THE RURAL SETTLEMENTS OF THE CANTERBURY PLAINS
IN THE AREA BETWEEN THE RAKAIA AND
WAIRAKARIRI RIVERS

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University of New Zealand Thesis presented for
the Degree of Master of Arts in Geography

University of Canterbury

1960
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ACKNOWLEDGEMENTS.

Special acknowledgement is made to assistance given by the following:-
The Soil Survey Bureau, D.S.I.R. who provided much information on the physical background; the Meteorological Department who provided climatic data; the Lands and Survey Department who made available records of initial land purchases and early maps; also Mr George Graham of Timwald for access to his unpublished manuscript; Mr David Habgood of Lincoln, Mr J.T.B. Purser of Leicester and the staffs of the University of Canterbury Library and the Christchurch Public Library.

The information on the function and tributary regions of the various settlements were provided by numerous local people and their interest and assistance is also gratefully acknowledged.
As Urban Geography has developed in New Zealand over the past decade, there have been a number of studies on Rural Settlements. Following on the work of such overseas students as Trewartha in the United States, Dickinson in Great Britain and Europe, and Andrews in Australia, the New Zealand field was pioneered by Anderson with his study of the rural villages in the counties immediately north of Auckland city. Then, in conjunction with Franklin, Anderson published a detailed study of the villages of the Waikato in 1955 which examined the rural settlements of a second selected area. About the same time, Lister reviewed this aspect of geography and discussed the New Zealand field in its wider relationships, indicating the material that is available and suggesting some of the lines along which fieldwork should proceed. In the light of increasingly theoretical studies overseas, the plea which Lister makes for the assessment of settlement data within a regional context is a refreshing one. In the most recent study, Carter has chosen an area in the Waikato and uses to advantage the methods established by the earlier workers.

Since detailed studies have been made of the character of rural settlement in three distinctive areas of the North Island, an investigation of the rural settlements in a typical area of the Canterbury Plains would now seem appropriate. Settlement here has evolved in a physical and historical setting which clearly sets this region apart from others in New Zealand. It is hoped that similar studies will be made in other areas of New Zealand.

In their works on selected areas, both Anderson and Carter reflect an attitude which can almost be regarded as a characteristic of Urban Geography in New Zealand. Formall has expressed it thus:—

"The primary aim of Urban Geography ... remains as the description and interpretation of the personality of a town and only secondly the explanation of the way in which its character was formed."

Rather than follow description with explanation, Formall suggests a study of specific problems and the advancement of some opinion on the possible future of the area. In most New Zealand studies, contemporary changes
receive more attention than does the explanation of the character of settlement as it exists today. In many cases full explanation of settlement character is not possible but overseas writers such as Trewartha, in his study of the American unincorporated hamlet, and Thorpe, who investigates the green villages of County Durham, have given much greater emphasis to this latter aspect. The present study endeavours to explain as well as describe the character of the rural settlements in the Canterbury region.

The primary aim of this study is to describe the character of rural settlements and, as far as is possible, to suggest explanations of this character. Many features remain unexplained and some cases the search for reasons has posed more questions than it has answered. Nevertheless this combined aim of description and explanation has been both stimulating and rewarding.

In order to achieve this aim, the foundations of the study have been an investigation of the physical background together with a reconstruction of the sequent occupancy. With this information available, it has been possible to study the evolution of the settlements themselves and to analyze their character as it exists at the present time. In order to gain greater understanding of those nucleated settlements existing today, all such settlements and district centres existing in the past or present have been investigated.

The second aim of this study is to investigate the extent to which the present day character of the rural settlements in this area is a reflection of the aims and ideals of the Canterbury Association planners. In their desire to create in New Zealand a pattern of life that reflected the best in English Society of the early nineteenth century, but avoided its defects, E. C. Wakefield and his fellow theorists appear to have visualized a pleasant agricultural countryside dotted by a number of neat, compact villages where the labouring and small tradesmen class worked to provide goods for a landed aristocracy. Although the social organization envisaged by Wakefield did not develop, the extent to which the character of the landscape and the rural settlement in Canterbury is a reflection of the theorists' aims is a subject of no little interest. This second aspect
of the study is intended not so much as a contribution to settlement geography, as an attempt to use the results of a geographic study to answer a question more properly posed by an historian or an historical geographer.

The area of study is that portion of the Canterbury Plains between the Rakaia River and the Waimakirir River. (see fig. 1) Inland, it is limited by the change of slope that marks the junction of plain and foothills. A similar change of slope excludes Banks Peninsula from the study. The remaining boundary is the limit of the Christchurch Regional Planning Authority Area. This arbitrary line is convenient in that it excludes the Christchurch Urban Area and a number of villages such as Templeton, Islington and Belfast which have been strongly influenced, and in some cases are being absorbed, by the spread of the metropolitan centre. It is felt that these latter settlements would more properly be included in a study of the rural-urban fringe of Christchurch.

This area embraces a typical cross section of the Canterbury Plains with a representative range of climatic and drainage conditions together with all the more important soil types. It was an area within the Canterbury Association block directly adjacent to the first settlement at Christchurch and, with a similar area north of the Waimakiriri River, forms the "hearth" of the larger region. The two major rivers bounding this area have proved obstacles to communication with the adjacent areas of North Canterbury and Mid-Canterbury with the result that the settlement net within these natural boundaries is a fairly self-contained one. Today it contains forty-six examples of the various categories of nucleated settlement and district centres discussed17 and it has been a convenient area in which to carry out field work. Thus, besides being a part of the Canterbury hearth area which is representative of the whole of the Canterbury Plains region, it forms a balanced, well defined and convenient unit for study.

For any place to be regarded as a rural settlement it is generally agreed that there should be sufficient agglomeration for the field worker to be conscious of a perceptible node in the settlement fabric.18 At the same
FIGURE 3. NATURAL ROUTEWAYS.

KEY
- ROUTEWAYS USED AT PRESENT
  - Red: Road
  - Black: Railway
- ROUTEWAYS ONCE PROPOSED
  - Green: Road
  - Orange: Railway
- RAILWAY SPACE TAKEN UP
  - Blue: Road
  - Grey: Railway

NORTH
TO ARTHUR PASS
TO BROWNING PASS
CH-CH
TO LYTTELTON
TO LITTLE RIVER

MILES
0 5 10
time, one or two isolated cultural or servicing units may serve as a focus for a farming district, especially if they are located at a place where other such units have existed in the past. Keeping this in mind, a four-fold classification of settlements in the study area has been made on the basis of number and complexity of functional units. Population as an alternative criteria was discarded as the census returns do not differentiate the population of smaller unincorporated centres from surrounding rural population. This, however, is not regarded as a disadvantage, as Christaller suggests that through the income mechanism the population of a centre is a function of the number of goods and services that it provides. The four classes of settlement representing successive stages of growth have been named respectively District Centres, Hamlets, Villages and County Towns. Definitions used by other students of settlement geography have been modified and adapted to suit the settlement net under discussion. The definitions are as follows:

1. District Centre: A unit, or units, of non farm settlement, such as a church, hall or garage, which do not form part of a recognisable agglomeration of settlement but which serve in one or more ways as a focus for the surrounding rural district.

2. Hamlet: A settlement with an index of at least five and not more than twelve functional units, "so spaced as to give an appearance of compactness exceeding that of ordinary homestead spacing." The index to be computed on the basis of two points each for commercial or industrial units and schools and one point each for cultural units such as churches and halls.

3. Village: A village must have an index of over twelve functional units including some of more advanced function such as a separate post office or a motor-engineering establishment. It should provide sufficient services to meet the day to day requirements of its local district, but will generally be lacking in any of those services which characterise county town.

4. County Town: These are settlements which provide a wider range of services for a larger region consisting of a number of districts each with its own locality centre, hamlet or village, together with a range of services and administrative functions not normally found in villages. These include such services as banks, stock and station agencies and the administrative
offices of county councils or government agencies.

The paper which follows is divided into two sections. The first of these consists of a chapter on the physical background, followed by a chapter in which historical factors such as the spread of settlement, the growth of communications and changes in farming techniques are discussed. From the wealth of material that is available, those physical and historical factors with the most direct bearing on the present character of settlement have been selected, and, where possible, presented cartographically.

In the second part, the analysis of the settlements themselves has followed a fairly well established pattern of investigation in this field. It is organised under the headings of Location and Site, Evolution, Morphology and Function. In the final chapter, the character of each of the types, and of the settlement set as a whole, is summarised and an answer is suggested to the question posed regarding the influence of the Canterbury Association planners on rural settlement in this region.

Published sources referred to in the bibliography together with topographic and soil maps available gave an excellent coverage of the physical background. With no great variation in the surface slope or the climate the most significant factors appeared to be the soils, surface water and drainage, and natural vegetation. The soil map contained a wealth of material and, with the aid of the officers of the Soil Survey Bureau, a map of agricultural potential for the area was prepared. Realising that natural vegetation boundaries, and more particularly the exact location of the margin between swamp and tussock grassland, would be of major significance to the early settlers, efforts were made to define these. A number of early published and manuscript maps held by the Lands and Survey Department, Christchurch, showed some of the information, and further deductions were made from the soil map.

Although there is a considerable amount of material on the spread of extensive pastoralism in Canterbury, detailed information on the spread of the agricultural frontier is very meagre and much of this from such dubious sources as the "Cyclopedia of New Zealand". Fortunately, from the list of initial land sales recorded by the Lands and Survey, together with the
relevant New Zealand cadastral maps, it was possible to find when each
individual block of land was freeholded and thus to map the spread of
permanent rural settlement. With the aid of local histories and map sources,
the development of the road net could in part be traced, while the New Zealand
Railways Geographical Mileage Table gives accurate information on the dates
when the various sections of railway were first opened for traffic.

Location and site could be studied from both observation in the
field and map sources. Local histories and other references such as licenses
for accommodation houses were important in a number of cases, as was the information
on natural vegetation previously referred to.

In studying the evolution of settlement it was found difficult to
correlate references in local histories, and statistical sources did not cover
these smaller settlements. A more comprehensive and objective picture of the
functional development of these settlements was obtained from Post Office
and Trade Directories. Published at five year intervals from 1875, Wise's
Post Office Directory listed the occupations of all householders. Assuming
that those people other than freeholders and farmers worked in the settlement
where they lived, this information was plotted cartographically to indicate the
growth in size and function of the settlements including most of those which
are now "district centres".

Base maps on which to show morphology were obtained by enlarging
traces made from vertical air photographs. The approximate location and
the function of all buildings was plotted in the field by pacing methods.
The relative spacing of the buildings is substantially correct although the
location of buildings should not be regarded as exact in view of the survey
methods used.

Information on function was obtained by observation in the field,
interview and reference to directories. Where possible the extent of the
tributary region was ascertained by interview but results were often unreliable
and only broad generalisations could be made from the conflicting evidence
obtained. Following the methods of Berry and Garrison a functional
hierarchy of settlements was established for the study area.


9. Lister; op.cit., p. 921


12. Loc. cit.


15. See page 4 for definition of District Centres.
Thomas, J.: Sketch Map of the Country Intended for the Settlement of  
Canterbury, mss. map, Canterbury Museum, 1849.

17. See Chapter 7.


19. Discussed by Berry and Garrison, op. cit.

20. See for example: - Trewartha, loc. cit., Brush, op. cit., p. 385.,  
Lister, op. cit., p. 918, Carter, op. cit., p. 6.

21. Trewartha: loc. cit., provides this definition of nucleation.


23. List of Sections Purchased. Vols 1 to 4 held by Lands and Survey  
Department, Christchurch.

24. Wise's New Zealand Post Office Directory. Dunedin. 1875, 1885, 1895,  
Auckland, 1956.  

25. Vertical Aerial Photographs. Scale 20 chains to 1 inch. Held by  
Lands and Survey Department, Christchurch.

CHAPTER 140
THE PHYSICAL SETTING.

The Canterbury Plains and the region under study have been formed from the erosion of the great mountain ranges that border them to the west. In the area of study the lower and younger Selwyn Hills have separated the plains from the mountains without modifying the structural relationship between the two.

In earlier geological times the combined effects of higher rainfall and greater glacial action eroded the mountains, which may then have been more elevated, at a much greater rate than is today the case. The rivers flowing eastwards from these greywacke mountains deposited their excess sediment load at the point where they debouched into a relatively shallow sea. As this deposition continued, great coalescing shingle fans were formed which spread out from the mountains and were eventually to tie the volcanic island of Banks Peninsula to the mainland. The bulk of the area under study was thus deposited by the earlier and much enlarged forerunners of the present day Hakaia and Waimakariri Rivers.

After a considerable period of relatively rapid erosion, temperatures seem to have risen and precipitation and glacial activity slackened. As a result the rivers were reduced in volume and sediment load and they began to cut into their own fans until they now flow into beds that are four hundred feet below the surface of the plains at their inner margins.

Since this time they have continued to build secondary fans covering the feet of the older fans. Those more recent fans are made of finer sediments and slope much more gently towards the coastal margin of the plains. The average slope between Dunedin and Invercargill (fig. 2) for example is fifty-seven feet to the mile, while between Waimakariri and Te Piri it is twenty-one feet to the mile.

Meanwhile secondary river systems, with their sources in the foothills, have developed in the interfan depressions where they have deposited finer sediments similar in character to those of the lower fans of the major rivers. In the study area, these secondary river systems are represented by the Selwyn
Between the present mouth of the Rakaia River and Banks Peninsula, wave action has formed a broad shingle bank. Behind this bank a much more extensive Lake Alloswore was ponded up and at one time received both the Rakaia and Waimakariri rivers. Gradually it was filled in by the finer sediments carried down by these rivers before they moved into their present positions.

The area under study has thus been made up of sediments carried out from the western mountains by the Rakaia and Waimakariri rivers. Although it forms part of the most extensive plains in New Zealand there is a considerable gradient from the coast to the inner margin and significant variations in microslope, the nature of the surface deposits and the character of drainage and surface water supply. It can readily be divided into four landform units (see fig. 2) whose character can be closely related to the processes just described. These four units differed significantly in soil quality and offered very different possibilities for settlement.

1. The Older Alluvial Fans.

These broad interfluves are separated from their entrenched rivers by a series of terraces. Near Springfield the fan rises to 1300 feet and is 400 feet above the bed of the Waimakariri River three miles away. The Rakaia is similarly entrenched, while the Selwyn lies on the surface of the plain between the two fans.

Formed of coarser gravels during the periods of maximum deposition these fans are very porous. Except for some glacial deposits near Windwhistle and sand dunes to the south of the Waimakariri, they have a very level surface, although each slopes at approximately forty feet to the mile away from its apex. As a result of aridity and lack of an adequate vegetation cover most of the finer surface silts have been removed by wind erosion. Their uniform expanses show little variation in soil or surface vegetation.

Excessive drainage, stony soils and lack of surface water have provided obstacles to settlement on these older fans. The excessively free drainage has been aggravated by the fact that the area has only a moderate rainfall and is exposed to desiccating nor-west winds. The size of the initial deposits and the exposed nature of the surface have prevented the formation of a silt or loess covering over much of the area. Furthermore there was
a lack of surface water as both the rivers and ground water level are far below the surface of the plains. These three factors combined to make the upper fans unsuitable for arable farming and provided obstacles to be overcome before the pastoral possibilities could be used to their best advantage.

The Younger Alluvial Fans and the Interfan Depressions.

The younger or secondary alluvial fans were deposited by the Rakaia and Waimakariri rivers after the period of maximum deposition. The interfan depression contains the finer sediments deposited by the Selwyn and its tributaries. Both are areas where ground water and silt from the older fans have naturally accumulated. The two areas merge together so imperceptibly that they are best considered as a single unit.

They may be distinguished from the older alluvial fans in a number of ways. They have a less level topography, more adequate ground water, and a greater variety of soil types. Towards the upper margins there are a number of low terraces which gradually change to a system of levees and there are again a number of sand dunes south of the Waimakariri. In spite of the more varied topography the slope seawards is less than on the older fans.

In contrast to the overfree drainage of the upper fans this is an area where much of the run off from the higher plains reappears at the surface. As a result of a number of smaller creeks have their sources here and some parts have contained swamp.

Thus the soils here are more diversified and generally more fertile as the gravels are usually overlain by a covering of silt or less fifteen inches or more deep. Finer sediments, greater humus content and adequate but not excessive soil moisture combine to produce here some of the finest arable land in Canterbury.

Within this area there were some less favoured parts; some of the higher margins lacked surface water, others bordering the lower Waimakariri and the lower Rakaia were excessively stony or sandy and parts proved difficult to drain. Generally speaking however it was this area of the plains which offered the best possibilities for settlement as the soils were of good quality and water supplies, both surface and subsurface, were adequate for stock and household needs.

The Lowland Fringe.

The lowlying area close to the sea contains finer material made up
of both marine and alluvial silts. There, in lagoons or lakes ponded behind
the storm beach finer materials were deposited. Then in more recent times
much of this area has again received a covering of river deposits and ribbons
of sand or gravel remain where rivers have been. These latter have been very
significant in the settlement of an area that was elsewhere swampy and difficult
to drain.

The flat, lowlying nature of this fringe, together with the fine
sediments, impeded drainage and resulted in extensive areas of swamp. There
drainage was required before the land could be effectively occupied and arable
farming had to be modified to suit the wetter conditions.

(4) The Coastal Margins.

The area shown as coastal margins is largely unsuitable for settle-
ment. It contains sands and gravels, which represent post lake or sea
margins, together with a large area which was periodically flooded by Lake
Ellesmere. During this century the lake level has been artificially con-
trolled and the area liable to flooding is less extensive than formerly.

Apart from their influence on the settlement of the region,
physical features have an important influence on lines of communica-
tion. Surface features provided few obstacles to communications. Apart from the
terraces of the upper Rakaia and Waimakariri there were few steep slopes
and the Selwyn and its tributaries were readily bridged, although they were
to have a significant influence on local patterns of communications and the
tributary regions of the smaller settlements. The major obstacle to be
avoided was the swampy margin of Lake Ellesmere.

Physical features were to have their greatest influence on the
lines of communication which extend beyond the study area. Each of the
natural features bounding the area formed an obstacle to communications and
there were certain points that would inevitably occupy a key place in any
well developed system of communications. (fig 3). Both the Rakaia and the
Waimakariri had wide gravel river beds and their shifting and braided
channels were difficult to bridge permanently. Both could be more easily
bridged at their gorges and to the present time both have been bridged at only
two points. The Rakaia Gorge also opened up the way to the Browning Pass and for a short time it seemed that this might become the main road and rail route to the West Coast. The Arthur’s Pass it was to be however, and Springfield became the gateway for both road and rail communications to the Coast. Land routes to Banks Peninsula were to skirt the edge of the plains before turning up one of the several valleys. This was a region that would hold an important place in any pattern of land communications that could be developed to link the settlement at Christchurch to the south and east and west of the South Island.

Within this relatively small area of the Canterbury Plains there are no great variations in climate. Rainfall increases inland from 25 inches annual average near the coast to 40 inches at Glentunnel (fig 4.). This is fairly evenly distributed throughout the year but droughts are fairly common in summer and autumn when evaporation exceeds rainfall to the detriment of both crop and pasture production. It is this factor of excessive evaporation, together with the very free drainage, rather than inadequate rainfall that accounts for the relative aridity of the older shingle fans. By comparison the lower rainfall totals of the lowland fringe are more than adequate in normal years.

Temperatures are moderate with a mean average of 52°F. Frosts are experienced with increasing severity and frequently inland (table 1). Pasture growth is halted during the frost period and winter feed must be provided for stock.

<table>
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<th>TABLE 1: Annual Average Number of Days of Soreen Frost</th>
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<td>Christchurch (1905-55)</td>
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<td>Lincoln (1881-55)</td>
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<tr>
<td>Eyrewell (State Forest) (1951-58)</td>
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<tr>
<td>Darfield (State Forest) (1959-55)</td>
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<td>Lake Coleridge (1917-55)</td>
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The soils within the area are formed from silts, sands and gravels
ALL FIGURES ARE GIVEN IN INCHES AND REFER TO THE PERIOD 1921-50.
derived from greywacke. They vary according to the age of the parent material, the depth of their loess or silt covering, and the nature of the drainage which has in turn controlled the natural vegetation. They are thus closely related to the structural units described earlier in this chapter.

With the co-operation of the Soil Bureau of the D.S.I.R., a map has been produced which classifies the soils of the area in terms of their agricultural potential. (fig.5).

When the first settlers arrived the impressions they received of the Canterbury Plains varied from 'A sea of golden tussock' to 'A dreary swampy plain ... which might extend, for ought we could see, over the whole island'. The vantage point was the same in both cases but the weather was different and both statements contain an element of truth about the natural vegetation.

Apart from the sand dune association of Birdlings Flat and similar areas there were three main types of vegetation on the plains when the white settlers first arrived. (see fig. 6) Each was closely related to the supply of moisture and hence to the physical structure of the plains.

The most extensive was the tussock grass land which occupied all of the higher and drier plains. There, the two dominant plants were the "low" tussocks Poa caespitosa and Festuca novae-zelandiae. On the better land these formed a semi-continuous mat that proved difficult to cultivate until the improved ploughs invented in the 1860s became available. In other areas woody shrubs such as wild Irishman (Discaria tomatou) and manuka or tall plants such as Spaniard grew above the tussock cover. These plants together with the inedible nature of the mature tussock were to encourage the practice of burning off by the early pastoralists.

The existence of tussock grassland rather than forest vegetation in an area which today supports many acres of plantations has been attributed to the inability of forest to establish itself naturally. Cockayne points out that although trees grow well, even on the drier plains, they cannot be sown broadcast but must either be planted, or have their seeds covered by soil. Towards the swamp margins, however, there is evidence to suggest
that an earlier forest vegetation that had developed under wetter conditions, was destroyed by fire in pre-European times. 8

The second important vegetation association was that found in the ponds and swamps which are found mainly in the coastal strip so often referred to by the earlier writers as the "agricultural land."7 In the deepest water raupo alone would be found but where it became shallower Phormium tenax and Rigorhead (Corex secta) became the most important plants. Around the margins herbs such as buttercup were more common and, where peat had formed, shrubs could be found. Once the water was drained from such areas the early settlers with a limited range of equipment found that the swamp land could be brought into cultivation much more rapidly and economically than the tussock grassland.

The other important type of vegetation found on the Canterbury Plains, swamp forest, does not seem to have been present in the area. Although it occupied comparatively small areas, swamp forest was very significant in the establishment of small settlements in adjacent areas as at Rangiora, beyond the Waimakariri, and Papamoa, later to be absorbed into Urban Christchurch. Apart from a limited amount of Black Beach (Nothofagus solanderi), and a few podocarps at Kowai Bush, the area considered was without timber although some supplies were available from Banks Peninsula Oxford and Rangiora.

2. The landform division was prepared on the basis of information supplied by the Soil Survey Bureau, Christchurch.


4. Information on frost frequency and rainfall was supplied by the New Zealand Meteorological Service, Wellington.


CHAPTER THREE

THE SPREAD OF SETTLEMENT AND
THE DEVELOPMENT OF COMMUNICATION

The Canterbury Association area selected by Captain Thomas, consisted of 2,500,000 acres extending from the Ashburton to the Waipara Rivers. Here the carefully thought out theories of W. G. Wakefield and the results of two years' careful preparation by the Association were to be put into practice under the personal leadership of John Robert Codley. Using the experience of the earlier established colonies, and the Wakefield doctrine of a "fixed, uniform and sufficient price," they began the establishment of this Church of England settlement in December, 1850 when the main body of colonists and emigrants arrived at Lyttelton.

The settlement was formed with the intention of transplanting a cross section of the best of English society, complete with everyone from Bishop to artisans and labourers, and to establish here the social organisation and the institutions of the homeland which were being threatened by the Industrial Revolution. The "sufficient" price of £3 per acre for land would, they believed, encourage the development of compacted settlements surrounded by "smiling agricultural lands" and the money thus obtained could be used for the threefold purpose of paying expenses (or even to return a profit), providing funds for the establishment of Churches and schools, and assisting further selected immigrants to maintain an adequate supply of labour. Although not to be prohibited, pastoral activities were to be subordinated to agricultural ones on the grounds that the former would cause undue dispersion and discourage land sales.

At the end of the first year of settlement it might have seemed to the casual observer that the scheme was well on its way to fruition. Growing towns were established at Christchurch and Lyttelton and practically all of the 14,000 acres purchased were either around the shores of Lyttelton Harbour or within six miles radius of Christchurch. Following the example of the Beanes Brothers at Riccarton, and using the methods familiar to them in England, the Pilgrims had started to clear their small holdings and to plant crops of wheat, oats and potatoes. The agricultural frontier might have been expected to extend steadily outwards from the young town of Christchurch.

In spite of its appearance however, all was not well in the infant
settlement. The limited local market for agricultural produce, the cost of clearing the land, and relatively high wages, made agriculture a hazardous business for any but the small farmer relying on his own labour. Following a series of droughts in the late 1840's Australian graziers with large capital and surplus stock were arriving at the settlement eager to occupy the natural grasslands. Land on the plains beyond the Association block was available at low rental under Pastoral licenses which allowed pre-emptive rights and for compensation/improvements, while the Association's system of leases involved high rents and offered no security of tenure.

John Robert Godley was placed in a dilemma. To offer cheap pasturage would reduce land sales and, while providing an outlet for the capital and energies of the gentleman class, it would threaten the whole ideal of compacted agricultural settlement and bring him into conflict with the Association. Alternatively to refuse cheap pasturage would drive away wealthy and experienced settlers and lose a chance to provide a sound economic basis for the young settlement. In view of world prices, costs of production and transport, wool was the one commodity that could provide an immediate and adequate return.

Backed by public opinion in Canterbury, but in the face of misgivings by the Association in England, Codley issued new pastoral regulations in February 1852 which offered pasturage licenses on terms comparable to those of the New Zealand Government's Crown lands Ordinance of 1851. The effect was immediate and far reaching. Climate and vegetation were ideal for extensive grazing, large reservoirs of sheep were available and could be imported cheaply from Australia or driven in from Marlborough. As A. H. Clark has shown, wool was the most profitable of possible alternative uses for the land and the Australian graziers were on hand to seize the opportunity. They demonstrated the techniques that were quickly copied by the local capitalists and the first wave of settlement rapidly flowed across the plains.

Within the short space of ten months the whole of the grassland and much of the swamp margin were leased as pasturage runs. The pastoral frontier spread rapidly up the south bank of the Waimekariri, around the margins of the Malvern Hills and burst over the rest of the area. Wire fencing was not yet available, and drinking water an essential, so runs of necessity were large blocks fronting on to streams or rivers. Methods were simple and little equip-
ment was needed. Setting out with a bullock dray loaded with tools and provisions enough for four or five men, the squatter would endeavour to establish his sheep yards on the site of the station homestead before his mob of sheep arrived. Such sites were selected close to water and at a point where all parts of the run could be reached easily. Good soil for a garden and natural facilities for making paddocks would be additional advantages. Buildings at first would be primitive - a tent or a grass where which could be followed later by a sod or cob hut which might also be used as shearing shed or wool store. The needs of the pastoralists were few and did not extend much beyond tea and flour to complement their mutton diet. When shearing was completed wool would be taken by bullock dray to Christchurch and fresh provisions carried on the return journey. As the run became established new buildings would be added, additional hands employed, and an area of land brought into cultivation to meet their own needs for food and animal fodder.

With its large units the Pastoral phase was associated with relatively sparse settlement. Duncan, who has constructed a map of population distribution for 1861, says that less than 20 per cent of the population was to be found in the pastoral areas. The only settlement units to be found on the plains were the station homesteads, the isolated shepherd's or boundary rider's hut and the occasional accommodation house usually located at river crossings. Some of the station homesteads, rebuilt in a more substantial form, have survived to the present day as larger than average farm dwellings, but in no case have they given rise to villages. Their needs were such that they do not seem to have encouraged the growth of rural settlements; their provisions were brought by bullock dray once or twice a year from Christchurch, their children were sent to school in Christchurch or educated by Governess and their spiritual needs met by itinerant clergy who conducted services in their homes. For reasons not fully understood the accommodation houses - for the most part located away from the railway or what have now become the main roads - did not give rise to any more permanent form of settlement in the study area. The one exception to this was Halfway House on the Great South Road which was owned by William Meeden and formed one nucleus of the settlement which carries his name.

The early squatters and the early farmers seem to have been two distinct groups; sometimes tolerant of each other, sometimes jealous of the
use the other made of the land. They differed in background, in interests and in material needs. The development of village settlements was almost entirely related to the spread of the agricultural frontier. The small farmer with limited capital needed a local store to provide his provisions, a blacksmith to maintain his tools and machinery, and a school close at hand for his children. It was to meet these needs that most of the rural settlements began.

The Spread of the Agricultural Frontier.

In common with their North American counterparts who were emerging from the timbered east and facing the open grasslands, the agricultural settlers in this region faced a number of obstacles which had to be overcome before effective occupation of the land was possible. The cultural background of the Canterbury settlers was fairly uniform but the nature of the obstacles varied with the physical background. The rate at which the obstacles were overcome and the land occupied depended on both technological advances and economic stimulus.

There was a widespread conviction among the early observers and also among the association settlers that the soils of the swampy coast margin were agricultural land while the tussock grassland was good for pastoral purposes only. Lack of equipment for cultivation in part justifies this attitude but it also seems to contain a strong element of cultural bias natural to a people who came direct from the British Isles and had few contacts with other areas of the world where the cultivation of natural grasslands was commencing. The lack of timber for fencing was an obstacle that could be overcome by carting it from the nearest supply or by using ditch and bank methods of fencing and relying on cob or sod for housing. Early equipment for cultivation consisted either of spades and mattock or the heavy and cumbersome English plough made of iron or wood and requiring a considerable yoke of oxen to pull it. Such a plough could be used with greatest success on the drier swamp margins where the surface was firm enough to carry it but where there were few bunchy tussocks to clog its more primitive shares. On the drier plains the lack of water - a serious handicap to the runholder - precluded cultivation unless it could somehow be obtained for the teams of bullocks or horses which until the late 1870s were the only
COMPARISON BETWEEN VEGETATION AND THE SPREAD OF SETTLEMENT IN THE LINCOLN - TAITAPU AREA

FIGURE 8: NATURAL VEGETATION

FIGURE 9: THE SPREAD OF SETTLEMENT

KEY AS FOR FIGURE 6.

L=LINCOLN, T=TAITAPU. KEY AS FOR FIGURE 7.
source of power.

Difficulties of transport were at no stage an insuperable obstacle to the marketing of goods but when coupled with the relatively high cost of clearing and fencing the land, high wages and relatively lower prices for agricultural products, they exercised no small influence. When prices for grain or dairy produce rose relative to costs or to the profits available from pastoralism, the frontier surged forward, and when prices fell the frontier tended to halt. Because of high labour costs most of the earlier agricultural holdings were developed by small men who provided their own labour or worked in co-operation with their neighbours. Frequently such people worked for wages during part of the year and slowly developed their farm during the remainder.

In the light of these two factors – the profitability of arable farming and the rate of cultural and technological development – the spread of the agricultural frontier as shown in figure 7 may now be studied in detail. In this area where the price of land was high the commencement of clearing and cultivation normally followed within a few months of purchase. Only towards the late 1870's did land speculation become rife and for this reason the map of land purchases is not used to show the spread of the frontier after 1875.

The events of 1852 and the diversion of energy and capital into sheep grazing brought land sales to a halt and it was not until 1857, by which time the price of land was reduced from £3 to £2 per acre, that land purchases recommenced. During this time consolidation rather than extension was the keynote of agriculture. Labour costs were high and the market limited but the small farmer with limited capital was able to grow wheat, oats and potatoes as he slowly drained and ditched the area he had leased or purchased from some earlier colonist. Such cultivation was mainly confined to the environs of Christchurch or the small river-port of Kaiapoi and barely extends into the study area.

By the late fifties, however, a small export trade in wheat to Australia had begun and the frontier slowly began to extend out taking in the more favoured land. Faced by difficulties of transport, purchasers at this stage elected the best land close at hand keeping close to the timber supplies of Banks Peninsula. Using fairly primitive equipment and methods familiar to them in their homeland, but at the same time carefully studying the costs
they took up the land of the swamp margins. (see fig. 9) Thus it was that the frontier first spread down the Halswell River and towards the present site of Lincoln.

Then in the early sixties there came a new economic stimulus. Gold was discovered — first in Otago (1861) and then in Westland (1869) — with the result that there was a marked increase in demand for foodstuffs especially flour and dairy produce. Thus arable farming and dairying became much more attractive and despite a failure to reduce the costs of fencing and drainage the frontier spread rapidly. At first the preference for swamp land rather than tussock grass land continued and the frontier continued to spread along the swamp margins. (see figs. 6 and 7) Distance from Christchurch seems to have been balanced against the greater drainage costs of the deeper swamp so that the occupation of the swamp margins beyond the Selwyn and the penetration of the swamps in the Lincoln — Lashbrooks area went on simultaneously. Drainage which began on a small scale by individuals developed into co-operative efforts with the establishment of Road Boards from 1863 onwards.

It seems also that the first attacks on the tussock grassland were made at this time. Either the results of agriculturalists extending out from the swamp margin, or the crops grown by the runholders for their own needs, demonstrated the fertility of the grassland soil and there was an awakening of interest in this land. Early purchases along the fertile south bank of the Waimakariri land along the Selwyn and Hawkins rivers were often made by the squatters exercising their preemptive right but they are clear evidence of the awakening interest the agriculturalists were showing in such land.

During the latter 1860s the foundations were laid for the spread of arable wheat farming over the better watered and more fertile grassland. Their fertility had been demonstrated and the powers of the squatter to maintain control over lands he had not freeholded were limited by the Waste Lands Act of 1867. As runs became fully stocked the value of surplus stock fell away and from 1867 onwards there was also a small but steady decline in the price of wool; all of these factors tending to reduce the power of the runholder and the attractiveness of his occupation. Two other events in 1867 were to send the balance swinging even more firmly in favour of wheat farming. The first was the opening of the railway as far as Selwyn with a consequent heavy reduction in transport costs. The second was the invention of a three
wheeled, lever type, plough by Pirie in Scotland. This type of plough was much better adapted to handling the tussock grass land and was quickly introduced and even manufactured by local firms. In its double furrow form it was easily handled by one man and pulled by a team of draught horses; it could quickly prepare large areas of tussock for their first crop of wheat.

Here in the study area then, close to Christchurch and adequately served by railways seven years before the Rakaia was bridged, the better wheat land was occupied almost a decade in advance of the bonanza wheat boom.

During the latter sixties the agricultural frontier broke up as small farmer and runholder alike fenced and occupied all of the grassland that was fertile and adequately watered. On the high water table areas, dairying and mixed farming were already established. In the interfan depression, and the better watered secondary fans, the better soils were being broken up and sown in wheat by runholders, by contractors or by smaller farmers. Away from the streams and rivers however the dry plains remained the undisturbed domain of the pastoralist. In 1866 Mr Dobson was able to describe the area thus:

For a distance of twenty five miles from Christchurch along the Leeston Road, the country is fenced in and mostly under cultivation producing both grain, dairy produce and livestock (while) the Southern Railway which is laid out so as to cross the Rakaia River as near as possible to the sea in yet two or three miles from the edge of this cultivated district and runs for miles across a desolate looking plain - without water, trees or human habitation.

The 1870's were years of growing agricultural activity. Wool prices continued to fall and under the stimulus of continued railway development, (see fig.9) Vogel's immigration policy, and an apparently insatiable market for grain in Europe, the bonanza wheat boom began to get under way. From 1875 onwards it was universally agreed that wheat was more profitable than wool and runholders and small-holders alike turned to the new occupation wherever practicable. Throughout this period there was an increase in mechanisation as a whole new range of inventions became available. Labour was plentiful as men were returning from the goldfields and Canterbury received the major share of the assisted immigrants. The large wheat estates that developed south of the Rakaia had no counterparts of similar size here as the more suitable land had already been taken up and land close to the rivers was becoming increasingly scarce. For a time the agricultural frontier seemed to have consolidated on the areas where water was readily available for the animals that
hauled the implements. The lack of water on the high plains was the last
great obstacle but it too was to be overcome.

The cartage of water in large four hundred gallon tanks and the
drilling or digging of wells both allowed some extension of settlement in from
the margins of the older farms. Both methods however had their limitations;
the former in the distance water could be effectively carried and the latter
in the depth of the water table. Then in the 1870's the possibility of a
water race system was conceived and after long negotiations and a number of
setbacks in construction the network of stock water races was established in
the 1880s.

As each of the several schemes neared completion, land in the area to
be served was rapidly taken up "settlement spreading from west to east following
their course from the hills."16 Wheat would be grown for a few seasons and
then, as these were the less fertile areas of the plain, soils were soon
exhausted and the land sown down for pasture.

Thus by the end of the 1880s the agricultural frontier had spread
over the whole of the region and the present settlement fabric had been
established. Large holdings here were fewer than in the areas of Canterbury
more remote from its capital and port so that the subdivision of holdings
associated with the Liberal Government between 1892 and 1911 was of lesser
significance here. Changes and readjustments in the farm economy were still
to come but by 1890 all the settlements had been established. The pastoral
frontier had dashed rapidly across the area and the agricultural frontier
followed in its slow and halting fashion taking much more account of soil
conditions and water supply. By the end of the 1880s the essential outlines
of the present pattern had been blocked in.17

The Development of Communications.

The development of communications was closely related to the spread
of the agricultural frontier. Out of the interrelation between the two has
come the birth of the rural settlements. The varying rates at which different
settlements have grown can only be understood in the light of changes in the
communications pattern.

Compared with the forested areas of the North Island early travel
over the Canterbury plains was free and unhindered except by the wide braided
rivers and the expanse of the coastal margin. Indeed the ease with which the
Carcnterbury Plains could be traversed in every direction was one of the chief
factors in the choice of this site for the Canterbury Association Settlement.
This ease of traverse within the study area and the natural obstacles to
communication which surrounded it (fig. 3) allowed a very different pattern
of penetration to that found in the forested region north of Auckland city
which is discussed by Anderson. It is almost the exact converse to this
latter area with its originally forested interior and its coastal points of
entry. Here in Carnterbury the main lines of communication and the main lines
of movement in both the agricultural and the pastoral frontiers tend to
radiate outwards from the hearth land around Christchurch and spread towards
the extremities and the margins of the area.

The pastoralist had no great need for roads. On horseback or
with his bullock drays he could follow across the plain by compass bearing or
in the line of some prominent landmark. Rivers/a greater obstacle and
ferries were soon established across the major rivers. Often run in conjunc-
tion with accommodation houses these soon became foci for overland routes
during the early period. Later main highways, however, have not bridged the
rivers at the identical points; the sites of the old Selwyn and Rakata
ferries both lie several miles from where the present main south road crosses
these rivers.

The needs of the small farmers were different. Settling first in
the swampier areas and producing bulkier and more perishable crops they needed
roads from the outset. An 1856 Road Ordinance made provision for road districts
but lack of funds rendered it ineffectual. Few roads were constructed in the
study area and as a result agriculture did not spread far until after a new
Ordinance in 1863. This time provision was made for the election of local
road boards and funds were provided by allocating them twenty five per cent of
the land revenue in their district. From this time onwards the network of
local roads developed as the frontier spread.

During the sixties there were important developments in through
communications as the system of main roads developed. In 1861 a mail coach
was able to run regularly to Timaru. With the West Coast gold rush of 1865
a road to Hokitika via the Waimakariri Valley was begun in March and in a furious
effort to capture a large share of the trade from the goldfields it was completed and opened in July of the following year. Coal was being mined on a small scale in the Malvern Hills at Sheffield, Springfield, and in the Selwyn Valley and the Coal Track, lying between the Old West Coast Road the present Main West road, became a well established route way. The coach road to Akaroa was begun about this time and opened by 1872. Towards Southbridge the most direct of the local roads were selected and developed into the main highway. With numerous bends and linking together a string of small settlements the Southbridge road contrasts greatly with the straight and direct Great South Road of the last century or the present Main South Road which travel across the more sparsely settled plains.

The greatest event of the sixties however was the beginning of the rail system. (Fig.9) By 1867 the line connection Christchurch to Lyttelton was extended as far south as the Selwyn. Then in the seventies came the Vogel policy and a renewed burst of activity. The railway was extended south to cross the Hakata and following considerable agitation by the coal mining enthusiasts of Whitecliffs, Glentunnel and Sheffield lines were built directly across the open plain to link these areas to Christchurch. At the same time the line to serve the settled areas as far as Southbridge was built in such a way as to tie in the majority of the small settlements (fig. 10) and construction started on the line to the sawmilling area of Little River.

In the wave of enthusiasm for railways during this period interior and coastal lines were contemplated and the section joining Waddington to Oxford actually built. More significant however were the proposals to build a line to the West Coast. After much discussion the Arthurs Pass Route was decided on and work was started extending the Springfield line which was eventually to be opened to the Coast when the Otira Tunnel was completed in 1923.

The importance of the railways was very great, not only did they carry great quantities of grain and other produce from the land but they were the chief means of passenger travel during the period when animal power was the only other alternative. From the opening of the lines until well after the First World War the railway reigned supreme in the field of passenger and goods traffic and it profoundly affected the location of some and the growth of all the rural settlements. Indeed its influence during this period was so
FIGURE 9. THE DEVELOPMENT OF RAILWAYS

KEY:
- OPENED BEFORE 1865
- 1866 TO 1870
- 1871 TO 1875
- 1876 TO 1880
- AFTER 1880

INFORMATION FROM NZR GEOGRAPHICAL MILEAGE TABLE.
great that the pattern of main road communications that had developed in the last four decades follows the railway more closely than it does the original main roads (fig. 10).

Except where traffic regulations dictate otherwise, road haulage has now captured much of the railways goods traffic especially on branch lines. Passenger services on the three branch lines have all been abandoned since the second World War. However both the West Coast Line and the Main South Line continue to carry a large volume of both passenger and goods traffic and the employment provided at the key stations in this system has no small effect on the rural settlements of the area.

Land Use Changes 1890 - 1958 -

Although the agricultural frontier had reached its fullest extent by the 1890s there have been significant changes in land use since that time. As a result of continued cropping of wheat in the same ground there had been a lowering of soil fertility and a reduction of yields. In the 1890s therefore farmers on the Canterbury Plains were ready to take advantage of a new invention which indirectly offered a solution to these problems and new sources of income.

Refrigeration meant that both New Zealand dairy produce and frozen mutton could be marketed in England. Wheat prices were low and pastoral farming offered a chance to restore soil fertility. To return to extensive grazing was neither desirable nor practicable and in the years preceding World War I the present day system of mixed crop - livestock farming evolved.

On the heavier and better land dairying was developed and a host of creameries buying milk and supplying cream to the dairy factories became as common the small local flour mills of the previous two decades. On the fertile land away from the deep coastal margins crop rotations involving rape, or other fodder crops, wheat or barley, and pastures of English grasses, brought in good returns from wool, fat lambs and grain. On the lighter and more easily eroded soils wheat was abandoned but fodder crops and improved pastures brought good returns from wool and store sheep. Each fluctuation in the price of dairy produce, wool, fat lambs or grain now brings a readjustment on most farms but this general pattern has been maintained and production steadily increased during the present century.

The tractor, introduced between the wars, and the header harvester,
introduced in the thirties, are the two most important of a wide range of machines and implements that have allowed increased production to be achieved from a steadily diminishing labour force. Nearly all farms now have their own tractor and cultivation implements and may also have a range of other implements including haybalers and headers. All of these have given a greatly increased demand for servicing industries.

Irrigation, mostly of the spray type, has become increasingly important on the areas of higher water table where a supply of water from creeks or wells is readily available. Here, on areas already highly productive, it is used to intensify production and to guard against minor droughts. On the higher plains large scale schemes are at present under consideration. It is predicted that when these eventuate they will have profound effects on production, land use and even the density of settlement in these regions which still remain very sparsely populated (see fig. 11) even after a century of development.
1. See Strowzel, in Night et al. 1957, pp. 186-90, for a more detailed discussion of this.

2. Land purchased prior to September 27th, 1850 is shown as sections numbered 1 to 432 on Canterbury Sheets of the New Zealand Cadastre Map, Survey District series.


10. Other representative writers who give expression to this view are R.B. Paul, C.W. Adams, and Captain J. Thomas in his Despatch of May, 1849.


15. This quotation appears as a footnote in Hochstetter, F.V.: New Zealand, Its Physical Geography, Geology and Natural History, Stuttgart, 1887, p.510.

16. For a fuller discussion of this see Clark, A.H.: op.cit. Ch.12. or Stevens, P.R.: op.cit. pp.510-14.


The dates at which the various sections of line were opened to traffic use were obtained from the New Zealand Railways Department Geographical Mileage Table, Wellington, 1956.

CHAPTER FOUR

LOCATION AND SITE.

The evolution of the rural settlements, their present function, and even their morphology, have all been profoundly influenced by their location. While there are no cases where the location of a settlement can be fully explained there are a number of factors which appear to have exerted a very strong influence on the location of various settlements within the area. In some cases the influence of these factors has increased since they were first established; in other cases it has declined or been replaced by new influences. In an area where the amount of flat land is more than adequate for the needs of nucleated settlement site factors have exerted a lesser influence on the growth and character of the settlements. Where site has had some influence it will be discussed but it is more important first to investigate the factors which have influenced the spacing of settlement and the location of individual settlements.

A number of factors appear to have exerted some control over the location of the settlements in the area studied. Some have tended to encourage a particular spacing of settlements or have favoured the location of settlements in particular local areas or at places where certain physical or human conditions obtain. At the same time there has been another group of factors, often closely related to the first, which has led to the selection of specific sites. The factors of location which follow are thus divided into two groups:

A. GENERAL FACTORS OF LOCATION.

(1) Physical factors.

There is a very strong correlation between the location of settlements and four closely inter-related physical factors. The locations of a group of early established settlements south of the main railway line shows a very marked coincidence with the margins of soils with a high water table. (fig.12) This suggests that the earlier settlers, while favouring the swamp margins for their agriculture, preferred to take advantage of drier areas in the immediate vicinity for the location of any dwellings other than farmhouses, and community buildings such as churches or schools. There drainage would not be an immediate necessity, the erection of buildings would be simpler and communications
with Christchurch (or later the railway at Rolleston, Selwyn, or Dunedin) would not be difficult. At the same time they would be well located with respect to the areas where farms were being developed. Two of the main exceptions, Doyleston and Springston South, reinforce this suggestion in that they both serve areas where there are no richer sites available.

The absence of swamp vegetation would offer similar advantages and the coincidence between the swamp margins and the location of these same settlements is almost as strong (fig. 6). The limits of swamp vegetation and the high water table did not always coincide and there were some areas such as that around Greenpark where drainage, but not the clearing of swamp vegetation was necessary and settlements developed. Although less fertile, the low sandy or stony ridges that ran through the swamps proved ideal for both travel and settlement and were taken advantage of by the founders of Taitapu, Lakeside and the eastern nucleus of Ledbrooks.

The location of forest with millable trees was also important. At Kowai Bush they exercised a direct influence in the establishment of a sawmill centre. The existence of forest on Banks Peninsula may also have influenced the location of some settlements established before the railway system developed. It should be noted here that both Leeston and Southbridge were within easy reach of timber which was ferried across Lake Ellesmere and landed at the timberyard, two miles north-east of Lakeside.

Surface streams and rivers influenced the location of settlements in both the wetter and drier parts of the area. In the former they often provided better drainage conditions while in the latter they provide the all essential domestic and stock water supply. A water driven flour mill on the stream at Milltown was the nucleus around which the small settlement grew and later mills formed part of the settlement of Irwell, Brookside, Lincoln and Hororata. Only seven of the nineteen settlements on the higher plains are more than a mile from running water and none of these was established before the coming of the railway and the water race system. The settlement formed by a group of Yorkshiremen on the road between Aylestbury and West Melton was one such attempt that had to be abandoned. 1

Two other physical factors were significant near the margins of the Malvern Hills; the existence of a number of lignite coal outcrops and a type of clay suitable for pottery. From the later 1850s coal was worked in several
places and stimulated the growth of several small settlements. Even during the 1870s and 1880s when mining was at its height probably no more than two score men were employed. Two or three pottery factories developed at the same time and may have employed a similar number. Since then both industries have declined although three small mines and one pottery works still operate and the small settlements have remained. The effect of these resources on location shall be considered again under specific factors.

(2) The Period of Initial Settlement.

The general pattern of distribution of settlements was also influenced by the spread of the agricultural frontier and changes in the attitude of settlers to the environment. End the settlement of the area been delayed for two decades, or inventions such as the lever type steel plough been available earlier, the location of settlements in the area south of the main railway line would have been altogether different.

Areas settled first tended to have a closer spacing of settlements. The contrast between the spacing of service centres on the higher plains and that of the former swamp margins is as such the result of improved communications between 1855 and 1875 as it is the result of the physical environment. Greater difficulties of travel in swampy conditions and the need to rely on bullock carts or post travel during this early period are two separate factors of equal importance in understanding the spacing of the settlement net. The land in the area under study was taken up over a thirty year period that saw changes in internal transport that were more revolutionary than those which have occurred in the last eighty years.

(3) Main Lines of Communication.

The development of a pattern of main roads and railways has been the third general factor influencing the location and the later development of the settlements. Its effect has not been equally felt by all settlements although two main groups can be distinguished.

The first group consists of those settlements which were established before railways or main road communications developed in their area. Instead of their location being influenced by the lines of communication they attracted both railways and main roads to them. This is most obvious in the case of settlements today located on the Christchurch-Southbridge and the Christchurch-Little River railways and main highways. Less obvious to the present day
observer has been influence of the small coal mining settlements fringing the
Malvern Hills; it was as a direct result of their agitation that the railway
system was extended from Rolleston to Whitecliffs and Sheffield in the early
1870s.4

Those settlements which were established after the main lines of
communication had been decided on form the second group. The majority of
these are in the central portion of the plains and were drawn to these
communications. Most were established on the main south railway or the
Midland Railway. On the old West Coast road Courtenay had developed before
the through route was opened but its neighbour Halkett sprang up soon afterwards.
Kimberley is an example of a settlement located on an anticipated coal tramway
that never eventuated.

The significance of the various main lines of communication (fig.10)
has fluctuated over the years with considerable repercussions on the growth and
prosperity of various settlements. Some, such as the original Selwyn on the
Great South Road, remain only as a group of trees at a crossroads while others
such as Courtenay survive only in the form of an isolated church or hall. The
present importance of the main lines of communication on the range of functions
a settlement can maintain is shown by the fact that sixteen of the twenty-one
service centres are located on the present main highways as shown in figure 10.5
In contrast there are thirteen of the twenty-five district centres located off
these main roads.

B. SPECIFIC FACTORS OF LOCATION

The exact site chosen for a settlement was normally fixed in one of
two ways. In some cases a nucleus would be established; most frequently in
the form of a church, store or school, and this in turn might attract other
activities. Alternatively an area would be surveyed into sections according
to government regulations and these would then be auctioned. In a number of
cases such as Boyleston these townships were laid out in the vicinity of an
already existing buildings. Whichever was the case one or more of the following
factors was usually taken into account in deciding the actual site.

(1) Physical Features.

As well as having a general influence, as already discussed, physical
features were often important in the selection of a particular site. Some
places such as Selwyn or Ellensmore's southern nucleus, were located at suitable river crossing points while Glentunnel is located at the point where a narrow gully containing coal reserves opens out onto a wider area of flat land.

Likewise Sheffield is located at the convergence of several natural routeways near a stream and immediately opposite a coal outcrop. The township of Whitecliffs was laid out on the area of flat land nearest to the Steventon Coal Mine and a supply of pottery clay.

(2) Road Junctions or Points Where a Road Intersects With a Railway

Even in areas where roads existed only on paper it was frequently a conveniently placed road junction that crystallised the exact site of a settlement in an area already favoured by a number of general factors. In the case of Charing Cross a blacksmith's shop and a school were established at the intersection of nine roads but the sparsity of local population and the absence of any large volume of through traffic have not favoured further growth. Greenpark and Dunsendel were both settlements that formed where a local road meets the railway. Springfield (illus. 1) is a particularly noteworthy example, two of its three nuclei are formed at road junctions while the third is found where the railway cuts the road linking these earlier nuclei.

(3) The Railway

The railway has given birth to many more settlements than it has been able to sustain. Examples may be given of settlements formed where the line bends (illus. 2), branches (illus. 3), or has merely halted in construction. (e.g. Selwyn) Waddington was a settlement begun in the expectation that a proposed South Island Interior Railway would here intersect with the West Coast line. The village at Balclutha began life as a rail terminus, continued as a point where passengers changed to narrower gauged train, and finally became a rail junction.

(4) Government Action

From the period of earliest settlement reserves for schools and similar purposes were established by the government but the location of these was usually determined after application by local settlers who would indicate a desirable location. In the 1880s the government attempted more ambitious schemes when it established a number of village settlements in several parts of Canterbury and made land available to immigrants who were to be employed on surrounding farms or public works. By this time however the better land in
this area had all been taken up and only two or three of these schemes were to survive in the form of a permanent rural settlement. The most important of these was at Darfield. Its establishment close to the rail junction coincided with the opening of the water race and after a late start this young settlement was able to outstrip all of its neighbours.

(5) The Action of Enterprising or Public-Spirited Landowners.

A considerable group of settlers were established on land purchased by an individual who either subdivided it into smaller sections or donated part of it for some particular community purpose. Sometimes the section would be purchased with a view to forming a settlement but there were also cases where a landholder took advantage of an opportunity that presented itself some years after the land was first bought.

The land now occupied by the village of Lincoln originally formed part of the freehold belonging to James Edward Fitzgerald, former emigration agent for the Canterbury Association and the leader of the main body of settlers in 1850. In conjunction with several others Fitzgerald had held the Springs Run from 1850. By 1852 most of the run had been fenced off by small settlers and the runholders decided to sell out. Fitzgerald laid out the town of Lincoln on part of his own freehold and auctioned the sections. The name of the town is significant in that the original plans of the Canterbury Association included the establishment of a town by this name at a point on the lower Selwyn River some six miles distant. Thus Lincoln alone of the rural settlements had its foundation directly related to any of the Canterbury Association plans and even here the connection is tenuous. It may also be noted that even in this case the site chosen for the settlement was not that of the station homestead which can still be seen about a mile distant.

The establishment of Leeston shows the extent to which this particular factor of location can outweigh a number of others. When the South Island Road Board was formed the owner of the land where Leeston now stands offered an acre of land for the establishment of the Road Board Office. The site was not an attractive one, the settlement of Boyleston was already established and the Road Board was aware that this was not the best location for the office. Nevertheless they accepted the section donated to them and the Road Board Office erected in 1864 was the first building. The town of Leeston was later laid out and auctioned by the same landowner. Southbridge had been similarly
established by a landowner who donated twenty acres for a church in 1865 and then laid out the town the following year.

In a number of other cases the disadvantages of the sites selected for such enterprise were dominant. Towns were laid out, but either the sections were not purchased or they were purchased and not built on, with the result that they exist today only in the records of the Land and Deeds Registry.

The profit motive does not seem to have been uppermost in the formation of Halkett and Kimberley. In both cases a pastoralist donated sections for a school, but there was no endeavour to follow this up by the formation of a town and the sale of sections.

A study of the spacing of settlements (as shown in fig. 2) reveals considerable variation within the area. In some parts settlements are clustered closely together while in other areas they are widely spaced. No theoretical spacing of the type suggested by Christaller exists here; smaller and larger centres do not form an interlocking pattern.

The pattern of settlements which may be theoretically expected to develop would consist of smaller settlements fairly closely spaced and successive grades of settlement each more widely spaced. Thus towns would be separated from other towns by villages, and villages would be separated from other villages by hamlets. The average distance between settlements of each successive type would increase from the smallest upwards.

Here in the study area no such theoretical pattern has emerged. Only the county towns appear to be located at theoretically suitable places. Villages are not evenly distributed and are frequently adjacent to each other or to country towns. The average distance between villages is approximately the same (4.8 miles) as that between district centres although there are thirteen of the former as compared with twenty-five of the latter. Hamlets are few in number and mostly on main highways and, while the district centres are more uniformly spaced, they are only partially developed as functional units. The explanation of the spacing of settlements does not lie in the field of settlement theory.

When the spacing of settlements is compared with the maps showing landforms, soils and natural vegetation (figs 2, 5 and 6) several relationships become apparent. The settlements are more closely spaced on the lowlands fringe,
the younger alluvial fans and the interfan depression. Similarly they are most densely spaced in areas with deeper soils and adequate surface water. If settlements on the railway line are excluded the spacing on the older alluvial fans is very sparse. Areas of former swamp and those which carried tussock grassland have an approximately equivalent number of settlements although, as already shown, there is a marked concentration on the former swamp margins.

When this same information is compared with the density of occupied farm dwellings (fig.11) it is apparent that these differences in spacing reflect fairly closely the present distribution of population. An actual count of occupied farm dwellings reveals that those settlements east of the main railway line serve an average of one hundred farm dwellings each while those located either on the main line or west of it serve approximately fifty each. Keeping in mind the greater distances involved in the west, the spacing of settlements would thus seem fairly evenly adjusted to the distribution of population.

Although a very high proportion of settlements, including most of those of more complex function, are located on the main roads or railway lines the pattern of these communications is such that none of the more densely populated areas is far from a settlement.

The present spacing of settlements would thus seem to bear a satisfactory relationship to the physical conditions, the pattern of communications, and the distribution of population. Original location factors have exercised some influence but a number of settlements which proved to be poorly located have either disappeared or lost most of their commercial units. Two questions are raised however which can be answered only in the light of material discussed in subsequent chapters. First, how is it that a number of villages survive so close to each other? Second, is the overall density of rural service centres well adjusted to present day requirements? A close adjustment of density of settlements to population density does not necessarily mean that the closeness of this spacing is that best suited to the needs of the present day farm community.

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In the majority of the settlements site features were uniform and
did not tend to favour growth in any particular directions. Most areas were suitable for building on although the high water table areas were less healthy to live on and offered more difficulties to construction work. Leeston was in this respect less favoured than its neighbour Southbridge.

The influence of changes in slopes were significant in some places and have left their mark on the present day morphology. Hororata and Sheffield both back onto a terrace which has limited growth to the other three directions. A terrace on one side and low hills on the other have tended to give a linear pattern to both Whitecliffs and Glen tunnel in the Selwyn Valley.

Several settlements on the lower plains are situated astride a small creek which has been sufficient to influence their morphology. Lincoln and Irwell are examples of this while Taitapu has tended to develop along only one side of the Halswell River. A similar effect occurs where a settlement grows up astride a pre-existing railway line. The growth of Darfield has been partly controlled by the curve of the railway line to Springfield while at Dunseadel a perfectly straight railway line has had some influence on the direction of development during various phases of its growth.

The presence of an area of swamp in the original site appears to have an influence that is not always easy to trace today except in the case of the swamp to the east of Taitapu. It is also highly probable that some of the segments formed by a crossroads (as at Doyleston) proved more difficult to drain than the others and were thus avoided. This cannot be confirmed however and the reluctance of a landowner to make his land available could account for the same morphological features.


3. "Service Centres" is here used as a collective term for hamlets, villages and County towns - i.e. all settlements which show functional development at the present time.

   Wilson: op.cit.,Chapter III.

5. These are Coalgate, Glentunnel, Greendale, Hororata and Killinchy. At the time of writing (Jan. 1960) it is anticipated that the Killinchy School will not reopen in which case this settlement would be classified as a district centre.


9. Graham, G.W.: The History of Ellersmere, the Land, the Lake, the People, (unpublished ms.), 1950.


CHAPTER FIVE
EVOLUTION.

Since their establishment the majority of the rural settlements have developed in three main ways. They have grown in population, have become more complex in their morphology and have enlarged their functions. In no case has growth been a steady and continuous one but, like the spread of the agricultural frontier to which it was initially linked, it has proceeded at different rates in different places and during different periods. Without a study of the evolution of the settlements it is difficult either to understand their present day character or to make an estimate of future trends.

In each of these three aspects, population, morphology and function, it has not been easy to find a suitable basis for a comparison of individual settlements during their formative period. Population growth has been treated in general terms by Duncan but figures for individual settlements have never been available as the Census Department does not separate smaller settlements from adjacent rural areas. No map material adequate for showing the areal spread or changes in morphology has been available because of the small size of the settlements. Discussion of this aspect must, of necessity, be in general terms. However there is one measure which makes possible a more detailed analysis of functional development (and to a lesser degree population growth). Information contained in "Post Office Directories" has been of considerable value in spite of certain limitations which will be discussed later in this chapter.

The same general patterns of areal growth and development in morphology have occurred in most settlements although some have not developed beyond the initial stage commonly noted and a number of others have bypassed it altogether.

The typical rural settlement in this area of Canterbury began as one or two simple wooden or cob buildings erected at a crossroad or later established beside a newly-constructed railway station. Growth may have proceeded with one or two more buildings being erected but frequently a grid pattern of streets would be surveyed adjacent to the already established nucleus and one or two streets might be formed. On paper the new town would be divided
into sections and these offered for sale by auction. This might then be followed by the erection of a number of new buildings scattered over the area surveyed.

In some settlements the grid pattern was never filled in with buildings although the individual sections may have been fenced in. Some settlements, more favourably located or otherwise more progressive, gradually filled in their grid pattern and some even found it necessary to divide up new segments or rectangles for further building. Frequently the location of such new development depended on which of the local landowners was willing to speculate and several settlements developed distinctive patterns as a result. The successive stages of this type of development are represented in the present day morphology of West Melton, Boyleston, Lincoln and Leeston (Figs 16 and 17). Many settlements such as Boyleston appear to have reached their level of functional maturity at which further growth has stopped before they have succeeded in filling in their surveyed street grid.

In other cases settlements continued to develop without subdivision on a grid pattern and new buildings ribboned down one or more roads. Sometimes ribbon development followed directly on the establishment of a nucleus as at Rolleston or Hororata and in other cases it followed the establishment and consolidation of a grid pattern as at Kikaee.

At first the commercial buildings tended to be located near the crossroads or the station but in those which continued to develop their service functions a main street, or even two main streets, could soon be distinguished by their greater proportion of commercial buildings. In some cases the earlier commercial nucleus near the railway station was to decline, and a new nucleus develop on the main road giving a distinctive pattern.

With every major change in the transport system, such as the use of a new main highway or the extension of the railway line to a new terminus there were some settlements which stopped growing. Some managed to remain but a number lost first their functional units, and then their residential units and finally disappeared. The earliest of the settlements called Selwyn is now only a clump of trees at a crossroads, the later Selwyn consists mainly of a number of empty fenced in sections while Courtenay's older commercial core remains only as a group of incongruous looking old buildings used as sheds by a local farm. Canterbury has its "ghost villages" but in most cases they
were built on good farmland and have been absorbed into the present day agricultural landscape.

One of the functions developed by most of the settlements within the first few months of their establishment was the provision of postal services. Only in a few cases did this warrant a separate establishment as the local store would be only too glad to perform a service that attracted so many people. In the absence of a store the local blacksmith, hotelkeeper or schoolteacher would act as part time postmaster. The result has been to leave a printed record in the form of "Post Office Directories"2 which give the names and the occupations of the householders of each of the small settlements from the 1870s until the development of the rural mail deliveries after the First World War. Such information can be used in conjunction with local histories and contemporary records to give a fairly comprehensive picture of the functional development of these settlements up until the present century.

In using this information, as for example in figure 13, it has been necessary to make several assumptions and some of these could affect the validity of the results. It has been assumed that people listed as farmers or stationsmen lived outside the settlements while miners who worked away from the settlements would reside in them. Contractors and labourers were more difficult to assign and it was decided to include agricultural contractors in the settlements as a farm servicing unit based on the settlement and to exclude other contractors who would be ephemeral workers employed mainly on railways, roads or water race construction.3 Labourers were likewise excluded. All of these assumptions have been made in the light of the material discussed in chapter three and referred to in footnotes in that chapter. In some cases places known to exist were not listed in the directories or the occupations were omitted. This has been noted on the maps concerned.

The cross checking of information as listed in the directories with other contemporary sources is particularly necessary in the case of some places which lost their functional units and continued to exist as dormitory settlements. The directory listings indicate only the place of residence and not the place of employment. Thus for example Selwyn does not appear to decline between 1875 and 1905 although the Cyclopedia of Canterbury 4 makes it clear that only residences remained in 1900 and that other functional units had either
moved to Dunsandel or closed down after the extension of the railway southwards.

The character of the rural settlements varied with the purpose for which they were first established. They grew up in response to needs which initially fell into one of three main categories—agricultural, transport and extractive industries. As they became established new needs arose and later, when a reservoir of surplus labour was established, some were able to take advantage of fresh opportunity in the field of factory industry. During the present century the needs of the agricultural community have increased in complexity but the effect of this on the rural settlements has been offset by increased contact between the farmer and the city. The evolution of the settlements as shown by figure 13 can best be understood against the background of the varying needs that have arisen.

It was the needs of the first farmers in their area that brought the majority of the settlements into existence. The general store with its post office facilities, and the blacksmith shop were sufficient to meet their needs for the first few years. The store provided them with food, and sometimes bought their dairy produce, while the blacksmith made or maintained their fairly simple range of farm equipment. Later when the farms were more established the service of the blacksmith might be supplemented by those of the wheelwright and the saddler. There was soon a demand for better housing and the carpenter was the forerunner of a wider range of building tradesmen.

As farming became more important and lines of through communications were established the needs of transport and accommodation were first provided by the accommodation house, the livery stables and the coach and cartage proprietors establishments. The railway brought a whole range of new demands at places where stations were established and where these were located away from existing settlement they often brought into birth a new agricultural community.

The presence of coal in the Balvern Hills and of timber beyond the Kowai River required new settlements to house the miners and the sawmillers. At first these would merely consist of a row of small cottages as at Sheath's Row (Cleatunnel), but they too needed the general store and eventually they succeeded in attracting the railway.

Whatever may have been the reason for their initial establishment all the settlements had similar needs for churches and schools except where they
were close to another settlement providing them. Such buildings were usually built during the first decade of settlement and in a few cases preceded the general store.

As the agricultural or mining communities became more firmly established and production began to increase, a demand arose for a whole new range of retail goods and personal services hitherto regarded as unessential. The butchery and bakery businesses were established and frequently operated delivery services in spring carts. Drapers, dressmakers and tailors were very widespread in an age before mass production methods revolutionized the clothing and footwear industries.

Administrative services, represented at first by the part-time post office were soon supplemented by the road board offices, the police stations and the local pound. Initially, medical services were available only in Christchurch but by 1875 there were doctors in a number of the settlements.

With the development of wheat farming in the 1870s and 1880s, and later the development of mixed farming and commercial dairying, a host of new farm services were required. Agricultural implement makers, contractors, threshing-mill owners and agents were typical of a new group of activities that grew up. With the larger scale commercial organisation of the wheat boom years there was a demand for banking facilities and these were provided in the larger settlements from about 1875 onwards.

Processing industries based on local farm produce held an important place in the rural economy of the last century. From the 1870s until the introduction of the roller type of flour mill in 1882, the small flour mill was very widely distributed; after this time the new mills were concentrated in larger towns. By the turn of the century creameries were established in all the rural settlements of the wester area and these supplied cream to the central dairy factories at Taitapu and Christchurch.

The increase of population in the rural settlements, and the services already provided there, made possible the development of manufacturing industries that served a much wider area than the normal tributary region of the settlement in which they were located. Several pottery works were established in the Selwyn Valley and one at Springfield. Other settlements developed breweries, soap or cordial manufactures while the Ellesmere Engineering Works at Doyleston employing over fifty men in the 1890s was only one of several such establish-
ments in the area. All of these industries except the pottery works at Clitheroe did not survive far into the present century.

It was to meet these varied needs that the settlements developed. In some the agricultural demands were dominant, in others it was the demands of transport or mining that brought about its growth. Sheffield is one example which developed to meet all three types of need.

In figure 13 the development of each settlement has been plotted using the information already referred to. Each of the occupations represented has been classified under one of the seven main types of service provided (Table 2) and the information then shown cartographically for each settlement at ten year intervals from 1875 to 1905. Had 1870 been chosen as the date for the first map only four settlements — Leeston, Doyleston, Southbridge and Springston would have been shown. The other areas settled by that time were close to Christchurch and either looked there for their services or were only just developing their own.

**TABLE 2** A NOTE ON THE CLASSIFICATION OF OCCUPATIONS INTO SERVICE GROUPS USED FOR FIGURE 13.

1. **Administrative and Professional:** Includes teachers, clergy, road board employees, bank employees, police and medical.

2. **Transport, Accommodation and Communications:** Hotels, Boarding Houses and Post Offices are included here.

3. **Building:** Includes timber merchants in addition to the various building trades.

4. **Farm Servicing:** Includes blacksmiths, saddlers and allied trades, auctioneers, agents, grain merchants and Veterinary Surgeons.

5. **Mining and Industrial:** Includes all manufacturing and processing which produces goods sold mainly in other settlements, towns or countries. e.g. Brewing and grain milling are included but not watchmaking.

6. **Personal:** Personal services, such as dressmaking and hairdressing, together with retail goods for personal rather than household use, e.g. Watchmaker but not grocers.

7. **Retail:** Mainly food and general stores. Excludes those listed in (4) and (6).

It is clear from figure 13 that no two settlements have followed an
identical pattern of growth and that each one could provide grounds for a detailed discussion on its own. At the same time general patterns can be established for each of three main types of rural settlement - the purely agricultural, the transport centre and the mining settlement. Most settlements are a combination of two/even three of these types. Sheffield is an example which began its life as a mining settlement and then became a railway terminus and construction camp for a number of years. In the 1860s the end of the line had moved on but Sheffield then possessed a soda water factory while the present century has seen the development of its agricultural services until these now provide the greater proportion of its income.

While the growth of the different settlements can be explained partly in terms of their location with respect to farm settlement, communications or coal reserves and partly in terms of changes in demand and opportunities the influence of purely human factors has often been important. A contemporary writer suggested that the decline of the importance of Southbridge relative to that of Leeston from the 1860s on began with the departure of two of its leading businessmen. Factors such as this have obviously influenced the growth of many other settlements in the region. Nevertheless three general types of settlement are recognised in an endeavour to isolate a number of fairly widespread trends.

(1) The agricultural service centre.

This type of settlement is the most common of the three although many of these have also combined the functions of transport centre as well. A typical example such as Lincoln, Doyleston or Greendale began its life following the arrival of a number of small farmers. Within a few years the nucleus of store, blacksmith and school was established and the hotel, the building tradesmen or the resident minister may have also appeared.

At the end of the first decade of their existence most of these settlements were beginning to fall into one of two groups; either they were merely continuing to serve the same simple needs of their immediate area or they were developing in addition a new range of services for a wider area. In the second decade of their growth settlements such as Doyleston or Lincoln had butchers and bakers and began to offer the services of dressmakers, tailors and shoemakers. More buildings trades were represented, hotels were well
established and most had their own surgeon. Thus an early distinction seems to have arisen between the agricultural hamlet and the village. Irwell, Killinchy, Brookside or Greendale were representative of the hamlets which developed during the wheat growing period of the 1870s and 1880s while a smaller type with a nucleus of school, church and creamery developed on the wetter land at places such as Lakeside and Greencroft towards the close of the century. With the advent of the home separator a decade later the creameries closed down but the churches and schools remained and a public hall was often added.

The villages had developed a wider range of functions in their first two decades under the influence of increasing wheat production and growing rural population. In the years which followed they consolidated their position without such expansion (fig. 13a and b). Later a new distinction began to emerge with the development of mixed farming. A few more favourably located for serving wider areas began to develop new farm services such as saleyards, stock and station agencies and veterinary services together with more specialised retail and personal services. Location is the outstanding example of the agricultural village located in a nodal position which has developed since the 1890s and has become the county town providing a wide range of services for an area which includes several hundred farms and eight or ten smaller settlements. Darfield has followed a similar pattern of development but here the role of the transport centre has been combined with its agricultural function.

Other villages which did not develop these new retail and service functions were faced with an increasing population and doubtless helped to feed the drift to the North Island and to the cities. Not many declined in importance however and a number developed some kind of manufacturing which maintained their employment. The engineering works making farm machinery or the cordial factory were typical and employed a large section of the population and allowed existing services to be maintained. Hardly any of these manufacturing industries have survived until the present day but their places in the village economy has often been taken by the servicing of motor or farm equipment or by the large scale cartage contracting company.

During this century the agricultural hamlet has declined as motor transport and better roads have facilitated contact with larger centres. The hall and the church have survived in most cases while in some the local store
has taken advantage of the same motor transport to extend its delivery services over larger areas. By and large however most purely agricultural hamlets have lost their identity as such and all but one or two have lost either their nucleation or their service units.

(2) The transport centre.

None of the settlements in the area have developed exclusively as transport centres yet this is a type which has been inherent or even dominant in some stages of the development of many of the other settlements. The earlier type of transport centre had as its distinguishing features the accommodation house (or a hotel and livery stables) and a coach/carriers establishment in addition to some of the more universal institutions such as school, hall or church. With the coming of the railway such settlements either declined quickly or went ahead with a new burst of activity depending on whether they were located on the railway or away from it. Many of the service units of such settlements located off the railway line were moved to a new settlement that was growing up beside it. New settlements which developed at termini or other newly established railway stations such as Dunsandel or Boystown frequently developed feeder coach services to areas not so served and during the decades of the wheat boom the railway settlements occupied an important place. Some settlements declined abruptly when the terminus moved on and many others declined more slowly this century as the volume of local railway traffic, especially passenger traffic, has fallen away. Settlements such as Rolleston or Springfield which occupy key positions on the main line system however have maintained their position with the Railway Department providing employment for a large section of their population.

(3) The Mining Settlements.

The growth of the mining settlements has been well traced by Wilson who studied the history of those in the Selwyn Valley. Mining had begun spasmodically in the 1850s and 1860s but was not firmly established until the 1870s when a number of small mining settlements began to flourish. Initially they were purely dormitory settlements but soon they provided themselves with general stores, churches, schools and other social amenities and successfully agitated for a railway. Once the railway was opened (fig. 9), and mining well established, it was usually supplemented by a pottery, brick or pipe works. As
Illustration I. Springfield - the Village with three nuclei. V.C. Browne photo.
Illustration II. Kirwee - Railway and Road Junction Village. V.C. Browne.
Illustration IV. Leeston, the County Town of Ellesmere.

V.C. Browne.
Illustration V. Doyleston - Grid Pattern only partly filled in. V.C. Browne.
Illustration VI. The Commercial Core of Southbridge. V.C. Browne.
Lincoln Station - now handles little traffic.

Springfield - a key station on the West Coast Railway line.

Whitecliffs - the part time Post Office.
they
mining settlements reached their hey-day in the 1880s and suffered a major
decline in the late 1920s after the Otira Tunnel made West Coast coal readily
available in Canterbury. Sheffield, Springfield and Coalgate had all developed
farm servicing and transport functions and were able to adjust successfully.
Glentunnel survived with greater difficulty and possesses the one remaining
pottery works. Whitecliffs is the only one of such settlements not located on
through communications and was thus unable to develop farm servicing or an
extended grocery delivery. As a result Whitecliffs exhibits most of the
features normally associated with a decaying mining village. Most of its
population are employed elsewhere; a part time post office run by a house-
holder is its only remaining service unit while plots of gorse or scrub,
sections from which houses have been removed, and fenced off streets separate
the houses which remain. Its neighbour, Glentunnel, is located on the main
road to the Rakaia gorge and there both the garage and the general store
serve very extensive tributary regions.

The other important feature to be seen by comparing the maps in
figure 13 with the present day development of the settlements is the relation-
ship between the evolution of the settlements and the location of the main lines
of communication. This factor has been important to all the settlements
including those whose transport function has been negligible.

Only one of the agricultural settlements located away from what
became the main highways developed into a village and the majority have since
depended from agricultural hamlets to what is here classified as a district
centre. The exceptions, Hororata, Greendale, and Killinchy, were all located
in more fertile areas at some distance from any main routes. The latter two
have declined to some extent but Hororata remains important as a village serving,
in addition to its immediate area, a wide expanse of pastoral farmland between
the Hororata and Rakaia Rivers.

Other settlements of earlier importance which have declined to
become district centres were the communications centres located away from the
railway, and a number of railway settlements which existed to serve purely
local traffic or were once rail termini.

Most, but not all, of the agricultural settlements on the main roads
grew into villages. Theoretical spacing apparently was non-existent even in
the 1870s as Doyleston and Leeston both grew while Irwell remained as a hamlet and later declined. The only hamlets which have grown during the present century are those located on the main highways at Durham, West Pelton and Motukarara and which have developed special services for passing traffic.

Those mining settlements located at key points in the rail system, namely Springfield, Sheffield and Coalgate, grew into villages and have retained their importance. Other stations such as Rolleston, Kirwee and Dunsandel were well located to develop as farm servicing and household supply centres and likewise grown into well established villages.

Both of the county towns grew up on the railway at nodal positions where more important local roads converged onto the main road. Each is thus well located to serve a number of smaller centres and has easy communication with the metropolis. The fact that Lincoln has not developed all of the functions common to the two county towns is partly the result of local body organisation and also a reflection of the closer proximity of Christchurch. However its position on a number of major local roads as well as on the rail junction, and the location of other settlements in this fairly densely settled area would all permit it to play a role similar to that of the two county towns.


3. Road Board Employees are included in the settlements under the classification of Administrative on the grounds that they were permanently based on the settlements and offered a regular service.


CHAPTER SIX

MORPHOLOGY AND STRUCTURE.

The physical features which serve best to distinguish the various classes of the rural settlements are their degree of agglomeration, their morphology and a variety of less easily classified features such as the condition of their streets and the evidences of growth or decay. While there are some physical features which tend to set apart one particular class in the hierarchy other features may be common to a particular group which includes settlements of all sizes. One group of physical features shared by most settlements in this area may provide a basic contrast with rural settlements elsewhere and a second group of features serve to give each settlement a degree of individuality within its own net. It is the aim of this chapter to pick out the most significant physical features that are common to some or all of the settlements studied and at the same time to recognize those features which give rise to individuality. While the settlements in this area have such in common, uniformity is certainly not a major characteristic.

Ground plans were prepared for all settlements by field mapping and plotting from vertical aerial photographs held by the Lands and Survey Department. A quantitative measure of agglomeration was not established in view of the irregular distribution and varying densities of dispersed farm settlement. Instead the degree of agglomeration was assessed subjectively by comparing the spacing of any non-farm units with that of farm dwellings in the areas adjacent. Instead of reproducing the ground plans for all settlements a classification has been made on the basis of their morphology (see Appendix A) and the ground plans for representative examples of agglomerated district centres and hamlets are shown in figure 16 which follows the Appendix. Figure 17 contains the ground plans for all villages and county towns studied.

As a group, district centres have already been defined as either lacking in agglomeration or having less than a minimum number of functional units apart from residences. The majority of them lack both. With very few exceptions they contain too few units, either residential or functional, to have developed a distinctive morphology. At the same time differences in degree of agglomeration give rise to some distinctions.

The largest group of district centres show no tendency towards nucleation.
In a number of local areas there may be two or even three functional units serving the community's needs in one way or other but these may be as much as a mile apart and even when together they do not produce a clustering effect more marked than that of two or three adjacent farm houses near the same road. District centres in this group (see Appendix A) are rarely located on main roads and in a number of cases, as at Brookside or Courtenay, they represent the surviving units of an earlier nucleated settlement.

In three other groups of district centres there is noticeable agglomeration. They are settlements which have either lost their earlier functional importance or never developed enough functional units to be classified as a hamlet. In each case, however, one or two units have provided a fairly strong nucleation tendency and today such settlements consist of a cluster of non-farm dwellings and one, two, or three functional units.

The group of non-farm dwellings that marks the site of a former flour mill or creamery stands in contrast to the unnucleated district centre which often plays a very similar role in focussing district consciousness. When the mill or creamery ceased operation a number of these settlements declined but those which remain are usually characterised by some new activity such as a builder's establishment or a cartage contractor's depot. Usually one or more of the familiar church, hall or school trio remain. Where the original mill depended on power provided by a local stream the morphology is even more fragmented as is the case in Milltown shown in figure 16.

The former railway station forms the nucleus for a more regularly spaced group of dwellings. Usually these are located beside the railway line or in the angles formed by a convergence of local roads at the station. Most of the dwellings in such settlements are occupied by railway employees engaged at larger stations on the same line or on maintenance work. Racecourse Hill (fig. 16c) is one of the smallest in this class but others may retain some other functional units apart from the flag station. Anmat for example has a general store.

Two other settlements, classified as district centres because they lacked functional importance, have a much more developed morphology. Whitecliffs and Waddington were both villages earlier in their history but have now lost most of their earlier importance and consist mainly of dwellings (figs 16d and 16e). Each has a street pattern comparable to that of the present day village
settlements.

Confined between a river terrace on one side and low hills on the other Whitecliffs was laid out on one side of the railway line which bisected the flat land. Its linear pattern is in contrast to Waddington where a grid pattern was laid out on the triangular area of land originally owned by William Waddington. In Whitecliffs at the present time the fencing off of some side streets, together with a tendency for others to become overgrown, and the recent tarmacing of its main road are all tending to reinforce the linear pattern.

Hamlets fall into two distinct classes both of which are characterised by a small number of separate non-farm dwellings. They are too small to develop a street plan and they have developed on the existing road pattern.

The agricultural hamlet (Fig. 16f) is made up of the surviving units of the more flourishing settlement of the last century. Apart from churches, halls and schools few other units are found although the general store at Greendale is an important survival. Agglomeration is only slightly greater than in adjacent areas and the majority of the houses mapped were farmhouses located on normal sized holdings.

The main road hamlet is usually a much more compact cluster of commercial buildings located at a bend or a crossroads on the main highway (Fig. 16g). There is also a church or a school located nearby in most cases. The commercial units usually have their residences incorporated with the result there are very few houses in the vicinity. Kotukarara with its railway nucleus and Ladbrooks with the remains of an earlier agricultural hamlet are both exceptions. Here, however, the older dwellings are off the main road.

The villages and county towns all have a well developed morphology and thus stand in marked contrast to the hamlets and district centres. Containing a greater number of both functional and residential units they exhibit a much greater tendency to agglomeration and in the majority of cases have developed a street pattern additional to the original road pattern. The fifteen settlements involved cannot be classified into groups which have a similar morphology. Rather does each settlement consist of a distinctive combination of four basic components.

The way in which the structural components combine to give each settlement a distinctive morphology is closely related to its historical evolution. The basic component in each settlement is either a road junction nucleus, a grid
pattern or a linear pattern. Further growth has either taken the form of ribbon development or has been facilitated by the establishment of an additional grid.

The linear pattern is usually related to a constricted site, as at Clentunnel (fig. 17c), or to the importance of one particular major road. Sheffield and Springfield both developed initially on points on a major road where it ran fairly close to a change of slope. The linear pattern may be distinguished from ribbon development by the presence of short cross streets and one or two longer streets close beside and parallel to the main road (figs 17c and 17e). These minor streets contain mostly residences. In the case of Springfield a very irregular pattern has evolved with later growth being related to two successive positions of the railway line and the formation of two linking cross streets (fig. 17i).

In most of the settlements the road junction component has played some part. It is particularly dominant, however, in three settlements that grew up at important places on the railway line. At Rolleston, Kirwee and Dunedal development has been focussed at the point where several roads converge at a railway crossing adjacent to the station (figs 17d, 17f and 17h). In two cases additional streets have been laid out in one of the segments to give a rudimentary grid pattern (illust. 2). Springfield is unique in that all of its development is related to three road junctions and the point where the main road crosses the railway (fig. 17g and illust. 1).

Where settlements were initially laid out as a private speculation and the sections sold by public auction as authorised by the Provincial Government a grid pattern is basic (illust. 5). In the case of Leeston the area of land subdivided was not rectangular and a distinctive pattern was established (fig. fig. 17o and illust. 4). Similarly the existence of a stream, as at Lincoln, or the railway, as at Darfield, have resulted in modifications of the rectangular grid (figs 17m and 17n and illust. 5). At Taitapu the combined effects of swampy conditions, a river bank location, and possibly land ownership complexities, produce a very irregular grid (fig. 17z).

Where further development has been in the form of a new street grid only the age of the buildings or the proportion of functional units indicate which was the original component. Subsequent grid patterns have been established on road junction nuclei (fig. 17b) as well as in settlements where an earlier
grid was already established. At Southbridge the formation of a new grid east of the railway line was merely an extension of the one established earlier while those at Leeston each have a different orientation and are not contiguous with the original one. (figs 17l and 17o). In most cases the location of the new grid depended largely on which landowners wanted to sell.

Ribbon development is most common in those settlements with a basic road junction or linear component. Usually it takes place along the roads most frequently used. In the case of Dunsandel, Kirwee and Rolleston there is a tendency for new commercial units to develop along the main highway while new residences are built on the more important subsidiary roads.

At the present time most new subdivision for housing purposes is taking place on existing roads and few new streets have been formed in recent years. Thus ribbon development is also taking place in settlements where the original grid is almost filled in and there is a continued demand for new housing. At Lincoln there is a big demand for housing associated in part with the development of the Agricultural College and the D.S.I.R. in its vicinity. The settlement is surrounded on three sides by government or College land which is not available for subdivision and the limited number of unoccupied sections within the grid are not available for sale. Ribbon development is thus rapidly extending down the one road where the land is privately owned (fig. 17m).

The degree of compactness differs considerably among the different villages and country towns. The density of buildings within the grid or their spacing along the roads that go to make up the settlement are not merely related to the number of units contained. In general, however, the settlements such as Leeston, Darfield, Lincoln, Southbridge and Dunsandel which have the greatest functional development have a moderately high density.

Where a grid pattern exists the extent to which it is filled in is determined by the functional development of the settlement as compared with the area of land originally laid out. Doyleston has a fairly small number of houses scattered over a relatively large area (illust.5). The greatest density of housing is found in the former mining settlement of Clentunnel where only a limited area of land was available. Taipua is an interesting example where one grid has now been filled in while another larger one on the other side of the main highway has been taken up again as farmland (fig. 17j).
In settlements where a railway line or a river cut across the grid there may be differences between the density of housing and commercial buildings in the two portions. In Lincoln this is still noticeable while at Darfield recent new housing development north of the railway line has reduced the difference.

Settlements not established on a grid system (See Appendix A) may extend over a mile or more of road except where an important railway station has exercised a fairly strong attraction. This lack of cohesion is similar to that noted in the villages north of Auckland where Anderson attributes it to their unplanned development. Here in Canterbury a lack of interdependence between functional units and the smaller proportion of houses within these villages are important considerations. In addition the fact that these villages are mostly located in areas of sparser farm settlement may also be significant; lower land values do not encourage more compacted farm settlement and where the majority of customers have to travel a number of miles the advantages of having commercial units immediately adjacent are minimised.

Springstone (fig. 17c) is a unique settlement in that it consists of three very compacted nuclei which are separated by two miles of road.2 There is no tendency towards ribbon development in between. There are a fairly high proportion of non-farm residences in each nuclei and the farming area about is more closely settled than that surrounding those settlements discussed above. The key to its distinctiveness probably lies in its historical evolution. Although the full details of this are not known at least one possible theory can be advanced. It seems likely that two separate agricultural hamlets developed at a time when communications across the swamp that separated them were slow and difficult. Later with improved drainage and the building of the road the two hamlets began to function as a single unit. Each would probably provide some distinct services while competition between the two would cause other businesses to close down or turn to new activities. When the railway was built it cut across the road joining the two earlier nuclei and a station was opened near the road in order to serve both. In addition the station and railway dwellings, an engineering works and a saleyards were established here and these later attracted a hotel.

Not all of the settlements have an obvious commercial core. While this reaches its fullest development in Leicester, (fig. 17c) a number of the
The Anglican Church.

The Multi-purpose General Store.

The Small Library.
larger villages have their commercial units well dispersed. This is especially so in settlements where a number of important local roads meet a main highway as some establishments such as service stations, tea rooms, or hotels prefer to be on the main road while others, such as general stores or butchers, cater for local traffic. In Lincoln a large proportion of its commercial units are located off the main street and away from other commercial units. Shops are rarely built joining each other except in Leeston and even here there are a number of residences in the commercial core. Although these are older buildings their paintwork and their gardens are well cared for showing no visual evidence of urban blight. The commercial core of Southbridge, shown in illustration 6, is representative of that found in a number of the larger settlements studied.

The increase of motor traffic, together with the cessation of local railway passenger services in the last three decades, has had a clear effect on the morphology and the visual appearance of most service centres. Apart from new buildings such as motor garages, tea rooms or confectioners which have sprung up on the main highway a number of other buildings like hotels or retail shops are also shifted here when due for replacement.

Within the rural settlements there are a number of individual functional units which give character to the settlements in which they are found. The existence of buildings which have fallen into decay on the one hand, or have been recently enlarged or rebuilt on the other, serve as an indication of which activities and which settlements are declining or growing in importance.

In the smaller settlements buildings such as the church, the hall or the school are usually small and unimposing although the Anglican church with its trees and its surrounding graveyard gives character to a number of these. The general store, where it still exists, provides a multiplicity of services that give it a local colour which is usually lacking in its counterparts in the larger settlements. Except for a number on the main road which have been remodelled the general appearance of such buildings has changed little over the past two decades.

In hamlets and villages on the main roads the new commercial buildings erected with the object of attracting the passing customer give a general impression of cleanliness, fresh paint and rapid construction. The owner's name and their function are boldly shown while their wares are prominently
The new main road service station.

Most garages cater also for farm and general engineering.

The Blacksmith, Southbridge.
displayed and frequently exposed to the sun.

Garages in most settlements are built of concrete blocks or walled with galvanised iron in order to minimise the fire danger. In all except some of those located on the main road which specialise in motor servicing, they combine the activities of farm and general engineering with motor engineering and the sale of fuels and lubricants. As a result they are readily distinguished by the wide variety of vehicles and farm machines which congregate in their vicinity during working hours. A number have been recently enlarged or rebuilt and some also have the addition of a small showroom for the display of items of farm machinery. The converse of these new developments is often seen in a number of small abandoned buildings that were once a blacksmith's shop. Where these still operate in several of the larger settlements they are inconspicuous buildings usually identified by a number of oxy-acetylene gas cylinders standing outside.

In all the larger settlements as well as several of the smallest (e.g. Hilltown) the sheds and yards of the cartage contractor are prominent. Sheep decks propped up on poles or empty drums, and a frequent traffic of heavy vehicles, are important features of the local scene. Large grain stores are distinctive mainly in Leeston and the other villages on the road between Christchurch and Southbridge as this is the area where grain growing still plays an important part in the farm economy.

Government buildings frequently vary little from settlement to settlement. Schools in the larger settlements have usually been rebuilt or enlarged in the last two decades. Their multi-windowed, low-ceilinged buildings are distinctive and their closely mowed playing fields frequently contrast with the local recreation ground where only the actual playing area may be mowed. Another more recent building in over half of the villages is a very attractive new wooden post office. By contrast railway buildings are drab and in need of repainting. In smaller stations, no longer permanently staffed, windows are often broken while rows of condemned waggons parked at several sidings on the Southbridge and little River lines complete the appearance of dereliction.

In Leeston, and to a lesser extent Darfield, a number of small new retail shops are a distinctive feature of the commercial core. Other villages like Southbridge contain a number of older shops now used as residences only. The old square two-storied hotel characteristic of the turn of the century has
Large grain stores, 
Leeton.

New wooden post office, 
Lincoln.

New block of retail shops, 
Leeton
been replaced by a more attractive modern building in a number of villages.
At Lincoln a new concrete block and steel public hall is being built to replace a much older wooden building. An attractive exterior has rarely been an important consideration in the planning of such buildings.

New housing is prominent in the two county towns and all the villages except Clentunnel. Lincoln and Leeston both have high density areas of state houses which include a number of double units. Of the villages Dunsandel has the greatest proportion of new houses and Bingleston at the other end of the scale has only one or two. Many of the new houses in Darfield and Dunsandel are being built for retired farmers. A variety of newer building materials including bricks and pastel coloured concrete blocks represent a departure from wood which was most widely used in older residences.

Public amenities such as footpaths and street lighting are best developed in Leeston and Southbridge, both of which formerly possessed town boards, and in Darfield. Elsewhere the standard of the amenities provided varies with the compactness of the settlements, the rated value of their properties and the efficiency of the local county council. Most villages possess street lights and have some streets tarsealed but not all possess curbing or footpaths. Several possess volunteer fire brigades which also serve extensive rural areas.

On the basis of the physical features discussed in this chapter the distinction between the various classes of settlement that have been defined are not always clear cut. In terms of morphology the district centres are mostly lacking in agglomeration or definite form although two of them, Whitecliffs and Waddington, retain the morphology they once had as villages. Hamlets usually possess a small number of separate non-farm dwellings but in the case of the newly developing hamlets on the main road they inherit a definite form from the highway itself.

Villages and county towns have a much more developed morphology and each tends to possess a unique form. No essential difference in the morphology of county towns, as distinct from villages, is apparent although they do tend to have a greater density of housing within their grid.

Differences in the physical appearance of the various buildings found in the different classes of settlement seem to be more marked although these do not lend themselves to fully objective comparison. At the same time signif-
The old two-storey wooden type.

New design and built of coloured concrete blocks.

Southbridge.

Hororata.
Lincoln.

A new hall to replace the old.

Additional housing is in demand.

The new Roman Catholic Church is built of brick.
significant differences in the proportion of new buildings can be seen. District centres have little or no signs of new development and frequently show signs of decay. In the main road hamlets and the county towns the emphasis is on new development while in the villages some establishments are thriving while others are declining. The full significance of the visual evidence that is available can be best understood by comparing their historical evolution with their present day function. Attention will now be directed to study of this latter aspect.


2. As a separate district centre known as Springton South is located a further three miles away and the only functional unit duplicated in Springton itself is the general store (two of these are found in one nucleus and one in another) there would seem to be no justification in reclassifying this village as two or three functionally distinct settlements.

3. In 1959 the Leeston and Southbridge Town Boards amalgamated with the Ellesmere County Council.
CHAPTER SEVEN
FUNCTION

The rural settlements of Canterbury exist primarily to serve the needs of its agricultural producers. Their most important functions are the provision of the goods and services which the dispersed farming community needs, and to act as social, religious and educational centres for nearby areas. Goods are rarely produced within these settlements and any such production is usually subordinate to the collection, distribution and maintenance of goods and equipment.¹

In the area under study such functions are the predominant, although not the exclusive, activities carried out in the settlements. Certain other activities may become locally important. This is the case in settlements such as Motukarara, Dunsandel or Springfield on the main lines of communication (see Table 3). As Christchurch has grown, some villages such as Taitapu or Springfield have developed dormitory functions while miners employed in the Malvern Hills² usually live in the settlements of the Selwyn Valley (Coalgate, Clentunnel and Whitecliffs).

It is in their functional aspects that the present day inter-relationships between the rural settlements and the surrounding countryside reach their greatest complexity and significance. Similarly the relationships between the rural settlements and the metropolitan centre of Christchurch are many and complex. Indeed the three may be regarded as complementary in function and together they combine into a single settlement net.

In order to analyse the great variety of functions and functional units that are found in the rural settlements it is desirable to establish a settlement hierarchy. By thus isolating distinct types of settlement a great mass of information can be reduced to order and valid generalisations can be made. At the same time the search for a settlement series must not cause the significance of the settlement net to be overlooked; the two are complementary. As Andrews points out "the manner in which the urban, suburban and rural elements combine (into the settlement net) is very complex ..... it is not a haphazard grouping of unrelated settlement forms but a coherent and independent organism."³

Since W. Christaller developed the hierarchical class system idea in his statement of central place theory⁴ most writers investigating rural
settlement have assumed such a system exists. Mostly on the basis of functional units, but taking form, and (where information was available) population into account, each has produced definitions and nomenclature to suit his own particular purpose. The validity of such assumptions has been challenged by Vining on the grounds that what is assumed to be a class system is merely "differentiation along a continuum" with purely arbitrary divisions. However in their investigation in the Sno. County, Washington, Berry and Garrison were able to prove on a statistical basis that the functional types they derived differed more between types than they did within types.

The information obtained in the present study has been used to show statistically and diagramatically the number and nature of the functional units present in each settlement. In the absence of employment statistics the unit chosen has of necessity been the establishment with the result that the functional importance of different units may vary considerably. The aims in presenting this information in the form chosen and in the investigation of tributary regions have been threefold; firstly to tabulate the available information, secondly to establish a settlement hierarchy (if such exists) as the basis for generalisation, and thirdly to be able to study more closely the relationships between the various settlement units.

Using methods adapted from the study made by Berry and Garrison the functional units in each settlement have been plotted in Table 3. Services are arranged from left to right according to the number of settlements in which they are provided; those provided by the largest number of settlements are shown on the left. Some services, such as post office facilities, not provided by a separate establishment have been indicated by letters. At the same time settlements have been ranged from top to bottom; at the top are district centres which no longer have any functional units while at the bottom are those with the greatest number of functional units. An index of centrality has been computed on the basis of one point for churches, halls and libraries (which are used less frequently than other establishments) and two points for all other establishments other than residences. (see Table 3)

On the basis of this table settlements have been classified as county towns, villages and hamlets and the definitions stated in Chapter I established (see Page 3). The other distinction - that between hamlets and
A NOTE ON THE CLASSIFICATION OF ESTABLISHMENTS INTO FUNCTIONAL GROUPS USED IN FIGURE 14.

N.B. This classification is not the same as that used in showing the evolution of the settlements.

1. **Social and Educational**: Churches, schools, halls, libraries and hotels. (The accommodation function of hotels in the study area is regarded as subordinate to their social function.)

2. **Retail**: The sale of household and personal goods. Service stations are also included here.

3. **Farm Servicing**: This includes motor garages as the servicing of farm machinery is a major function of the majority of these. Stock and Station Agents, bulk fuel supplies and sale yards are also included here.

4. **Administrative**: Police, separate Post Offices, local bodies, power boards and fire stations are included in this category.

5. **Transport**: Includes both road and rail transport.

6. **Building**: Includes painting, plumbing and other allied trades as well as construction.

7. **Professional**: Banks are included here but schools and churches are excluded (see 1).

8. **Others**: Includes manufacturing and professional services not included in 2.
district centres is not purely functional as it depends on the degree of agglomeration, and the number rather than the type of the functional units.

The divisions between the three higher classes are justified on the grounds that each provides most of the services common to settlements in the next lowest class plus a range of services not normally found there. (see page 64). In some instances where settlements are unusually close together specialisation has taken place and does not necessarily imply a reduction in functional importance. Such is the case in Coalgate and Doxcaston which have neither church nor school (see Table 3). Furthermore, it is not uncommon for settlements to grow at different rates due to changes in location factors and it would seem that Southbridge is declining in its range of functions (see Chapter 5) and Lincoln is increasing its range of functions with the result that both lie in a transition zone between villages and county towns. In theory, a hierarchical system seems justified but in practice it can only develop within limits imposed by the lack of uniformity in the physical environment, the history of previous settlement and the operation of such variable factors as local body policy or the availability of building sections.

On the functional diagram (fig. 14) the information in Table 3 has been re-arranged to give a visual impression of the differences between the various classes of settlement and to investigate the types of service most commonly provided by each class in the hierarchy. From the information shown there would appear to be definite relationships between the size of the settlements and the type of service provided. It is readily apparent from Figure 14 that the main functions of the more numerous district centres and hamlets are educational and social. Retail, farm servicing and construction establishments are most common in villages or county towns while professional services are predominantly in the latter.

The relationship between the needs of the farm population and the distribution of service units is not as simple as is often assumed. A closer examination of Table 3 reveals that the services most frequently required are not the most widely distributed. Bakers for example are found in only one village and one county town, and butchers and stock and station agents are rarely found in villages and never in hamlets yet all three are more frequently required by the farm population than is the builder. Motion pictures are seen
as often and by as many people as attend church yet there are twenty-six settlements with churches as against four which have picture showings.

Several factors can be suggested to explain this distribution of functional units between the different classes of settlements. The frequency with which a particular service is required is certainly one of these but it must be ranked alongside the mobility of the particular service and the degree to which large scale organisation can make the service more efficient. If each of the services listed is studied with these three factors in mind its distribution will be more readily understood. Rural mail deliveries are among the best examples of a service that is now highly mobile and it is therefore not surprising that this factor, plus the advantages of larger scale organisation, have resulted in a system that is operated from Christchurch. In the baking industry the advantages of large scale production have outweighed other factors west of the main railway line and a Christchurch firm now delivers bread daily to the country stores in this area.

Theoretically these three factors should control the distribution of functional units but certain other factors also operate in practice. These are mostly related to the past and have already been discussed in Chapter 5. Many early established units later found that greater mobility reduced the need for them. Many commercial units closed down but churches and halls have tended to remain even though their distribution is quite unrelated to present day needs. In other cases commercial units survived by specialisation. Often establishments in smaller settlements have continued to exist by extending their tributary area to include adjacent settlements. The butcher at Rolleston for example delivers meat to Waedons, West Melton and Templeton township as well as his own immediate area. Alternatively small settlements have often continued to thrive by developing some new or specialised service with a very extensive tributary region. A noteworthy example of this may be found in the Doyleston Garage which has extended its second hand spare parts service for older models of farm machinery until it has a tributary region covering the whole of arable New Zealand.

Because the present day spacing of settlements is all too often a relic of the past the tributary regions of the various settlements have been difficult to obtain and often serve only to underline the mal-adjustment between
the spacing of the settlements and the present needs of the farming
community.

In many of the activities commonly regarded as the best criteria
for determining tributary regions there was little relationship between the
population of the area served and the size of the establishment or settle-
ment providing the service. Bakeries and rural mail deliveries have already
been mentioned as operating largely from Christchurch. Primary schools
have frequently consolidated and the degree to which this has taken place is
often determined by local prejudice; cases can be cited where pupils are
carried past one school to attend another.

Areas served by halls fluctuate wildly and frequently in this
present motor age and often depend on such unstable factors as the relative
popularity of the various dance bands. Many of the smaller churches are now
used only once or twice a month.

County divisions here are notorious for their inefficiency and
several mergers have long been under negotiation. The areas served by
telephone exchanges are more logical although the population of these differ
considerably and the exchanges are not always located in the centres providing
the widest range of services.

Of these services most commonly provided by settlements with
commercial units only two, general stores and motor garages, were regarded
as satisfactory for defining tributary regions (see fig. 15) and in both cases
limitations must be mentioned. Delivery services operated by general stores
were often quite unrelated to the general movement of traffic and many stores
with a small local market operated deliveries over a large area as in the case
of Coalgate, Glentunnel and Doyleston. Over much of the more densely
settled areas competing firms from different settlements deliver in the same
area. One of the Springfield stores, for example, provides a delivery service
within Lincoln which itself has two stores. The tributary areas of motor
garages frequently consisted of two components - an immediately adjacent area
where they met the general needs of the farm population and a much larger area
where they operated a specialised agency for a larger firm. Two overseas
firms are outstanding in the field of farm machinery used in Ellesmere; the
agency for one is held by a Southbridge firm while the other is held in
Leiston and both serve the whole of the area.
Figure 15: Tributary regions of those settlements with general stores and garages.
The results achieved by plotting tributary regions on this basis are not intended to give a detailed picture of the relationship between the individual settlements and the areas they serve. Instead they serve as an indication of the complexity of such relationships in general. It should be noted that the relationships between settlements and tributary regions in areas settled after the development of the road system are much more simple than in the areas of earlier settlement (Cf. figs 7 and 15). The main element of complexity west of the main railway line is that introduced by the settlements associated with coalmining in the Selwyn Valley.

Theospacing of the county towns is much better suited to the provision of the more advanced services they provide. District High Schools, Veterinary facilities, maternity hospitals and a wider range of retail facilities are typical of these. Darfield serves the whole of the less densely populated part of the study area and the eastern boundary of the area thus served coincides with a line through Aylesbury and Bankside. Lenton performs a similar role for a roughly circular area of some nine or ten miles in radius, although the District High School in this case is located at Southbridge. Lincoln provides a modified range of these services for that part of the area which is located closer to Christchurch.

In the light of the background material already discussed and the information shown in table 3 and figures 14 and 15 it is now possible to make a number of generalisations about the present function of rural settlements:—

(1) District Centres.

The most important functions of the district centres are social, religious and educational. In the face of the challenge of the internal combustion engine it has been the churches and schools which have survived in greater numbers so that they now represent seventy-five per cent of the functional units. These establishments which needed to make a profit in order to survive are now rarely found in these centres and, in the interests of efficiency, a number of schools have consolidated. Once built however churches and halls have required little money for maintenance and thus tend to remain until they need replacement. In only three cases have general stores remained and each of these has developed an extensive delivery service in adjacent districts. The part these surviving units play in the focusing of district consciousness is often quite out of proportion to the extent to which they are used.
The Village Stores.

Cash only.

Credit and Delivery.
Four of the district centres—Whitecliffs, Waddington, Irwell and Greenpark—stand in marked contrast to the others. In each the residential function remains important although most of the other functional units have been removed. These nucleated district centres are all located close to larger settlements which provide a fairly wide range of services and openings for employment.

(2) *Hamlets.*

In addition to the social and religious units found in district centres most hamlets possess one or other of the commercial units whose services are most frequently in demand. In some cases it is the general store offering a wide range of goods such as bread, groceries, confectionery, clothing and hardware and which may or may not have postal facilities or a petrol pump in addition. Alternatively the hamlet may have a small garage which carries out a wide range of motor and farm engineering as well as catering for passing traffic.

In four out of six cases they have a main road location and they depend on passing traffic to a much greater extent than do most other settlements. As a result of this any additional units which develop here are usually hotels or separate service stations.

(3) * Villages.*

Villages normally provide a full range of the social, religious and educational facilities found in the less developed types of settlement. A number of commercial activities that have disappeared in the smaller settlements are commonly found here. These include the permanently staffed railway station, the butchers shop, and the hotel.

Frequently several general stores will exist in partial competition with each other. Where two stores exist it is common for one, prominently placed and recently renovated to attract passing traffic, to operate on a cash basis while the other, less attractively laid out but carrying a wider range of goods, will operate on a credit basis and run a delivery van. In the case of garages they will hold agencies for different types of cars or farm machinery.

Some of the functions for which there has been an increasing demand in recent years are most commonly provided by villages as well as by county towns. Cartage contractors and builders are the most important in this
The Village - typical functional units.

The Butchers' Shops.

The Garages.

Builders' Establishments.
In villages the administrative needs most frequently required are provided by separate establishment. The full post office and telephone exchange are usually present while a number of villages have separate police stations. In this part of New Zealand Counties are small units with the result that their administrative headquarters are sometimes located in villages. If the proposed merger between the Springs, Halwell and Paparua Counties eventuates Lincoln would assume a new range of administrative functions and thus reach the next class in the settlement hierarchy.

The tendency towards specialisation of function in villages, already mentioned, adds a considerable degree of individuality to this class of settlement. Attacked by the same forces as the small settlements many of the villages have maintained their population and importance by developing one or more specialised functions. Indeed the prosperity of a number of these settlements depends largely on a single firm or activity. In the case of Springfield, where goods trains on the West Coast line are broken down and reassembled, the railways department is all important while most recent development in Dunsandel is related to the increase in main road traffic. At Holleston one single firm is engaged in building contracts, the sale and maintenance of farm equipment and machinery, earthmoving and farm contracting of all types, in addition to the sale of radios and electrical goods, and employs twenty-two people or three-fifths of the working population.

(4) County Towns.

Many of the services offered by the county town are parallel to those offered in most of the villages. Its primary schools, its churches, general stores and garages compete on equal terms with those adjacent settlements at the same time it provides both farm and rural settlements with a range of services not commonly found in its smaller neighbours.

It is in the county town that the stock and station companies find it most efficient to establish their smaller branches. In Darfield a number of competing firms each have their store or permanent agent while Locoton has, in addition, the local branches of several grain and seed companies. From here agents and fat lamb buyers travel quickly and frequently to all the farms within the larger tributary regions of these towns. In recent years Veterinary services have been established here and specialised
Leeton - the County Town.

The Commercial Core.

One only Department Store.

Legal facilities.

The Bank.

County Council Office.

Stock and Station Agents.
agencies for farm machinery are frequently, but not exclusively, held by firms in the County Towns.

The wider range of retail shops and a distinctive note to the County Towns without necessarily excluding the services offered by the general store. In addition to these Leeston has a large department store. Personal services not normally found in the smaller settlements may be represented by the barber and the beauty salon.

Cartage contractors can operate only within limits prescribed by the Transport Department and several of the larger have centralised their organisation in the County towns. In contrast to this passenger traffic is focussed on Christchurch and in no cases to the County towns operate as terminals. Internal rail passenger traffic is no longer significant.

A moderate range of medical services represented by the local doctors, the chemist and the maternity hospital is available but specialist treatment, surgery and ordinary hospitalisation are available only in Christchurch.

Permanent banking facilities are found only at Leeston while Darfield and Southbridge have bank facilities available once or twice per week. The services of accountants and lawyers are available on a similar basis while both County towns have their own magistrates court. The headquarters of the local electrical supply authority complete the range of administrative and professional services available.

The county town then represents the most highly developed form of rural settlement within the area studied. Although it has many features in common with urban areas its primary role is that of farm servicing. With the exception of those cartage contractors with other local depots, none of the firms centralised here have branches elsewhere. Wholesale distribution is absent and manufacturing and processing occupy a very small place in its economy. Banking and professional services are present but only partly developed. Thus the County towns exist only as the highest class in a hierarchy of rural settlement and in common with the lesser members of the hierarchy they are fully subordinate and dependant upon the metropolitan centre of Christchurch.
1. The only exception to this in the study area is Glenburnie where the pottery works employs the greater proportion of the working population. Lincoln Agricultural College, Burnham Military Camp, and Woomera Air Force Station are all relatively self-contained functional units as they are not regarded as forming an integral part of the settlement have been excluded from the present study.

2. Three small mines here employ about twenty-seven men.


5. These include Trewithen, Brush, King, Lister, Anderson and Carter (see Bibliography).


8. An "establishment" is here defined as a building, part of building or group of buildings under separate control. Thus a group of four buildings in a county council yard represents one unit while a chemist and a barber occupying the same building represent two units.


10. The only factory industry carried out in either of the county towns is a branch clothing factory at Leeston which is contained within a converted building about the size of a school classroom.
CHAPTER EIGHT
CONCLUSION.

The activities carried on in the rural settlements of Canterbury are determined largely by the needs of the farming community and the type of farm economy that exists at the present day. Yet many of the characteristics of these settlements have been profoundly influenced by factors which now belong to the past. Two of the most outstanding influences are widely separated in time. The first was the way in which the original agricultural settlers reacted to, and eventually conquered, the particular physical environment they found on the Canterbury Plains. The second is the way in which businesses in the settlements have adjusted to the new conditions brought about by the development of motor transport over the last four decades.

The choices made in locating the settlements were influenced by physical factors. Of these the margin of swamp vegetation, the limit of soils with a high water table, and the existence of streams to provide better drained sites or adequate supplies of drinking water seem to have been the most important. To a very large extent the significance of such factors was determined by the experience and the attitudes of the original agricultural settlers. As the frontier of agricultural settlement spread and as new types of equipment became available, or new methods of farming were made possible by economic changes, the type of locations most favoured also changed.

The influence of main lines of communication on the location of settlements was also very profound. That of the early main roads was almost completely replaced by the influence of the railways built in the late 1860s and 1870s. So rapid was the decline of some settlements such as Courtenay or Melbourn, that it could almost be said that they shifted to new locations at places like Kirwee and Dunsandel.

The variety and complexity of the physical and cultural factors influencing location has had its result in an absence of any form of theoretical spacing of settlement within the area. The various classes of settlement are not evenly spaced and villages especially are often found located adjacent to other villages. The only observable pattern of location is that related to main line communications. In general the larger settlements are located on the more important road or rail routeways while a much higher proportion of those settlements which are lacking in agglomeration and functional development
are located away from these.

The existence of large expanses of level ground, and the absence of forest, have meant that physical factors have not had any great effect on the morphology of settlement. The main components in the ground plan of most large settlements are either road junctions or a street grid surveyed out on an area that was originally held by one landowner. Only in the settlements fringing the Malvern Hills or those such as Lincoln or Taizagu which are astride or adjacent to a watercourse have physical features been significant. The extent to which agglomeration has taken place is much more closely related to the evolution of the settlements than to site factors.

The present day function of the settlement net as a whole is largely determined by the agricultural requirements although through communications are locally significant. The distribution of functional units among the various types of settlement, however, is largely a result of an adjustment of past development to present needs.

While each settlement tends to be unique in a number of ways, there are certain groups of settlements with similar characteristics. On the basis of their functional development a hierarchy of settlement was identified and it was found that the settlements within each class have frequently followed the same patterns of evolution and are showing similar signs of growth or decay.

The district centres are the most numerous and they are mainly settlements which have declined in importance because of changes in communications. Some were once agricultural hamlets located away from main routeways; others were villages located on earlier main roads or at important points on the railway system either before it was completed or up until the decline of local traffic this century. The majority have lost their commercial units and only two, Whitecliffs and Waddington, are still important residential areas.

Except for the two just noted, the district centres usually lack sufficient buildings to have a distinctive morphology and only where buildings are located close to the site of a former flour mill or railway station is nucleation apparent. The church and the hall are the most commonly found non-farm buildings and a few schools remain in areas where a policy of consolidation has not been favoured. Non-farm dwellings are found only where the district centres are close to larger settlements which provide employment.

In their function the district centres are now mainly social and
religious centres although even here their importance is diminishing. In this motor age many of the churches and halls are not really needed but because they are there they continue to be used on occasions. The majority of commercial units were under stronger economic pressures to close down and their buildings have usually been removed. In many respects these settlements are now fully rural yet once they formed an important part in the settlement next and even today it is in these settlements that the first signs of urban development, in the form of nucleation and the existence of non-farm dwellers, can be found.

The hamlets show two sets of opposing tendencies; the one a decline, similar in nature but not quite so marked as that noted among district centres, the other a development of new services related to main road communications.

A few agricultural hamlets located in fairly densely settled areas well away from main routeways have not declined so rapidly as district centres. Their social and religious buildings are more numerous and an occasional commercial unit has remained. Such settlements contain more buildings, but like the district centres, they lack nucleation and any definite form. At present it is difficult to determine whether their decline has halted or whether it will continue.

The main road hamlets show signs of recent growth that are equalled only in one village, Hummellel (also on the main road), and the county towns. They are characterized by a number of new buildings, such as service stations or refreshment shops, and a lack of separate residences. Their number of buildings is too small for these settlements to have a well developed morphology but nucleation tendencies are strong. It seems highly likely that such roadside settlements will continue to grow unless there is a significant reduction in the volume of private motoring.

Villages in the area are much more numerous than hamlets. This is largely due to the fact that the majority of agricultural hamlets have declined while most villages have maintained much of their functional importance.

The largest group of the villages began as agricultural hamlets which were located on what later became main roads. Some others were first founded as communication centres while others grew with the mining industry of the Malvern Hills. Most grew rapidly to reach their present order of size within three decades of their establishment and once provided a wide range of retail
and personal services. For a time a number even developed moderately large manufacturing industries such as implement-making or cordial manufacturing.

The coming of motor transport proved a strong challenge which the villages were able to withstand with varying degrees of success. Many of the widely distributed retail and personal service establishments were forced to close down or did nearly all the manufacturing units. A number of retail establishments survived however by expanding the area they served to include other villages or developing some new and specialised farm service which would attract customers from areas further afield. At the same time certain new activities, in the form of cartage contracting and motor engineering, developed in most villages. A comparison of their tributary regions with the services provided by the villages shows that the key to their survival has been specialisation and also that competition between villages is intense and adjustments continue.

In their morphology the villages stand in marked contrast to the smaller settlements. Each has a unique ground-plan but these are usually made up of some combination of grid, junction or (less common) linear development. Ribbon development is now a feature of several villages which are still expanding. In the villages nucleation tendencies are much stronger especially in more densely-settled farming areas and where the land has a higher rated value.

Within the villages as a whole there are evidences of both growth and decay. Some establishments such as motor garages give the appearance of expansion while others such as retail shops are now used only as residences. Overall expansion seems to be limited to a few main road villages but in the majority of others there is sufficient new building, both residential and commercial, to meet normal replacement needs.

The spacing of the villages is far from ideal and the distribution of functional units between them suggests that their overall density is much greater than actually needed to serve the farming community. The same internal combustion engine which has been so largely responsible for this has also made it possible for villages to survive in spite of this. Ease of road transport allows many businesses to compete successfully in neighbouring settlements and to extend their tributary regions much farther afield. As a result of this, no great changes are predicted in the future for the
the villages in this area.

Until the present mixed-farming economy began to develop there was little to distinguish the two county towns from the villages. However the need for a new range of farm services together with the changed transport conditions of the motor age has made possible rapid development of Leeston and Darfield. Both were nodally located and could provide services not available in other villages for much larger areas. As their importance grew a number of retail services less frequently demanded moved from the villages to these newly developing shopping centres and a number of administrative, health, and professional services also became concentrated here. The proportion of new buildings is greater in the county towns than in any of the other settlements.

In morphology the county towns are very similar to the villages although the density of housing tends to be greater in the former. Leeston has a much more noticeable central business than have Darfield and the villages. A number of new shops present a continuous front to the street while its large department store is a distinctive feature.

In the range and character of the services they provide, however, both Leeston and Darfield are similar. Some of the services they provide are paralleled in one or another of the villages but in addition they have a large number of other services not found in any of the smaller settlements. Farm and servicing and retail are their most important activities; a number of personal, administrative, legal, financial and health services are also found here.

The county towns represent the most highly developed of all the settlements under study. Yet even these may be classified as rural rather than urban as many of the activities normally associated with urban settlement are absent or only partly developed. Warehousing and manufacturing industry are almost non-existent and the legal, professional and health services provided frequently need to be supplemented by those provided by Christchurch.

That then is the character of the settlements which go to make up the hierarchy and form part of the settlement net which serves this area. The results of the present study support the belief that hierarchies of settlements do tend to develop but evidence does not suggest that identical hierarchies develop in different areas. Even minor differences in the physical background are sufficient to influence the location of the settlements as does the way in
which communications develop. The spacing and the consequent functional development are very much influenced by the segment occurrence. Even where physical and historical factors are similar the nature of the hierarchy of rural settlements varies with the distance from the metropolitan centre. The hierarchy of settlement in the area studied here is not identical to that found in the hinterlands of Ashburton and Timaru.

The relative importance of the various settlements within any hierarchy tends to wax and wane with technological and economic changes. Sometimes these changes bring about readjustments in the character of whole classes, while at other times individual members of a class may grow or decline relative to other members of the same class. While this is happening they may fit properly into neither class. In the present study it appears that Lincoln may be moving into the next step of the hierarchy while Southbridge has declined relative to Leeston and may now be properly classified as a village.

Within the area the settlements do not exist as individual units which are independent of each other. The relationship of each settlement to its surrounding district is to a large extent influenced by the relationships between other settlements and that same area. The rural settlements studied and Christchurch together make up the one integrated settlement net. Each new influence, such as changes in transport conditions or the introduction of new farming methods, calls for a readjustment of the settlement net. If some settlements grow faster than the net as a whole others must decline in relative importance.

The changed conditions in agriculture, transport, and business organization during the present century have been the cause of considerable adjustments in the settlement net. The greatest development has taken place in the metropolitan centre which has established many new direct contacts with the agricultural community. Among the rural settlements it is the county towns which have grown most and have taken on many functions intermediate between those of the villages and those of the city. Villages have usually survived by specialization although many of their services could be effectively be provided by the larger centres. The most noticeable decline is found among former agricultural hamlets which are the smallest and most numerous of the rural settlements and in most cases exist only as district centres with no agglomeration or commercial function.
Such is the character of the rural settlements in this area of the Canterbury Plains. The influences, physical, cultural and economic, which have created this character are many and varied. Despite the fact that the settlement of this area was carefully planned and initiated by the Canterbury Association its influence on the character of the rural settlements was largely lost among a variety of other stronger influences.

The period of extensive pastoralism delayed the spread of the agricultural frontier into this area by almost a decade and by this time the influence of the Canterbury Association had almost been lost. Only in the case of Lincoln was there a direct link between an Association planner and the establishment of a settlement and even here the influence did not extend beyond the street pattern.

The character and experience of the settlers brought out by the Canterbury Association was doubtless an influence on the spread of the agricultural frontier and the establishment of some settlements. Even during the 1860s however a whole host of new influences and new settlers were beginning to crowd in. The development of the transport network under the Vogel policy, the nature of the bonanza wheat boom and the technological advances that made possible the settlement of the drier tussock plains all played a more significant role in the establishment of the rural settlements. By the decade of the 1870s, which was the period of maximum evolution for most settlements, a whole host of new people and new influences were of greater importance in the rural settlements than those which arrived with the Canterbury Association in the early 1850s.

Today the rural settlements of Canterbury are distinctive in their location patterns, their physical appearance, and their function. At the same time they show many of the features and the trends that are found in rural service centres in other areas of the new world. Their function is predominantly farm servicing and they are dependent on the mixed farming economy of the area in which they are found. In both their character and their function the rural settlements of Canterbury make a major contribution to the total geographic personality of their region.
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A P P E N D I X A

A CLASSIFICATION OF THE SETTLEMENTS ON THE BASIS
OF THEIR MORPHOLOGY.

DISTRICT CENTRES

(a) Those showing no agglomeration.

Broadfield  Halkett  Te Piriti
Brookside   Kimberley  Wendons
Charing Cross Lakeside  Windwhistle
Courtsey    Roseville Flat

(b) Those showing some agglomeration.

(i) About a railway station:-
    Anmat       Ellesmere  Racecourse Hill
    Ayersbury   Kowai Bush  Selwyn
    Bankside

(ii) About the site of a flour mill or dairy factory:-
    Greenpark  Irwell  Killtown.

(iii) Others:-  Springfield South.

(c) Those showing agglomeration and morphology.

(i) Linear morphology:-  Whitecliffs.
(ii) Grid pattern:-  Waddington.

HAMLETS

(a) Agricultural Hamlets - little agglomeration.
    Greendale  Killinchy.

(b) Main Road Hamlets.
    Buncham  Motukarara
    Ladbrooks  West Melton.
    (Ladbrooks and West Melton also contain older nuclei).

VILLAGES AND COUNTY TOWNS

Listed in ascending order of functional development. The main
components of the morphology are given for each with the dominant component
listed first.

Coalgate:  Junction, linear.
Doyleston:  Junction, grid.
Glentham:  Linear, grid.
Rollston:  Junction.
Sheffield:  Linear, grid.
Kirwee:  Junction, grid.
Springston:  Pour junctions.
Hororata:  Junction, ribbon.

Springfield:  Linear, irregular.
Taitapu:  Irregular, grid.
Bunsandel:  Junction-grid-ribbon.
Southbridge:  Grid-linear, junction.
Lincoln:  Grid, ribbon.
Darfield:  Grid.
Laeston:  Three grids.
KEY

FOR FIGURES 16 AND 17.

—— STREET OR ROAD  ——— RAILWAY.

——— MAIN HIGHWAY —— RIVER.

——— TREES ——— CHANGE OF SLOPE.

\[\text{CHURCH}\]

\[\text{PUBLIC HALL}\]

\[\text{OTHER HALL}\]

\[\text{ROAD TRANSPORT DEPOT}\]

\[\text{UNUSED e.g. unused store}\]

\[\text{POST OFFICE}\]

\[\text{TELEPHONE EXCHANGE}\]

\[\text{CARPENTER'S OR JOINERY ESTABLISHMENT}\]

\[\text{MONUMENT}\]

\[\text{DWELLING}\]

\[\text{DOUBLE UNIT}\]