The Land Utilisation of Renfrewshire.

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FIG. I. RENFREWSHIRE PARISHES.

N.B. The portion of the Parish of Renfrewshire which lies ~~west~~ NORTH of the Clyde contains no agricultural land and has therefore been ignored in this account of the Land Utilization of the County.

THE LAND UTILIZATION OF RENFREWSHIRE.

INTRODUCTION.

The aim of this thesis is to give a description of the manner in which the land of Renfrewshire is utilized from the point of view of Agriculture. In attempting to do this the following method is adopted.

I. A general description of the Utilization of the land of the County is given.

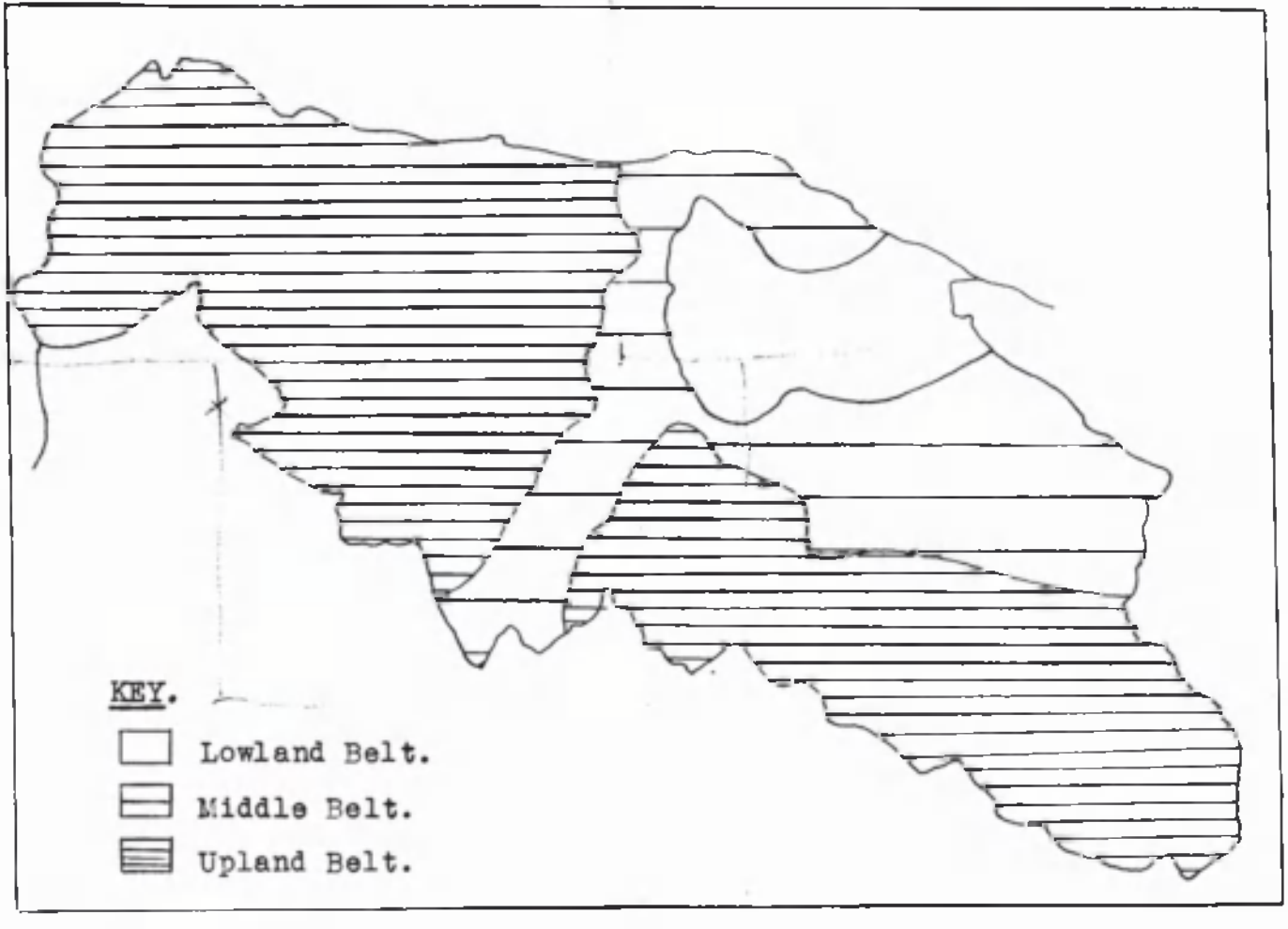
II. On this basis the various types of farms in the county are classified. A detailed account of each type of farm is given, i.e. a detailed description of the Land Utilization.

III. A geographical account of these various types in their distribution over the County is attempted, i.e., the reasons for the Land Utilization of the County.

IV. Summary.

The ground of the conclusions in this thesis was a Land Utilization Survey of Renfrewshire. A series of maps showing the crops for 1937 was constructed. The necessary information was acquired by a field to field survey of the whole area and while in addition for over half of the whole area/

FIG. II. RENFREWSHIRE - Showing the THREE AGRICULTURAL BELTS.



area further information was collected regarding the cropping rotations, manures, etc., used during the last few years. Finally maps were constructed on a scale of two inches to one mile. The method of representation, while based on the official Land Utilization Survey, was augmented in order to differentiate between oats and wheat and between rotation grass and permanent grass. It is to be noted that in this district where land may lie unbroken for ten or fifteen years the boundary line between rotation grass and permanent grass is necessarily arbitrary, and there is a similar difficulty in establishing a fixed boundary line between permanent grass and roughland.

GENERAL DESCRIPTION OF THE LAND UTILIZATION.

I. From the above mentioned maps it is clear (first) that the county can be divided agriculturally into three belts, viz. (a) A lowland belt with a high percentage of arable land; (b) An upland belt situated on the plateau showing a high percentage of permanent grass and moorland; and finally (c) an intervening belt of undulating land above the plateaux' edges. This belt extends up the main valleys and is remarkable for the amount of rotation grass.

On the higher areas, as will be seen from the maps, the conspicuous feature is the distribution of roughland.

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The moor is marked by the march or head dykes. It varies from three hundred feet to eight hundred feet in height above sea level and in general is lower in the west than in the east.

Woodland occurs in all three belts but is most noticeable in the middle one - belt c. There is, however, an unusually high percentage in the parishes of Inverkip, Greenock and Kilmacolm - belt b. This is due to the interest which the local Landowner, Sir Hugh Shaw-Stewart, takes in forestry. His plantations are carefully tended; every felled tree is replaced. The most common location of these plantations is near the ward dyke where they shelter the upper fields or when actually on the moors near the farm houses, where they act as wind breakers to the land and buildings.

On the undulating area - belt c, small woods are numerous on the less profitable land, e.g. the summits or steep faces of hills. Further there are trees in the private parks of the many large houses in the district. While these plantations give the county a pleasantly wooded aspect, individually they are small and though often situated on farms they are not included in the rented land, but are retained by the estate owner for his personal use. Many leases, indeed, include clauses to the effect that if cattle are found straying/

straying in these woods the farmer is responsible for any damage they may do.

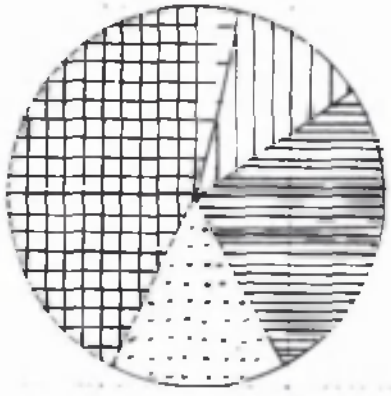
In the lower belt - belt a, two types of woodland are found. On Barrachan and Linwood mosses, the last remnants of large waste lands which formerly lay there, there is a natural open growth mainly of silver birch and bushes. At Fulwood on the other hand there is a large coniferous plantation. Much of the Fulwood area, which like the greater part of Barrachan and Linwood was reclaimed in the late eighteenth century and early nineteenth century, was rendered agriculturally useless by the building of Government Factories during the Great War. Fifteen or Twenty years ago this land was replanted with coniferous trees. This area and the district of Inverkip are the only two places where replanting is conspicuous. Elsewhere woods are being cut down and are not being replaced.

One method of land development in the county is that of Small Holdings. These occur in all three belts. They have been established under Government Schemes and in their present forms are a modern development which brings intensive farming into an area of extensive cultivation.

No general account of the Land Utilization of the county would be complete without the mention of two further factors/

Fig.3.

Diagramatic Representation of the ACREAGE under the VARIOUS CROPS -- excluding ROUGHLAND



KEY	ACREAGE	%
Grain	Grain	48
Green Crop	Green Crop	12
Hay	Hay	25
Rot.Grass	Rot.Gra s	12
Perm.Grass	Prem.Grass	3

factors, viz., industrialization and golf courses. As regards the former Renfrew is a heavily industrialised county. Towns, particularly in recent years, have been rapidly overwhelming the surrounding agricultural land. This is specially noticeable in the Glasgow - Paisley - Johnstone Conurbation which sprawls across the east of the county on the low and the gently rising land below the eastern plateau block. As regards the latter of these factors, there are a large number of golf courses. The result of this is that a considerable acreage of land though it lies under grass is non-agricultural and is not mentioned in the returns of the Scottish Board of Agriculture.

II. DISCUSSION OF METHOD FOR ESTABLISHING FARMING TYPES.

On a closer examination of these forementioned belts of land utilization it became apparent that several methods of farming were in operation. Before any detailed conclusions could be established about these methods of farming some basis of comparison had to be found.

The obvious method would be to compare the acreages under each crop on individual farms in the various areas. This method, however, is hardly practicable in a county where the farms excluding small holdings vary in extent from sixty to five hundred acres; and while the acres could of course have been percentaged on their own totals the further difficulty would have arisen of determining which out of say one/

one hundred farms represented the typical farm.

In view of these considerations the following method of obtaining comparative figures was adopted. A four inch square of inch graph tracing paper was placed upon the six inch to one mile maps on which the original survey was carried out. On these maps this square covered an area of 284 acres. Within the land on the maps covered by the square the proportions under the various crops were severally reckoned. Then, it being known, that the total area covered by the square was 284 acres, the acreage under each of the various crops was calculated. The larger maps were used in preference to the smaller ones in order to reduce the error which is unavoidable in the application of such a method, and the size of four inches was selected for the square of graph paper firstly because it was a convenient size and secondly and of more importance because when reduced to acres it represented 284 acres which is roughly the size of the average farm in the county.

The existence of different types of farms was suggested by the study of the maps. In order to determine the precise nature of these differences the above method was used to assess the acreages in areas where from the map there appeared to be a concentration of a particular type of land utilization. When the figures thus obtained were tabulated it was found that the farms could be classified into six groups.

Table I.
Farm Types.

Showing actual calculated averages under each crop.

Type	Area	Ploughed Land				Pasture			etc.	Height in feet	Total
		Oats	Wheat	Green Crop	Hay	Rotation Grass	Permanent Grass	Rough			
I	Fulwood	58.5	78.5	33.4	76.5	.8	17.9	-	2.6	25'	288.2
	Walkinshaw	57.7	70.4	29.1	56.5	38.4	6.2	-	3.4	25'	262.7
	Killington	93.	20.2	29.2	66.5	52.3	-	1.4	9.9	50'	272.5
II	Boghall	19.5	18.1	77.5	20.6	67.5	-	-	5.	50'	208
	Bishopton	24.4	31.8	5.8	22.	73.	35	6.2	6.5	50'	257
	Hatton	31.	5.	47.5	19.7	140.	10.8	-	17.	85'	271.1
III	Eaglesham	30.	-	24.	48.	146.	21.	-	12.	500'	281
	Kirkhall	21.9	-	26.4	35.	174	18.3	-	11.3	350'	284.6
	Barnshake	28.8	-	22.4	26.2	72.	123.	-	2.7	500'	275
IV	Kilmacolm	57.7	-	9.	36.4	75.	42,5	47.5	2.2	500'	270.3
	Neilston	23.8	-	10.1	43.	60.5	117.	-	15.3	600'	269.7
	Thornleymuir	23.4	-	2.4	22.6	2.7	181.	13.2	7.	700'	276.6
V	Langbank	21.4	-	15.6	51.	73.5	45.5	48.	7.7	250'	262.7
	Kippany	27.5	-	12.8	53.6	61.2	32.2	104.5	3.9	500'	275.8
	Flatterton	25.6	-	12.2	41.5	56.	45.5	108.	6.8	300'	295.6
VI	Shieldhall	-	-	5.7	11.3	7.1	20.4	238.	1.2	850'	283.7

Note:- The group "etc." includes all farm buildings, plantations, farm roads and small quarries.

Before the final results were obtained however it was found that an adjustment in method had to be made for two reasons, firstly there was usually a small unavoidable error in calculation of up to four per cent so that when the aggregate of the various crops was calculated it was found to differ from 284 acres which was the total area which the square covered; and secondly every selected area contained farm buildings, woodland, etc., which reduced the actual area of agricultural land. In order therefore to obtain a reliable basis of comparison from the total acreage of each selected area, the acreage occupied by buildings, etc., was subtracted and then each crop acreage was percentaged on its own area total. This adjustment in method gave as final result a "Standard Farm" of 100 acres.

Standard

The Farm of 100 Acres.

Type	Area	Ploughed Land				Hay	Pasture		
		Oats	Wheat	Total	Green Crop		Rotation Grass	Permanent Grass	Rough
I	Fulwood	22	29.4	51.4	12.7	28.6	.4	6.9	-
	Walkinshaw	22.5	27.2	49.7	11.3	21.8	14.6	2.6	-
	Hillington	35.6	7.8	43.4	11.	25.2	19.8	-	.6
II	Boghall	9.6	8.9	18.5	38.2	10.1	33.2	-	-
	Bishopton	9.8	12.8	22.6	2.3	8.8	29.2	14	2.4
	Hatton	12.2	2.	14.2	18.7	7.8	5.5	4.3	-
III	Eaglesham	11.2	-	11.2	8.9	17.8	54.3	7.8	-
	Kirkhall	8.	-	8.	9.6	12.8	63.7	5.9	-
	Bainslake	10.1	-	10.1	8.3	9.6	26.8	44.8	-
IV	Kilmacolm	21.4	-	21.4	3.4	13.6	28.	15.9	17.7
	Neilston	9.3	-	9.3	4.	16.9	23.8	46.	-
	Thornleymuir	9.7	-	9.7	.9	8.4	10.	67.	4.9
V	Langbank	8.4	-	8.4	6.1	20.	29.	17.8	18.7
	Dippany	10.1	-	10.1	4.7	12.4	22.6	11.8	38.4
	Flatterton	8.9	-	8.9	4.3	14.4	19.3	15.8	37.3
VI	Shieldhall				2.2	4.1	2.6	7.3	83.8

For general comparative purposes the county averages of grain, green crop and hay were obtained from the statistics of the Scottish Board of Agriculture. In practice, however, these averages were found to be of doubtful value. There are in the county 61,064 acres of moorland (39.7% of the total farming area). Of these approximately 90% belong to sheep farms which grow no appreciable acreage of crop and only approximately 10% belong to the arable farms. If therefore we take, on the one hand, the county cropping averages based on an area which includes the whole moorland, and if we take, on the other hand, the total area occupied by the arable farms and strike a cropping average, then we get two different figures; and only in the latter case do we get a figure with which we may profitably compare the cropping average of any individual farm.

Table III.
County Averages.

Crop	Total Acreage	% of County Total 128,364	% of County Total minus moor 77,300
Grain	8,799	6.8%	11.4%
Green Crop	4,515	3.5%	6%
Hay	13,308	10.3%	17.2%

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The various types of farms.

Type I - Fulwood.

Table IV.

Standard Farms.

Area	Height in feet	Ploughed Land				Pasture		
		Oats	Wheat	Green Crop	Hay	Rotation Grass	Permanent Grass	Rough land
Fulwood	25	22.	29.4	12.7	28.6	.4	6.9	-
Walkinshaw	25	22.5	27.2	11.3	21.8	14.6	2.6	-
Hillington	50	35.6	7.8	11.	25.2	19.8	-	.6

The outstanding features about this type of farm are the high percentage of land under grain and the low percentage of grass land. Very few cattle are kept and nearly all the crops are sold away from the farm. The grain, or as the farmers term it, the white crop, consists of oats and wheat. There is usually a rather higher average of the latter than of the former, and as much as 50% of the land may be under grain. The acreage of wheat depends largely on the weather conditions in autumn. If harvest and autumn ploughing is delayed owing to rain or frost the acreage of wheat which it will be possible to sow before growth ceases in the midwinter period will be greatly reduced. Spring sown wheat is unusual.

The acreage under green crop, i.e. potatoes, turnips, etc., is well above the county average of 6%. The term green crop is used to include all such crops as potatoes, turnips, mangolds, vetches, cabbage, rape, maritime kale, etc., but as the first two between them account for 93.5% of the whole crop, the remaining crops need not be considered separately. On these farms potatoes cover a greater acreage than turnips; there are anything from two to five acres of the former for every acre of the latter.

The hay average of about 25% is well above the county average acreage of 17.2%. This crop is entirely cut from seeded hay which is sown two or three weeks after the last white crop in the/

the rotation. It consists mainly of rye grass with some clover. Timothy seed is not sown as it is not the intention of the farmer to establish lasting meadows. There is no permanent grass cut for hay. The crop is entirely made for fodder; there is no attempt at harvesting it for seed.

Under 20% of the land is under grass and almost the whole of this is rotation grass. Permanent grass only occurs in such locations as river lands liable to floods where ploughing would be unwise. There is no roughland on these farms save where retreating industries have left behind them such relics as mine dumps.

As may be expected from the low grass acreage there are few cattle kept. Dairying is not practised but about half of the farms keep anything up to twenty young cattle for fattening. Sheep are stocked only in autumn and winter; the season is rarely good enough for second crop of hay to be made from the regrown grasses after the hay crop is cut. Sheep are pastured on these fields, the quick growing clover being the predominating "grass" of this second growth. They are also folded on turnip fields. These animals are either bought in for fattening in early autumn and sold in winter or are ewes brought down from the higher ground to which they will be returned in spring either before or after the lambing season. The majority of these sheep are of the Leicester or "Leicester Crossed" breeds which will not thrive/

on the bleaker moors during the winter. They may be either bought and resold or there may be an agreement between the highland sheep grazer and the lowland pasture owner. The interest of the latter in sheep rearing has increased in the last few years owing to the low price of grain and the high prices gained on the home fed mutton market. Unfortunately the Board of Agriculture Returns are of little help when attempting to prove this statistically for in June, when they are sent in, this land is under arable farming.

With the exception of part of the turnip crop and the second hay crop which are fed to sheep all the crops are sold away from the farm, a practice which aggravates the difficulty of maintaining fertility. Probably the most important reason for the stocking of young cattle is the small but invaluable amount of dung they provide. Similarly the folding of sheep manures the land. Soil nitrogen is maintained partially by the leguminous crops; but the natural manures are not nearly sufficient and large quantities of artificial fertilizers have to be imported. These are mainly nitrogen producing salts of ammonia, potassium and sodium or salts of the superphosphate group. Lime is also widely used. The combination depends on the crop, the season and the condition or "heart" of the land.

The rotation of crops is not fixed in detail but varies according to the nature of the soil, the season, the market, etc. The/

The general basis of the rotation, however, is a five year circuit of oats, green crop, wheat seed hay and pasture. Although the second white crop may be oats, the first is never wheat because only the autumn sown strain is cultivated and there is not time for the broken turf to be sufficiently destroyed. On the other hand the rich residue left by the heavily manured green crop and the well worked soil present excellent conditions for wheat. If a late season prevents the planting of wheat, oats may be sown in spring instead. If the land is in good heart after the second grain crop, a second green crop may be taken. The hay crop may be cut for two years in succession or used for pasture the second year. A large number of variants therefore occur in the standard five year rotation.

Type II - Boghall.

Table V.

Standard Farms.

Area	Height in feet	Ploughed Land			Hay	Pasture		
		Oats	Wheat	Green Crop		Rotation Grass	Permanent Grass	Rough Land
Boghall	50'	9.6	8.9	38.2	10.1	33.2	-	-
Bishopton	50'	9.8	12.8	23.	8.8	29.2	14	2.4
Hatton	85'	12.2	2.	18.7	7.8	55.	4.3	-

In these farms the grain crop occupies a much less important/

important position covering as it does on an average only 18.4% of the land. This, however, is still well above the county average of 11.4%. Oats and wheat are both cultivated but the former tends to predominate over the latter.

The high percentage of the land under green crop, the outstanding feature on this type of farm, is the result of this crop appearing twice and sometimes thrice in the rotation, whereas in other types it appears only once. It covers about 26% of the land; there are five acres of potatoes to every acre of turnips.

The hay crop on the other hand falls below the county average. It consists entirely of sown grasses, mainly rye grass and clovers. Timothy grass is unusual but may occur on the higher ground where the soil is lighter and less suited to heavy cropping.

The extent of rotation grassland is greater on these farms and increases on an average to about 39% of the total acreage. In one case indeed, that of Hatton, it increases to over 50% of the total acreage, due to the fact that part of the farm lies at levels over 100 feet above the sea where the physical conditions are different. On account of this Hatton might be taken as a type by itself; but where the whole group is so small further division would give rise only to obscurity and repetition. On this type of farm there is little or no permanent grass or roughland.

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Though not entirely dairying these farms carry a large number of cattle. On the standard farm there would be from twenty five to fifty beasts. On the actual farms the herds vary from twenty to one hundred and fifty according to the acreage. As farms usually extend over from two fifty to four hundred acres herds of the latter size are the more common. The density is normally about one cow to four acres of farmland, but it may rise to one cow per two acres. Where only about 40% of the land is under grass it is impossible to feed large herds on the farm during the summer months. To overcome this difficulty the young beasts are pastured on grazing, rented elsewhere. These extra pastures may include winter steadings, so that the young beasts never return to the home farm until they join the dairy herd. Alternatively they may be housed during the cold months in the byres of the home farm and driven back to the grazing in spring. This system enables the high cropping acreage to be maintained without stock reduction and further gives a larger supply of manure than the small home herd can give. The extra crops thus made possible help in turn to provide the winter feed for the young herd. Sheep are similarly brought down to the better lands in autumn and winter. Not every farm stocks these "winterers". The practice depends on the number of cattle kept and the acreage. Those that do, however, carry

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from seventy to one hundred and fifty with an average density of about one sheep per two acres of farm land.

Fewer crops are sold off the land on this type of farm. The potatoes and grain are almost entirely cash crops, but a small quantity of the former and the straw from the latter are diverted to the dairy for cattle feeding and bedding. Turnips, hay and small quantities of cabbage or kale are fed to the stock along with cattle cake. The dairy produce is marketed entirely in the form of milk. Calves not needed for stock herds are usually sold when a few weeks old, although if the extra pastures are plentiful, they may be kept until two or three years old.

The rotation is based on an eight years circuit of green crop, white crop, green crop, white crop, seeded hay, pasture, pasture. The white crops of oats and wheat are sown according to the autumnal weather and ground conditions. As there are here no ploughing difficulties to prevent the sowing of autumn wheat, the two grains are interchangeable within the rotation. If the land has a tendency to be heavy many farmers prefer to sow potatoes after ploughing out of lea as the work necessary in cultivation opens up the clods better than the simple ploughing and harrowing that precedes a grain crop. If the land is particularly suited to potatoes, the first white crop may be replaced by second crop of potatoes, after which the following crop will be turnips. If, on the other hand, the soil is of a lighter variety/

variety, the first green crop may be omitted and the rotation started with oats. Similarly in the rotation two years of hay followed by two years of grass may become either three years of hay followed by one year of pasture or one year of hay followed by three years of pasture according to the amount of hay required and the condition of the grass.

Type III - Eaglesham.

Table VI.
Standard Farms.

Area	Height in feet	Ploughed Land			Hay	Pasture		
		Oats	Wheat	Green Crop		Rotation Grass	Permanent Grass	Roughland
Eaglesham	500'	11.2	-	8.9	17.8	54.3	7.8	-
Kirkhall	350'	8.	-	9.6	12.8	63.7	5.9	-
Barnshake	500'	10.1	-	8.2	9.6	26.8	44.8	-

This is probably the most general type of farm to be found in the county. The grain crop consists of oats, and covers about 10% of the ground. No wheat is sown. Between 8% and 9% of the land is under green crop. Though potatoes still cover more ground than turnips the acreages devoted to these two roots are more nearly equal than in the farms we have so far considered. The portion of land under green crop is still above the county average of 6%. Hay is more important

on/

on these farms than grain and occupies a larger acreage than any other individual crop. Thus hay may be cut from land sown with a mixture of rye grass and clover seed and the land used for grazing after a year or two, or it may be cut from timothy meadows. A successful "catch" of this type of grass may last as good hay land for over twenty years without requiring to be resown. If it is intended that the land remain for some years as pasture, the proportion of clover seed to rye grass seed sown when the hay is seeded is decreased because otherwise the ground may become clover sick and the pasture fail.

About 68% of the land is under grass, the greater part by far being rotation grass and only a small proportion being permanent.

These farms are true dairy farms. They vary in actual acreage from fifty to over two hundred acres. The average farm extends over about one hundred and fifty acres. The standard farm would carry from thirty five to fifty cows where a herd of fifty would comprise twenty four milch cows, twenty five young animals of all ages designed for stock replacement and one bull.

As the dairying business is in a rather difficult condition some farms are fattening young beasts for the meat market; this, however, is the exception rather than the rule. If the dairy farm is on the outskirts of a town in

some/

some cases no young stock are kept; the cows are bought just before calving and sold again when they go out of milk. The dairy products are marketed as milk and owing to Government c control it is fast becoming almost impossible to buy local farm butter. This in turn affects the pig rearing industry, few farms keeping any pigs at all.

Sheep are also stocked on these farms but normally as winterers. As in the preceding types of farm these animals may be bought and sold again after fattening or lambing or they may be boarders. When brought in after harvest they are first of all pastured on the second growth of hay, and then as this fails turnips are supplied and on occasions maritime kale. These foodstuffs may be carted to the failing pastures or the sheep may be folded on the green crop fields. As regards those beasts, transferred to the lowlands in the cold season and sent back to the moors in spring, if the grazer returns the sheep at the beginning of April to the shepherd he is paid by the latter from ten to twelve shillings per sheep. If he does not return them until May, he is paid more. He has, however, to account for every sheep under the number originally delivered to him with a veterinary surgeon's certificate stating the cause for any deaths. Loss to the shepherd through carelessness or dishonesty on the part of the grazer must be compensated.

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The normal rotation takes about eight years to complete. It is oats, green crop, oats, seeded hay, hay, pasture for anything up to four years. If the grass is not showing signs of exhaustion it may be left unbroken for five or six years. "Exhaustion" is a relative term, for the exact determination of it in any particular case depends on the individual farmer. If he has as much land under plough as he can work, an area of grassland may remain unbroken although the grasses are becoming less nutritious. If, however, he is short of arable land he may break a field which at another time he would consider in good condition. Generally speaking a pasture may be said to be nearing exhaustion when the original sound rye grass and clover turf begins to be replaced by reeds, due to poor drainage, or weeds such as buttercups, daisies, ragworts and mosses. When the soil has a large proportion of clay the first grain crop may be omitted and potatoes planted instead, for the extra labour necessary in cultivation breaks up the heavy soil more efficiently.

Type/

Type IV - Kilmacolm.

Table VII.

Standard Farms.

Area	Height in Feet	Ploughed Land			Hay	Pasture		
		Oats	Wheat	Green Crop		Rotation Grass	Permanent Grass	Rough land
Kilmacolm	500'	21.4	-	3.4	13.6	28.	15.9	17.7
Neilston	600'	9.3	-	4.	16.9	23.8	46.	-
Thornleymuir	700'	9.7	-	.9	8.4	10.	67.	4.9

Farms of this type are small, seventy to one hundred acres being the average size. They are entirely engaged in dairying and have no secondary interests.

The only grain crop is oats which covers about 8.5 of the land. This is below the county average of 11.4% but above the 6.8% the figure based on aggregate agricultural and moor land. In the instances quoted Kilmacolm with an area of 21.4% is an exception. On enquiring into this unusually high acreage it was found that in the five preceding years the land under oats had only been between 8% and 10% of the farm; and as usual the cause for such a rise in ploughed land was grass failure which could be repaired only by breaking with a view to re-seeding even where this involved a change in the rotation.

The green crop occupies a very small acreage, well below the county average of 6%. Turnips are more important than/

than potatoes and there are two acres of the former to every one of the latter. The entire green crop is normally used on the farm but if the market is favourable some of the potatoes may be sold as a cash crop, along with any surplus turnips. If sheep are stocked a small acreage of cabbage or kale is cultivated for winter feeding.

Hay is the most important crop and often covers a greater acreage than the combined grain and green crops. It is cut from meadows seeded two or three weeks after the second grain crop, with a mixture of rye grass and clover, from timothy meadows, and from permanent natural meadows. These last are situated on land that is not in fit condition for ploughing, usually owing to bad drainage. In a good season when the work is well advanced these natural meadows may be cut between the hay and the grain harvests, but in a bad season they may be too wet even for grazing. Their herbage consists of a mixture of wild grasses and flowers of all descriptions, and is used mainly for bedding. Its value will be better appreciated when the low grain acreage and consequent small supply of straw is remembered.

Nearly 64% of the farm is under grass but rather less than one third of this area is rotation grass, the greater proportion being permanent and some farms however have also a small acreage of roughland. The proportion of roughland to permanent/

permanent grass varies from nothing to fifty per cent. In separating roughland from permanent grass both terms require some definition. "Permanent Grass" is a term used to denote all pastures, even some of which may have been improved from the natural state in former years, and which do not come under the rotation cropping of the farm and are never ploughed up. These pastures have a cover of grass which is close knit and nutritious in comparison to the inferior grazing of the roughland. The roughland is part of the traditional Scottish farming system, being the direct descendant of the common land. Now, however, it is all either rented or owned by the occupier and saving for small local areas it lies above the farm lands. In these upland areas the farms are by no means arranged in the ideal compact square; the normal lay out here is for farms to extend in a long and often awkward rectangle from the valley bottom up to the moors. This is a relic of ancient farming when every man had a piece of better land/and right of access to the moor, and records still exist of the movement of the cattle to the roughland shielings in summer though all trace of the shielings has now disappeared. To-day this roughland is covered by coarse grasses, heath, heather, bracken, etc, and by way of attention it receives only occasional burning and some artificial drainage. Sheep, which are selective grazers, eat out the better grasses and permit the poorer ones to grow stronger/

stronger. The result of this is a gradual deterioration of the grazing.

These dairy farms carry stock of forty to fifty beasts. A herd consists of about twenty five cows and twenty five young animals for stock replacement. These farms therefore carry the same proportion of cattle as the Eaglesham type. It would appear that the carrying power of a farm is not affected by the increase of sound permanent pasture and the decrease of rotation grass. Owing to the small area of each individual farm sheep rearing is not practised as the number each could carry is too small to make the trouble worth while.

The rotation is similar to that of the preceding type but the circuit is lengthened by a third cutting of hay and then the grassland is left unbroken for as much as eight to ten years though five or six years is a more normal period. In cases when land has remained unbroken for many years it is difficult to draw a definite line between permanent and rotation grass.

Type V - Langbank.

Table VIII.
Standard Farms

Area	Height in Feet	Ploughed Land			Pasture			
		Oats	Wheat	Green Crop	Hay	Rotation Grass	Permanent Grass	Roughland
Langbank	250'	8.4	-	6.1	20.	29.	17.8	18.7
Dippany	500'	10.1	-	4.7	12.4	22.6	11.8	38.4
Flatterton	300'	8.9	-	4.3	14.4	19.3	15.8	37.3

The farms of this group vary in size from one hundred and fifty to over four hundred acres. This great range is due to the inclusion in many farms of large tracts of moorland suitable for rough grazing.

Oats is again the only grain cultivated and covers a similar proportion of land as in the case of the Kilmacolm type. The green crop (about five per cent. of the acreage) consists of equal proportions of potatoes and turnips. A small quantity of kale or cabbage is sometimes added, though by far the most important crop is hay cut from seeded meadows (including Timothy meadows) and from permanent grass.

60% of the land is the usual proportion under grass but this figure may rise to over 80% in certain cases. Rotation grass/

Rotation grass, however, in this type of farm accounts for only about 34% of this land while 21% is under permanent grass and the remaining 45% is roughland. In certain farms an increase in roughland is compensated by a decrease in permanent grass; and the varying areas of roughland is the only marked difference between this type of farm and the preceding type. When the attempt was made to divide the county into farming belts it was found expedient to group these two types, i.e. the "Langbank" and the "Kilmacolm" type, together because of the manner in which they were intermixed. This decision was due to the fact that the Kilmacolm farm boundaries often along the head or ward dyke and that the boundaries of the Langbank farms while running parallel to those of the Kilmacolm type in the valley, in some areas extended beyond them on to the moor in such a manner that a "Langbank" farm might march with several Kilmacolm farms at the ward dyke.

Dairying is still the major consideration. The number of cattle vary according to the size of the farm. While a standard farm would carry between twenty three and thirty beasts, the actual herds vary from thirty to sixty according to the amount of grassland, exoluding roughland. An increase in the moorland does not increase to any extent the size of the dairy herd. Such land, however, may be useful/

useful on occasions for summer grazing for young beasts and though this is not the general practice, a farm with a large moor will carry a greater number of sheep than one with a small moor. In late autumn the standard farm would carry about fifty sheep. The flocks in actuality vary from one hundred to one hundred and fifty in number. They are generally of the "black faced" or "black faced crossed" breeds and the rams are often Leicesters. By the following June, i.e., after the lambing season, the flock may have increased as much as two and a half times its original size.

The rotation is the general one of oats, green crop, oats, seeded hay, pasture. The hay may be cut for three years in succession and the grass is often left unbroken for ten years.

Milk is the main dairy product to be marketed. The only cash crops are oats and in the case of farms lying near a town a small quantity of potatoes.

The sheep also present a large source of income when sold on the stock or meat market and their wool brings in a small additional sum

Type VI. - Shieldhill.

Table IX.

Standard Farms.

Area	Height in Feet	Ploughed Land			Hay	Pasture		
		Oats	Wheat	Green Crop		Rotation Grass	Permanent Grass	Rough land
Shieldhill	850'	-	-	2.2	4.1	2.6	7.3	83.8

The Shieldhall type of farm is the only instance in which the system which we have used in determining the foregoing types, is not satisfactory. These farms, found upon the moorlands, are large, often extending to over one thousand acres, and the only parts cultivated are small areas around the farm steadings. It will be remembered that the method so far used to establish the various types was to estimate the acreages under various crops within a selected square of 284 acres. While in the case of the former types of farm, because of their high percentage of "rotation land" it was possible to place the square almost anywhere and obtain a representative result, in the case of these moorland farms the square might be so placed as to give a representative result only by the sheerest good luck. In a thousand acre farm for example, to take extreme cases, it would be possible so to place the square that it covered an area either entirely of roughland on the one hand or including all the cultivated land on the other; and not only would the results so obtained not be representative but would be misleading.

Table X. Illustration of advisability of alteration in method in the Shieldhill Farm Type.

Type of Land	% calculated on 284 acres	% calculated on 1000 acres
Farmland	16.2%	4.5%
Roughland	83.8%	95.5%

N.B. The farmland consists of the same actual acreage in both instances.

While this method, therefore, is not generally applicable it is valuable none the less with regard to this type of farm when discussing the various cropping areas on the farmland as distinct from the roughland.

No grain is grown on these farms. The ploughed land is used entirely for the cultivation of small quantities of turnips, rape, kale and hay, which are used, during the winter as supplementary to the natural vegetation for feeding the sheep. A small acreage of potatoes may be sown for the personal use of the shepherd. The hay, here, contrary to the practice on the other types of farm, is seldom, if ever, seeded with oats. It is grown for as long a time as the grass will bring a profitable return. Then the land is used for grazing for a short time before it is reploughed and cultivated for a year or two. This small additional acreage of rotation grass is particularly useful if it is necessary to drive the sheep off the moors on account of bad weather or sickness.

Animal husbandry is confined to sheep rearing and the farms carry about fifty sheep to the hundred acres. In practice the farms are large and the flocks rise to about five or six hundred beasts before lambing. The stock is graded in late. summer. All the young beasts are sold off with the exception of a few which are retained for stock; and any old ewes which have ceased/

ceased to lamb satisfactorily are weeded out. If the moors are particularly exposed the sheep may be wintered at lower levels and returned to the moors in spring when growth starts, Some of the lower moors where grazing is good may may be used in summer for the pasturing of young cattle which are driven up from the farms at lower elevations; but normally the moorland farms are not stocked with cattle.

The Renfrewshire moors are particularly favourable to sheep raising because their westerly location in Scotland ensures a comparatively high winter temperature. In practice this means that heavy snow storms, the terror of the border shepherd, seldom occur; so that the hardy black faced sheep are able if necessary to remain on the lower moors through the whole of a normal winter. The crossbred sheep, however, which are not so hardy are generally moved down to lower levels.

This completes the account of the six types of farms to be found in Renfrewshire. No detailed account of the Land Utilization of the county could, however, make any pretence at being exhaustive without some discussion of the questions of smallholdings and manuring.

SMALL HOLDINGS.

The question of smallholdings in Renfrewshire has been omitted from the previous account of the various types of/

of farms for, as can be seen from the map of the "distribution of Farm Types", the settlements occur on land covered by more than one of the farm types.

The schemes are an attempt to establish upon the land men with little or no capital with a view to their becoming self-supporting. The movement started, (in England), before the end of last century but its major development has taken place during the last twenty years when the Government became seriously interested in the reduction of unemployment. In Renfrewshire the first three groups were established in 1913 (Johnstone Castle and Meikle Crossford in the Parish of Lochwinnoch) and in 1915 (Laigh Linthills, Lochwinnoch Parish). By 1930 three additional schemes were in operation (Brownfield, Inchinnan Parish - 1922; Allands - Inchinnan Parish, - 1926, and North Kirklands, Eaglesham Parish - 1928); and since then seven more have been developed (Bargarran and Craigend, Parishes of Erskine and Inchinnan - 1931; Park Mains, Inchinnan Parish - 1934; Nether Johnstone, Kilbarchan Parish - 1935; Kaimhill, Kilbarchan Parish - 1936; Pilmuir, Mearns Parish - 1936; and East Fulton, Kilbarchan Parish - 1936). These various schemes occupy in all about 1920 acres and are situated in the lowlands and on the surrounding gently rising areas. The holdings are described in one report of the Department of Agriculture thus:- the "recent land settlement activities/

activities have been directed chiefly to the formation of holdings up to ten acres intended for the intensive production of eggs, poultry, pigs, fruit, flowers, vegetables and the like. Experience goes to show that the formation of holdings of this type in moderate numbers in the neighbourhood of urban markets can be continued with a reasonable prospect of success for the new holders."

In practice in Renfrewshire there appear to be the following three types of holdings within the above thirteen schemes.

(1) The first type is of the type described above and out of a total of 152 farms 120 conform to this type. Each holding is about ten acres in area and has a new or modernized house and offices. Due to the physical conditions live stock raising is preferred to market gardening. The soils vary from the light basalt derivatives of, for example, North Kirkland to the heavy clays of, for example, the Brownfield Scheme, and the reason why early market garden crops are not grown is that none of the holdings are situated on the warm sandy soils which are essential for this type of development. Further the harvesting season in the Renfrewshire lowlands which are relatively exposed, is later than for example in the Lanarkshire/

Lanarkshire fruit growing region which lies in the sheltered Clyde valley, and while this difficulty could be overcome by glass house culture, these holders lack the capital to establish and maintain glass houses. The holders, therefore, have concentrated upon the production of eggs, poultry and pigs. They derive a small additional revenue by subletting the land between the henhouses for grazing purposes.

(2) The second type of holding is rather larger than the first, and may extend over as much as twenty acres. There are only ten of these in all and they are organized on similar principles to those of the above type.

(3) The third type of farm is larger still and varies from forty to sixty acres. There are twenty two such farms, one or two of which are usually to be found in each scheme. Here the original large farm steading is occupied by one of the holders or is divided between two of them. The land is so worked that these holdings might be regarded as small general dairy farms of the Eaglesham type. The holders are the men who sub-rent the grazing of the smaller holders, and they are thus enabled to carry more cattle upon their land.

These farms are all designed to be run by one man and his family and very little outside labour is therefore employed. The holdings are often criticised on the ground that/

that they are unprofitable, but it has been proved by experience that from such a farm a capable man by hard work can make a living. In all schemes of this kind there are bound, of course, to be a certain number of men who are not capable of succeeding, but in due course these will be succeeded by men who are.

All the schemes so far discussed are Government owned but the Government is not the only owner of small holdings. On the outskirts of towns there are often small privately owned poultry farms extending over two or three acres of land which are rented from the farmer or the land owner. Here houses are seldom found with the ground which is usually cheap land which otherwise could be used only as rough grazing. Each holding is an isolated individual effort receiving no external assistance and the holders when compared with those upon the Government Schemes are therefore working at an extreme disadvantage. Again the Burgh and County Councils have the legal right to establish holdings. Their efforts, however, are usually confined to providing allotments for tenement dwellers, employed or unemployed. These allotments are designed not in order to provide a livelihood but to furnish a leisure occupation for men who do not own gardens.

MANURES AND FERTILIZERS.

The question of manuring might have been discussed under/

under each of the various farm types. As, however, the practice in each type of farm is, generally speaking, the same, this would have involved considerable repetition. It was thought advisable to deal with the question separatively and as a whole.

The agents used for maintaining soil fertility may be divided into two groups, manures and chemical fertilizers. To the natural manures which have been used to a greater or less extent throughout the centuries there have been added in the last hundred years new chemical products. These have appeared on the market often as bye products of industry under the general name of chemical fertilizers. They have not displaced the old manures but are used together with them; and experience has shown what is the most valuable combination for any given case. Generally speaking manures decay slowly. They therefore last longer than fetilizers, and they cost less. Fertilizers on the other hand provide salts more quickly and in more governable quantities than manures. The farmer, therefore, uses the former as much as possible and reserves the latter for top dressing of crops.

The manure groups are of either animal or vegetable origin. As the county is a dairying region it is mainly cattle dung that is available for manuring purposes, but owing to the large quantities of cake used for feeding their dung has/

has an unusually high percentage of salts. It is carefully stored in order that it may be ready to be spread on the fields before the land is ploughed for a green crop, the first ploughing usually being autumn or winter, and again in the drills before the seed is planted. It may also be spread in autumn to prepare a field for a hay crop if the field has already been used for this crop for three or four successive years. It is unusual to dung the land at any other time. The pastures, manured by sheep and cattle out at grass, receive no additional attention other than a limeing before breaking or an occasional dressing with nitrous chalk if the land has been lying under grass for some time. The age-old custom of folding sheep on arable land is widely practised in autumn in the hay and turnip fields. Vegetable manures come mainly from ploughed in lea and leguminous crops. The latter are invaluable because they supply the ground with nitrogen.

The management clause in many cases still demands that the whole production of hay roots and straw be consumed on the farm and the resulting dung carefully spread upon the land. This by conserving the salts prevents loss of fertility. Other leases demand that chemical fertilisers at least equivalent in quantity to any crops sold away from the farm be imported and carefully applied to the land that the fertility/

fertility may be maintained.

Chemical fertilizers are not entirely a development of modern industry. Some have been known and used for a very long time although their exact chemical reaction was not appreciated until recently. Among this latter group are soda, bones, salt, saltpetre, hooves and horn, shoddy scapers waste, lime and marl. Of these the last two are the only ones used in their original form.

The reason why lime continues to be widely used is that the soils of the county are almost all, though in varying degrees, acid. To combat this calcium is essential and lime calcined from local limestone - or occasionally marl - is the form in which it is applied. Both of these manures provide this very easily washed out salt. The duration of its efficacy depends on the amount used and the drainage of the land. Calcium Superphosphates, while mainly used because of the superphosphates, also in respect of the calcium, help to counteract acidity; but the cost of using them for this latter purpose alone is prohibitive.

Ammonia Sulphate, sodium nitrate, calcium superphosphates and potash salts mainly in the form of potassium sulphate are the chemical fertilizers generally used. Every progressive farmer knowing his own land has of course his own ideas as regards the use of these chemical compounds; but the/

the following are the general applications. The first oats crop benefits by the ploughing in of lea. Then it is top dressed with ammonium salts or sodium nitrates which provide nitrogen while the soil is still cold and superphosphates which stimulate the green growth. The amount of fertilizer used is about two or three hundredweights per acre with superphosphates predominating, but a good early season will reduce the amount of free nitrogen necessary and therefore the amount of fertilizer applied. Potatoes require more manure than oats. They receive per acre about fifteen tons of dung and a mixture of superphosphates, ammonium sulphate and potassium salts, varying in amount from eight to twelve hundredweights. The second white crop after this heavy manuring requires much less dressing. It receives only per acre one hundredweight of nitrogen-producing salts, some superphosphates to stimulate the vegetable growth and if necessary some lime. The hay crop as stated, may or may not receive dung - practice only the Timothy meadows are so dressed. If the hay crop is not dunged it is dressed with about two hundredweights per acre of nitrate of soda or potash or nitrous chalk.

The majority of the farmers do not mix their own fertilizers but buy them from the retailers suitably blended for the various types of crops. While this practice undoubtedly saves time and space for mixing it is obvious that a/

a man will have a more intimate knowledge of his land if he experiments himself with manures and fertilizers.

GEOGRAPHICAL ACCOUNT OF THE DISTRIBUTION OF THE VARIOUS TYPES.

III.

The types of farming practice and their distribution over the county depend upon two major factors:-

(a) The influence exerted on agriculture within the county by the industries and urban markets situated in Renfrewshire itself and in the adjacent counties of Dumbarton and Lanark.

(b) The Physical condition - elevation, soil, etc.;

(a) A century ago farms were still, owing to bad roads, as far as possible self-sufficient. Those situated on the outskirts of towns or villages did indeed send their surplus milk and butter to market there, but those further away from such centres were limited in their marketing to salt butter, cheese and home fed calves. With the improvement in transport, however, the zone which could market milk was steadily widened until it extended over the whole county. Then every farm with the exception of those situated upon the moors became interested to a greater or less extent in the dairy from the point of view of the milk supply; and the lowland farms therefore lost at the same/

same time their monopoly of this market and their need to be self-sufficient. Having lost this monopoly they concentrated upon arable farming which in this area became more profitable than dairying. The result is that the farms of the lowland area are almost devoid of cattle. In recent years, however, owing to the increasing demand for home fed mutton the farmers of this area have started the practice of fattening sheep in autumn and animal husbandry is again becoming important. The market for these animals also is in the surrounding towns.

In short at present the moorland farms are devoted to sheep raising, lowland farms specialize in arable agriculture and generally the remaining farms are engaged in dairying; and the reason for this differentiation of functions is industrial development and the concomitant growth of communications and urban markets.

(b) While this question of markets affects the general agricultural trend of the county the physical conditions exert a more local control, i.e. they, much more than the markets, determine what particular type of farming will be found in any given area. Before, however, we proceed to the consideration of the physical conditions and their effect on the farming types there are three introductory remarks to be made in the interests of clarity:-

(1) The account is geographical not geological. No detailed survey of/

of soils has been attempted but the results of any published work on this subject have been considered so far as they seemed relevant to the special aim of this Thesis.

(2) The boundaries of farm types are not strictly determined by physical conditions alone. There is another determining factor, viz. industrial development.

(3) Broadly speaking the native rocks of the county can be divided into two types, the hard volcanic rocks of the upland areas and the softer carboniferous rocks which the process of denudation has hollowed into lowlands. The soils of the county, however, depend not so much upon the native rocks themselves, as upon the glacial and post glacial deposits with which the native rocks have been overlaid.

(1) Fulwood Type Area.

The Fulwood farm type extends over that area of lowland in the county which corresponds to the 50' raised beach. The only undulations of this stretch of land occur in the South East in the neighbourhood of Hillington and in the west in the parishes of Houston and Kilbarchan. These "islands" - Geologists after studying their sands and gravels are of the opinion that they were islands built up by the waves which beat upon the 50' beach - are cultivated in the east. In the west on the other hand they usually form the wooded parks of the county houses which may date back to feudal times. Houston House/

House and Barachan House are typical examples.

While the 50' contour line is not to be taken as a rigid boundary an unmistakable change in soils and agriculture does occur in its neighbourhood. The area over which this type of farming extends comprises the Parish of Renfrew, half of Inchinnan Parish, South East of Erskine Parish, East of Houston, North East of Kilbarchan and part of Paisley Parish. As the town of Paisley is steadily extending the southern boundary of the belt is further north than the strictly physical conditions would demand.

The region is what is termed "carse land", i.e. land in the subsoil of which material of marine, littoral, and terrestrial origin is interbedded. Owing to cultivation the horizons of the soil have lost their original composition and it is now impossible to prove under what conditions each was deposited. A great variety of material is to be found in this area, e.g. sands, gravels, clays and peaty deposits. Near Renfrew an examination of the subsoil showed beds of sand interspersed often with thin strata of clay and sometimes with peat and the whole deposit occasionally interrupted by large masses of unstratified clay. Oxides of iron such as develop at the foot of bogs were found between layers of sand and shells were found in the sand and gravel beds. Below the alluvium lie deluvial clays which contain boulders of lava rock. Again at Arkleston the examination of a cutting/

cutting showed interbedded sands and gravels overlying shell bearing clays. The upper shells were mainly littoral and those found lower down marine. The whole series rests upon boulder clay.

As may be expected from the variety of deposits there is a great variety of soils. In the Renfrew district these are mainly sandy but contain some peat which provide help to the soil with an essential supply of humus. These soils are easily drained and therefore warm. The district used to be famous for potatoes. Westwards in the Parish of Inchinnan is an area of stiff clay. These are heavy to work but when once broken are very suited to grain crops. The land here is low lying and drainage is difficult. Further west still - East Erskine, East Houston and North East Kilbarchan Parishes - these clays and sand are overlaid with a deposit dark in colour derived from bog vegetation. The marshes which gave rise to this - Dargarval, Barachan and Linwood mosses - have been drained and the land reclaimed mainly within the last hundred years. During the reclamation process part or all of this peaty material was ploughed into the under lying clays and sands and a deep soil rich in humus has resulted.

In this region the physical conditions make arable farming profitable. Because of this and because of the fact that clays which are liable to "puddle" are often unsuitable to cattle/

cattle raising and pastoral interests are relatively unimportant here. The fact that much of the area is reclaimed land is reflected in the presence of the drainage ditches and the embankment on the north bank of the Gryfe. The fields of this region are large and average about twenty acres in extend. Wheat is grown extensively on this type of farm. As, however, the Boghall type of farm, which is dealt with next, is the only other type upon which wheat is grown, it is more convenient to postpone the question of wheat cultivation till after the discussion of the Boghall type. Then the question may be dealt with as a whole.

(2) Boghall Type Area.

The Boghall Type of farm which occurs in the vicinity of Bishopton is the smallest group of any. In the area which these farms cover, the land varies in height from sea level to about 150' above sea level. The conspicuous physical feature of this area is a low ridge (an extension of the western plateau), at the western end of which, i.e. on Hatton Farm, the native rock lies very close to the surface. From this ridge the land falls on its north side to the Clyde and on its south side to the lowlands. While the soils are partially derived from the under lying basalts whose effects are most noticeable on or near the crown of the ridge, and while on the northern flats of the ridge towards the river recent alluvium occurs, the/

the most important factors in determining the soils are the clay, sands and the old peat deposits (of Fulwood type) which steadily increase in depth both north and south of the ridge as the altitude decreases.

The soils and rotations in this area often vary from field to field. One reason for this is that while the heavier soils on the south flank are especially suited to potatoes and will carry this crop three years in succession, the lighter soils at higher levels may carry potatoes for only one year. Again the wheat crop which is grown profitably in the lowlands does not give a satisfactory yield at the higher levels. Further a distinctive feature of this type is the increase of grassland-which is explained by the thinner soils- towards the crown of the ridge.

The better drainage which is due to the natural slope of the land is noticeable.

As previously stated practically all the wheat of the county is grown in the two above types of farms. It is therefore convenient to deal here with the land utilization in respect of wheat.

The cultivation is dependent upon several physical and economic factors. In general for successful cultivation wheat demands a mean summer temperature of/

of three to four months of not less than 55° Fahrenheit. The clay and heavy loam soils are particularly suited to wheat growing but with good farming excellent crops can be produced on light soils. Indeed where the climate is moist a light dry soil is best. Humidity and deep soft soils are unfavourable to the cultivation of wheat, they produce a luxuriant foliage at the expense of the ears. Finally in wet soils, in which other grain seeds would perish, the wheat seed being unusually resistant to moisture does not rot.

TABLE XI.

With reference to temperature the Eastern Lowland of Renfrewshire has a growing season, longer by two or three weeks - if 41.5° is taken as the point of germination - than the western and southern higher land and in the lowland the summer temperatures are a little higher.

TABLE XI.

TEMPERATURES - AVERAGE MONTHLY MEANS.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Greenock 199'	39.8	39.5	40.9	44.7	50.3	55.3	58.3	57.5	53.7	48.4	42.6	40.5
Paisley 106'	39.7	40.	41.8	45.7	51.5	56.5	59.5	58.5	54.3	48.6	42.3	40.3

TABLE XII.

RAINFALL - MONTHLY AVERAGES.

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Paisley 106'	3.99	3.51	3.18	2.32	2.49	2.48	2.86	3.91	3.01	3.74	4.18	5.05	40.72
Wault Glen 280'	5.05	4.1	3.84	2.66	2.84	2.64	3.19	4.28	3.53	4.26	4.94	5.83	47.16
Greenock 199'	5.84	5.62	4.93	3.64	2.45	3.3	3.92	5.44	4.75	5.38	5.42	7.89	61.58
Thornley Muir 645'	4.81	4.29	3.82	3.06	2.98	3.16	3.55	4.86	4.24	4.75	5.15	6.18	50.85

Further the Rainfall particularly in the winter months is lower in the lowlands than in the uplands. This is important because where the land is low-lying - and therefore slow draining - and the soil of a clayey texture, unusually heavy rains in autumn and winter would impede ploughing and sowing. The small local differences in climate undoubtedly have an effect on the wheat cultivation in the county but it is dangerous to over emphasise this factor.

The lowland area/which consists largely of the clays and rich loams is suited to wheat and practically nearly all the wheat of the county is grown there. While it is true that in an area of good farming and comparatively heavy rainfall such as Renfrewshire, good crops can be raised on the lighter soils also, it was found from the Land Utilization Survey that it is not the practice to grow wheat there. The reasons for the localization of wheat in the lowland area of the county must therefore depend on non-physical rather than on physical factors. These non-physical factors fall into two groups viz. the distribution of work in the farming year, and the economic consideration of yields and subsidies.

As regards the former the harvest season in the lowlands is two or three weeks earlier than in the uplands.

Oats/

Oats, for example, are usually cut at the beginning of August in the former area and not till the end of August or the beginning of September in the latter. This in turn means that in the former area the wheat harvest is garnered and the land prepared for autumn ploughing at an earlier date. Further, particularly in the case of the Fulwood farms which carry fewer live stock, fewer preparations have to be made for winter. The farmers, there, therefore unlike the upland farmer who has a later harvest and more preparation to make for winter, have/time to prepare the land and sow winter wheat before the frosts prevent ploughing.

As regards the question of yield and subsidies, and to take the first the question of yield, the figures while they are quoted by the county and not by the parish and therefore give no indication of variations according to soil are none the less of value when compared with those of Scotland as a whole, and England and Wales as a whole, for they indicate the good quality of wheat/land which this lowland area provides.

TABLE XIII.

WHEAT - YIELD PER ACRE.

Year	Yield per Acre.		
	Renfrew	Scotland	England and Wales
	cwts.	cwts.	cwts.
Average 1928-37.	22.4	20	17.6
1935	22.4	23.1	18.3
1937	22.8	22.4	16.1
1938	23.7	22.4	20.3

From the above table it will be seen not only that the average yields of Scotland exceed those of England and Wales but that those of Renfrewshire are higher than either. This indicates that this land is exceptionally suited to wheat growing.

TABLE XIV.

Wheat - 1936. Acreage per Parish and Estimated Yield per Acre.

Parish	Bushels per Acre	No. of Acres	Parish	Bushels per Acre	No. of Acres
Renfrew	44	168	Eaglesham	42	23
Paisley	44	460	Mearns	42	29
Eastwood	44	110	Neilston	40	17½
Cathcart	-	-	Lochwinnoch	40	8
Erskine	40	322	Kilmacolm	-	-
Houston	40	134½	Port Glasgow	-	-
Inchinnan	40	270	Greenock	-	-
Kilbarchan	40	171	Inverkip	38	1

The yield of wheat in the upland parishes is generally speaking lower than in the purely lowland parishes. Because the parish boundaries are not the same as the type divisions it is impossible to separate accurately the lowlands from the upland areas; but from the estimated parish yields for 1936 it can be seen that the purely upland parishes with/

with the exception of Mearns and Eaglesham have a lower yield than the lowland parishes. It is to be noted in addition that the entire acreage under wheat in the former region is negligible.

As regards subsidies the subsidy on wheat encourages the cultivation without affecting its localization. The subsidy is paid to the farmers on the basis of a standard price of 45/- per quarter. When the market price falls below that figure as in practice it always does the Government pays the farmer the difference calculated on the average prices over the winter six months. The subsidy may be claimed only for wheat sold to the flour millers. The oats subsidy unlike the wheat subsidy is reckoned not on the yield but on the acreage sown. The reason for this difference is that because a certain percentage of oats is used on a farm for feeding purposes, it would be impossible to check accurately the total weight. Further as the subsidy is paid per acre the farmer in the upland area is not penalised because of his slightly lower yield. In the case of the wheat subsidy on the other hand which is paid on yield the farmer with the lower yield suffers.

The localization of wheat cultivation in the lowlands may therefore be attributed to the following factors:-

the/

the better climatic conditions, the rich soil which gives a high yield, the fact that the cultivation sorts well with the demands of the farmer's year, and the wheat subsidy.

(3) Eaglesham Type Area.

This type of farm is most common in the county. It comprises the best dairy farms which have about a third of their land under cultivation and is to be found in a belt extending round the highland area and up the valleys. Four main extensions are noticeable, namely the Gryfe and its tributary valleys, the Black Cart Valley, i.e. the Lochwinnoch Gap, the Cawdor Burn Valley at the northern end of the Loch Libo gap round Barrhead and Neilston and the middle White Cart Valley south to Eaglesham village.

The soils of this belt which are extremely varied are primarily derived from three main sources, the native basalts of which the plateaux are composed, glacial deposits and alluvium. The basalts when weathered give rise to a light easily worked loam which when mixed with decayed vegetable matter is of medium fertility. This soil is best developed in the wide undulating valleys of the White Cart and the Gryfe. Glacial deposits are unusual here but some sands of this origin are found south of Eaglesham village/

village. It is in the remaining part of this belt that the main glacial deposits are to be found. The rivers where they leave the plateaux and in the lower reaches of their upland valleys cross a region of boulder clays. These clays cover the underlying carboniferous strata though at higher levels the basalt rock may rise through the deposit. The soils are usually stoney and vary from moderately light to heavy dark grey or brown clay loams; and because the subsoil drainage is often difficult they are rather cold. It has therefore been found advisable to lay them down in pasture for as long as possible and as pasture this land becomes relatively valuable though it gives a comparatively poor yield when cropped. The alluvium occurs along the rivers. The rich light loams are easily worked and as they give good crop returns they lie under grass for a minimum period.

Throughout this belt from Johnstone to Busby along the foot of the scarp edge because of the number of golf courses and the amount of old and new building it is difficult to define any special type of farm. Near Darnley there is indeed some indication of a similarity to the Boghall type; but the area in question is so small and so broken up - by mine dumps, etc., - that it is probably better to classify the whole area as part of the Eaglesham type/

type belt and to designate the golf courses not as permanent grass but as non-agricultural land.

(4) Langbank Type Area.

The Langbank type of farm is found at varying heights and in varying locations. The land on which they are situated is confined entirely to the basaltic plateaux. The peculiar feature of this land is that the soil is isolated into "pockets" by the native rock. Cultivation is profitable only in these pockets and elsewhere the land has to be left under permanent grass. The areas in question - of Langbank farm type - lie along the steep rise of land behind Langbank and in the Spango Valley in the Parish of Inverkip. The soils which are basalt derived are light loams. While in the soil pockets good crops are raised, the rest of the land owing to the thinness of the soil is unsuitable for crops. It is therefore left under grass as much as possible and is not ploughed except when the grass needs renewing.

The third area of this type of farming, namely Dippany, is found in a different type of location. It lies higher than the others and is situated in the upper reaches of the Greenwater valley. The valley here lies high and might be more truly described as a depression in the plateau surface/

surface than as a valley. While in the valley bottom there is a certain depth of light soil, in general the altitude and soil thinness defeat extensive ploughing. The soil is a light loam of basaltic origin. The presence of peat gives it a slight acid tendency which is hostile to plant growth.

(5) Kilmacolm Type Area.

The Kilmacolm type is in general very like the Langbank type just described. As it occurs however at higher levels poorer soils and increased rainfall reduce the possibilities of plant growth. There is therefore a low general cropping acreage and turnips predominate over potatoes in the green crop. The pasture is consequently of prime importance and the land is not broken until the grass shows signs of exhaustion. These farms extend up to the maximum height cultivation and their boundaries lie among the head or ward dykes. Any land lying above the dykes is merely moorland which is used entirely for sheep grazing.

(6) Shieldhill Type Area.

The Shieldhill type is found throughout the whole length of the county and varies little in character from place to place. The land of the farms is typical moorland situated at a level higher than that at which grain will ripen/

ripen. The soil lies in pockets in the rock and is black with a high humus content. Generally they are thin and even where they reach a greater depth there are many small stones. Peat covers most of the area and in conjunction with poor drainage gives rise to acidity. This land can be used only as grazing for sheep or - occasionally for young cattle. The lower boundaries vary from place to place and the ward dykes may be situated at 300' or 800' above sea level. Among the lower areas of these farms much improved pasture now permanent grass is found.

IV. SUMMARY.

In the above Land Utilization Survey of Renfrewshire the land of the county was in the first place divided into three agricultural belts and the relevant general features of these belts were described. Secondly and upon this basis a detailed examination of these belts served to classify the general farming of the county under six types of farm. Finally this differentiation of the farming of the county into types was found to be determined by economic and physical conditions. The economic conditions - industrialization and the consequent development of urban markets - were found to operate generally, i.e. their effect was not to determine the type of farming obtaining in any given area, but/

but to modify that type. The factors which determined the type of farming in any given area were found to be the physical factors, which unlike the economic factors were of partial applicability. Each of the six farming types was found to occur under certain specific physical conditions.

These six farming types and their determining physical conditions may be summarised as follows:-

(1) Fulwood Type.

These farms extend over an area of land under fifty feet above sea level. The soils of the area are mixed heavy clay loams and sand which are peculiarly suited to grain culture. The fertility is high.

The definitive characteristics of these farms are:-

(a) A high percentage of grain producing land;

(b) A low acreage of rotation grassland and an absence permanent grass; and

(c) An absence of any considerable cattle-farming.

II. Boghall Type.

The land upon which these farms are situated is in part similar to the land of the above type; but, at the higher levels, the soil is lighter than in the Fulwood farms. This light soil is less suited to grain and more to the pasturing of cattle.

The/

The farms here are very similar to those of the Fulwood type. As opposed to these, however, the Boghall farms show a greater concentration on potato culture, a high acreage under rotation grass and a definite interest in cattle husbandry

III Eaglesham Type.

This is the most common type of farm in Renfrewshire. The soils, derived from weathered boulder clay (which is unsuited to grain culture) directly determines the large proportion of grassland which is the definitive feature of this type of farm.

The main interest of these farms is dairying. Only about one third of the land is ploughed annually. One half is in rotation grass and about one third in permanent grass.

IV. Kilmacolm Type.

As opposed to those of the previous types the farms of this type occur at higher levels where the soils are thinner. Arable farming is consequently less profitable here and the tendency is to leave as much land as possible under permanent grass.

Like the above Eaglesham type the farms are interested in dairying; but in contrast with them, less of the land is ploughed annually and the acreage of permanent grass/

grass greatly exceeds that of rotation grass.

V. Langbank Type.

These farms show a marked variation in size which is dependent upon the amount of roughland which each includes. Compared with those of the above Kilmacolm type, they occur at a lower altitude where climatic conditions are more favourable to arable farming. Green crop and hay acreages are therefore higher.

The farms of this type are dairy farms. They may also, however, carry fair sized flocks of sheep.

VI. Shieldhill Type.

The farms of this type are situated on the moors. The poor soil condition in conjunction with the elevation makes arable farming virtually impossible.

The farms of this type are therefore sheep farms.

It is to be noted that in addition to the above six types of farm there was found in Renfrewshire a seventh type of land utilization confined to no one of the preceding "type areas", viz. small holdings. These are either given over to intensive farming and produce eggs, poultry and pigs or are developed as small general farms of the Eaglesham type.

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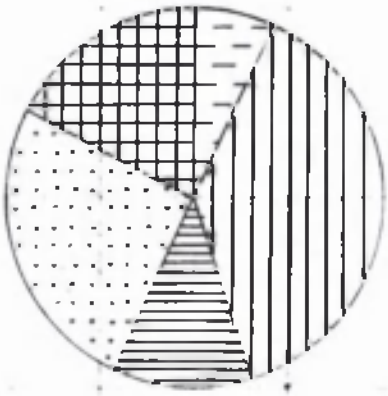
Fig.4.

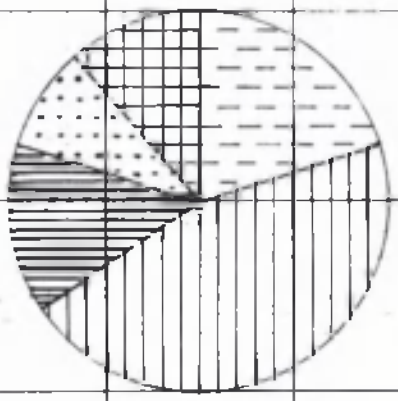
Diagramatic Representation of the Acreage under the VARIOUS CROPS - excluding ROUGHLAND



KEY	ACREAGE	%
Grain	Grain	19
Green Crop	Green Crop	26
Hay	Hay	9
Rot.Grass	Rot.Grass	40
Perm.Grass	Perm.Grass	7

Fig 5.

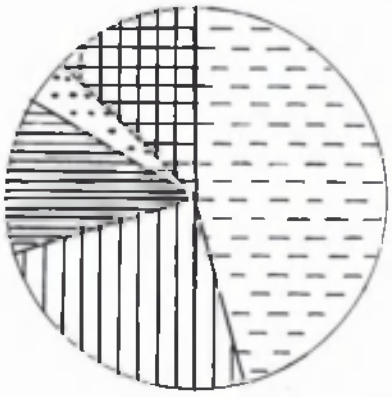
Diagramatic Representation of the ACREAGE under the VARIOUS CROPS - excluding ROUGHLAND



KEY	ACREAGE	%
Grain	Grain	10
Green Crop	Green Crop	7
Hay	Hay	23
Rot.Grass	Rot.Grass	48
Perm.Grass	Perm.Grass	20

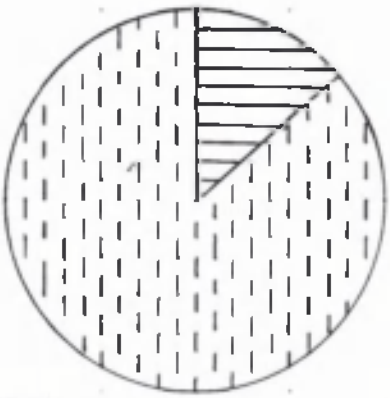
Fig.6.

Diagramatic Representation of the ACREAGE under the VARIOUS CROPS - excluding ROUGHLAND



KEY	ACREAGES	%
Grain	Grain	14
Green Crop	Green Crop	3
Hay	Hay	14
Rot.Grass	Rot.Grass	22
Perm.Grass	Perm.Grass	47

The ACREAGE under FARMLAND and ROUGHLAND



KEY	ACREAGE	%
Farmland	Farmland	7·5
Roughland	Roughland	92·5

FIG. VII. MAP - Showing Location of FARMS below the MOOR.

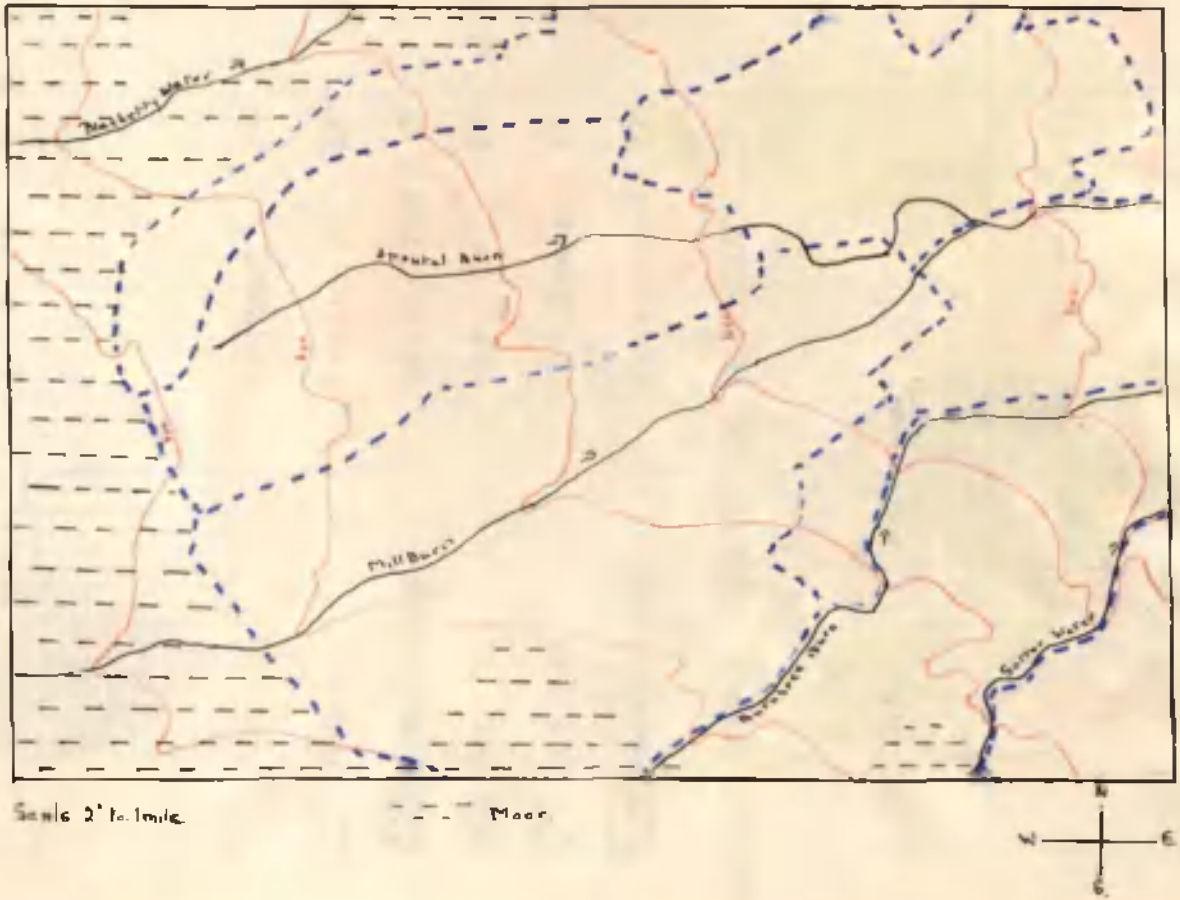
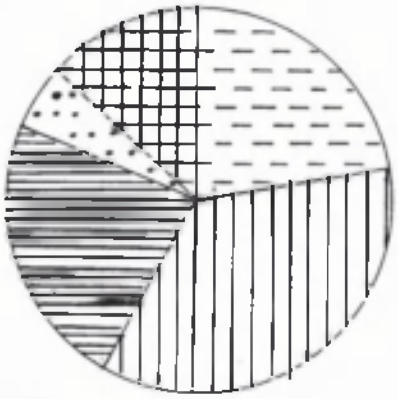


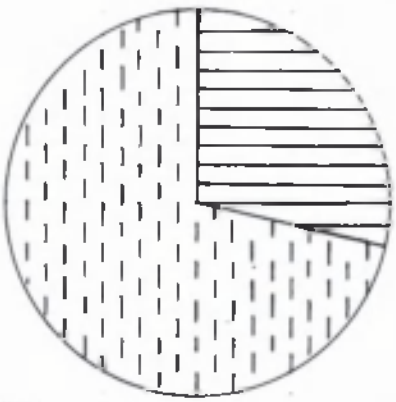
Fig 8.

Diagramatic Representation of the ACREAGE under the VARIOUS CROPS - excluding ROUGHLAND



KEY	ACREAGE	%
Grain	Grain	13
Green Crop	Green Crop	8
Hay	Hay	23
Rot.Grass	Rot.Grass	34
Perm. Grass	Perm.Grass	22

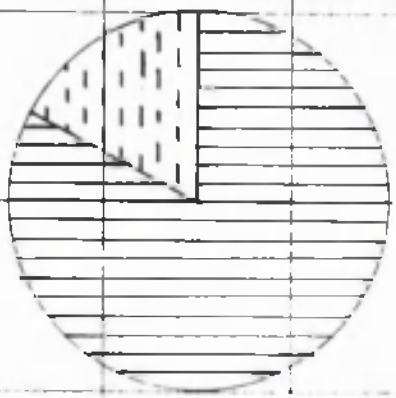
The ACREAGE under FARMLAND and ROUGHLAND



KEY	ACREAGE	%
Farmland	Farmland	68·5
Roughland	Roughland	31·8

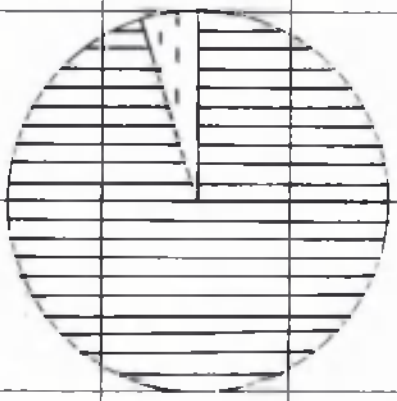
Fig.9

Diagramatic Representation of the ACREAGE under FARMLAND and ROUGHLAND



KEY	ACREAGE	%
Farmland	Farmland	16
Roughland	Roughland	84

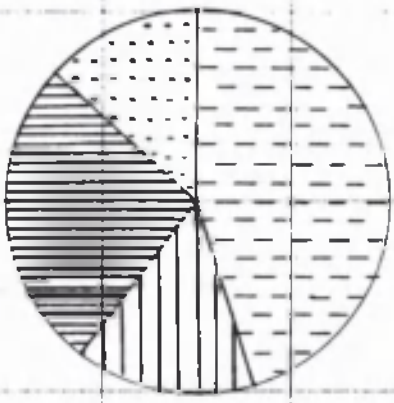
Diagramatic Representation of the ACREAGE under FARMLAND and ROUGHLAND



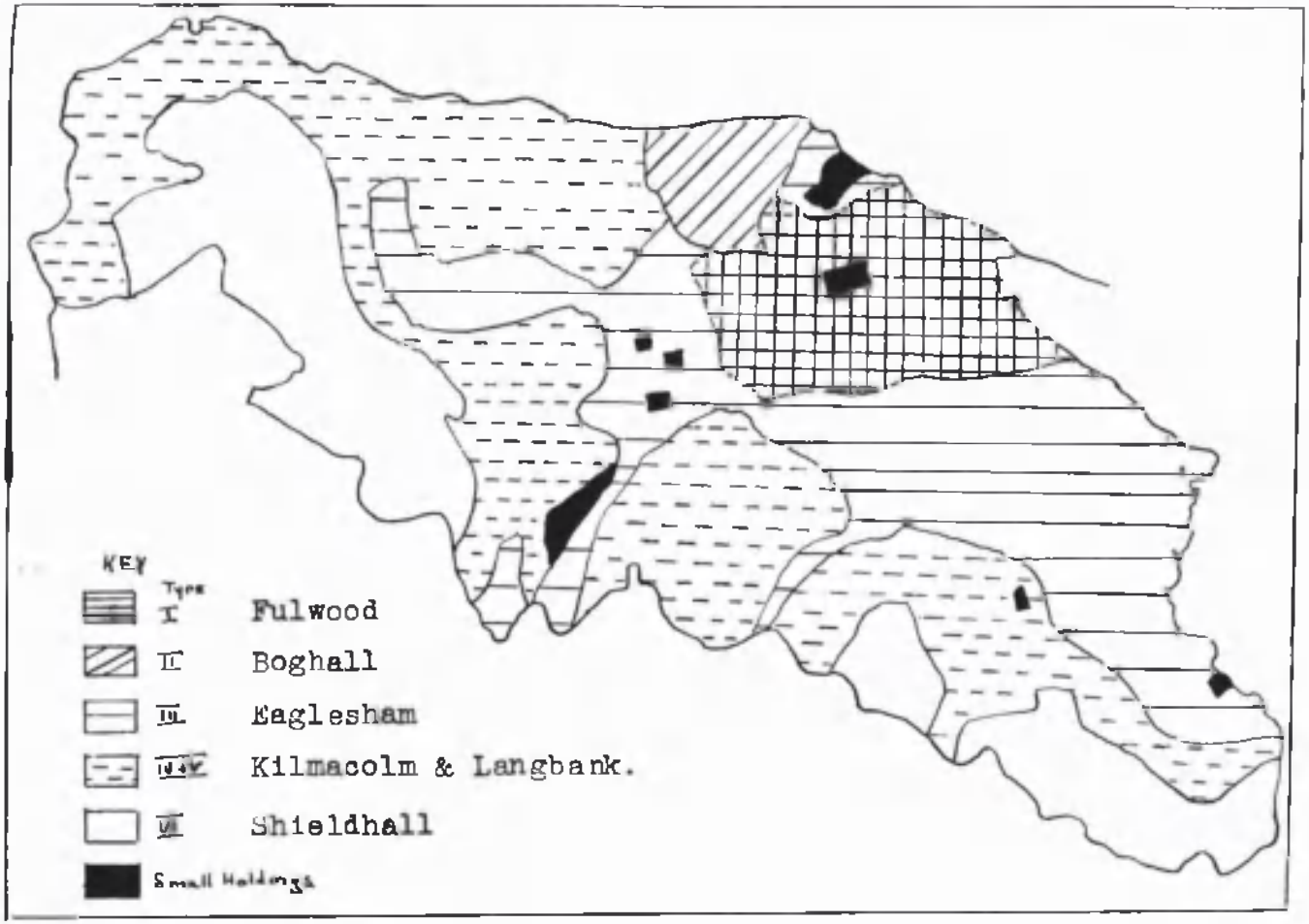
KEY	ACREAGE	%
Farmland	Farmland	4.5
Roughland	Roughland	95.5

Fig.10.

Diagramatic Representation of the ACREAGE under the VARIOUS CROPS - excluding ROUGHLAND



KEY	ACREAGE	%
Grain	Grain	0
Green Crop	Green Crop	13
Hay	Hay	25
Rot.Grass	Rot.Grass	16
Perm.Grass	Perm.Grass	46


KEY
Type
I
Fulwood
II
Boghall
III
Eaglesham
IV
Kilmacolm & Langbank.
V
Shieldhall
Small Holdings