to both light and air, with the result that as

this process is continued portions gradually decompose, and supply feeding matter to plants, the roots of which are enabled to penetrate within it.

There are few systems of cultivation adapted to the Small Holding in which both grass and arable land are not required. The market gardener may prefer a holding which is entirely under tillage, but should it be necessary for him to keep a horse he will find a plot of grass land advantageous. Small holders who keep cows, pigs, or poultry, or a combination of each class of stock, will also find a plot of grass essential. The pig is as natural a grazer as the cow, the horse, or the sheep, and although young pigs bred for pork or bacon are better kept in the sty from weaning to sale or slaughter, the sow will derive considerable benefit from daily exercise on a plot of pasture land.

Both her vitality and her prolificacy depend to a very large extent upon her liberty and the fresh air and exercise she obtains in consequence. Grass, too, is highly beneficial as a food for sows, especially when they are compelled to graze and earn their living. All things considered, however, arable land provides the heaviest crops which can be

grown in such great variety, for which reason it is that we strongly urge the importance to small holders of holdings which are chiefly under tillage, but only on condition that they have experience in connection with the crops they propose to grow, and sufficient capital to enable them to conduct their work in the most thorough manner possible.

Although Small Holdings are worked successfully in all parts of England, and in almost all climates which prevail in these islands, a wise man will seek for land which is not at too high an altitude, in which the climate is fairly mild, and where he will be able to grow crops in such variety as he pleases. In some parts of England it is possible to grow in the open air crops of the most profitable character, whereas in other parts these crops are grown only under glass or in highly favoured positions. In a southern county, for example, a friend of the writer produced early potatoes in a field some acres in extent, which realised in his first year sufficient money to pay the cost of the land. The success of a Small Holding depends, therefore, very largely upon the climate and aspect, which is an important feature, as well as upon the soil

and the skill of the grower. Large numbers of working men, however, are severely handicapped, sometimes by their want of knowledge of the system of cultivation of the most lucrative crops, and sometimes by the character of the soil and the climate in which they live. Where a field slopes from north to south it obtains a much larger share of sunshine than one which is flat or sloping in any other direction, while a field which slopes from south to north—and such fields are quite common in hilly districts—obtains scarcely any sunshine at all, with the result that the crops are later and less abundant. The heat of the sun, too, is absorbed much more freely upon dark soils than upon those which are light in colour; hence, the moist black soils which prevail in some countries are more productive.

Again, no matter what the type of cultivation is intended to be followed, it is important for the successful working of a Small Holding that it should be well watered. Water is imperative for stock, and should be found in every grass field at all seasons of the year. However good other conditions may be, and however tempting the land and the situation, it would be foolish of a man

whose livelihood depends upon his crops and stock to take a holding in which the water supply is defective. Apart from the requirements of stock, the modern or intensive system of cultivation demands abundant water. Intensive cropping means the liberal supply of manure, which should form a large proportion of the top six inches of the soil, and profuse watering in hot weather. The manure warms the soil and feeds the plants, with the result that by supplying water freely the crops grow earlier and later in the year, and with great rapidity, owing to the fact that they are practically forced.

It is important that every field should be well divided from its neighbour by a vigorous hedge or a substantial fence. Hedging is an art which is not too freely practised by small holders, but it is to their advantage to maintain their hedges in perfect condition. The object of trimming, pruning, or laying is to induce a hedge to grow quickly at the bottom as well as elsewhere. As stock, especially sheep and pigs, frequently make gaps in the bottom of a hedge, it should be thickest at this point, gradually diminishing until it forms a ridge, a flat-topped hedge being objectionable and contributing to its weakness.

The condition of the soil is almost as important as its character or composition. Where land is foul it is costly to cultivate, and if foulness is indicated by the weeds upon the surface, it is rational to suppose that it is equally foul with seeds which will germinate on the least provocation by the implements of the farm, and smother or partially destroy young plants growing from seed which was sown for a coming crop.

It is specially important for the prospective small holder to notice whether either grass or arable land is foul with couch or twitch grass, which every man who proposes to take land for cultivation for a livelihood should be able to recognise with ease. If he is not, and if the more destructive weeds are unknown to him, he has missed his vocation and had better seek some other, for the recognition of the enemies of the farmer is among the first of his qualifications.

The common bent grasses, especially those with creeping roots, the sedges, charlock, poppy, mayweed, daisies, and buttercups also indicate foulness or poverty in the soil. Among the more prevalent and troublesome weeds on arable land are the poppy, charlock, the thistle, and the dock. The two latter are difficult

to eradicate, owing to their vitality and the resistance of their roots, while charlock and the poppy are notorious for the quantity of seed they grow and distribute on the soil, and, in consequence, for the ease with which they cover a field. The presence of heath is also indicative of poor soil. Again, if the timber consists largely of the fir or the beech, or, in the absence of these varieties, of trees which are stunted in their growth, suspicion should be aroused. Poor grass land, too, is frequently covered with moss and tufted hair-grass. Moss, however, is not of such great importance on land which has a good staple, but which has become poor owing to careless cultivation or want of liberality in the employment of manure. If land of useful character is carefully cleaned, good culture and judicious manurings will quickly bring it back to condition and enable it to grow excellent crops, but land which is thoroughly foul should be avoided altogether.

Before taking a farm upon which so much depends, the intending occupier should make an effort to inspect it during the two important seasons of the year, and especially when it is carrying a summer crop. A meadow is best examined before it has been mown, a pasture

when it has produced abundant feed, one object in each case being to ascertain whether clover forms, as it should do, a large portion of the herbage—at least 25 per cent. —or whether it is practically absent and its place more than occupied by weeds. It is true that a pasture or meadow can be easily improved, but the business of the small holder is to make a living and not to spend his first few years in improving land with the object of ultimate success, unless the conditions of his tenancy or of his purchase make it worth his while.

We have pointed out that thin land is useless; we may also remark that wet land is equally bad. Although foul land is to be avoided as a rule, there are instances where good land produces weeds owing to the carelessness of the occupier. The best farm in the country, given half a chance, would produce more weeds, and weeds with a stronger vitality, than the poorest farm; and this fact should be borne in mind, for the thistle, like the dock, is no respecter of farms. Both plants, like couch grass and charlock, are versatile pests, and, as a matter of fact, they will grow with greater luxuriance on good than on poor land.

Rich land can easily be recognised by careful examination with a spade. For example, a hole is dug to a depth of two feet ; if the soil is rich the top nine inches will be dark in colour, and similar throughout; it will contain too, a large proportion of organic matter, much of which may be recognised by the eye in the form of rootlets and other vegetable substances resembling the decayed matter which is found beneath the herbage growing on pasture land.

CHAPTER VII

THE SOIL OF THE SMALL HOLDING

We have seen that the value of land as a crop-producing medium depends upon a variety of conditions; its position, its altitude, its aspect, and the rainfall of the district in which it is situated. Land of inferior quality, however, can be materially improved by skilful management, but its value can be more easily diminished by carelessness in cultivation and by inadequate manuring. On the other hand, land of inferior quality can be improved in value, because its power to produce crops can be increased. The land is the raw material upon which the small holder must depend not only for the production of saleable crops, but for the food which his stock require; and we think we may justly say that his most important duty is not merely to maintain, but to be continually improving, its condition.

The soil may be divided into two parts: the mineral matter, and the decayed or decaying vegetable matter, both of which provide food for plants; but the capacity of the soil to grow crops depends not only upon the quantity of this food, but the condition in which it exists. Living plants consist to a very large extent of water. Thus, in the turnip we have 90 per cent. in round numbers, and 10 per cent. of solid matter, most of which is nutritious and digestible, and, consequently, food for stock; but only a small portion of the solid matter of plants is derived from the soil, *i.e.* that which is of mineral origin. The feeding matter of plants is usually divided into four parts: the protein or albuminous matter, of which the albumin of the egg, the gluten of wheat, and the legumen of pease and beans, all of which contain nitrogen, are examples, and which, in consequence, are utilised for the construction of the muscular and other nitrogenous tissue of the body of the animal; the carbohydrates, which chiefly consist of starch and sugar; the oils and fats and the minerals. The carbohydrates and the fats, however, are derived from the atmosphere, although the elements of which they are composed

are not absorbed by plants in the same way as the nitrogen to which we have referred, but which is also derived from the atmosphere, although indirectly. All cultivated plants, however, are able to obtain nitrogen, which is present in the soil in a combined form, as in the organic matter of plants, roots, and dung, and from such manures as nitrate of soda, sulphate of ammonia, nitrate of lime, guano, and farm-yard manure, both liquid and solid. The method by which soil nitrogen becomes available for the use of plants and the manner in which it enters their system are fully explained in such handbooks as *The Chemistry of the Farm*, which will repay a reader who desires to know the functions of soil and manure. It is sufficient for us to point out that just as it is imperative to feed a cow with liberality to enable her to provide a large quantity of milk, or a bullock, a wether sheep, or a pig to increase its production of meat, so must we feed the soil, for without liberal treatment it cannot respond.

Let us employ an illustration that the reader may better realise the importance of what is generally described as 'fertility' in the soil; and we include under this term not only

the food which plants appropriate, but those invisible germs which are known as bacteria, and which are necessary in its preparation. Thus, although farm-yard manure contains nitrogen, phosphoric acid, and potash—all of which are essential to plants—these materials are not available until it has passed through a process of decomposition in which the micro-organisms of the soil play an important part.

Again, we have referred to the fact that leguminous plants are enabled to obtain nitrogen from the air with the help of specific bacteria, but if the seed is sown in what we may regard as a sterile field—a field in which there are no such bacteria—germination, indeed, takes place, and the plant obtains a start in life, but, having exhausted the nitrogen present in its seed, it dies and there is consequently no crop. In such circumstances, therefore, it is not only imperative to supply the mineral manures—phosphoric acid, potash, and lime—but also the bacteria. In this case, the seed having germinated, the bacteria assist the young plants to obtain the nitrogen they require, and this, in conjunction with the minerals which have been supplied in artificial

manures, enables them to grow and to produce a crop,

Looking at the subject from this point of view, we may regard the soil as a medium for the production of crops rather than as their source. Before the discovery of the fact that bacteria were the means of assisting leguminous plants to obtain atmospheric nitrogen, many experiments were made in order to determine how and from what source nitrogen was obtained by growing plants in field culture in those cases in which, like clover, a larger quantity was removed in the crop than was known to be present in the soil.

It is now well known that although clover is rich in nitrogen, the roots which are left in the soil after the removal of a crop may contain more nitrogen than was present in the soil before the seed was sown. Thus, when barley was sown upon one portion of a field at Rothamsted, which had grown cereal crops in the preceding five years, barley with clover being sown upon the other portion, the quantity of nitrogen removed by the barley crop grown alone was 37 lb. per acre, while that removed in the clover crop reached 151 lb. per acre. In the third year barley

was again grown over the whole field, but the crop which was grown on the clover land obtained 30 lb. more nitrogen than that which followed the barley grown alone, in spite of the fact that the previous clover crop has removed 114 lb. more nitrogen per acre than the first barley crop. After the removal of the clover and barley in the second year analysis showed an excess of nitrogen in the clover land to a depth of 9 in., much greater than that in the barley land. Long before the discovery of the medium which enabled clover and other leguminous plants to obtain free nitrogen from the atmosphere, opinions were expressed by a number of scientific agriculturists, including the late Dr Voelcker and the French chemist, Ville, that the atmosphere was the source from which they obtained their nitrogen, although in what way there was no evidence to show. In 1886, however, the German, Hellriegel, discovered that when farm plants such as the grasses were grown in sterile sand, they practically grew in proportion to the quantity of combined nitrogen supplied, and that they died as soon as the supply in the seed was exhausted.

A similar result followed the attempt to

grow clover itself and other plants of the leguminous order in sterile sand to which mineral fertilisers alone were supplied. When, however, a small quantity of fertile soil was added as a watery extract to the sand, the still-living plants continued to grow and mature, assimilating atmospheric nitrogen. On the roots of these plants small clusters of nodules were found, which may be also found upon the roots of the leguminous plants of the farm which are growing under ordinary conditions. These nodules were found to contain bacteria now known as Bacteria Radicicola. Thus, these organisms live in symbiosis or cohabitation, as it were, with the plants on the roots of which they exist for mutual benefit.

A simple experiment will prove the above facts to be true. If a few seeds of the clover plant, or the pea, are placed in sterilised sand in a flower-pot, they will germinate and grow until they have exhausted the reserve food which the seed contains, when, having nothing to fall back upon to continue the life process, they die. If, however, the sand is supplied with mineral plant foods, and a small quantity of the soil-extract to which we have referred, the young plants will continue to grow to

maturity, nodules will be found upon their roots, and the quantity of nitrogen which they contain will be largely in excess of that which was present in the seed. Thus, without a supply of nitrogen in the soil, this element has been appropriated of necessity from the atmosphere through the medium of the bacteria in the nodules. Thus farmers are shown why the nitrogen in the clover roots, which remain after the removal of a heavy crop of clover hay or forage, may be larger in quantity than that present in the soil before the clover seed was sown; and, therefore, why a wheat crop succeeds when it is sown after a clover ley. The examination of a clover, trefoil, or pea plant will reveal the presence of the nodules in which the bacteria are so actively engaged in providing nitrogen for their assimilation of plant life.

Reference has been made to this subject in order that the principle of manuring may be better understood. A case in point may be taken, and it is one in which the writer was personally concerned. A large field of extremely poor soil was sown with barley and manured with basic slag, excepting upon a small portion, which was dunged. When the barley had reached a

height of two to three inches lucerne was drilled across it and rolled in. The seed germinated well, but when the young plants had reached a height of some two inches they died off, except upon the land which was dunged. Here they continued to grow with great luxuriance, until at harvest they had reached a height of fourteen inches. The failure on the land which received the slag was not occasioned by want of food, for it was well supplied with two materials in which it was originally deficient—phosphoric acid and lime; the third material, nitrogen, lucerne is able to obtain from the atmosphere when the soil contains the requisite bacteria. These organisms, however, were absent, as shown by the result, and, being consequently unable to obtain free nitrogen, the plant died off and the crop was lost. On the other hand, the roots of the lucerne growing in the land which was dunged was well furnished with nodules, and the plants were consequently enabled to obtain free nitrogen in addition to the combined nitrogen in the dung. The value of dung, therefore, consists not only in the fact that it provides plant food, but that it supplies the soil with bacteria. For this reason the

small holder should not be induced to replace dung by artificial fertilisers for use on poor soil intended to grow leguminous crops, inasmuch as bacteria are as essential as the plant food the dung supplies.

There is, however, another value in dung to which reference may be made; and here again we deal both with the principle of manuring and the principle of cultivation. We refer to its mechanical value. The successful cultivation of heavy land depends very largely upon the employment of dung, and especially that containing a large quantity of straw. Clay, of which heavy land is chiefly composed, is a plastic material which is not easily reduced and mellowed. The admixture of coarse dung, however, reduces its plasticity, and by its continual employment, and especially if it is supplemented by the use of lime, sand, ashes, or the ploughing-in of green crops, a loam-like condition is ultimately reached. Thus the improvement of a clay soil depends, apart from good cultivation, almost entirely upon the introduction of organic matter.

We have seen, then, that dung possesses the property—and on this point it is a purely mechanical property—of improving

the texture of heavy soil by reducing its tenacity, improving its working capacity, and, in consequence, its power to retain moisture. Dung also exerts a marked influence upon light soils, but in this case short dung is superior to dung which is rich in straw. Thus, pig or cow manure assists in making a lighter soil more compact, substantial, and homogeneous. Light soils, like the heavy clays, contain comparatively small quantities of organic matter, for which reason they should be well supplied with short manure. Green crops, too, may be grown upon them and ploughed in, until, in course of time, the per cent. of organic matter is materially increased; when they become more substantial, and contain larger quantities of plant food.

In Germany, a famous agricultural reformer, who had received a scientific training in agriculture, purchased 600 acres of sandy land which was described as desert, at a cost of 12s. per acre. Its poverty in plant food was such that for the purposes of taxation its crop valuation was fixed at 9½d. to 14½d. per acre. By the application of marl and artificial manure green crops were grown and ploughed in for a series of years. This enrichment with

organic matter and the consequent provision of nitrogen and mineral fertilisers gradually increased the fertility of the land, until it was able to produce fine crops of grain, pulse, clover, potatoes, and mangels. This work was a revelation to the farmer's fellow-countrymen. He was sent to Parliament, and was there the means of establishing a State station for research, and of showing thousands of farmers how the poorest land might be converted into a fertile garden.

Similar work has been carried out for years in this country on a Kentish farm by Dr Bernard Dyer and his coadjutor, Mr Shrivell. Here, by the use of dung combined with artificials, a practically barren field has been actually converted into a garden, which produces luxuriant crops of a large variety of vegetables and fruits. In this case the crops produced have been prodigious. Thus, on the average of ten years, the annual weight of cauliflowers on the best system of manuring exceeded 25 tons to the acre, autumn-cut cabbages reached 31 tons, savoys 28 tons, brussels sprouts 300 sieves, summer lettuce 30 tons, winter lettuce 17 tons, summer spinach 10 tons, winter spinach 36 tons,

rhubarb 63 tons, the actual average of five years' potatoes $11\frac{3}{4}$ tons, and onions 15 tons; gooseberries yielded 3750 lb., black and red currants 1600 lb., and raspberries 2330 lb. Plums, strawberries, apples, damsons, cob nuts, asparagus, and various other crops were equally productive.

Reference to this subject has been made in order that the small holder may realise the fact that, however small his holding, it possesses great potentiality. Good seed, perfect cultivation—in which the small holder should excel—and liberal and skilful manuring are invariably accompanied by excellent crops, and if the principles which we are endeavouring to explain are perfectly digested and the work conducted upon the lines which they indicate, there is no reason why every Small Holding in the land should not become a prosperous concern.

We have seen that farm-yard manure and the system of green manuring by ploughing-in leguminous crops are beneficial both to light and heavy land, as well from the point of view of the improvement of their texture as for the provision of plant food. Let us next deal with the question of the texture of the soil, that we may obtain some idea both

of its mechanical composition and its feeding value. It is now recognised that an ideal soil is that which combines perfection of texture, the power to retain moisture, depth of staple, with richness in organic matter and lime. The term 'organic matter' specially refers to the vegetable matter in the soil—such as the roots of plants and dung, both being in a decomposed or decomposing condition. It is true that animal matter is 'organic,' but in connection with this discussion such matter practically finds no place. There is, for example, a considerable amount of organic matter in old pasture land, as in all soils which are abundantly manured, and which, being farmed on the rotation system, are constantly replenished by the clover roots, by the stubble of cereals and pulse, and by the leaves and haulm of bulbs and potatoes.

During a long series of investigations in which different crops were grown upon soils of varying character, it was found by a French scientist that the most productive land was that which consisted of equal parts by volume of four soils—those of a sandy, clayey, peaty, and chalky character. Thus, the clay provided substance, the peat the organic

matter, which, like the sand, improved the texture, these being assisted by the chalk, which also provided lime. A mixture of such soils would not only be porous, promoting the passage of extraneous moisture into the subsoil in wet weather, while retaining sufficient moisture for the use of plants in dry weather, but, owing to its excellent texture, it could be easily tilled and cleaned.

Reference may now be made to the importance of lime as an aid to the production of crops. Lime is itself a plant food; it promotes the decomposition of farm-yard manure—a fact which may be recognised if a handful of quicklime is mixed with a spadeful of dung, when ammonia will be released; while it exerts a physical power which is highly advantageous to the majority of soils. Thus, it increases the cohesive and water-retaining power of a light soil, and, on the other hand, renders a stiff soil less exhaustive, gives it great friability, and thus renders it more porous, enabling an excess of rainfall to pass through it. It is of great value on sour soil, inasmuch as it neutralises the acids, and in consequence promotes the growth of cultivated plants at the expense of the weeds

which flourish in this medium. Lime, however, should not be used upon undrained wet land.

It is a curious geological fact that land, especially that which is of heavy character like the clays, though frequently found overlying chalk, is constantly in want of lime. We have noticed that the remains of limekilns may sometimes be found on land of this kind, clearly showing that in the distant past farmers were in the habit of sinking shafts into the chalk and making lime for themselves. The practice of chalking is now quite uncommon, although a heavy dressing may last for some years, but owing to the difficulty of obtaining chalk sufficiently fine it is now practically abandoned in favour of lime. The best lime for agricultural use is obtained from chalk which yields ninety per cent., and mountain limestone which is almost equal, but lime made from magnesian limestone, which is common in Yorkshire and neighbouring counties, is much less valued by farmers, owing to the large quantity of magnesia which it contains.

The value of lime depends not only upon the material from which it is produced, but the degree of fineness to which it is brought.

Lime sold by builders often sets when it is mixed with water, and is, in consequence, of little use, while lime obtained from the purer carbonates is much more easily slaked and pulverises very readily, so that it can be thoroughly distributed on the land in the form of an almost impalpable powder. The best classes of limestone vary in their contents of calcium carbonate from 94 to 98 per cent., while a sample of Silurian limestone contained only 44 per cent. There should be as great discrimination in employing lime as in using marl, which varies enormously in its content of carbonate of lime. Where chalk is used instead of lime, it should be spread before a frost—all the better if it is in a wet or moist condition—that it may pulverise when the thaw arrives. Chalk, as we have seen, is chiefly carbonate, a condition to which lime returns on exposure to the air. When chalk is burnt in the kiln it becomes oxide of calcium or quicklime, possessing caustic properties, but when mixed with water it slakes and becomes hydrate of lime, and is then fit for spreading on the land. In the past, and occasionally at the present time, farmers deposited quicklime in heaps on their ploughed land and allowed

it to slake naturally, or covered it with soil and subsequently spread it. If allowed to remain exposed too long lime absorbs carbonic acid, and loses its caustic properties, being little better than ground limestone or chalk.

The best system of liming land is to broadcast it in a ground condition when it is extremely fine. In this state 10 cwt. per acre used in alternate years, or in some cases yearly, will be found more beneficial than much larger quantities supplied at greater intervals. Ground lime has the advantage over slaked lime or chalk, in that it is much less costly to buy, to cart, and to distribute, while, owing to the fact that it is in a powdered condition, it does not cake. Ground lime should be the produce of chalk or rich mountain limestone and not of gray lime, which is quite unfit for the land. Lime should not be used on poor land which is unmanured, or it will become poorer still. Acting as a base, lime promotes the oxidation of the humus of the soil by combining with the organic acids which are the result of decomposition, thus increasing the formation of nitrates, and providing rich food for plants. It is partly for this reason that alkaline manures such as

basic slag are so much more useful on sour than on sweet soils. Lime has also the faculty of converting certain insoluble phosphates, especially those present in clay soils, into phosphate of lime, which is more easily utilised by plant life, while it assists in rendering potash soluble for the same purpose. Thus, lime not only provides plants with food, but it is an important agent in providing crops with the latent nitrogen, potash, and phosphoric acid which most soils contain.

We have seen that dung or farm-yard manure possesses two important properties—in a word, that it not only provides food for plants, but that its mechanical action in the improvement of the soil enables plants to grow with greater freedom, and to appropriate more easily the food which it supplies. It is important, however, to discriminate between the dung produced by each class of stock, and the quality of that dung as it is influenced by the food which the stock consume. Fresh dung produced by cows, when mixed with straw, contains less nitrogen, phosphoric acid, and potash than fresh dung produced either by the horse, the sheep, or the pig. The manure produced by sheep contains much

more nitrogen and more potash than that produced by horses or pigs, while the manure of the horse contains more nitrogen and phosphoric acid—which is the dominant constituent of all phosphatic manures—than the pig, but less potash. Again, the urine or liquid excrement of the sheep contains more nitrogen than that of either the cow, the horse, or the pig, but the horse takes next position, the urine of both horses and sheep being rich in this element, while the urine of the pig is essentially poor. The liquid manure produced, however, by both horse and pig is rich in phosphoric acid, of which fertiliser the urine of the cow and the sheep contains a sufficient quantity to make it worth salvage; indeed, the urine of all classes of stock should be saved with great care and distributed on the land at the earliest moment, or, if this is impossible, mixed with a sufficient quantity of water to prevent the loss of ammonia. The urine of each class of stock, the pig excepted, is rich in potash.

The fertilising value of dung depends almost entirely upon the character of the food consumed by the stock. Thus the dung produced by fatting stock kept in boxes is much richer than that produced by cows, while

all forms of manure produced under cover and kept from the rain are of greater value than manure which is exposed, and to which rain-water is easily added. For this reason covered stock-yards are of greater utility than open yards to which rain has access and into which hundreds of tons may be poured in a short season, thus reducing the value of the dung so considerably that it may be scarcely worth carting away. It has been shown that a herd of cows varying in weight from 850 lb. to 1500 lb., and averaging 1000 lb., produced an average quantity of dung—liquid and solid, without litter—weighing 70 lb. per day, or 12¾ tons in the year. These figures, however, are subject to considerable variation. Thus cattle kept in open yards produced a much greater weight of dung during a given period than cattle kept in covered yards; the excrement varied but little, but the weight of the litter supplied in the open yards was twice as great as that in the covered yards, for obvious reasons, while, in addition, the rain-water added largely to the bulk. It has been estimated that a ton of dung produced in an open yard consists of only 10 cwt. of excrement and litter, the balance being rain-water.

Thus it is of great importance to protect the dung produced upon a Small Holding, and to prevent its too rapid decomposition. A ton of manure of average quality should contain about 12 lb. of nitrogen, 12 lb. of potash, and 7 to 8 lb. of phosphoric acid. The supply of rich food to the stock would increase the quantities of these materials, while their quantity would be diminished in proportion as the food is poorer, especially in such materials as cotton cake, linseed cake, beans and pease, which are rich in nitrogen.

In estimating the weight of manure, however, it must not be supposed that a load actually weighs a ton. As a matter of fact it seldom exceeds 16 cwt. Heavy dung is usually well fortified with rain-water, if we except that which is produced by cows or fatting bullocks, which is comparatively free from litter. The mixed manure of a dung heap in which straw is not abundant is considerably reduced in weight after fermentation or decomposition. Thus, a given quantity of fresh dung is largely diminished both in volume and weight by the process of rotting.

Although rotten dung is not infrequently

employed by farmers in the belief that it is of greater assistance to plants, its manurial value, as compared with that of fresh dung, is reduced, and in accordance with the time which has elapsed since it was voided. This reduction in value applies not only to its provision of food, but also to its mechanical value.

Long manure, *i.e.* dung containing plenty of straw, exerts, as we have seen, a specific influence upon heavy soils. When, however, the dung has rotted the straw has largely vanished, and in consequence its mechanical influence is lost. Similarly, the rotting process is followed by a loss of nitrogen in the form of ammonia, and where a dung heap is exposed to the rain there is a further loss of the mineral constituents, which are carried off in drainage water. For these reasons dung should be conveyed to the land at the earliest possible moment, and some farmers have consequently found it advantageous to keep a dung-cart near the stock-buildings, that it may be filled as the stalls are cleared daily, and the dung carried to the fields. This practice applies equally to the liquid manure which is so easily lost unless a receptacle is

constructed to retain it until it is removed to the land.

The value of the fertilising matter in a ton of farm-yard manure of average quality—estimating the ammonia at 6d. per lb., the phosphoric acid at 3d., and the potash at 2d. per lb.—is from 7s. 6d. to 10s. It is, however, always difficult to prevent loss as between the time that the manure is voided by the cattle and ploughed beneath the soil.

There is also a loss of the fertilising matter, owing to the conversion of a portion of the nitrogenous matter in the urine into carbonate of ammonium, which is a volatile substance, and therefore easily lost. It was estimated by Sir John Lawes and Sir Joseph Gilbert that owing to the slowness of action of dung, and to the losses of fertilising matter which occur during its preparation as a food for plants, its actual money value was not more than one-half as much as that of the excrement originally produced by the stock. This opinion, however, was expressed on the assumption that the prices for the nitrogen, phosphoric acid, and potash in the dung were estimated at the same rate as in chemical manures. It is thus doubly important that

dung should be conveyed to the land while still fresh, and with as little loss of weight as possible. We have seen that by keeping it to decompose or rot a considerable portion is lost, but in addition to this, loss occurs from the use of rotten dung, owing to the fact that the ammonia which it contains combines with certain soil materials to form insoluble compounds, which are but very slowly available for the use of plants. Where dung is allowed to heat in bulk the temperature should not be permitted to rise above 86° F., and with this object in view a dungheap should be built with perpendicular sides, to prevent loss by waste and drainage, and should be under cover. It should stand above a tank into which the liquid should be drained, and which is provided with a pump, the object being to pump up the liquid for distribution on the solid manure from time to time, not only for the purpose of keeping the heap cool and thus preventing fermentation, but in order that with the removal of the solid as much liquid may be taken with it as it will absorb.

The quantity of farm-yard manure of average quality which is required to replace the fertilising materials removed from the

soil by an acre of grass converted into hay has been placed at 6 tons; for an average crop of wheat, barley, or oats, 5 tons; for a crop of cabbages or mangels, 20 tons; turnips or swedes, 12 to 15 tons; and potatoes, 10 tons; but it will be easily understood that where a smaller quantity of dung is employed in the manuring of land, whatever the crop, the deficiency must be made up with the aid of artificials.

Successful farmers are now in the habit of using the two manures in conjunction for a variety of crops, and especially for roots and potatoes. On certain soils crops can be grown with complete success by the aid of artificials alone, but where it becomes essential to conserve moisture it is advisable to employ dung to some extent, inasmuch as it acts as a mulch and, in consequence, assists in the retention of sufficient moisture to provide for the crop. This practice is confirmed by the excellent results which are obtained in dry seasons. Dung, too, however rich it may be, is comparatively slow in action, and consequently leaves a residue which assists in the supply of food to a crop in the following year, or, it may be, for two or three years in succession. It will be well to observe,

however, that the evaporation of moisture is prevented by hoeing.

The term 'Dry Farming' has been given to a system of cultivation of soils deficient in moisture and situated in districts where the rainfall is low. The chief feature of this system, apart from ploughing and the usual operations of land culture, consists in hoeing the surface soil to a depth of some three inches, the object being to prevent the escape of the moisture from below.

The 'Dry Farming' system is based upon the principle that the moisture of a subsoil rises to the surface by capillary action, and that where the soil is firm and compact throughout it escapes by evaporation. Thus, after ploughing, cultivating, harrowing, and rolling, with the object of producing a perfect tilth, and the soil is pulverised, the particles are pressed close together, while not cohering to form a plastic or homogeneous mass. While the particles of soil are in this position water is conveyed from one to the other, inasmuch as they are in contact, constantly rising upwards until the surface soil is reached. If, however, the surface soil is kept loose with the hoe to a depth of two to three inches,

this ascent of water is checked and evaporation prevented, the loose soil acting as a mulch. Thus the growth of crops is promoted during dry weather by hoeing the surface soil and keeping it in a loose condition. This practice has been long abandoned in connection with grain crops on large farms owing to the cost of labour, but the small holder will find it a profitable if arduous undertaking, for it will enable him to materially increase the weight and value of his crops.

CHAPTER VIII

STOCKING A HOLDING

From what has been said already the reader will have realised the value of stock on a Small Holding. So far, however, no reference has been made to the particular varieties which it is desirable to secure. There is no country in the world in which purity of breed is regarded with such high favour as Great Britain. In times past the man who intended to buy a cow went into the market and made his own selection from among the ordinary stock of the district in which he lived; he paid no regard to breed, but a great deal to the form, age, quality of the coat and skin of the cow, and the formation of her udder, as well as to her temperament and general character. Purity of breed was the last consideration—if, indeed, it were ever considered at all. Owing, however, to the improvement which has taken place in the

milking capacity of our most important breeds of dairy cows, purity of blood has taken a higher place. Thus, we find the Scottish dairy farmer, especially in the great milk-producing counties of the South-West of the country, almost invariably maintaining a herd of pure-bred Ayrshires; in the East of England the Red Poll is kept for milk production more extensively than cows of any other type; in Wales the black cattle of the country, usually of pure blood, are the prevailing milk producers; in the West of England the Devons are kept with the same object; in many of our best dairy counties—Lancashire, Cheshire, parts of Yorkshire, Cumberland, Westmorland, and some of the Midland and Western counties, the Dairy Shorthorn is bred with great success; while in all parts of England amateurs and many farmers breed the Jersey, the Guernsey, or the Kerry. The majority of these varieties have been bred to points of great perfection, and it is therefore easily understood why they are preferred to the average cross-bred cow which is found in all parts of England, and in far too great numbers.

It is not our object to suggest that the small

holder should select pure-bred stock for his dairy. The points in favour of good cross-bred cows are probably more numerous than those in favour of purity of breed; but, while we cannot regard the Dairy Shorthorn as cross-bred, it is impossible to place it in the category of pure breeds owing to its lack of pedigree. It is, however, owing to its many qualifications, the most valuable type of cow we can name for the purpose we have in view. It is large in size, rapid in growth, easily converted into beef, and, in consequence, less likely to lose money where it is intended for sale after milking; it is a deep milker, and where careful selection is made cows can be obtained which also yield extremely rich milk; it is a good feeder, and produces calves which are always saleable. The fact that the Dairy Shorthorn is so excellent and economical a cow, however, does not prevent us from also recommending cross-bred cows which may be found of two or three types. We would refer especially to a cross between the Dairy Shorthorn and the Guernsey, the Dairy Shorthorn and the Dutch cow, and the extremely hardy animals which are bred between the Dairy Shorthorn on one side and the Devon, the Welsh, or the

Ayrshire on the other. In Devon and Somerset a good non-pedigree Red Devon cow can frequently be obtained at a normal price, and, like the cross-breds to which we have referred, she may be utilised with some confidence owing to the fact that she is a producer of rich milk.

Our object in making these suggestions is to induce the small holder to look not only for cows which produce large volumes of milk, but milk of high quality, and, by no means least, cows which possess strong constitutions which are easily imparted to stock by crossing between the healthy parents of two varieties, and which are calculated to feed well when they have been milked sufficiently long. In the words which some farmers employ, the cow which they prefer to select is the animal which 'keeps the money together.' It is too often regarded as inevitable that when a cow is sold her owner should be prepared to receive a few pounds less than she cost to buy, but unless she is some years older there is no reason why this should be the case. The mature cow sold out of the dairy should be sold out fat, and if she has been gradually fed during the last few months of her existence in the stall she

should have put on sufficient meat to make her worth approximately as much money as she cost.

In suggesting that a cross-bred cow will be found an economical servant to the small holder, we have in view a type of beast which is frequently utilised by farmers in various parts of England. Thus type is consistent, although the animal is not always the same. For instance, in parts of Cornwall we have frequently seen large deep-bodied, well-formed cows which are the produce of a cross with the Guernsey. A good beast of this type, with wide loins, plenty of breadth between the buttocks, fine neck and shoulders, and a good milking head, is frequently useful, yielding large quantities of very rich milk; indeed, it is owing to its propensity in this direction that it is kept by Cornish farmers chiefly for the production of clotted cream, which, Cornishmen insist, is superior to that produced in Devonshire, where Devon cows are invariably employed. Quality in milk is of as great importance as quantity, except, perhaps, in those cases where large farmers make a practice of selling the whole of their supply, but even here there is doubt whether they would not realise a larger net profit by

supplying the dealers with whom they have contracted with a smaller quantity of rich milk than they are accustomed to send. The small dairy farmer cannot afford to be left in the lurch. If his milk is unsaleable at a remunerative price, he is able, if the quality is good, to sell cream, butter, or cheese, but where the quality is poor neither of these products will pay.

The objections which are usually raised against the employment of pure bred Jerseys or Guernseys, owing to their want of flesh, and the difficulty of fattening them after their milking days are over, or of converting their calves into beef, does not apply to the half-bred Guernsey, which invariably responds to good feeding, assuming that on one side she contains the blood of a good-feeding variety. Thus, a heifer bred from a large Guernsey cow which has been crossed by a Shorthorn or Devon bull of milking pedigree, should prove both a good milker and a good feeder, although where it is possible to make the cross, better results are obtained by using a pure Shorthorn or Devon cow and a Guernsey bull. It may be pointed out that well-selected Guernsey cows are among the best milkers known in the British Islands, and

this fact is amply recognised by the small farmers on Guernsey Island who frequently exhibit cows at their exhibitions which have produced a thousand gallons of milk in a year, although this quantity has been frequently and very largely exceeded.

The fact cannot be too strongly emphasised that purity of breed does not of necessity mean that a pure bred cow is a good milker, for the large majority are not. There are thousands of Jerseys, Guernseys, and other pure-bred cows in the country which would be dear to the small holder at a gift if he were compelled to keep them in his herd. This fact is largely owing to the want of knowledge of amateurs who have bought to please the eye rather than to fill the pail. A Jersey heifer in her prime is an extremely handsome beast however badly she may milk, but to the man who looks for milking properties, form, and colour, she is of no value whatever. That the principle so long adopted at our agricultural shows of awarding prizes to the best-looking beasts is responsible for this, there can be no doubt. Cows, especially those of the Channel Islands breeds, are still exhibited in large numbers, although they would not have a remote

chance of obtaining a prize in a milking or butter-making competition. These cattle are taken into the ring and paraded before the judges, who award prizes upon the basis of appearance, inasmuch as no test is made to ascertain their value as milking stock. It is for this among other reasons that the small holder should be guided by milking tests rather than by the appearance of a cow.

We have pointed out that a small holder should hesitate to add a dairy to his farm unless his experience of cows and the management of their produce warrants the undertaking. The experienced man cannot be instructed in the line to follow through the medium of a book. Reading as an adjunct to experience is of the highest value, but while a description of the points of a good cow will help the man who knows something about them to make a good selection, it will not help the man who has had no experience at all. There are many persons who, having seen nothing more than the inside of a cattle-house with the cows standing in the stall, have the impression that they could succeed better than the owner if they only had the chance; such men have often tried and

failed. Let us suppose, however, that a man who possesses some knowledge of dairy cows proposes to take a holding and to form a little herd of four: what is his best method of procedure in making a selection; should he attend a sale of pedigree stock where he can rely upon the information in the catalogue? We think not. On such occasions the best cows usually realise fancy prices. Should he attend a market, fair, or auction sale and use his judgment? We think he would be unwise. No facts would be forthcoming, and judgment is very fallible. We should recommend one of two courses: a visit to a few well-known breeders of dairy cows who will be able to point to the dams and the sire of the stock they have for sale, or an application to a dealer of reputation. A reliable dealer can almost invariably place his hand upon first-class cows if the buyer is willing to pay a good price, but in either case the best-looking milkers should be milked clean in the presence of the proposed buyer both morning and evening, and the milk accurately weighed, a gallon being estimated to weigh roundly 10 lb. A sample should then be taken from the well-stirred volume at each milking and tested by the Gerber Tester, which every

small holder should possess in order to ascertain the quality of the milk as denoted by its percentage of fat. To submit samples to an analyst is to cause considerable delay, and we are not prepared to advise those who desire to do the very best for themselves to adopt any less thorough course.

If we assume that an average cow yields 500 gallons of milk in a year, it follows that a cow which yields 600 gallons will earn £3 to £4 more, and that her value is in consequence at least two or three pounds in excess; nor should this money be grudged by the buyer because it happens to be slightly above the market price for average cows. He should recognise that market price is precisely what the seller is able to obtain, and that the quotations which appear from week to week are in this sense misleading. If a 600 gallon cow is worth two or three pounds more than a 500 gallon cow, it follows that one yielding 700 is worth still more, and the higher the yield the greater the proportionate value. A word of caution, however, is necessary. Because a cow is yielding 500 gallons of milk at the time she is purchased, it does not follow that she will of necessity continue to milk

freely until she calves. It is one of the uncertainties of dairying that some cows frequently yield large quantities of milk for some weeks after calving, then gradually fall off, while others which yield a less quantity after calving maintain their yield for a greater length of time. It is for this reason that it is so important to learn what has been accomplished by the parent stock; and hence the inference that pedigree tells.

In breeding calves the small holder is frequently at a disadvantage. He cannot keep a bull, and it may happen that there is no stud bull in the neighbourhood which is sufficiently good for his purpose. In breeding, therefore, he must rely upon his own efforts to find the animal that he requires, and, having found it, he should not hesitate to pay a liberal fee if it is demanded. The calves which the four cows will drop in due course should be of great value if the bull is all that could be desired, but should the owner carelessly put his cows to a bull with no milking character he might as well give his calves away, for they would be of little value. There is always a demand for first-class dairy stock, hence, by

employing the best blood obtainable and rearing his heifers well, he will be able to sell them at handsome prices should he desire to do so.

Sheep on the Small Holding.

As a rule sheep are not a very desirable adjunct to a Small Holding, unless, as in the case in some mountainous districts—especially in Scotland and Ireland—the tenant has an upland run or the liberty to turn out sheep upon a mountain side. In this case a small flock, sixteen to twenty head, may be kept at extremely small cost, not only paying their way, but leaving a handsome profit behind, especially if twins are numerous. The variety of sheep adapted to the work are usually those which are common to the country. Thus, we find Exmoors in Devonshire, the Welsh sheep on the Welsh hills, the Herdwicks on the hills of Cumberland and Westmorland, and the Black-faced Horned sheep on the Scottish mountains—all being peculiarly adapted to the requirements of farmers living in each district. Scotch mountain ewes are, however, frequently brought south and bred upon the lowlands, but they frequently cause considerable trouble, owing to their wandering

character and their capacity, owing to the size and strength of their horns, to break through the strongest hedge and commit damage in a neighbour's field. Sheep-breeding, however, is not adapted to a Small Holding of average type, this branch of farming being usually conducted with two objects in view: the production of lambs either for selling fat or for running on and selling as wethers, the ewe lambs being brought into the flock; and the manuring of the arable land by folding. Thus, on a large arable farm, where it becomes impossible to provide sufficient dung from the stock-yards, green and fallow crops are grown in the course of the rotation in order to provide food for the sheep and to act as a medium for the production of corn. Thus, roots and forage crops frequently follow wheat. The land is cleaned in the process of cultivation, and the crops are consumed by the sheep, which receive cake, corn, and hay, and in consequence prepare for a succeeding grain crop which is followed by seeds, usually clover or clover and rye-grass, which remains down one or two years, as the case may be, when wheat comes in again. In this way the fallow and forage crops answer two purposes: they

provide for the requirements of the flock, and they enrich the soil. Thus, where turnips are grown by the aid of superphosphate and consumed by sheep which are receiving rich dry food, the lambs or tegs are fatted off, and, at the same time, a large proportion of the superphosphate and of the manurial constituents of the cake and corn is returned to the land in the manure voided by the flock. Obviously, a small farmer is seldom in a position to farm on a strict rotation system; his root and forage crops are usually valued at something more than sheep food; but if this were not so it is quite possible that in most instances the labour involved in folding off a small plot of land every day for a few head of sheep would occupy too much of the time at the command of the tenant, who would be better occupied.

A few breeding ewes of large size and strong constitution—and when purchased they should not have more than four permanent teeth—can always be kept with advantage where there is room for them. Should the grass land permit of their addition to the grazing stock, so much the better; but it cannot be too

strongly impressed upon the reader that his land should never be overstocked. Where, owing to any circumstance which cannot be avoided, the food is insufficient to feed the stock in hand, the farmer is placed at a great disadvantage, for he must either buy food—which will absorb his profit—or sell a portion of his stock below its value. From this point of view it is better to be over-rented than overstocked.

We would finally point out to those who contemplate the addition of a few ewes to their stock that, like every other branch of work upon the farm, sheep demand special knowledge and experience if they are to be successfully managed. They invariably give some trouble, although this is minimised by care at the hands of the owner during summer, especially from foot-rot, which is easily caught, as it is most contagious, and the attacks of flies, while they are especially liable to a foul and costly complaint known as 'scab,' which is caused by the presence of a very active organism which finds its way beneath the skin. Washing, shearing, and dipping are also essential, and all involve labour.

Pigs on the Small Holding.

There is no variety of live-stock which is of greater value to a small holder than the pig. Most men who contemplate the acquisition of land have kept a breeding sow, and are acquainted with her habits, her requirements, and her value as a money getter. As a rule, however, their experience is limited to the type of pig which is kept in the district in which they live. This may or may not be unfortunate, for it is not every man occupying a small position who is able to obtain a sow of first-class variety or type from a distant breeder and to pay him market price. Small pig-keepers, too, are frequently mistaken in their method of production, and, in common with large numbers of agricultural labourers, they are accustomed to buy a small pig and to feed and fatten it in a stye for a long period—until, indeed, it has reached a considerable weight.

It should be accepted as an axiom that when pigs have exceeded a given weight—which depends largely upon the breed employed and the method of feeding adopted—they cease to pay, and the longer they are kept and fed, the more money they lose. Modern pig-keeping—and we are naturally speaking

of profitable pig-keeping—is based upon early maturity, the attainment of a given weight in a given time. Buyers demand young pigs whether for sale as porkers or baconers, and it is seldom that it is found profitable to exceed a live weight of 200 lb. or 150 to 160 lb. in the carcass. This being the case, it is obvious that the breeding stock should be large, thrifty, and full of vitality; that sows should not be used for breeding until they have reached maturity and attained both size and weight; that they should be mated with boars calculated to assist in the production of strong, vigorous, growing pigs, which will feed rapidly and produce a fair proportion of lean meat to fat, excessive fatness being as objectionable as actual leanness, for neither is profitable. The bacon factor pays a higher price for pigs in which the fat meat is not excessive, but he also devotes some attention to the method of feeding. He prefers meat which is firm, instead of meat of a soft and oily character, which is produced by unskilful feeding.

A breeding sow should be lengthy, broad across the loins, deep bodied, and with plenty of flank; the belly portion of the carcass providing abundance of streaked meat, good

hams, necks of medium length instead of the short thick necks with fatty collars, heads of medium size, not erring on the side of shortness, ears of fair size not pricked, and broad foreheads; the face should not be dished, nor the snout turned up, short dished heads with turned-up snouts, short ears, and thick necks denoting aptitude to fatten too heavily as well as want of size. The hair is also an indication of capacity to produce good meat. It should be medium in quantity, fine, and silky—coarse, bristly hair being more objectionable than no hair at all. It is true that hair denotes constitution, as in the case of the wild boar, but when in excess or too coarse it indicates leanness, agility, restlessness, and no aptitude to fatten. Bearing these facts in mind, the breeder will note the form and points of his sow, or sows, should he possess more than one, or he will take them into consideration when he is making his selection. As few men are able to obtain sows which are absolutely perfect, or even approximately so, without the expenditure of a large sum of money, they may, if able to utilise the services of good boars at will, be able to produce large strong litters of pigs adapted to their purposes by employing boars possessing those

points in which the sows are deficient. Thus if a sow is too short-headed, with small ears which are pricked, heavy neck, and a carcass indicative of aptitude to produce pigs which are too fat, the selection of a boar in which these points are replaced by points of an opposite character will assist in the correction of the faults. As a rule, however, small farmers usually possess sows which are lengthy not only in the body, but the head, the ears, and the neck, and which are usually too lean for breeding purposes, although they are well calculated to produce rapid growth in the young.

Pig meat is consumed in this country to so large an extent that there is a never-ceasing demand both for pork and bacon; and the man who breeds pigs consistently, not ceasing when prices are low or corn dear, or breeding more when prices are better or corn cheaper, will be well rewarded for his pains. Small holders are frequently in a position to realise better prices for their pigs than farmers who breed much larger numbers. Thus, instead of killing a batch of youngsters when they are fit for the market and sending them to a London salesman in the carcass, they are in a position to kill one at a time,

and in this way to realise 1d. or 2d. per lb. more by retailing than would be paid them by a dealer or the butcher in their nearest market town. Occasionally a small holder is skilled in curing bacon, but although this work is not intended to deal with technical questions of this character, it may be remarked in passing that young pigs adapted for curing purposes will pay their breeder well if he is able to convert them into bacon and hams for sale direct to the consumer.

Although the cost of curing, however, is extremely small, it is essential to devote daily attention to the meat as it lies in pickle. It will be well, however, to remark that bacon cured by the private individual is now invariably cured with salt, sugar, and a small quantity of saltpetre, whereas that cured by the bacon factor is preserved by the aid of a large proportion of boric acid—a material which the small holder will be well advised to ignore, for if he fails to cure bacon for sale to his customers he will probably cure a small quantity for himself.

In days gone by farm labourers were in the habit of keeping fat pigs for their own consumption during winter. They almost invariably

preferred meat which was excessively fat. In these days, however, the public demand bacon containing a large proportion of lean. The object of the writer in referring to these facts is to point out to those who cure bacon for their own consumption that the fat meat of old times is a superior food. The consumption of excessive quantities of the lean meat of bacon is deleterious to the consumer, partly owing to the fact that the digestion of salted lean meat is a tax upon the system, and partly because the salt is deleterious. This fact is emphasised in the case of lean bacon which has been cured in a factory, for in addition to an excessive quantity of salt the buyer consumes boracic acid.

We may take it as a general rule that the small holder should utilise the breeding sow as a portion of his stock. Where the waste in the garden or on the farm is considerable, or where the crops produced are peculiarly adapted to pig feeding, a small farmer may keep two, or even three, breeding sows, but he should make haste slowly, beginning with one and adding a second only when he can see his way. Bills for barley meal and other foods supplied to pigs are apt to become

too large if great care is not exercised in their management and in accordance with the returns obtained. Many a poor man has found that his corn bill has reached a sum that would not be covered by the sale of the pig he has fattened, but this position is not likely to be reached by careful men who know what they are about. Before it is decided to buy a breeding sow the small farmer should think out the question of food. What proportion of her requirements can he grow upon his own land? We do not suggest that he should grow barley for feeding purposes, inasmuch as it would not pay. Barley meal can be purchased at less money than it can be grown for milling, but it is always possible, unless a farm consists entirely of grass, to grow potatoes—the unsaleable chats being reserved for the pigs—mangels and swedes—both of which latter are excellent additions to the winter ration—cabbage, clover or lucerne, sainfoin or tares, all of which are equally well adapted for summer feeding. When there is a garden there is always a certain quantity of waste material which should find its way to the sty before it has commenced to decompose, but we may take it that except when a sow is in-pig or

with her litter she can be almost entirely supplied by the products of the farm. She should be allowed to graze during the summer, receiving a few handfuls of corn every day in addition to the waste material which is provided from the garden or the home; while in winter, although she may be turned out to grass for exercise, she may still be supplied with potatoes, mangels, or swedes. Many successful breeders supply their sows throughout the year with middlings or 'ran-dan,' the ration being materially increased when she has produced her young, this food being regarded as excellent for milk production, but at no time need she be fed upon such fatting food as barley or maize meal.

The importance of good blood in a sow is indicated by her power to maintain herself in good condition upon a comparatively small quantity of food. This power is owing chiefly to her disposition. The nearer a sow approaches to the type of the wild pig, the more restless she becomes. Instead of the quiet contented product of the modern breeder's art—which chiefly lives to sleep and feed—the narrow-bodied, long-headed, coarse-haired sow of no breed at all is ever on the

move, expending energy, seldom resting, and, in consequence, failing to lay on fat. From this point of view, too, it is important to remember that where pigs are fed upon such foods as slop, which they can swallow rapidly, they waste almost as much as they digest. Nature has provided the pig with teeth which are intended to chew and assist in the mastication of their food. Without thorough mastication and salivation, as is the case where the food is too sloppy, it escapes the first form of digestion—that which occurs in the mouth, at the very door of the digestive system. Although it is true that a second opportunity is afforded for the digestion of the starchy matter of grain, and pig food consists chiefly of starch, the results are by no means equal to those obtained where the starch is chiefly digested in the mouth and in the stomach by the aid of the saliva with which it is intimately mixed.

With regard to the best breed of pig for use upon the Small Holding, it may be pointed out that as the breeder requires two qualifications, size and quality, by which we mean the ability in the young pigs to grow to sufficient size and weight as quickly as possible and to produce a marketable quantity of

lean to fat, it is necessary not only to look to those breeds which are best adapted to fulfil these requirements, but to individual animals of the breed. The Large White, for instance, is exceptionally valuable, but this remark cannot, and does not, apply to all pigs of this variety. The great majority of the pigs of any pure breed are inferior, and useless for the purpose indicated. We have therefore to look for good representatives of the variety which we select, and it is for this reason that a first-class Berkshire pig, which is much smaller than either of the large breeds, is superior to second-class specimens of either. If a Large White sow of exceptional size and quality is compared with sows which are so frequently seen in breeders' yards, and which are supposed to be normal specimens, the difference will be recognised as ludicrous. One of the most important reasons why this is the case may be explained. A breeder of pigs is anxious to obtain a good strain of a given variety. He has seen magnificent specimens in the show-yard or in the piggery of some other breeder, and he determines, in consequence, to purchase a sow for breeding purposes. He applies to a successful exhibitor for a young

pig which will grow into the sow which he desires to use, and in due course it is supplied. Owing to his inexperience with the breed, he fails to recognise its inferiority, until, having arrived at maturity, he is disappointed at its size and general character; he has been supplied, in fact, with an inferior pig. However large and perfect a breeding sow may be, she invariably produces some inferior pigs. Breeders with a large demand for stock pigs are induced to sell these specimens, which in their turn produce litters, and gradually both size and character are diminished in value until the pigs are merely Large Whites in name; they have lost their distinguishing points by careless breeding. There can be no doubt that in the great majority of litters of pigs of pure varieties at least one half should be fed for the butcher as being unfit for breeding purposes.

What applies to the Large White applies equally to the Large Black and to the curly-coated pig of Lincolnshire. All these breeds are of large size; good specimens attain great weights and grow with rapidity, but only good specimens. If the small holder is able to obtain a really fine sow of either variety,

he should make the most of her, and invariably mate her with a boar which is equal to herself. The Small White need simply be mentioned for the purpose of indicating its uselessness for breeding. The Middle White pig is occasionally useful, but owing to its aptitude to lay on too much fat it should only be used for crossing purposes, and then through the medium of a boar. A good Middle White boar is excellent for the purpose of crossing upon lengthy, long-headed sows, which are apt to produce lean, slow-growing litters. This breed is eminently adapted for supplying those points in which many common sows are deficient.

The Red Tamworth pig is an excellent variety for profitable use, but it should be large and fleshy. A sow of this variety is admirably adapted for crossing with the Large White or the Berkshire, while the Berkshire pig, which is full of quality, producing excellent pork or bacon, may be increased in size by judicious crossing with one of the larger breeds. The owner of a Large White or Black sow may, in the absence of a boar of either breed which is adapted to the purpose, safely employ a Berkshire boar, but he should not be too small nor too chubby

in appearance; he should possess good hams, deep sides, a head of good length, and plenty of hair of fine quality. The breeder should remember that a pig is very much what he chooses to make it. Some men have a peculiar genius for breeding to a good type. A man with an ill-bred sow of fairly large size may, by judicious crossing, and by the continuous selection of the best gilts, produce almost any type of pig he requires in the course of a few years; hence, by a recognition of the type of pig which produces the most saleable meat and rapid-growing youngsters, he may be able to evolve that type by the practical exposition of his art. The same work is accomplished by the breeder of cattle and horses, but a much longer period of time is required in either case than with the pig, which, owing to the rapidity of its growth and productive powers, can be transformed from a model of imperfection to a model of perfection in a comparatively short space of time.

Poultry Breeding.

The skill of thousands of men has been displayed for many years in the production of highly perfect specimens of the many pure-bred varieties of poultry which exist in these

islands. These birds, however, have been bred with one object—that of winning prizes at poultry exhibitions. The breeder's aim has been to produce perfection in the colour and markings of the feather, the form of the comb and the ear-lobe, the colour of the legs and feet, the size and form of the tail, the symmetry of the body, and size generally. Although we cannot but admire the pertinacity and ingenuity which have affected such marvellous changes in so short a space of time, and which have produced so many specimens of great beauty, we cannot but deplore the fact that so many men have exercised their skill to so little purpose. The Brahma fowl, for example, has been bred for nearly fifty years with the object to which we have referred, with the result that as a utility variety of poultry it is a mere wreck of what it should be—practically useless on the table, an inferior layer of small eggs in comparison with its size, it stands as a mere monument to the art of breeding to feather. What applies to the Brahma applies equally to birds of such varieties as the Cochin, the Polish, the Malay, the Long-legged Game fowl, the Spanish, and, to a more or less marked extent, to all the remaining varieties; the poultry

'fancier' has, in a word, spoiled everything which he has attempted to improve. These remarks are made with the object of pointing out to the poultry-breeder for profit the danger of relying upon pure-bred varieties. Happily, the facts we have mentioned were recognised some fifteen years ago, when a movement was started with the object of breeding poultry for utilitarian purposes. Hens are naturally intended, as we are bound to believe, for the production of food for man, and in consequence of the acceptance of this fact utilitarian poultry-breeders set to work with the object of improving the laying and meat-producing powers of those breeds which are best adapted to the purpose, and their efforts have been accompanied by marked success, although the system for breeding to feather is equally as strong.

Among the more modern varieties of poultry, such as the Wyandotte, the Orpington, the Leghorn, and the Plymouth Rock—the last-named was introduced into this country by the writer of these lines nearly forty years ago—there are some which possess considerable value for utility purposes, but it may be remarked that the more modern the

variety the more it approximates towards the standard of the utilitarian fowl. A new breed is the result of crossing between two or more varieties, and just as a half-bred fowl, like half-bred stock of larger kinds, is usually of greater economical value than either of the breeds from which it is derived—for it partakes of the good qualities of both—so is a breed of recent manufacture an improvement upon the varieties which have been used to produce it. This is believed to be chiefly owing to the improvement of its constitution, to its increased vitality, and, in consequence, to its greater power to lay on flesh or to produce eggs. In the process of time, however, as by constant crossing with birds of the same variety, the breeder aims to fix a standard of form and feather, to say nothing of minor points, its vitality is diminished, it gradually loses its utilitarian character, and, like the older breeds, its productive power diminishes, and it is set aside for something new. Thus in breeding for profit—in other words, for the production of large numbers of eggs and strong-growing chickens with meat adapted to table purposes,—a small farmer should bear in mind the fact that he will do better work by crossing

between two breeds or by improving his own stock, assuming that to be of no breed at all, by the systematic introduction of male birds of good type than by the maintenance of the purity of any one variety.

It is probable that the average number of eggs laid by the average hen in this country does not exceed 80, but in competitions which have been held in England, in America, and in Australia, extending over a long period of time, sometimes a whole year, young hens have averaged as many as 240 eggs per annum; and since the introduction of the trap-nest, which enables the breeder to actually count the number of eggs laid by individual hens, and, consequently, to select the best layers for his breeding stock, great improvements have been made, and it has become possible to adopt the process of selection for breeding up to a higher standard of proficiency than was ever possible before. Just, therefore, as the owner of a few head of cows makes every effort to obtain the best milkers that he can afford to buy and to ascertain their yield of milk from day to day and month to month by the aid of a record, just, too, as a farmer can improve his pig

stock by the introduction of improved blood, so can he, if he chooses to take the pains, increase the egg-producing powers of his flock of hens, or, on the other hand, produce chickens which will realise in the market fifty per cent. more money than would be possible if he continued to breed from unimproved stock.

Chickens bred from barn-door hens, mated with stags but little better than themselves, are rejected by poulterers—indeed, by all who require good chickens for the table; but where, by careful study of the subject and by the acquisition of good birds such as those we have named, fine chickens are bred and well fatted on the modern plan, so that they are ready for the table in sixteen weeks or thereabouts, they will find a ready sale at remunerative prices. The poultry-keeper should not be satisfied with less than 7s. as a minimum for each couple of young birds he sells, and he should aim at still higher prices; nor should he be content with less than 140 eggs per hen per annum. On this point, however, something further may be said.

The age of a hen exerts enormous influence

upon her productive powers. Chickens hatched in the first three months of the year should commence to lay by the end of August or September. The writer has owned birds which commenced to lay in June. During the first year, commencing with the first egg, the number laid should be the maximum of which the bird is capable. In her second autumn she moults, laying ceasing until she is newly clothed; but the number of eggs which she lays in the second year of laying—*i.e.* the year commencing with her first egg after moulting—will not be so numerous as in her first year, and as with each year she diminishes her number of eggs, it will, unless in exceptional cases, be advisable to sell her before her second moult while she is still in good condition. It will be observed that if this plan is adopted the number of eggs laid during two laying years will be required to cover the cost of feeding from hatching at the commencement of the first year until the end of the summer in the third year, or about two and a half years in all. Assuming that each hen costs 1d. per week —which should be quite sufficient where

the birds are at liberty on the farm and are provided with a quantity of waste food—the actual cost of feeding will amount, in round numbers, to 11s., whereas the value of the eggs, averaged at 1d. each —purposely placed below the market price —would in the two seasons reach 23s. 4d., assuming that the average of the two years reached 140. This figure might be exceeded, or it might not be reached. Be that as it may, bearing in mind the fact that eggs in autumn and winter realise higher prices than 1d., we hold the opinion that the poultry-keeper should at least obtain a return per hen of 11s. per year. The most prolific hens, assuming them to be large, healthy, and vigorous, should be retained for stock and mated with a cock which is the produce of a good laying hen. The cockerels should be kept in separate runs in groups and fed off for market, just before they have reached crowing age. The best pullets should be retained year by year for laying, and those of second-rate quality fattened for sale. Where birds are of first-rate table quality they should find a ready market among private consumers. Such customers are worth attention, and if well

served will come again. Retailing in this way enables the breeder to obtain a shilling a couple more than is paid by the dealer, who, apart from this, is more particular, rejecting many birds which less critical buyers are ready to accept.

Among the breeds of poultry which should be rejected on a Small Holding are Spanish; the Hamburg varieties, which are too small and entirely unfit for the table; the modern Minorca, which has lost its laying powers; the Andalusian, which was at one time one of the best known laying varieties; the Brahma, the Cochin; the modern Game; the Houdan and the Creve Cœur. There are various breeds of fancy fowls which are still more inappropriate and practically useless upon a farm. It need scarcely be remarked that the laying power of a hen cannot be discerned or distinguished by her size, colour, or form. The White Wyandottes, the Orpingtons, the Leghorns, and the Plymouth Rocks have all taken high positions in laying competitions, but the reader must guard against the supposition that because of this fact hens of these breeds are necessarily good layers; this is not the case. Whatever the presumption may be, we cannot depend upon the birds of any breed

unless the strain of that breed is recognised for the laying propensity of the birds it produces. On the other hand, it is quite possible to judge of the meat-producing power of birds from their appearance. Thus the Dorking, like the Shorthorn among cattle, the Lincoln, the Hampshire Down, the Oxford, and the Shropshire among sheep, or the Large White among pigs, is, in its formation, a typical meat-producer. It possesses a long, deep, broad breast which carries abundant meat, and that of the highest quality. If we contrast it with the Brahma or the Cochin, we may find similar size, but form of quite another type. The breasts are narrow and contracted, the keel short, the meat deficient in quantity and defective in quality, less white in colour, less tender, and less agreeable on the palate; and these remarks apply with still greater force to such varieties as the Hamburg, the Leghorn, the Minorca, and other breeds of poultry which have no claim to table purposes.

When, however, we come to the group of modern fowls to which we have already referred—the Wyandotte, the Orpington, and the Plymouth Rock—we find something approximating more closely to the Dorking.

These birds are large, they possess good constitutions, and produce a fair quantity of flesh, while they make useful crosses; but they cannot compare with the Dorking in the quantity of meat which they produce, especially on the best parts of the carcass, or with its quality. For this among other reasons we strongly urge the poultry-breeder who devotes his attention to the production of chickens for the table to employ the Dorking either in its pure condition or by using it for crossing with his hens. If he adopts the latter course he should make a point of selecting the best half-bred hens—those which resemble the pure Dorking most nearly—and again crossing them with the Dorking cock. By the continual introduction of Dorking blood he will improve the size and the table properties of his birds. If, however, a first cross is preferred between two pure breeds, the best plan is to select large-framed Dorking hens —for the size of the chickens is influenced by the size of the female parent—and mate them with an Indian Game cockerel. In this case the two pure breeds would of necessity be employed each year as breeding stock, the chickens, all of which would be half-bred, being sold for table purposes.

The majority of poultry-keepers, however, especially the class to which we appeal, prefer general-purpose fowls, their object being to obtain as many eggs as possible and to sell their surplus chickens for the table. There are no means of producing birds, however carefully we may select the stock, which will at the same time lay large numbers of eggs and produce chickens equal in table properties to the Dorkings or the Dorking and the Indian Game.

One of the best crosses with which we are acquainted is more difficult to make owing to the fact that the variety of hens which should be employed are but little kept in this country. We refer to the Flèche, so well known in France. These hens are large in size, square, deep-breasted, black in plumage, with large white ears and combs similar to the head of an arrow, from which they take their name. They are non-sitters, but they produce a great number of large white eggs. If these hens are crossed with the Black Langshan—and for the purpose a deeper-bodied, shorter-legged bird than is common should be selected—they will produce fine-growing, strong chickens, which provide fine white flesh, and which are soon ready for

the table. The cross-bred pullets, too, are first-class layers, and with care in breeding and judgment in selecting we believe they might be made to yield as many eggs as any birds which are known. Their uniformity in colour is also an advantage, if not an important one.

Crosses may be made between the Wyandotte and the Orpington or the Plymouth Rock, with the result that pullets useful for laying and cockerels for table will be grown. As it is possible, however, that the great majority of small farmers already possess some few hens and prefer to retain them, we refer to an earlier suggestion, and once more emphasise the importance of introducing a Dorking cock for crossing and only selecting the best pullets for stock, with the certainty that, in the end, the flock will be immensely improved.

Ducks.

Although poultry-keeping does not of necessity involve the breeding of ducklings for table purposes, this branch of the poultry industry is distinctly profitable, simple in practice, and occupies but a small portion of the year. Well-bred ducklings, by which we mean birds of large size and well furnished with flesh, command

high prices in London and other cities in the early season. The birds are mated in November, they commence to lay in December, and the eggs are hatched under hens and reared in groups of twenty to thirty until they are fit for sale. Many of the cleverest breeders of ducklings prefer large White Pekin ducks which they mate with a young, well-bred Aylesbury, which has a flesh-coloured bill, and, as a natural consequence, delicately-coloured skin, which is an indication of the quality of the meat. Size is secured by the Pekins, which are large and which lay large eggs, and it will be found that the size of the duckling depends largely upon the size of the egg. During cold weather the birds are kept in small compartments, sanded or covered with straw in an outhouse which is artificially warmed, one of the best methods being to place a stove in the centre and to turn the newly-hatched ducklings into a compartment which is close to it, removing them back to other compartments as their places are taken by new batches of young ones. In this way they are gradually hardened off, until, reaching the compartment near the wall which is farthest from the stove, they become fit for removal into

similar compartments which are placed in sheds, but which are larger owing to the increased size of the birds.

Young ducklings are forced by good feeding, which consists to some extent of offal from a butcher's shop, including fat, or, in its absence, tallow chandler's greaves; but the highest type of feeding is practically confined to the employment of oatmeal, barleymeal, or maize-meal, or these foods mixed in appropriate quantities and stirred into a thick paste with milk, a little chopped suet being added. The chief trouble with ducklings is their liability to diarrhœa or scour, but this can be obviated by the exercise of the greatest cleanliness in the preparation of their food, and the provision of their water. Care must be taken to prevent the possibility of their consuming food or water which is tainted with manure, their own droppings, or with tainted soil.

The duck industry, which involves three to four months' work in the year, is of a sufficiently profitable nature to make it worth the while of the small holder to learn something of the system, which he may do by paying visits to farmers like himself in Bucks, where large numbers

of ducklings are bred for the London market.

Turkey Breeding.

We have already pointed out that, except in special cases, sheep are not an adjunct to the Small Holding which can be confidently recommended, and we have given reasons why this opinion has been expressed. Our reference to the breeding of turkeys as a branch of profitable poultry-keeping must be made with a similar precaution. The production of the turkey is one of the most profitable branches of *petite culture*, but, in the first place, no man is warranted in taking up the work, in justice to himself, unless he has had some experience. The risks of failure are considerable where the habits and requirements of the birds are not thoroughly understood, and when we add that the loss of a well-bred chick means the loss of a guinea at Christmas or thereabouts, we feel we are fully warranted in cautioning the small holder against venturing upon a branch of industry with which he is not fully acquainted. Again, the turkey demands considerable time and attention, and however skilful a breeder may be he will do well to calculate the cost of adding turkeys

to his stock if he has already undertaken to accomplish as much work as is justified by his circumstances. Where the wife of a small holder, or some member of his family, is able to undertake the management of a poultry-yard, turkey breeding may be regarded as a very valuable addition; but the management of a flock of young birds between spring and Christmas involves the expenditure of considerable time, and by no means a small sum in the purchase of food. Broadly speaking, a young turkey is as profitable as a lamb, and a flock of eight hens and a gobbler, all of which should be of the highest quality, will return a larger net profit than an equal number of breeding ewes.

It is a recognised fact that poultry of all kinds thrive better upon the drier soils, especially chalks and gravels; but they will do well upon loam, or loam with a clay subsoil which is well drained; indeed, in good hands poultry of all kinds will thrive upon any class of soil which is well protected from cold winds and which is not absolutely wet. From this point of view it may be added that land which is suitable for cultivation as a Small Holding should be equally suitable for poultry.

We have referred to the question of soil owing to the fact that the turkey is peculiarly sensitive to wet land and to bleak situations. If by want of knowledge, by the employment of unsuitable stock, or by conditions which are insanitary, a number of turkeys are lost after they have reached a considerable size—and it should be observed that they frequently die, where the conditions are unsuitable, just before they mature, or when, as is sometimes remarked, they 'shoot the red' on their heads—the loss involved is considerable, for the cost of food is much greater than that consumed by poultry of other kinds.

Success in breeding turkeys is chiefly determined by the character of the stock, which should be of the Giant Bronze variety, the hens, which should be in their second or third year, weighing not less than 16 lb. apiece, while the cockerels should exceed 20 lb. Without large hens it is impossible to obtain large birds for Christmas, when sales are usually made, and it should be specially noticed that price depends almost entirely upon size, assuming that the birds have been well fattened. One turkey weighing 20 lb. is worth considerably more than two weighing 10 lb.

each, the price per lb. being higher as weight increases; hence the importance of obtaining birds as large as possible. To raise such birds as these it is useless to employ British breeds —the Norfolk or the Cambridge, or white turkeys of any kind. The usual practice is to sell the young cock birds for the Christmas table and the smaller pullets, retaining two or three of the best cockerels and the largest pullets for stock or sale later on. There is a never ceasing demand for cockerels of great size and large hens, both for breeding and exhibition purposes, so that the breeder need have no fear of failure to obtain good prices for birds of both classes if they are well reared and in good health.

Turkeys provide another source of income; we refer to the sale of their eggs, which are worth 1s. each for hatching purposes. Bearing all these facts in mind, the turkey breeder will realise the importance of paying liberal prices for the very best at his command. Without such stock he will be far wiser to leave the industry alone. We may justly state that fifty young birds reared to maturity should realise an average price of a guinea each. Thus, if we place the cost of feeding and other expenses at 10s. per bird, there

should be a net profit of 11s., or £27 upon the flock. Although account must be taken of the smaller weights attained by a certain number of the birds and their consequent failure to reach the average price, we have suggested that birds weighing 20 lb. and upwards would realise more. A 20 lb. cockerel, for example, is worth 15d. per lb., whereas birds weighing 23 to 25 lb. are worth 16d. to 18d. per lb., and in the experience of the writer there has been for many years past a much greater demand for birds of this size than has been met by the supply.

CHAPTER IX

DAIRYING ON A SMALL HOLDING

THE production of milk is one of the most convenient and lucrative adjuncts to the Small Holding, but it should be clearly pointed out at the commencement of these remarks, and solely in the interests of those who contemplate the adoption of this branch of farm industry, that although cow-keeping pays those who are experienced in the management of stock, in the sale of milk, or in the manufacture of butter or cheese, it may prove disastrous to an inexperienced man. There are so many who are under the impression that the management of a dairy requires very little knowledge and is an easy road to competence, that a word of warning will not be thrown away. We venture to believe that those who hold such optimistic views upon this subject would hesitate before embarking in the business of a baker, a tailor, or a watchmaker without possessing sufficient mastery of the work, and yet they would apparently

exhibit no hesitation in investing their capital and their time in the purchase and management of cows. In the first place, none but men of experience can buy cows advantageously, and nothing is of greater importance than the acquisition of suitable stock, upon which everything depends. The novice who makes the attempt, which we urge him to abandon until he has acquired experience, will find that if he is compelled to rely upon his own knowledge and judgment, the selection of first-class cows will be impossible. His object should be to acquire cattle which are young, healthy, full of vitality, well formed, with perfect udders, newly calved or down-calving, gentle in disposition, and producers of large quantities of rich milk. He will, however, be unable to decide correctly upon either of these points, and if he attempts to make his own selection he will assuredly fail. On the other hand, should he decide to place his order in the hands of an experienced man, he will soon find himself in the same position. Cows may be acquired by such assistance, although at greater cost, but, being ignorant of their management, he but defers the evil day, and when too late he will find out for himself that

before embarking in his undertaking he should have been patient and waited for experience.

The points to which we propose to refer are intended to assist those who have acquired sufficient experience to warrant their undertaking to form a small dairy upon their holding. It will have been already determined whether the milk should be sold or butter or cheese manufactured. We will suppose, however, that it is intended to sell the milk, and we therefore base our first calculation upon the average wholesale price of the year. To large numbers of men the question whether a cow produces $3\frac{1}{2}$ or 4 per cent. of fat is a matter of indifference, nor do they make a point of ascertaining with accuracy facts with regard to the quantity of milk produced by the cows they propose to purchase. In taking a farm a proposed tenant usually decides for himself how much the land is worth per acre; he knows that if he can grow 30 cwt. of hay in an average season, or 5 qrs. of wheat, he can afford to pay a few shillings per acre more than if the land were capable of only producing 20 cwt. or 4 qrs., and, in consequence, he prefers to rent the richer land.

Let us take another case for analogy. The experienced farmer who has been accustomed to employ artificial manures is aware from what he has already accomplished that the sum he expends in the purchase of 3 cwt. of superphosphate and 1 cwt. of nitrate of soda may be returned in the crop with 50 per cent. interest, and in consequence he invests his money in the purchase of these fertilisers. It is precisely the same with the cow. Where the trouble is taken to ascertain how much milk a cow yields and how much fat that milk contains a buyer is justified in paying a higher price. Nor is it possible to determine the approximate yields of two cows of similar type standing side by side, for one may produce 700 gallons of rich milk and the other 500 gallons of poor milk. Although it is impossible to ignore the fact that some men are better judges of a cow than others, yet there is no royal road to the selection of milking stock, still less of cows which give rich milk. In support of this statement it may be remarked that for many years the writer has examined the cows which are placed in competition for three sets of prizes at the London Dairy Show. They are first judged, and the prizes awarded, upon the basis of

their appearance; they next compete in the milking trials, and finally in the butter test. and the fact remains that year by year the best judges to be found fail to select the best. They take great pains, but they subsequently find that there is no rule to the effect that the best looking cow produces the largest yield of milk. In some instances champion milkers have received no prizes on inspection; on the other hand, the prize cows on inspection frequently fail to obtain any notice in the Milking Trials or the Butter Tests.

Reference to this question has been made with the object of inducing small holders to take the greatest pains in the selection of their stock, and not to be afraid to pay a pound or two more than market price for cows which, as they have ascertained, yield large quantities of rich milk. Let us make a simple comparison between an average cow and a first-class milker. The average yield of the cows of this country is believed to be 460 gallons; but in order that we may not be charged with making too low an estimate, we will assume that the average is 500 gallons, and that a good milker yields 750 gallons, although it is possible to buy cows which produce from 800 to 1000 gallons, and still more. At an

average price of 8d. per gallon the returns from a 500 gallon cow would reach £16 3s. 4d., a small herd of five cows thus returning £83 6s. 8d. Taking the average cost of feeding a cow of full size to be £13 a year, this leaves a gross profit of £3 13s. 4d. per cow, or £18 6s. 8d. for a herd of five. Obviously, therefore, cows which yield an average quantity of milk fail to pay, for while a small holder could obtain a livelihood from keeping five good cows, he would be unable to pay his rent from the produce of five bad ones.

We do not propose in a work of this kind to discuss the details of the cost of feeding, but while we have fixed that cost at the lowest estimate, we may remark that considerable skill is required in the purchase and preparation of food to feed a large cow for less than 1s. 1½d. per day during the period in which the cows are kept in the stall, and which commences with October and ends with the first or second week in May. The difference in the value of the milk produced by a good cow may be seen by a similar estimate based upon a yield of 750 gallons. At the price already named this quantity would return some £25 per year, or £12 after

the deduction of the cost of feeding, leaving the sum of £60 to represent the gross profit upon a herd of five. The cost of feeding two cows of equal size is practically the same, but every gallon of milk produced by the one in excess of that produced by the other is net profit, and for this reason it is obvious that a buyer can afford to pay a considerably larger sum for stock upon which he can rely. There are many small holders who are able to keep ten good cows upon a comparatively small area, producing, as they do, large quantities of forage, root, and corn crops for their summer and winter use.

An experienced man can manage ten cows, and, with the help of a strong youth, produce the crops essential for their maintenance; but we do not suggest that he would be able to deliver the milk by retail: that would be impossible. The milk of ten cows sold at 8d. per gallon would return, less the cost of feeding, £120 or thereabouts, for we do not propose to fix the actual cost of feeding in an arbitrary way. Milk retailed at 4d. per quart would be followed by a return of almost double the figures named, but assistance would be essential. A milk 'round' means the purchase and maintenance of a pony and

cart and occasional bad debts. In some cases milk is retailed at 3d. per quart in summer and 4d. in winter, but it should not be sold below these figures. At all times the small holder should make a point of recording the yield of his cows. If he takes a deep interest in the welfare and improvement of his herd he will find that the time occupied in this process adds very little to his work, but if daily weighing and recording is objectionable, the work should be performed at least twice weekly, while, by the aid of a Gerber Tester, the quantity of fat can be frequently and accurately ascertained.

It is important to notice that, as one of the chief features of the Small Holding is the production of food for the house, a cow should invariably be kept where it is requisite to provide for a family. How great is the assistance which a cow can render may be shown by the following case. Some years ago a friend of our own living in one of the London suburbs was anxious to provide milk, cream, and butter for his family by maintaining a cow upon his own premises, to which no grass land was attached. As he would be compelled to purchase the whole of the food, he was doubtful whether he could

make it pay. By our advice he purchased a cross-bred cow of medium size which was producing a large quantity of milk—between 5 gallons and 6 gallons per day—with the result that he was not only able to provide all the milk required in his household, but all the butter, and to sell sufficient milk to his neighbours to pay for the cost of the food.

A cow producing milk containing four per cent. of fat would also produce 4 lb. 3 oz. of butter from 100 lb. or 10 gallons of milk. Thus a cow yielding 5 gallons of milk per day, which was less than the average yield during the first portion of the period of lactation of the cow referred to, would supply 4 quarts per day for the household and 4 quarts for setting for cream, leaving 12 quarts for sale. This milk at 4d. per quart would return 28s. per week, or much more than sufficient to pay for the cost of the food where all is purchased. The milk set for cream would, on this basis, produce, in round numbers, 3 lb. of butter, so that, as actually happened in this instance, the house was supplied for a large portion of the year with milk and butter free, together with a quantity of skimmed milk which was left after the cream

had been removed, and which is a valuable food, especially when employed in the manufacture of bread or of the various dainties of the dinner table. It may be further pointed out that by the addition of 1 oz. of finely chopped suet to a quart of separated milk, its feeding value is brought back to that of new milk. Thus by the selection and careful management of a cow, it is not only possible to supply milk and butter—and cheese, if cheese is required—for family use during ten months of the year, but to sell sufficient milk during a great portion of that period to cover the cost of feeding, and to leave a substantial profit behind.

The retail sale of milk affords a medium through which the small holder can sell other products of his farm, such as cream, eggs, butter, fruit, vegetables, poultry, and pig-meat, and for this reason the cow-keeper who sells his produce in the neighbourhood of his farm will be well advised not only to keep pigs and poultry, but to convert a portion of his holding into a market garden or a garden in which he can grow produce upon the best market-garden system. Here we may urge the importance of following the same course in the production of pigs,

poultry, and garden produce as we have suggested should be adopted in the production of milk.

Butter.

We turn now to the production of butter on the Small Holding. Where the milk produced is sufficient to induce the small holder to sell the whole at market price if he can do so advantageously, it is evident that butter-making is out of the question; but where a portion is sold by retail or the whole retained upon the farm, butter may frequently be produced with profit to the maker. Where milk is retailed, customers are sometimes induced to order butter, believing it to be superior to the imported article which they obtain at the grocer's shop. This being the case, the maker should employ every means in his power to produce a sample which will give satisfaction and consequently increase his sales. Butter-making as an industry is of no value to a man who does not make the best and realise the highest price obtainable. It is only when the milk is rich, and the cows are fed upon suitable rations, inasmuch as there are many foods which are adapted to the production of milk intended for sale which impart a disagreeable flavour or

character to butter, that a fine article can be produced and butter-making made to pay.

Let us suppose that owing to difficulties of position or distance from a market, a small cowkeeper is compelled to skim his milk and convert the cream into butter. His first object will be to secure not only deep-milking cows, but cows which produce rich milk. This point is more essential than in those cases where milk is sold. Although milk intended for retailing need not of necessity contain more than 3·0 per cent. of fat, and although it is quite true that milk which is richer gives greater satisfaction to retail customers, it is of greater importance to the butter-maker that the milk he produces should contain not less than 4 per cent. of fat. As we hold the opinion that butter-making is not worthy of attention unless milk of this quality is obtained, we base the following argument on this percentage :—

An average cow yielding 500 gallons of milk producing 1 lb. of butter per three gallons will return, for butter sold at 14d. per lb., a gross sum of £9 14s. 3d. If the separated milk is estimated to be worth 1½d. per gallon

—which is the approximate value for stock feeding, whether calves or pigs—we get a total gross return of £12 10s. 6d. per cow. If, however, we estimate the value of the butter produced by a cow yielding 700 gallons of milk and producing 1 lb. of butter per 25 lb. or $2\frac{1}{2}$ gallons, we get a gross return by the same method of calculation of £20 7s. 11d. per cow, or £101 19s. 7d. for five cows, while for ten cows the return would represent £203 19s. 2d. We have seen that the cost of feeding a cow cannot be placed at less than £13 a year, so that an average cow employed to produce butter will lose money for her owner, while the profits realised from a small herd of five cows yielding 700 gallons of milk of much higher quality would fail to pay sufficiently well to enable him to make butter his chief article of produce.

Prima facie, a cow returning £20 7s. 11d. should be regarded as a useful animal, and one which could be depended upon to assist the small holder to pay his rent; but the fact remains that it is more profitable to sell milk at the average wholesale price of 8d. per gallon than to make butter at 14d. per lb. The question arises: What is

the best way out of the difficulty, or how can the returns be increased? The answer is obvious : first, by increasing the yield of butter either by obtaining an increase in the yield of milk, or by improving the fat percentage, or, next, by improving the quality of the butter and obtaining a higher price. All these propositions are possible, and where the small holder has no other source of income from his cows than that obtained by making butter, he must of necessity turn his attention in these directions. How far he is able to go may be realised by a knowledge of one fact —that it is possible to obtain an average yield of 450 lb. of butter per cow in a herd of much larger size. In order that this suggestion may not be regarded as an exaggeration, we may point to the fact that the herd of cows owned by Dr Herbert Watney has frequently averaged 450 lb. of butter per cow, and if we are not mistaken—for we speak from memory, deriving our information from Dr Watney's lips and from inspections of his herd and balance-sheet—the price realised was 1s. 6d. per lb.

In reference to cases of this kind it is frequently remarked by those who are urged to do likewise, that men of means are able

to do much better work than farmers who are compelled to look at every pound they spend. There is probably something in the argument, but not much that is worth defending. A man who depends entirely for his livelihood upon the produce of his stock, and who makes a point of selecting them himself, should, and does, stand in a better position than Lord Rothschild, who has also done pioneer work in the same direction, inasmuch as this gentleman, like Dr Watney, is practically compelled to leave the selection of his cows in the hands of an employee, whose power of securing exceptional stock, apart from the fact that he is better able to pay the price, is no greater than that of the small holder, who is equally able to go from market to market or farm to farm in search of the cattle he needs.

Food.

Reference may now be made to the importance of knowledge of the system of cultivation of those crops which are grown upon the farm to feed the cows. We have suggested that the minimum cost of feeding a full-sized dairy cow is £13 a year; but the reader will not assume that the whole of this sum is spent in purchased foods. A

large proportion of the ration provided for the cows should be grown upon the farm. Small holders will of necessity purchase cake, meal, bran, grains, and other concentrated forms of nourishment, which will serve the double purpose of increasing the value of the rations and the quality of the manure. The bulky foods, however, such as hay straw, roots, cabbage, and forage crops of various kinds should form a large proportion of the produce of the soil. Cow-keeping is therefore a means of enabling the small holder to realise profit in two directions—first, that derived from the sale of milk, butter, or cheese; and, next, that gained by the cultivation of the crops to which we have referred. Had we based our estimate of the profit earned by each cow on the sum remaining after deducting from her gross returns the cost of purchased food alone, we should have been able to show a much larger net result.

Assuming, for example, that a cow consumes 8 lb. of cake and meal daily during the two hundred odd days of winter feeding, and 2 lb. per day for the remainder of the year, and taking the average cost of these foods at ¾d. per lb.—which is

approximately near the mark—the total sum would amount to £6, leaving a balance of £7 to cover the cost of that portion of the ration produced upon the farm. On this basis the maintenance of five dairy cows would be followed by a much larger net profit, but as it is manifestly impossible to determine what foods would be grown, and in what quantities per acre, for each man is a law unto himself in relation to the system of cropping and the liberality with which he uses manure, the only safe plan is to estimate the cost of the food consumed, basing our figures upon normal prices. It will thus be seen that the cost of feeding the cows is, soil and weather apart, entirely in the hands of the farmer. If he is satisfied with an average crop of hay, roots, or forage, his cows will cost him more than they should do; if, on the other hand, his hay crop yields from 35 to 40 cwt. per acre, his roots 40 tons or more, and if he is able to obtain 40 to 50 cwt. of oat straw for forage and litter, and other crops in proportion, his cows will be fed to the greatest advantage, and in consequence they will return an increased profit.

The general tendency of occupiers of

Small Holdings is to attempt to feed their stock with as little recourse as possible to purchased foods, and their land solely upon farm-yard manure. These attempts to economise are the road to failure, for it is impossible to sell milk continuously without impoverishing the land. The value of the fertilising matter in the milk of an average cow is approximately £1 per annum, and although this sum is comparatively small the loss of fertility soon begins to tell. There is, however, a very natural tendency to increase this loss, and we cannot doubt from past experience that the real loss sustained is equal to £2 per cow. We may give one among other reasons why this increase is so large.

The most important item in the manure bill is nitrogen. By the careless manipulation of manure, such as the heating of the dung heap, large quantities are lost in the form of ammonia. Manure is wasted upon the average farm in many ways; a ton of solid dung produced in the cattle-house being practically reduced to 15, and sometimes 12, cwt. before it is ploughed under the soil. Again, weight for weight, the value of the urine or liquid excrement produced by cows is greater than

that of the solid dung, and unless great care is taken to prevent its decomposition the nitrogen which it contains, and which is considerable, is lost, and it is practically true that upon nine farms out of ten, whatever their size, three-fourths of this liquid never reaches the land. The small holders of this country will do well to follow the example of the small farmers of Belgium, Holland, and other Continental countries where the greatest pains are taken to prevent the loss of the smallest portion of the excrement of the live-stock of the farm.

One of the most important aids to milk production is phosphatic manure. There is no form of fertiliser which is so suitable to the production of grass, inasmuch as it influences both the weight and the quality. Systematic manuring with superphosphate, basic superphosphate, bone manures, or basic slag, is followed by an increase in the clovers and a corresponding diminution in the weeds. The grasses, like cereals, respond to manures containing nitrogen, and as the clover herbage is rich in this element, the more abundant it is the richer the manure produced by the stock feeding upon it, and the more abundant the grass. Thus the employment of phosphates

upon grass-land is followed by an increase in the yield of milk. This fact has been amply demonstrated on the farm attached to the Midland Agricultural College near Derby. Two plots of land, each four acres in extent, were dressed with 10 cwt. of ground lime per acre. One of these plots, however, received in addition to the lime 4 cwt. of superphosphate and 1½ cwt. of sulphate of potash per acre. Cows were fed upon both plots during three seasons, with the result that while the yield of milk upon the unmanured land was 5586 lb., it reached 8921 lb. on the land receiving the phosphates and potash. In the first year the increase in the milk reached 84 gallons, in the second 86 gallons, and in the third year 81 gallons. At a value of 6d. per gallon the total profit returned per acre after the deduction of the cost of the manure was £4 16s. 6d. It was not only found that the manured land produced more milk, but that it kept more stock. The small holder may therefore take it for granted that by the judicious employment of phosphatic manure he will be able to keep more stock upon his land, and, in consequence, produce more milk

What is thus accomplished with cows may be also accomplished with cattle and sheep. Experiments have been conducted by the Bath and West of England Society, by the Highland Society of Scotland, by the experts of the Northumberland County Council, the Edinburgh College of Agriculture, and by the Agricultural Department of Cambridge University, in the feeding of sheep, or sheep and cattle mixed, upon grass-land, both unmanured and manured with various combinations, and in every instance it was found that the weight of the animals was considerably increased by the employment of phosphatic manures, whether combined with potash or not. When, however, cattle and sheep were mixed upon the same land the increase in the live weight grown was greater than with sheep alone.

There are no means of testing the value of herbage other than that of grazing by stock. To weigh the crop is to mislead the grower. The weight of a hay crop, for example, is no guide to the feeding value of the grass, which is more digestible and nutritious when young. Thus, where stock are grazing upon a pasture field they are continually consuming young herbage, whereas if left to mature for

conversion into hay its character is entirely changed. Again, the employment of manure effects a great change in the variety of the plants of which the herbage is composed; the clovers increase, the weeds diminish in number, while, owing to the richness of the clovers in nitrogen—to which the grasses respond—the grass herbage is increased in future years. Thus the herbage is improved by the increase in the clovers directly, and indirectly by the increase in the grasses. Chemical analysis is equally as fallacious as weight, as so much depends upon the palatability and digestibility of the grass. It may also be pointed out that land which is manured with phosphates is ready for grazing earlier in the season, and can be grazed longer. That mixed stock such as cattle and sheep improve a pasture field better than sheep alone is evident from the fact that while sheep bite closely, like horses, they leave a large proportion of the rougher herbage, and partially owing to the feeding value of this herbage, which cattle consume, greater weights are attained. To this evidence much might be added, but it is sufficient to add on the basis of what has been said that by the liberal but judicious employment of phosphatic

manures the small holder can depend upon increasing his returns.

Cheese.

We come next to the manufacture of cheese, to which it is essential to refer, although there are comparatively few men occupying small areas of land who turn their attention to this branch of dairy work. We have already referred to the fact that in some Continental countries small holders deliver their milk to co-operative cheese factories, receiving in return its money value as determined by the price obtained for the completed product. We may add to this fact, however, that it is the practice of small milk producers in some parts of France, Germany, and Italy to employ their milk, however small the quantity, in the production of certain varieties of cheese of small size. We have had the advantage of visiting farm after farm in one county in Normandy in order to see the process of manufacture of a variety of cheese known as Neufchatel, which, resembling the well-known Bondon in shape, is about $2\frac{1}{2}$ in. in height by $1\frac{1}{2}$ in. in diameter, and like a diminutive Stilton or Cheddar Loaf. One gallon of milk produces about four cheeses of this type, so that the smallest cowkeeper is able to manufacture

for himself, although, as a matter of fact, the makers are usually the farmers' wives. These cheeses are of a refined character, being kept some weeks to ripen and to acquire the blue mould which permeates the cheese, as in the case of Stilton. Although large numbers send their produce to Paris or some other important market, the small makers retail them in the adjoining market town, and are enabled to realise from 10d. to 1s. per gallon for their milk. Cheese of other types, such as the Limburg and Munster of Germany, and the Livarot, Gournay, and Mignot of France, are similarly made and marketed. In our own country, remembering the fact that the production of soft cheese is comparatively small and confined to the summer season of the year, the small holder has only two sources open to him: he may consistently produce a small Cheddar Loaf or Baby Stilton weighing about 8 lb., assuming that he is able to produce 8 to 10 gallons of milk per day, or he may follow the practice to which we have referred, selling his milk either wholesale or retail and producing, as he obtains orders from his customers, such soft or cream cheeses of some special variety as may be required.

Soft cheese-making is now taught at all our Dairy Institutes, and it is within the power of the simplest individual to learn the process in the course of three to six weeks. Soft or curd cheese, especially when ripened, pays better than the sale of milk or the manufacture of butter or pressed cheese, and it is worth the while of the small holder to take this fact into consideration. If it were possible for him to follow the system adopted by the French, he would be able to utilise the whole of the milk he produced in this direction, and to realise an average sum of 10d. to 1s. per gallon for his milk in the summer season, when the wholesale price seldom exceeds 7d. net. Unfortunately however, there is no market which resembles that of Paris and the great provincial towns of France. The English small farmer must therefore depend upon his retail customers if he determines upon the production of soft cheese.

Some years ago the author gave demonstrations in soft cheese-making at the annual exhibitions of the Bath and West of England Society. Recognising the importance of the soft cheese industry, the Society has since conducted some experiments with the object

of ascertaining as far as possible the value of milk of different quality for making soft cheese in three varieties: Coulommiers, Pont l'Eveque, and Camembert. The result was in one case unusually satisfactory, for the Coulommiers cheeses, which averaged 12¾ oz. each, were valued at 9d. when made from Jersey milk, and 8d. each when made from Shorthorn milk, when they averaged 13⅓ ozs. each, and at 5d. each when made from Kerry milk, weighing in this case 11⅔ ozs. each. Each cheese being made from two quarts of milk returned the equivalent of 18d. per gallon for the Jersey milk, 10d. for the Shorthorn milk, and 5d. for the Kerry milk. The Coulommiers cheeses were finally weighed, judged, and valued at the end of ten days. The Pont l'Eveque cheeses, which are of a firmer character, consequently weighing less than the comparatively new Coulommiers, were weighed and judged at the end of three weeks. Those made from the Jersey milk weighed 14¼ ozs., and were valued at 10d.; those made from the Shorthorn milk weighed 12¾ ozs., their value being placed at 9d.; while those made from the Kerry milk weighed 12 ozs. each, and were valued at 8d. Each cheese, however, required 7½ lb. or 3

quarts of milk for production, so that the value of the milk was considerably reduced. The Camembert cheeses, which were judged at the end of four weeks, were ripened, and consequently weighed considerably less than the Coulommiers. Fifteen pounds, or six quarts of Jersey milk, produced two cheeses each weighing 12 ozs. and valued at 11d.; the same quantity of Shorthorn milk produced two cheeses weighing 11½ ozs. and valued at 10d. each; while six quarts of Kerry milk produced cheeses weighing 10½ ozs. each and valued at 9d. It should be remarked, however, that the values of the cheeses of each variety are higher than the prices charged by retail traders, and although the results were most encouraging, we do not think that a producer could obtain more than 8d. for a Camembert or Pont l'Eveque, or 9d. for a Coulommiers. It will be noticed that, the cheeses being made from the same quantities of the same milks, the greater weight of one variety as compared with another is due to the larger quantity of water it contains.

We have suggested that the alternative is the manufacture of small Cheddar or Stilton. Whether or not a small farmer keeping from

two to six cows will be wise in taking up cheese manufacture depends entirely upon the conditions which govern his particular case. If his wife or daughter is able to undertake the work, one of the chief difficulties is removed, but even in this case everything depends upon the ability of the maker. To make cheese of second quality would be useless; it should be first or nothing. Cheddar cheese of an inferior type comes into competition with the imported cheese of Canada and Australia, and therefore fails to realise more than the imported price. First-class Cheddar, however, can be sold at 10d. per lb. by the whole cheese, and Stilton at a still higher price, an average of 1s. being easily obtainable during the winter months. If, therefore, a small holder can depend upon making a first-class cheese of either variety he will be wise to keep his milk at home in those cases in which he is unable to sell it advantageously in its raw condition.

The chief points at which to aim in cheese manufacture are quality and quantity. Assuming that the maker is sufficiently well skilled to carry out the work successfully, both points depend upon the quality of the milk. The richer the milk in fat, therefore,

the greater the weight of cheese made and the better the quality, for where two cheeses are made side by side, the one containing an average per cent. of fat, say $3\frac{1}{2}$, and the other as high a percentage as $4\frac{1}{2}$, the latter will be the richer and the finer, as well as the much heavier cheese. The weight of the cheese produced from one gallon of milk, which nominally weighs 10 lb., averages 1 lb. as between April and October, but rich milk such as that to which we have referred, will produce from 18 to 19 ozs., so that the increased profit realised by the employment of milk rich in fat is sufficiently marked to warrant a farmer making every effort to produce it.

CHAPTER X

SPECIALISED AND MIXED FARMING

Among the ranks of farmers there are many who specialise, and who in consequence make larger returns. Thus, the profits which are derived from the breeding of pedigree stock are much larger than those which are obtained by breeding and feeding for meat. The production of stock, however, for breeding purposes demands both experience and skill at the hands of the farmer, but these qualifications must be supplemented by sufficient capital to enable him to buy specimens for crossing from time to time, and to cultivate a sufficiently large area of land. A glance at the catalogues of our horse and cattle shows will be sufficient to enable any one to realise the fact that there is no variety of the live-stock of the farm in which tenant farmers do not specialise, and in which they have not failed to achieve success which is sometimes of a remarkable character. The Shire, the

Clydesdale, and the Suffolk horse are bred by large numbers of men who occupy land of a suitable character, and who are enabled to make annual sales at high prices. In some parts of the country, notably in Yorkshire, the Cleveland Bay, the Coach Horse, and the Hackney are bred by horse-loving farmers with almost equal success, and there is probaby no county in England in which there are not a fair proportion of men who, if not actual specialists, employ the services of thoroughbred stallions with the object of producing foals of an improved type. Some farmers, too, who make a practice of riding to hounds, have proved themselves skilful breeders of hunters, which they are enabled to sell with advantage owing not only to their knowledge of the requirements of hunting men, but to the fact that they are excellent horsemen, and are in consequence enabled to prepare the colts which they breed for sale to liberal buyers. Specialisation in horse-breeding, however, is out of the question in the case of the small holder. Yet there are small occupiers of land who are compelled to keep a horse either for purposes of haulage—which they sometimes undertake for other people—or for the cultivation of their land,

for many a man is compelled to plough, harrow, and roll with a single animal. In such cases a useful cart mare may become the medium of earning two profits: first, by work upon the land, or by haulage; and next, by breeding a colt. It is in view of this possibility that the small holder is strongly recommended, where he requires a horse, to keep, if he is able to pay the price, a large, strong mare, with good legs and feet, and to put her as occasion requires to a stallion of a suitable breed—if she is a cart mare, to a Shire, Clydesdale, or Suffolk; or if she is of a lighter-build capable of producing a carriage horse or a hunter, either to a Cleveland Bay, a Coach Horse, or a Thoroughbred, the stallion in any case being of pedigree blood.

A still larger number of farmers specialise with cattle, of which there are so many varieties in this country. The Shorthorn is, perhaps, bred more extensively than cattle of any other type. The object, however, in most cases is the production of bulls for sale for reproductive purposes. The owner of a recognised strain of pedigree Shorthorns is invariably able to obtain substantial prices for healthy, symmetrical, and generally good

stock, either from farmers who select the Shorthorn for the improvement of their herds, or for export. The Shorthorn is not peculiar to any locality, but is bred to great excellence in all parts of England and Scotland. In the East of England the Red Polled cattle are largely bred by farmers, many of whom maintain pure strains of blood. In Devon and Somerset three types of Devon Reds are bred with the same objects: the production of bulls for breeding purposes, or of milk. In Sussex and parts of Kent there are many farmers who specialise with the Red Sussex breed. In Hereford and adjoining counties the Hereford breed is predominant, and largely bred for beef and stock purposes; and the remark equally applies to the Black cattle of Wales; the black polled Aberdeens and Galloways, the Ayrshires as milking stock, and the West Highlanders, all of which are bred in Scotland. There are only two varieties, however, which are peculiar to Ireland: the Kerry and the Dexter, both of which are bred by numerous small farmers for milk production.

Reference has been made to this subject in order to show the reader that there are

great possibilities in connection with every British breed, and that the small holder who is unable, owing to his limited capital and the smallness of his farm, to specialise to any extent with the larger breeds of stock, may at least make a point of keeping the best where he keeps cattle at all, and, in consequence, place himself in a position to realise much higher prices than he could possibly obtain with stock of an inferior character. Although sheep are not very frequently found upon Small Holdings, those who breed them will be well advised to specialise as far as their means will permit. The fact that good sheep cost no more to feed than sheep of an inferior type, while they realise much higher prices, should be emphasised. It is not essential in keeping a small flock of ewes that each animal should be of pedigree blood, but it is important that they should be as perfect as possible in form, size, and wool, and that they should invariably be mated with a pedigree ram. It is not suggested that the small holder should breed pedigree stock for sale in imitation of the ram-breeding flockmaster, but that, by the production of first-class lambs, he should be able to realise higher prices than the average breeder owing to

the fact that his sheep are of superior quality.

We have met from time to time small occupiers of land who have specialised with pigs; and here there is every opportunity for the small holder to succeed in the production of stock of the highest class, the one condition being the possession of the requisite knowledge to buy and to breed. A man accustomed to the management of pigs, and master of his work, may safely pay a long price for a breeding sow of the Large White or the Large Black variety. Accustomed to rear a litter of pigs for the butcher or the bacon curer successfully, he will devote still more attention—if that is possible—to the requirements of the sow which has cost him a larger sum of money, with the result that he will rear to maturity if necessary a number of excellent youngsters, the best of which he will be able to sell with comparative ease for stock purposes. It is perfectly true that such a man will be unable to compete with large and popular breeders whose reputations have been acquired by years of successful exhibiting, but there are always buyers of exceptionally good pigs in every district in which they are all too few, and we have therefore no

hesitation in expressing our belief that they will sell easily and leave a substantial profit.

The breeder of pigs must remember that while the name of a breed is important, it is the type which the buyer requires, and that no pedigree, however lengthy, will sell an inferior pig. The Tamworth and the Berkshire are also worth consideration, for it is usually advisable to breed pigs in accordance with the demands of those residing in the district. In some parts of England neither farmers nor butchers will buy pigs of the White breeds, while in others the Black breeds are practically ostracised. Although the Berkshire breed is not a large variety, it is important that size should be maintained, as there is a growing objection to small pigs. This, too, is an important point in breeding the Tamworth, a red pig of great value for bacon, which is worthy of attention in those parts of the country where the Tamworths are kept more generally than other varieties. However good a stock sow may be, a breeder of good pigs should not lose sight of the ordinary market, to which he should make a point of consigning the inferior pigs of his litters when they have reached the requisite

weights. There is nothing more essential in breeding and feeding live-stock for sale for breeding purposes than the practice of selling only the best. The majority of buyers of stock pigs are persons who are not good judges, and who rely upon the breeder to make them a good selection, and if they are well treated they usually buy again. Thus a business is built up on a foundation of straightforward dealing which never fails.

Although specialist breeders of poultry do not belong to the ranks of the Small Holding class, it is probable that they are equally numerous, and that a very large proportion realise excellent profits from the production of pure-bred birds. The cost of exhibiting poultry is practically limited to the payment of an entrance fee and the railway carriage to and from the exhibition. For this reason there are large numbers of persons who make a practice of exhibiting the best of their birds, which so frequently form a lucrative hobby among those who are better off than the small holder. Poultry-keeping is usually associated with farming in a small way, although the majority of poultry-keepers prefer egg production to the production of

chickens. Breeding poultry for the table occupies a great deal more time than the management of a flock of laying hens. The specialist poultry-keeper, however, is compelled by the nature of his work to breed chickens more extensively, and to rear them as well as he can. In these days in which poultry are kept so extensively, a flock of barndoor or mongrel hens is out of place; such birds produce comparatively few eggs, they are worthless for table purposes, and they fail to pay. On the other hand, a flock of well-bred hens of either of the utilitarian varieties can be depended upon to lay and produce excellent table chickens. The demand for live poultry is always extensive; buyers are not confined to the rural districts—indeed, they are more numerous in country towns and the suburbs of large cities—and as the great majority of private poultry-keepers take some pride in their birds they prefer hens of a pure variety, for which they are willing to pay larger sums than are realised by the sale of table chickens.

The average poultry-keeper can scarcely hope to obtain more than 6s. a couple for the chickens he breeds, but by breeding good hens as a specialist does he can sometimes

obtain 10s. apiece, and if he takes the trouble to advertise he will find the demand exceed his expectations. Higher prices, however, are seldom paid for birds which have not some exceptional merit, and these are usually confined to the yards of exhibitors.

Success in breeding poultry on the lines we have suggested involves something more than the possession of a flock of hens. However skilful the management, the owner must take a pride in his flock and give them the advantage of good housing, with large runs enclosed by well-constructed fences, all being displayed to the best advantage. Buyers are influenced by appearances, and the birds are kept cleaner and in better condition on a run well covered with grass, the house being smart, clean, and well lime-washed within, than where they are at liberty, and where in consequence they congregate in the vicinity of a shed in which they roost, and near which they are fed, with the result that the soil is tainted and covered with pools of water in wet weather, the plumage of the birds is soiled, and their general appearance extremely unsatisfactory. Buyers can always be invited to see

a flock of birds which are for sale with the assurance that they will be gratified if, in addition to their smart appearance, the run is planted with a few fruit-trees, the roosting-house painted or tarred, and the fences covered with climbing roses like the crimson rambler, or backed by evergreens, which add an additional attraction to the whole.

Practically speaking, a specialist in poultry-keeping should be a 'fancier' in the strict sense of the term; in other words, he should be a thorough judge of the variety he breeds, and, consequently, a master of this branch of his business. The value of hens in these days of keen competition can only be appreciated by those who are excellent judges, but while it frequently happens that the unskilled amateur overestimates the value of his stock, he seldom possesses specimens which are of greater value than he has placed upon them. Imperfect knowledge of a subject like stock-breeding is usually accompanied by mediocrity in the stock, but the acquisition of knowledge which is the result of experience is followed by the acquisition of superior birds, either by breeding or purchase.

Many large farmers and small holders alike specialise in the production of such crops as potatoes, celery, asparagus, cauliflower, rhubarb, and other plants, for which there is a great demand. There are large numbers of growers who make no special effort to produce either unusual quantities or exceptional quality; this is reserved for the specialist. Thus, the potato grower makes a special point of obtaining seed from Scotland or some other distant part of the country; indeed, he secures the best seed he can find without regard to expense; his crop is an annual experiment which guides him in his future work; he spares no effort to produce the requisite tilth in his soil, and to supply it with abundance of food. He recognises that if he would obtain a lucrative crop his treatment of the soil must be generous, and that good judgment and liberal expenditure will be followed by a commensurate return.

Specialising with Market Garden Crops.

The Education Committee of the County of Wiltshire have shown that potatoes can be grown upon suitable soil with much better results than are believed to be possible. Thus, while the average British yield is only 6 tons

per acre, the Committee grew 13 tons at Warminster by close planting, and 17 tons 4 cwt. at Honingham, this being extended to 18 tons 18 cwt. by wide planting—*i.e.* 18 in. to 20 in. from row to row, and 15 in. to 18 in. from plant to plant. In a second test with home grown seed versus imported seed, the former yielded 18 tons 13 cwt. and the latter 17 tons 3 cwt. These crops were grown under two systems of manuring, with 32 tons of dung to the acre, and a complete fertiliser consisting of 4 cwt. each of nitrate of soda, superphosphate, and kainit, this combination producing as good results as the heavy dressings of dung. On the other hand, when the quantity of dung employed was only half as large the results were but little inferior.

We have seen potatoes grown in Cornwall upon a light, friable, rich soil of an ideal character, which was manured with a mixture of dung, seaweed, and white sand at the rate of 160 small loads per Cornish acre, equal to $1\frac{1}{7}$ Imperial acres, each rod, which is slightly larger than the Imperial rod, thus receiving one load of manure. In addition each acre received $1\frac{1}{2}$ tons of nitrate of soda, or some fifteen times as much as is supplied by an ordinary potato grower. The land

upon which the crop was grown, although exceptional in every way, was rented at £9 per acre. In spite, however, of these heavy expenses, the crop, chiefly Myatt's Ashleaf, was dug and sent to market in May, realising a high price, and being followed by a crop of broccoli, which was planted immediately the potato crop was off without further ploughing. There is plenty of soil of an equally suitable character in various parts of England, but the Cornish grower has the advantage of climate, and in consequence he specialises and is not afraid to lay out his money, experience teaching him that it will be returned with ample interest.

The potato is especially adapted to the requirements of the Small Holding, inasmuch as it needs personal treatment, which is more easily given on a small than on a large area. The possibilities of potato culture were vividly shown by the members of the Hallam Field Garden Association, in Derbyshire, in 1911. Fifty-four members competed for prizes offered for the greatest weight of potatoes grown from a pound of seed and the heaviest crop grown upon a single root. In spite of the dry weather which prevailed during the summer months the results were remarkable. The winner of

the first prize in the former class divided his pound of seed into 110 sets, with the result that he produced 181 lb. of potatoes. The winner of the second prize, however, produced only 67 sets, his crop weighing 173 lb. These, like most of the competitors, employed both dung and artificial manures. It will be observed that the winner obtained slightly more than $1\frac{1}{2}$ lb. of potatoes per plant, but one competitor, who grew only 47 lb., produced $4\frac{1}{2}$ lb. per plant. Obviously, this individual, by growing an acre in a similar way, would be rewarded by a prodigious crop. The heaviest weight of potatoes grown upon a single root was $11\frac{1}{4}$ lb. These facts, the results of the labour of working men, are a further testimony to the importance of potatoes as a crop for a Small Holding. Although a heavy soil is not so well adapted to potato culture as a medium or sandy loam, it can be made to grow a heavy weight of potatoes by the exercise of skill in cultivation and by the judicious application of long dung, to which artificials may be added, but without long dung no such attempt should be made upon soils of a plastic and tenacious character.

In the growth of rhubarb with the Victoria or large variety Dr Bernard Dyer and his

coadjutor, Mr Shrivell, have grown upon the average of five years from 40 to 63 tons per acre, a quantity which is so large that it is difficult to conceive why this lucrative plant is not more generally grown upon the same system of cultivation. By the expenditure of £5 upon an annual dressing of 12½ tons of dung, the weight of rhubarb grown was 41½ tons per acre. When the dung was increased to double the quantity the yield was 57½ tons. When the smaller quantity of dung was supplemented by phosphates, potash salts, and 6 cwt. of nitrate of soda, costing £9 14s. per acre, the crop reached 63¾ tons, and, be it remembered, these are no isolated cases, but the actual average of five successive years. Although these crops were grown upon a Kentish soil which was orignally a poor clay loam, or brick earth resting upon heavy clay, we would however warn the reader not to presume too far, and to be wary of soils which are plastic almost to the surface, which are extremely difficult to drain and clean, which poach easily in wet weather, and which burn during heat. We have seen instances in which experienced men have attempted to grow rhubarb and crops of a similar nature upon soils of this class, but

which have entirely failed. Wherever it is possible to obtain a fine tilth, of 9 in. to 12 in. in depth, there, with town dung or long farmyard manure, good crops may be grown.

On the farm already referred to, cauliflower has averaged over 25 tons to the acre during eleven successive years, autumn cabbage has reached 27¾ tons, savoys 25¾ tons, brussels sprouts 291 sieves of 40 lb. each, summer lettuce 31 tons, winter lettuce 17½ tons, winter spinach 36½ tons, winter onions 15¼ tons, and asparagus 2014 bundles averaging 17·2 oz. per bundle, for nine successive years. Referring to the value of these crops, we may take lettuce as an example. A yield of 30 tons to the acre is equivalent to 67,200 lb., or, estimating each lettuce to weigh 1½ lb., 44,000 plants, which at ½d. each would be worth £91 sterling. At the time of writing we are paying 2d. per lettuce, and are glad to get them. Again, on the same farm, lucerne yielded in one year 23½ tons, averaging 15¾ tons during a period of twelve years. Scarlet-runners averaged during a period of eight years 13,700 lb. per acre picked green for the market, with over 8000 lb. of haulm. Gooseberries averaged 3750 lb. during eight years; Victoria plums

7580 lb.; strawberries as much as 5000 lb., although the weights varied remarkably in accordance with the variety of strawberry grown. We have had the advantage of inspecting many plots of land on Small Holdings upon which strawberries have been successfully grown, Worcestershire holders of five acres having in the season during which we visited the farms realised as much as £80 for one-and-a-quarter acres gathered without the expenditure of a shilling for hired labour, and sold wholesale in the Birmingham market. This Kentish farm, which has produced vegetables and fruits in great variety, the latter including apples, cobnuts, damsons, raspberries, and currants, is an existing testimony to what is possible in the production of crops upon poor heavy land occupied by men who are at once able to till it and provide it with the requisite manure.

CHAPTER XI

EQUIPMENT—ENTRY—PROSPECTS

THE cost of the equipment of a Small Holding depends not only upon the system which is adopted by the occupier, but his capacity to construct buildings for himself. The cow-house should be a substantial structure, and it will be essential to employ a skilled tradesman to build it. There are few among the tillers of land who are able to handle bricks and mortar, although there are many who are capable with carpenters' tools, and who are consequently well fitted to construct their own piggery, poultry-house, and tool-house or implement shed. The whole question of buildings, however, is one which must be decided by each man for himself. On a new holding the buildings should be erected by the owner either to let to a tenant or for his own use should he also be the occupier. In view of the fact, however, that the occupier of a Small Holding will find the whole of his

time employed attending to his stock and land, it will usually be found a much wiser plan to leave the whole of the work to a builder. Nurserymen who grow their produce under glass usually erect their own buildings, simply employing a tradesman to lay the foundations in brick, and to construct their furnaces, but they are able to buy the woodwork ready-made; they have simply to put it together after thoroughly painting, and to glaze it, the glass being purchased to size. It is true that there are many handy-men with tools, who are able to find the time to erect their less extensive buildings, employing lads to assist them in general work, but it is a great mistake to spend money and time in constructing buildings which soon prove useless owing to inferior workmanship.

It is important to protect the stock thoroughly, to provide a good water supply, and a roof for the manure heap to protect it from rain. On all holdings the equipment should include the tools and implements requisite for use in the garden, on the arable, and the grass land. These should include a chain-harrow, seed-harrows, drag-harrows, a suitable roller of medium weight that it may be employed

both upon grass and arable land, the type depending upon the texture of the soil; hay-making implements, including a scythe, a horse-rake, a hay-drag, a sheet for protecting the hay-stack against rain, and the usual smaller implements, including forks and rakes. The equipment of a Small Holding, however, whether it be chiefly arable or grass, depends entirely upon whether the occupier is a member of a Co-operative Society. In many instances there are already Co-operative Societies in existence where the small holders are able to provide implements and machinery for use among themselves, but where there is no such organisation it becomes imperative that each man should provide the major portion of his own implements and tools. If for no other reason than that a large proportion of this money might be saved, small holders should co-operate wherever a sufficient number are living in proximity to each other.

Where cows and pigs are kept, together with a dairy, the occupier will require a hand-separator for skimming the milk, a cream-pan, a churn, a butter-worker, a draining trough for the butter, and butter-making implements, together with milk pails

and measures, a railway churn if milk is sent away, a milk barrow with a delivery churn if it is retailed, and a pony and cart where such are required to deliver a large quantity of milk. Where the milk is sold wholesale a refrigerator or milk cooler will be required, a weighing machine to weigh the milk from each cow, chains to tether the cows to the stalls, a feeding skip, a machine for breaking cake, a root-pulper, a chaff-cutting machine, a wheel-barrow for the removal of the manure, a liquid manure tank for the conveyance of the liquid to the fields, pig troughs, bins for the protection of grain, cake and meal both for cows and pigs, a hay-knife for cutting the hay from the stack, and such hand-tools as are essential for the various purposes which are common on the farm and in the garden. In some instances where the small holder is skilled in the breeding and feeding of poultry he may find it to his advantage to buy an incubator, together with a brooder or rearer, that he may be better enabled to hatch and rear chickens in the winter season when sitting hens are difficult to buy.

Although we have made the above suggestions it is obvious that each man will prepare

his own programme of operations in accordance with his own experience and the capital at his command, and decide what his equipment should be. We would press home the point that the experienced man needs few suggestions with regard to the expenditure of his capital for the equipment of his farm. We would, however, point out that the cow affords the simplest means of obtaining ready money. Assuming that a small holder has got into his farm, on which he has plenty of grass, the purchase of a single cow will enable him to obtain an immediate return, both milk and butter being easily sold. A flock of laying hens, if young and healthy, will add to the immediate income from the cow by the production of eggs. It is for the reason given that cow-keeping is so common among small holders in all the countries of the world in which modern agriculture is prospering. As the milk from one cow is sold, a second can be added, while additions can be made from time to time as the demand is warranted, and as far as the land is sufficient to feed them.

Pig-keeping, however, affords a less rapid return. A man possessing little capital may be compelled to buy a gilt and to wait until

she has arrived at maturity before she is ready for breeding, and then he must wait still longer for the production of her litter, which will not be of the best. Where possible it is far wiser to purchase a mature sow about to farrow with her second or third litter, and then to feed the youngsters either for local sale or for the auction mart or the butcher, and thus to obtain a return. Where the small holder is compelled to depend upon his crops, whether of the garden or the farm, he has to wait a much longer period for his return, this depending upon the time at which he enters the holding. In any case his capital must be sufficient to enable him to live and pay his way until his crops are sold. This remark applies to the system of rotation cropping—corn, roots, clover, and grass; to market gardening whether upon the English or the French system, and to flower and fruit culture. All demand capital at the hands of the grower. French gardening, however, which requires a much larger expenditure of capital, produces a much quicker return. These facts are sufficient to show the importance of mixed farming as opposed to crop growing alone.

A small holder may take over land under

the most advantageous conditions at Lady Day, or, in some cases, grass-land at midsummer, but in the latter case the grass should neither have been grazed nor mown. Entry at Michaelmas means the loss of the best portion of the grass crop, for after the meadows are mown and the pastures grazed up to the end of September what remains for winter grazing in an average year is very small, for not only is the grass much less plentiful, but its feeding value is diminished. Entry on a farm at Michaelmas or Christmas practically means that where stock are kept food must be purchased, and in most cases this would involve considerable loss unless milk is produced for sale at retail prices. Where a small holder enters upon a farm at Lady Day, should there be arable land under cultivation, it will be necessary for an arrangement to be made with the outgoing tenant. If the outgoing and the incoming tenants can agree upon terms made either between themselves or with the aid of a valuer, it will be more advantageous for the incoming tenant to take over the growing crops and to pay for the various cultivations; but where a tenancy commences at Michaelmas the hay and corn crops will have been harvested, and should

there be potatoes, roots, or seeds on the ground, the whole or part of these may be taken by valuation, or left to the outgoing tenant to dispose of as he thinks best. It will, however, obviously be to the advantage of the incoming tenant to take over the roots and seeds, and to pay for such cultivations as may have been carried out. The incoming tenant should not regard these payments as a tax upon his purse, for they are usually to his advantage, and they place him in the same position as the outgoing tenant would have occupied. The better, therefore, the latter has farmed the land, the better for his successor.

Whether the farm is occupied at Lady Day, Midsummer, or Michaelmas, the garden, or the land which it is intended to convert into a garden, should be handled at once. If a portion of the grass-land is to be brought under garden culture, it should be well trenched at the earliest opportunity—preferably as soon as the grass crop has been removed. Bearing this fact in mind, it is important that the land should be of deep staple, in which case trenching will prove as useful as a good coat of manure. There is probably no process or act of cultivation which is followed by such

good results. The land will feel the effect of trenching for years, and the crops will respond accordingly, but it is equally true that where this form of cultivation is neglected there will be a corresponding loss, for no form of manuring will make up for the absence of trenching. Land which is prepared in this way is followed by the best results when it is subjected to frost, especially if the work is so suitably done that the frost can penetrate to the depth of the trench. In this case from 18 in. to 20 in. of soil will be thoroughly pulverised, and thus a tilth will be provided which will ensure the productive growth of a great variety of plants.

Land intended for market gardening, if not demanding the same capital which is essential to stock-keeping or French gardening, still demands liberal expenditure for tools, seeds, frames, the provision of a water supply—than which nothing is more essential —and plenty of dung. If a man is master of his work he will find that the addition of frames and bell-glasses will help him to increase the variety and value of his crops, inasmuch as he will be able to place them on the market at an earlier date, and in consequence reap the advantage of high prices.

The prospects of success upon a Small Holding depend chiefly upon the occupier; although suitable soil is essential, and although good seed, liberality in manuring, and climate all play a prominent part in the process of production, it is brains that tell in the end. Thus without knowledge and the power to apply it we cannot honestly say that a small holder has much prospect of success. There is no class of produce, animal or vegetable, for which there is not an excellent market; and while there are times when, owing to adverse conditions, such as bad weather, the results of labour are disappointing, yet, taking one year with another, the man who knows his business and who has consequently taken precautions to acquire land which is suitable to his purpose, should have no cause to complain.

APPENDIXES

SMALL HOLDINGS AND ALLOTMENT SOCIETIES

ENGLAND

BEDFORDSHIRE—

Biggleswade and District Small Holdings and Allotments Society, Ltd.
Stotford Co-operative Small Holdings, Ltd.
Wootton (Bedford) Small Holdings and Allotments Society, Ltd.
Potton and District Small Holders, Ltd.
Kempston Small Holders' Society, Ltd.
Arlesey Allotments and Small Holders' Co-operative Society, Ltd.

BERKSHIRE—

North Berkshire Small Holdings and Allotments Society, Ltd.
Uffington and District Small Holdings and Allotments Society, Ltd.
Abingdon Small Holdings Society, Ltd.
Reading Small Holdings and Allotments Association, Ltd.
Shrivenham and District Small Holdings Association, Ltd.
Stanford and Charney Small Holdings Society, Ltd.

BUCKINGHAMSHIRE—

Cuddington Small Holders, Ltd.
High Wycombe and District Small Holders and Allotment Holders, Ltd.

CAMBRIDGESHIRE—
Coates and District Small Holders' Society, Ltd.
Over Small Holdings Association, Ltd.
Sutton Small Holdings and Allotments Association, Ltd.
Cottenham Small Holders, Ltd.
Elm and District Small Holdings Association, Ltd.
Witcham Small Holders' Association, Ltd.

CHESHIRE—
Birkenhead Allotments Association, Ltd.
Higher Bebington Allotments Association, Ltd.

DEVONSHIRE—
St Budeaux Allotments Association, Ltd.

DORSET—
Sturminster Newton Small Holdings, Ltd.
Marnhull Small Holdings, Ltd.
Sherborne Small Holdings, Ltd.
Buckhorn Western Small Holdings, Ltd.
Stour Small Holdings, Ltd.
Borough of Poole Allotments Association, Ltd.
Newtown Allotments Association, Ltd.
Hamworthy Allotments Association, Ltd.
Poole Small Holdings Association, Ltd.
Oakdale Small Holdings Association, Ltd.
White House Hill Allotments Association, Ltd.
Okeford Small Holdings, Ltd.

DURHAM—
Cleadon and Whitburn Small Holders, Ltd.
Ryton and District Small Holdings and Allotments Co-operative Society, Ltd.

ESSEX—
Little Waltham Co-operative Allotments and Small Holdings, Ltd.
Woodford Allotments, Ltd.

HAMPSHIRE—
Winchester and District Allotments Holders' Society, Ltd.
Eastleigh and Bishopstoke Allotments Co-operative Association, Ltd.
Alton and District Co-operative Land Society, Ltd.
Passfield Co-operative Land Society, Ltd.
Soberton Small Holdings and Allotments Association, Ltd.

HEREFORDSHIRE—
Herefordshire Small Holdings and Allotments, Ltd.

HERTFORDSHIRE—
Bushey Co-operative Small Holdings and Allotments Association, Ltd.
Potton End Small Holdings Association, Ltd.
King's Langley and District Co-operative Small Holdings Society, Ltd.
Sleaps Hyde Small Holdings Society, Ltd.
Cheshunt Land Club Co-operative Society, Ltd.
Croxley Green Co-operative Small Holdings Society, Ltd.

HUNTINGDONSHIRE—
North Hunts and District Central Small Holdings Association, Ltd.
Somersham Small Holdings and Allotments Association, Ltd.
Farcet Small Holdings and Allotments Association, Ltd.

KENT—
Swanley Small Holders, Ltd.
West Malling and District Co-operative Landholding Association, Ltd.

KENT (*Continued*)—
Bromley Small Holders, Ltd.
Sutton Valence Small Holders, Ltd.
Sevenoaks Co-operative Small Holdings Society, Ltd.
Westerham Allotment and Small Holders, Ltd.
Welling and District Co-operative Small Holders, Ltd.
Edenbridge Land Club, Ltd.
Erith and District Allotment Holders Society, Ltd.
Halstead Small Holders' Society, Ltd.
Orpington and District Small Holdings and Allotments Co-operative Association, Ltd.

LANCASHIRE—
Clitheroe Small Holdings, Ltd.

LEICESTERSHIRE—
Aylestone Co-operative Allotments Society, Ltd.
Newfoundpool Co-operative Allotment Society, Ltd.
Leicestershire Co-operative Small Holdings Association, Ltd.
Lutterworth Co-operative Allotments Society, Ltd.
Oadby Co-operative Small Holdings Association, Ltd.

LINCOLNSHIRE—
South Lincolnshire Small Holdings Association, Ltd.
Timberland and District Agricultural Union, Ltd.

LONDON—
Brotherhood Trust Extension Society, Ltd.
Plumstead Common Allotments Society, Ltd.

MIDDLESEX—
'All for Each' Allotment and Small Holders, Ltd.
Ruislip-Northwood Co-operative Small Holdings and Allotments Society, Ltd.

MONMOUTHSHIRE—

Trelleck and District Land Association, Ltd.

NORFOLK—

Wayland Small Holdings Association, Ltd.

NORTHAMPTONSHIRE—

Mid-Northants Small Holdings and Allotments Society, Ltd.

Moulton and District Small Holdings and Allotments Society, Ltd.

Far Cotton and District Small Holdings and Allotments Society, Ltd.

Clipston and District Small Holdings and Allotments Society, Ltd.

Flore and District Small Holdings and Allotments Society, Ltd.

Wootton and District Small Holdings and Allotments Society, Ltd.

Crick Small Holdings and Allotments Society, Ltd.

Piddington, Hackleton, Horton, and District Small Holdings and Allotments Society, Ltd.

Rothwell Small Holdings and Allotments Society, Ltd.

St James's (Northampton) and District Allotments Society, Ltd.

Harpole Small Holdings and Allotments Society, Ltd.

Long Buckby and District Small Holdings and Allotments Society, Ltd.

Nether Heyford Small Holdings and Allotments Association, Ltd.

Yardley Hastings Small Holdings and Allotments Society, Ltd.

Spratton Small Holdings and Allotments Society, Ltd.

NORTHAMPTONSHIRE (*Continued*)—

Finedon Small Holdings and Allotments Society, Ltd.

Kingsthorpe and District Small Holdings and Allotments Society, Ltd.

Kislingbury and District Small Holdings and Allotments Society, Ltd.

Brafield and District Small Holdings and Allotments Society, Ltd.

Welford and Sulby Small Holdings and Allotments Society, Ltd.

Hargrave Small Holders, Ltd.

Higham Ferrers Small Holders, Ltd.

Irchester Small Holdings and Allotments Association, Ltd.

Creaton and District Small Holdings and Allotments Society, Ltd.

Wellingborough Small Holdings, Ltd.

Rushden Co-operative Land-holding Association, Ltd.

Newborough District Land Society, Ltd.

Wollaston Small Holdings and Allotments Society, Ltd.

NORTHUMBERLAND—

Wallsend Small Holdings, Ltd.

Ashington and Hirst Small Holders, Ltd.

Blyth Small Holdings and Allotments Association, Ltd.

Newcastle-upon-Tyne Small Holdings Society, Ltd.

NOTTINGHAMSHIRE—

Mansfield Woodhouse Co-operative Small Holdings and Allotment Society, Ltd.

SOMERSETSHIRE.

Street and District Small Holdings Association, Ltd.

SOMERSETSHIRE (*Continued*)—
Brislington Allotments, Ltd.
Bath Co-operative Allotments Society, Ltd.
Radstock and District Small Holdings Society, Ltd.

SUFFOLK—
Bardwell and District Small Holdings Society, Ltd.

SURREY—
Woking and Maybury Allotments Society, Ltd.
Addlestone Co-operative Small Holdings and Allotments Society, Ltd.
Epsom and Sutton District Small Holdings Society, Ltd.
Haslemere and District Co-operative Allotments Society, Ltd.
Richmond and District Agricultural Co-operative Society (Surrey), Ltd.
Merrow Land Club, Ltd.
Croydon Allotments and Small Holdings Co-operative Society, Ltd.
Dormansland Small Holdings and Allotments Society, Ltd.
Reigate Small Holders, Ltd.
Battlebridge Allotments, Ltd.
Woking Village and Mayford Allotments and Small Holdings Association, Ltd.
Guildford and District Allotment Holders' Society, Ltd.
Mitcham and District Small Holders' Co-operative Society, Ltd.

SUSSEX—
Hastings Small Holdings and Allotments Co-operative Society, Ltd.

WARWICKSHIRE—

Nuneaton Small Holdings and Allotments Association, Ltd.
Coventry Allotments, Ltd.
London Road Allotments (Coventry), Ltd.
Shirley Allotments, Ltd.
South Leamington New Allotments Association, Ltd.

WILTSHIRE—

Mere and District Small Holders, Ltd.
West Lavington Small Holders' Society, Ltd.

WORCESTERSHIRE—

East Worcestershire Small Holdings and Allotments Co-operative Society, Ltd.
North Bromsgrove Market Gardeners, Ltd.
Sidemoor and Perryfields Small Holdings and Allotments Society, Ltd.
Cradley and District Small Holdings and Allotments Society, Ltd.

YORKSHIRE—

Barnsley Small Holdings and Allotments, Ltd.
Bridlington and District Small Holdings and Allotments, Ltd.
Pickering Small Holdings and Allotments Association, Ltd.
Morley Small Holdings and Allotments Association, Ltd.
Kilham District Small Holders, Ltd.
Pocklington and District Small Holdings Society, Ltd.
Broomfleet Small Holders, Ltd.
Hornsea and District Small Holders, Ltd.
Driffield Small Holdings and Allotments Society, Ltd.

WALES

CARNARVONSHIRE—
Carnarvon Small Holdings and Allotments Society, Ltd.

GLAMORGANSHIRE—
Barry Small Holdings Tenants' Association, Ltd.
Cardiff Allotment and Small Holders, Ltd.
Cardiff Land-holders' Co-operative Society, Ltd.
Porthcawl Small Holdings and Allotments Association, Ltd.
Coychurch Lower Small Holdings and Allotments Association, Ltd.
Cadoxton and District Small Holders' Association, Ltd.

CREDIT SOCIETIES

ENGLAND

BEDFORDSHIRE—
Clophill Credit Society.

BUCKINGHAMSHIRE—
High Wycombe Credit Society.
Drayton Parslow Credit Society.

CAMBRIDGESHIRE—
Coates and District Small Holders' Credit Society.

ESSEX—
Coggeshall Credit Society.
Tiptree and District Credit Society.

HAMPSHIRE—
Hedge End Agricultural Credit Society.

HEREFORDSHIRE—
Froome's Hill Co-operative Credit Society.

HERTFORDSHIRE—
Barley Credit Society.

KENT—
Bromley and District Credit Society
Halstead Small Holders' Credit Society.
High Halstow (Kent) Credit Society.

LEICESTERSHIRE—
Freeby Agricultural Credit Society.
Brookvale Credit Society.
Mountsorrel and District Credit Society.
Oadby Credit Society, Ltd.

LINCOLNSHIRE—
Scawby Agricultural Credit Society.
Spalding and District Agricultural Credit Society
Friskney Agricultural Credit Society.

MIDDLESEX—
'All for Each' Credit Society.

NORFOLK—
Wiggenhall Agricultural Credit Society.
Whissonsett Small Holders' Credit Society
Gedney Dyke and District Credit Society.
Trunch and District Credit Society.
Stiffkey Credit Society.
Wayford Credit Society.

NOTTINGHAMSHIRE—
Mansfield Woodhouse Co-operative Credit Society

OXFORDSHIRE—
Heyford Agricultural Credit Society.
Islip and District Credit Society.

SURREY—

Dormansland Small Holdings and Allotments Credit Society.
Limpsfield and District Credit Society.
Croydon Co-operative Credit Society.
Epsom Small Holders' Credit Society.

WORCESTERSHIRE—

Castlemorton Agricultural Credit Society.
Far Forest Agricultural Credit Society.
Cradley and District Small Holdings and Allotments Credit Society.

WALES

GLAMORGANSHIRE—

St Fagan's and District Credit Society.
Cadoxton and District Credit Society.
Barry and District Credit Society.

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