

LAND USE AND AGRICULTURAL PRODUCTION IN
ANTICONISH COUNTY, NOVA SCOTIA

A geographical approach to land use problems
and the means available for their solution in
an area marginal for commercial agriculture.

by
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Thesis submitted to the Faculty of the Graduate School
of the University of Maryland in partial
fulfillment of the requirements for the
degree of Doctor of Philosophy

1950

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INTRODUCTION

Antigonish County is located on the mainland section of northeastern Nova Scotia. Within its borders are to be found many of the features that characterize land use and rural life in the whole province. Morphologically, Nova Scotia is made up of uplands and lowlands, the distribution of which largely determines the pattern of agriculture in the province. The same is true in the county. Geologically, the Windsor formation in the lowlands seems to have given rise to some of the province's best agricultural soils. In Antigonish County, agriculture is centered in the area underlain by Windsor beds.

Nova Scotia's primary industries are agriculture, fishing, mining and forestry. All of these, with the exception of mining, play a direct and important part in the economic life of the county. In 1941, approximately 30 percent of the land area of the province was in farms. The figure for the county was 50 percent. The proportion of farmland in crops was 14 percent in the province and 16 percent in the county.

From the point of view of acreage occupied and rural population, both the province and the county reached an agricultural peak in the decade 1881-1891. In 1891, the area in farmland in the province was 46 percent of the total land area compared to the present figure of 30 percent. In the county, the 1891 figure was 76 percent compared to the present figure of 50 percent. In the period 1881-1931, rural population decreased almost 40 percent in the province and over 50 percent in the county. There has been a slight increase in the rural population of both county and province in the decade 1931-1941.

County and provincial developments have^e thus had great significance for each other. In the study that follows, emphasis is placed on developments within the county. Passing reference, however, is made to the province as a whole and throughout, county events take on an added

meaning because they are a reflection of some of the more important developments both in the province and in the whole eastern Maritime area of Canada.

One of the most significant features in the development of agriculture in Antigonish County and in the rest of Nova Scotia has been the high rate of farm abandonment since the turn of the century. The phenomenon has resulted, in large part, from the operation of national and international forces which affected the whole Maritime area. Declining yields on the one hand and increasing opportunities in industry and in other sections of the country on the other hand led to population decline in the province. Adverse climatic conditions, rolling topography, stony soils, soil depletion and lack of markets have all been contributing factors to the abandonment. In Antigonish County itself, abandonment has taken place most rapidly where physical handicaps of soil were greatest. This is probably true of other sections of the province also.

The settlement of large proportions of the land area both in the province and in the county was possible under the self sufficing system of rural life that prevailed before 1900. Such settlement is not suited to the commercial type of agriculture which has developed since then. Many Antigonish farmers are still under the spell of old habits. The lack of any agricultural tradition in the area has been an important factor hindering the passage of its economy to a position that would meet demands of the present day. Another factor may be the lack of any full scale program of development from which the farmer could draw encouragement and assurance.

The problems of agriculture in the county involve resources, management and markets. The growing season is relatively short and near drought conditions occur one year in five. Many of the soils now being cropped are not suitable for agriculture; others are marginal for this

use. Almost all soils in the county need lime, fertilizer and organic matter. Management in the county leaves much to be desired in nearly every aspect of agriculture from the adoption of basic rotations to the making and feeding of grass silage.

The major markets for county farm products are the town of Antigonish and the city of Sydney. In the past, Antigonish farmers did not have sufficient volume, or did not have the product in continuous supply, or could not meet the requirements of quality and grade to supply the Sydney market. Recently, this set of conditions seems to have changed. With the increased demand for milk in the Sydney area during World War II, Sydney distributors were forced to solicit milk from Antigonish farmers. Perhaps this was the step needed to bring to the farmers of the county an appreciation of the market at their doorstep. The development of a fluid milk industry, with the bulk of shipment to Sydney, is the most promising ray of hope for many Antigonish County farmers. The channels opened up by milk shipping would, in turn, encourage attempts to sell other farm products on a large scale in the Sydney area.

Co-operative organization in the county has been an important factor in teaching farmers an appreciation of the need for volume, continuity of supply and quality in their products. Co-operatives are an integral part of the Antigonish Movement, a program of adult education through economic co-operation, fostered by the Extension Department of St. Francis Xavier University in Antigonish. Though still young, the Movement has done much to break down the excessive individualism of primary producers in the county. Another organization that has made an important beginning toward the solution of agricultural problems in the county and in the province is the Nova Scotia Department of Agriculture. The provincial policies, however, have provided only piecemeal solutions. It is recognized that Nova Scotia is a poor member in

the national family of provinces. But the question is raised as to whether piecemeal solutions are, in the long run, more economical than an overall program.

The present study is an attempt to bring one point of view - the geographic - to bear upon the setting up of long term land use development program for the county. Soils have been delineated and the county divided into six "land use" regions. With these two items as a basis, the county has been further differentiated into five "economic land classes". Although this classification is very general and only tentative, it is meant to point the way to a detailed land classification scheme. Such a scheme would provide a framework for the development of an integrated policy. Within this framework, a host of problems relating to land use could be further studied and means advanced for their solution.

I

PHYSICAL GEOGRAPHY

INTRODUCTION

The geographic argument in the study of any area involves two very important sets of factors - those that are physical or inherent in the area and those resulting from human occupation. Whether the study proceeds from the physical factors to the human or vice versa, the results should not be significantly different. What is important is that these two groups of factors should be set side by side and investigated independently to some degree before an attempt is made to single out important reciprocal relationships.

In this study, the physical elements of the area are discussed first, not because they are deemed more important but because this order seems the more logical. Once this order of presentation is adopted and the physical elements are investigated, it is, of course, impossible then to shut them off, even temporarily, from subsequent sections of the study. All the writer can promise (and all the reader can hope for) is that an honest attempt will be made, when the time comes, to develop the theme of human occupation in its own right. At the same time, implications arising out of the physical order must be given their proper due.

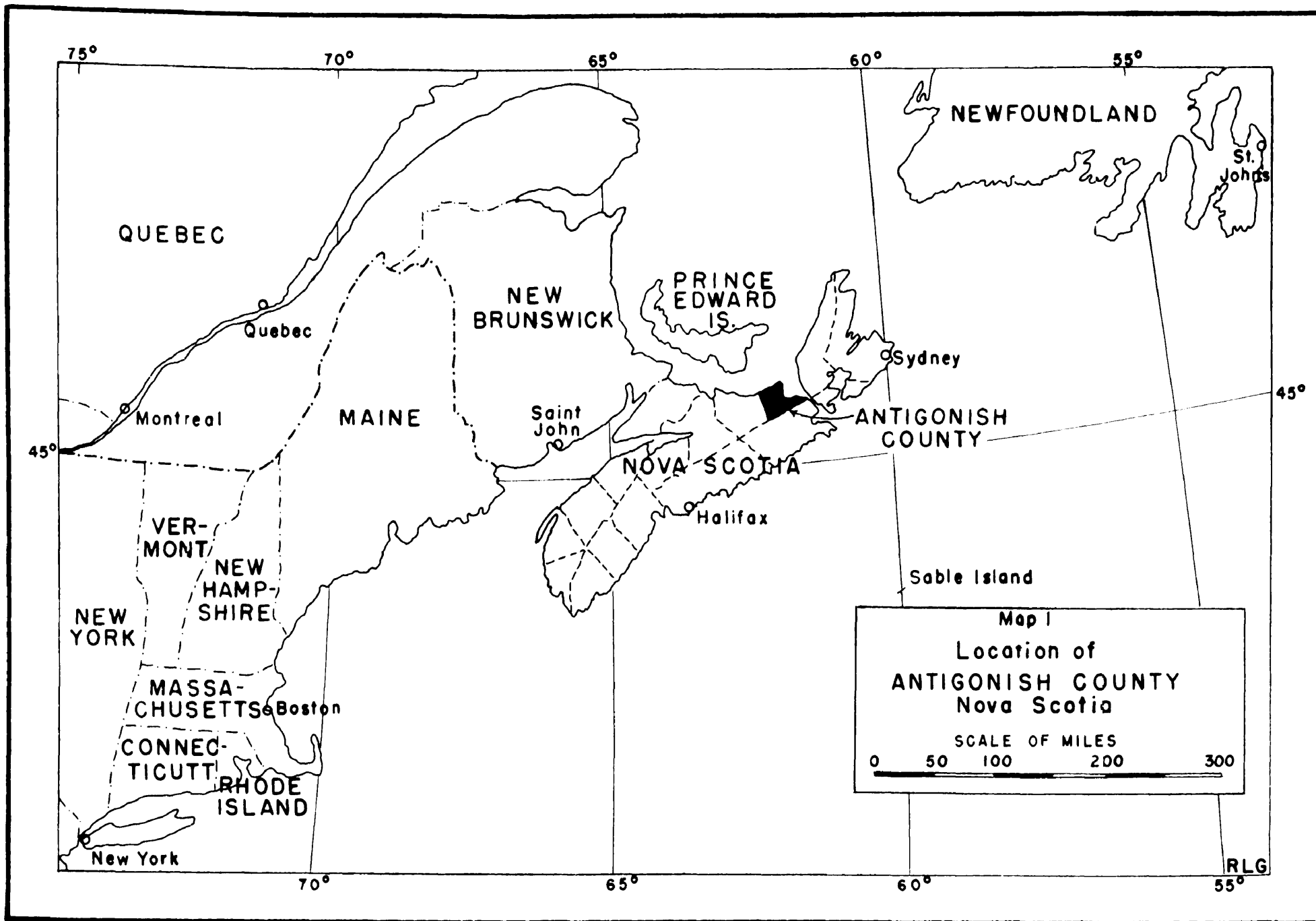
The physical elements included under the general heading "Physical Geography" include climate, geology, morphology and soils. In the matter of climate, the county area is too small a unit and data insufficient to allow for any significant differentiation. Climate is important because of the limitations it imposes on agriculture not only in the county but in the adjacent parts of the province. Any differentiation within the county itself is best indicated in the discussion

of soils, an element that to some extent reflects micro-climatic factors. Soil

is something geographic, as well as something physical, chemical and biological. Climate, vegetation, rocks, and the shape of the land surface are characteristic of the areas also. Each combination of features that make a landscape have co-operated to produce the soil. It is the synthetic expression of all of them.¹

The treatment of climate, geology and morphology has thus been arranged, at least in part, as a prelude to the chapter on soils. In addition, there appears in these chapters a good deal of data that might be termed non-essential to the purposes at hand. This has been inserted for the purpose of inventory. The area is one where such inventory is being made for the first time.

¹C.E. Kellogg, The Soils That Support Us, p. 105



CHAPTER 1

CLIMATE

Because of their peculiar position (Map 1), the Maritime Provinces - New Brunswick, Prince Edward Island and Nova Scotia - have considerable regional climatic variation. Cyclonic storms control the weather. In winter, they pass along the southern border, inducing invasions of cold air from the interior. In summer they pass to the north drawing in warm air from the south and southwest. As far as plant life and human activity are concerned temperature probably constitutes the controlling climatic factor in the Maritimes.

Until very recently, two meteorological stations were located in Antigonish County - one in Antigonish town and the other at Collegeville (Map 2). The former was closed at the end of 1947 and the latter was replaced by a station at Copper Lake in 1945. Climatic charts for the Antigonish and Collegeville stations are shown in Figure 1. The actual data are given in Table 1.

Temperature

D. F. Putnam has divided the Maritime Provinces into eleven climatic regions (1, 8).¹ All of Antigonish County with the exception of a bit of the Eastern part, is included in his region "Northern Nova Scotia". The region consists of a low northern coastal area and a higher interior to the south. The difference between the two in mean annual temperature in the county is insignificant, less than one-tenth of one Fahrenheit degree. This is the coldest part of Nova Scotia in the winter. At Collegeville, in the interior, February, with an average mean monthly temperature of 18 degrees F., is slightly colder than January (20 degrees F.). The same is true at Antigonish town, on the coast, with an average February mean of

¹

Numbers in parentheses refer to the listings in the Bibliography.

INDEX MAP

- Base Map from Office of the
Surveyor General, Ottawa*



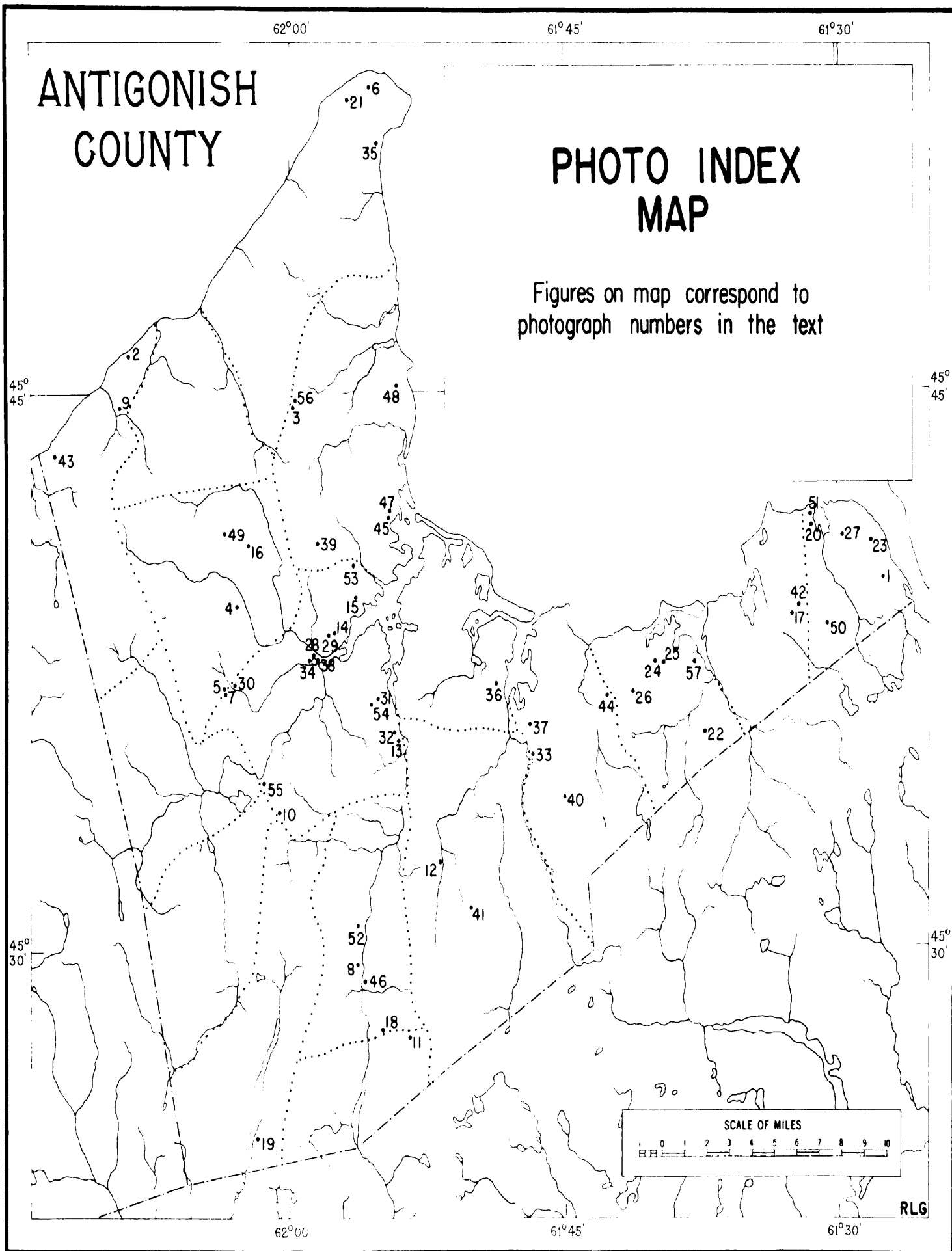


TABLE 1. Climatic Data for Antigonish and Collegeville, Antigonish County, Nova Scotia.¹

ANTIGONISH (1911 - 1938)

	Mean Temp.	Mean Min.	Mean Max.	Total Pptn.
Jan.	20.4	9.6	31.3	3.12
Feb.	17.6	6.9	28.1	2.68
March	27.6	18.0	36.9	2.46
April	37.0	28.3	45.6	2.81
May	47.5	36.1	58.8	3.43
June	56.8	45.3	68.3	2.56
July	65.0	54.3	75.6	2.82
Aug.	63.5	52.3	74.7	2.87
Sept.	56.4	45.5	67.2	4.08
Oct.	47.9	37.8	58.0	3.77
Nov.	37.6	29.5	45.6	4.25
Dec.	26.6	18.4	34.8	3.75
Year	42.0	31.8	52.1	38.6

COLLEGEVILLE (1916 - 1939)

Jan.	20.0	9.5	30.5	4.36
Feb.	18.0	6.8	29.3	3.24
March	27.7	17.9	37.5	3.18
April	37.5	28.4	46.6	3.04
May	47.6	36.1	59.1	3.31
June	57.6	45.8	69.4	2.96
July	64.4	53.2	75.7	3.05
Aug.	64.2	52.9	75.6	4.04
Sept.	57.2	46.4	67.9	3.69
Oct.	48.0	37.9	58.0	4.65
Nov.	37.4	28.9	45.9	4.30
Dec.	26.0	17.6	34.3	4.71
Year	42.1	31.8	52.5	44.6

¹ Data from Meteorological Division: Climatic Summaries
(1,2).

17.6 degrees F. and an average January mean of 20.5 degrees F. A large part of the county has experienced temperatures of -35 degrees F. Summer temperatures are not excessive. The average July mean temperature at Collegeville and Antigonish is 66 degrees F. An extreme of 101 degrees F. has been recorded once at Collegeville.

The growing season in the county lasts approximately 185 days. (The term "growing season" refers to that period in which plant growth occurs. It should not be confused with the "frost free season", the period in which no frost damage occurs. Strictly speaking, each plant has its own growing season but on the basis of botanical research with ordinary crop plants, the British Meteorological Service¹ has adopted 42 degrees F. as the critical temperature limit). For the Maritimes as a whole, the growing season varies from less than 150 days in northern New Brunswick to more than 190 days in southern Nova Scotia.

The frost-free period in the county (i.e., the number of days between the average date of the last killing frost in the spring and the average date of the first killing frost in the fall) varies from 105 days at Antigonish to 109 days at Collegeville. It is well to remember, however, that frost dates may vary as much as three weeks on either side of the average. The frost-free period in the county suffers substantial reduction due to a range of temperature which is greater than in most other parts of the Maritime Provinces.

The eastern part of Antigonish County experiences a cooler and later spring than the rest of the county. This is due to the Labrador Current whose influence is felt over the easternmost parts of the province.

¹British Meteorological Service, Met. Glossary, London 1930 - cited in D. F. Putnam, "The Climate of the Maritime Provinces" (1,8; p. 137).

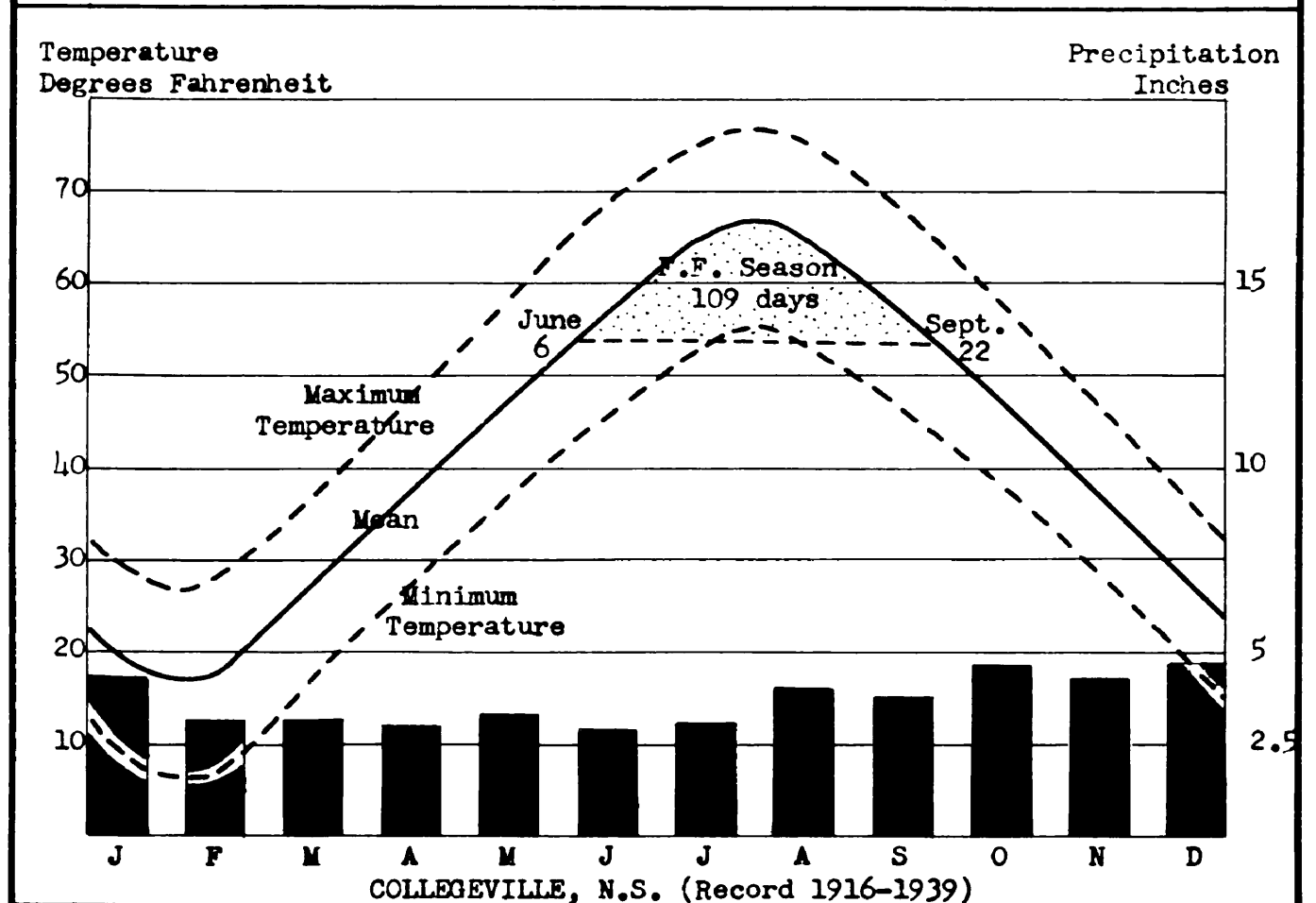
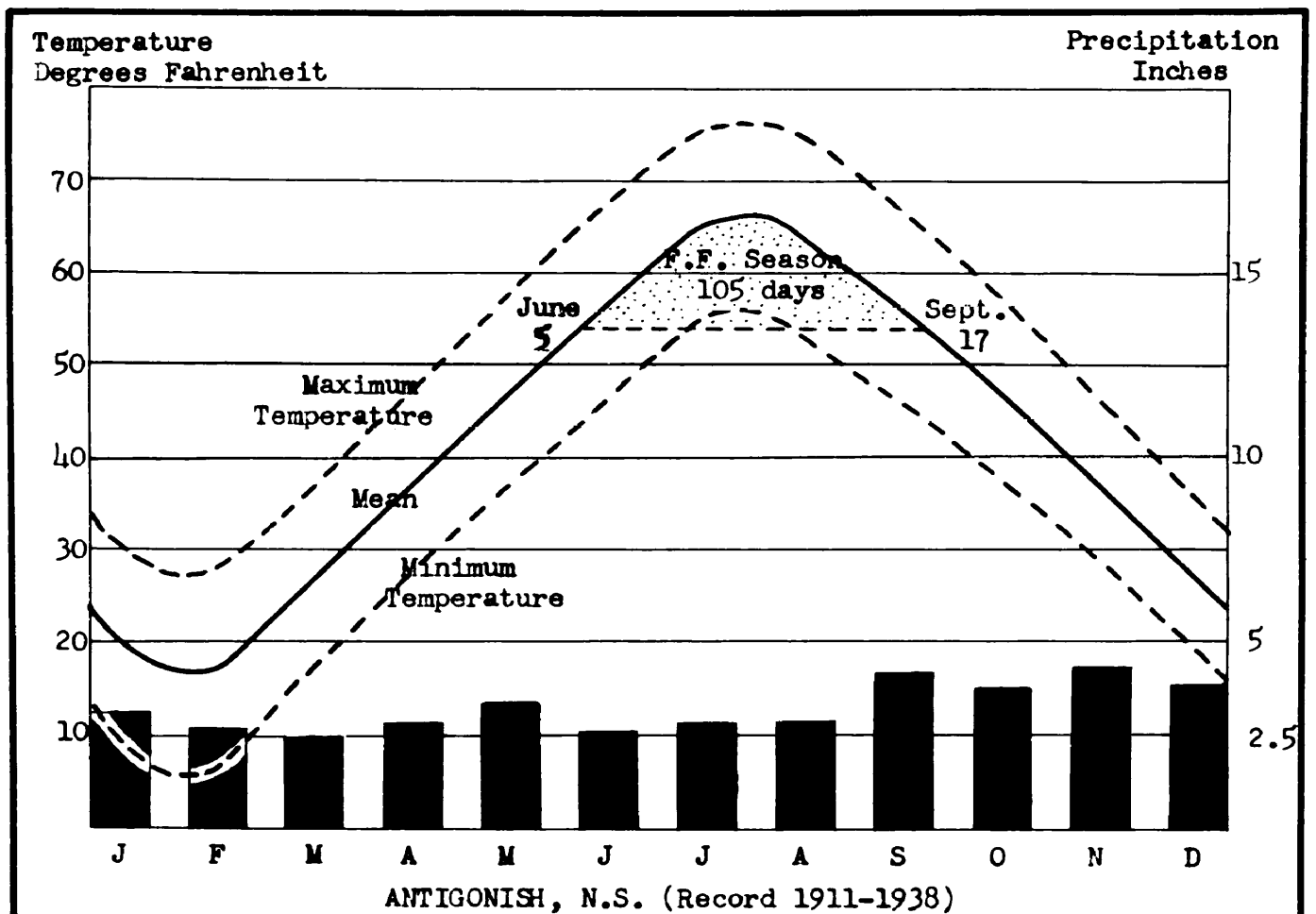


Fig. 1. CLIMATIC CHARTS - ANTIGONISH AND COLLEGEVILLE, N.S.

Precipitation

It is well known that the rainfall of the Maritime Provinces is, in most years, quite adequate for the requirements of all vegetation which can exist within the thermal limits. In fact, it may at times be regarded as excessive.

In general, the precipitation increases southward in the county, with the difference greatest in winter precipitation. This is illustrated by the climatic charts (Fig. 1). Annual precipitation is 38.6 inches at Antigonish and 44.5 inches at Collegeville. Precipitation in the winter half-year (October to March) is 20.0 inches at Antigonish and 24.4 inches at Collegeville. In the summer half-year, Antigonish receives 18.6 inches and Collegeville 20.1 inches.

The important consideration from a biological standpoint is the amount received in the growing season. Of special significance is the distribution in the three summer months, June, July and August. Under the prevailing temperature conditions of the area, nine inches is considered necessary for successful agriculture. In the three summer months, Collegeville receives, on the average, 10.1 inches of rain while Antigonish receives only 8.3 inches. This summer deficiency at Antigonish is brought out graphically when the Thornthwaite formulae are applied to the station (Fig. 2). The Thornthwaite chart is especially significant because it carries the discussion of moisture conditions beyond the realm of precipitation alone. Evapotranspiration (i.e., the combined evaporation from the soil surface and transpiration from plants) is considered together with precipitation to indicate whether the climate of a given area is moist or dry.

Potential evapotranspiration is determined through special equations devised by Thornthwaite (1, 9). A monthly temperature efficiency index is obtained from the equation $i = (t/5)^{1.514}$ in which t = mean monthly temperature. Summation of the monthly indices (Table 3)

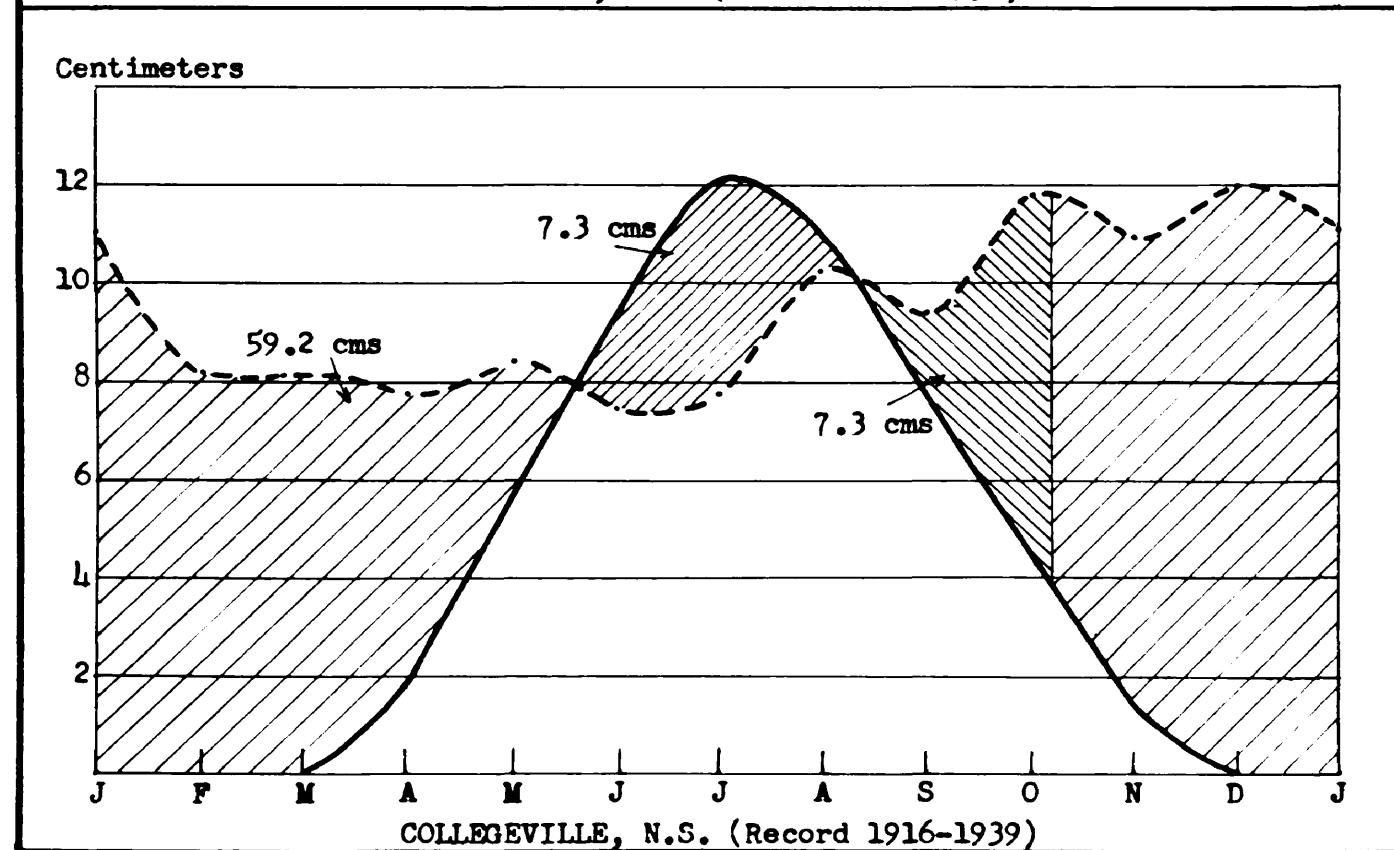
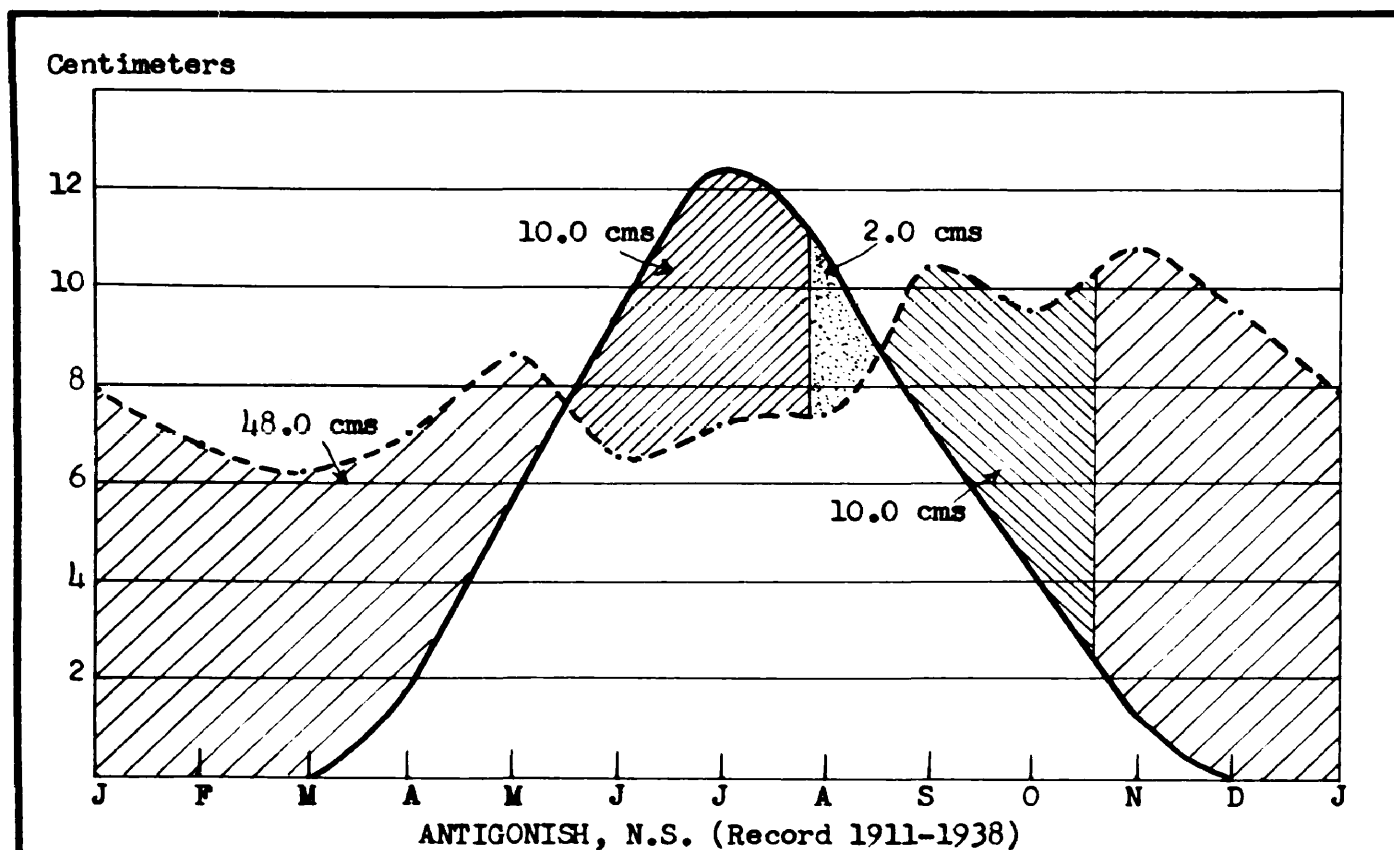


Fig. 2. THORNTHWAITE CHARTS - ANTIGONISH AND COLLEGEVILLE, N.S.

----- Precipitation.

— Potential
Evapotranspiration.

Water
Surplus.

Water
Deficiency.

Soil Moisture
Utilization.

Soil Moisture
Recharge.

gives a yearly index and this is used with a nomogram to determine unadjusted values of potential evapotranspiration. These values are then adjusted for day and month length by means of a correction factor based on latitude.

The plotting of potential evapotranspiration and precipitation values indicates rainfall limitations in relation to the moisture needs of the station. Monthly rainfall alone is not necessarily the same as actual evapotranspiration however. Available storage water, which in the Thornthwaite computations attains a maximum measure of 10 centimeters in the ground, must be added to precipitation (Table 3). As precipitation falls back of the moisture need (or potential evapotranspiration), water is taken out of storage to make up the deficiency. In months when this operation is possible, actual evapotranspiration equals precipitation plus water taken out of storage. If no water is available in storage, actual evapotranspiration equals precipitation.

The Thornthwaite charts (Fig. 2) indicate a deficiency of two centimeters at Antigonish from August 25 to September 22. This deficiency indicates that the country is not free from the danger of drought. Another important measure of the drought danger is provided by variations in summer precipitation from year to year. Table 2 indicates the extent of such variations at Antigonish and Copper Lake in the summers of 1945, 1946 and 1947.

The most striking figure in Table 2 is the precipitation of 0.21 inches in July, 1947 at Antigonish - a deviation of over 92 percent from the average July figure of 2.82 inches. One summer month in which less than one inch of rainfall is received occurs every four to five years in the county.

TABLE 2. Variations in summer precipitation - Antigonish and
Copper Lake - 1945-1948.¹

ANTIGONISH ²	Monthly Precipitation (inches)						
	Average 1911-1938	1945	Percent Deviation from Avg.	1946	Percent Deviation from Avg.	1947	Percent Devia. from Avg.
June	2.56	4.84	+89.1	Incom- plete.	---	1.27	-50.4
July	2.82	2.87	+ 1.8	2.16	-23.4	0.21	-92.6
Aug.	2.87	4.21	+46.7	3.65	+27.2	4.75	+65.6

COPPER LAKE	Average 1916-1939 (College- ville)	1946	Percent Deviation from Avg.	1947	Percent Deviation from Avg.	1948	Percent Devia. from Avg.
June	2.96	1.63	-44.9	4.28	+44.6	2.99	+ 1.0
July	3.05	2.95	- 3.3	3.66	+20.0	3.70	+21.3
Aug.	4.04	3.47	-14.1	1.43	-64.6	4.42	+ 9.4

¹Data from unpublished statistics, Central Meteorological Office, Toronto.

²The Antigonish station was closed in 1947. The Copper Lake station replaces the old Collegeville station and was opened in 1946.

Summary

It is evident from the foregoing that climatic data for the county are too incomplete to warrant any but a sketchy presentation of climatic conditions in the area. This is unfortunate. The material presented in Table 2 is probably the most significant in the chapter but the short period of the record prevents generalization on any scale. Recurring drought, especially, is a phenomenon that deserves detailed investigation because of the direct influence it exercises over agriculture in the county.

CHAPTER 2

GEOLOGY¹

The Appalachian Region of Canada, sometimes called the Appalachian-Acadian Region, comprises the three Maritime Provinces - Nova Scotia, New Brunswick and Prince Edward Island - and that part of the province of Quebec that lies southeast of Logan's Line, a thrust fault extending from Lake Champlain northeastward in a gentle curving arc to Quebec City and from there down to the St. Lawrence. The whole belongs to a larger unit usually referred to as the Appalachian Highlands or the Appalachian System, which stretches from Alabama in the southwest to Newfoundland in the northeast, a distance of 2,000 miles. The Appalachian Region in Canada corresponds to the New England Province in the United States. It is an upland dissected by valleys and broken by broader lowland areas developed on beds of less resistant rocks. It has a long stretch of coast, for the most part irregular in outline and with many deep embayments (I, 1; p. 98).

Nova Scotia

Nova Scotia is a geological patchwork made up of upland and lowland areas (Map 3). There are no large areas underlain by single formations such as are found in the interior of North America. The character of the underlying rock changes every few miles and with it changes the character of the topography and the soils. Except for the plateau of northern Cape Breton, there are few points more than 1,000 feet above sea level. The upland areas, in general, are above 500 feet save for the seaward slope of the Atlantic peneplain which maintains its rugged character to the water's edge. The uplands

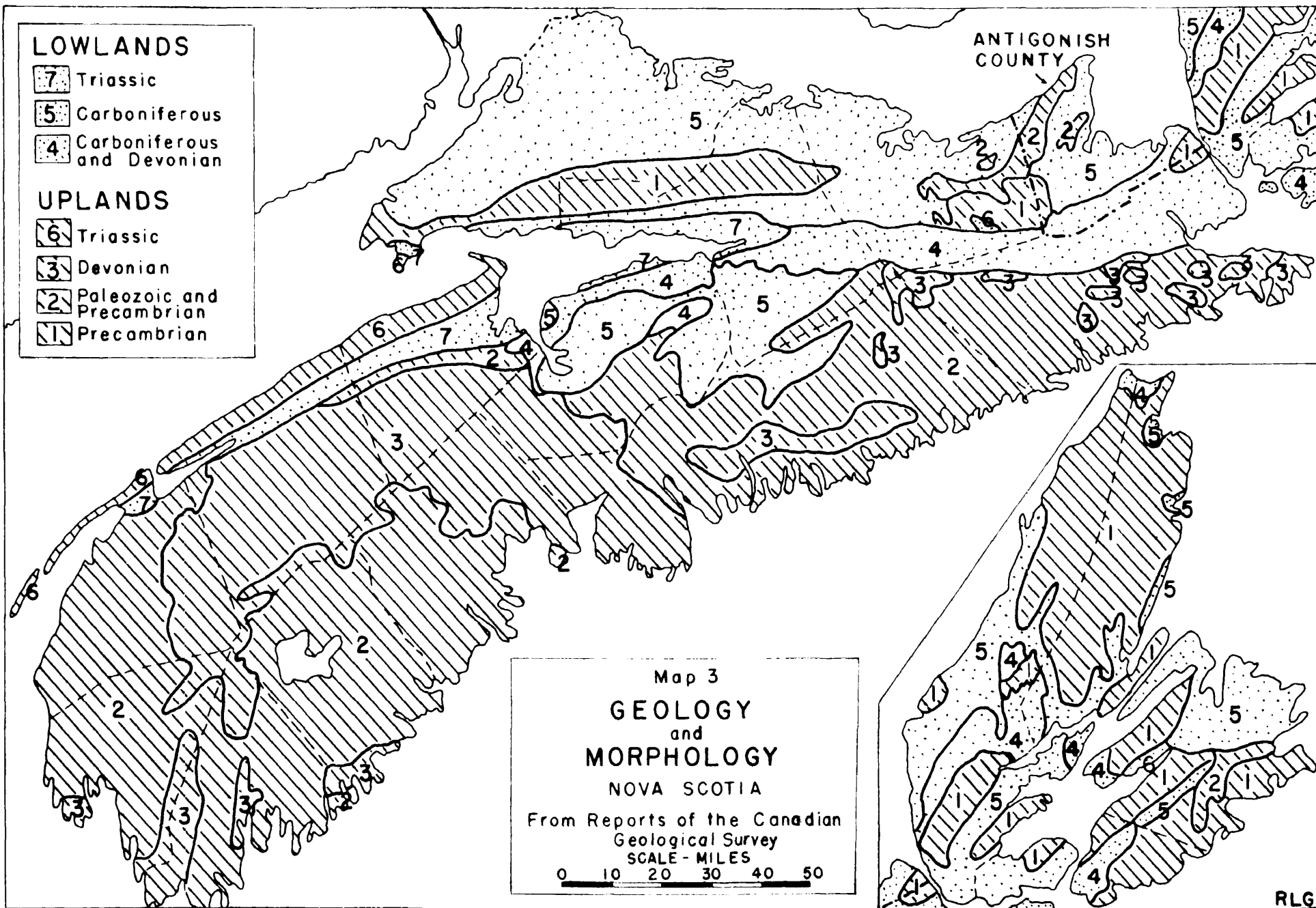
¹This chapter is a summary in the main, of reports of the Canadian Geological Survey as presented by F. J. Alcock in Geology and Economic Minerals of Canada, Chapter III - The Appalachian Region (I, 1; pp. 98-155). Specific references, where used, are indicated at the end of each paragraph.

LOWLANDS

- 7 Triassic
- 5 Carboniferous
- 4 Carboniferous and Devonian

UPLANDS

- 6 Triassic
- 3 Devonian
- 2 Paleozoic and Precambrian
- 1 Precambrian



Map 3 GEOLOGY and MORPHOLOGY NOVA SCOTIA

From Reports of the Canadian
Geological Survey
SCALE - MILES

0 10 20 30 40 50

RLG

are underlain by hard igneous and metamorphic rocks of ancient geological age while the lowlands are formed from softer sedimentaries.

Goldthwait (I, 6) has divided the province into five upland and five lowland areas. The former comprise: (1) The large Southern Upland (Map 3) which slopes from elevations of 600 feet to the sea and which is underlain largely by Precambrian and Cambrian quartzites and slates; (2) North Mountain, a narrow, flat-topped ridge of Triassic diabase averaging about 550 feet in height; (3) the Cobequid Mountains, a region of broad rounded summits with an average elevation of about 900 feet, consisting mostly of Precambrian igneous and metamorphic rocks; (4) the highlands of eastern Pictou and western Antigonish counties, which are largely made up of Precambrian and early Paleozoic metamorphic and igneous rocks; (5) the upland belts and northern tableland of Cape Breton Island where hard crystalline rocks - Precambrian metamorphic and igneous - come to the surface (I, 1; p. 98).

The lowlands are underlain by the less resistant sedimentary rocks such as sandstone, shales, limestone and gypsum and show a considerable diversity of form. These include: (6) The long trough-like depression of the Annapolis-Cornwallis Valley underlain by Triassic sandstone; (7) the lowlands of Hants and Colchester counties; (8) the Cumberland-Pictou lowland; (9) the lowlands of Antigonish and Pictou counties; (10) the lowlands of Cape Breton Island. The last four areas are all underlain by Carboniferous shales, limestones and sandstones with Devonian sandstones important in some localities (I, 1; p. 100).

Antigonish County

Of the areas listed above, two are found in Antigonish County, an upland and a lowland. The upland area, the highlands of Pictou and Antigonish, makes up approximately one-quarter of the area of the county. It is located on the western margin and extends northeastward to Cape George (Map 4). In the southern part the

62°00'

61°45'

61°30'

ANTIGONISH COUNTY

GEOLOGY

- - Limestone Outcrop in the Windsor formation

7-Windsor - shale, sandstone, limestone, gypsum

6-Horton - sandstone, shale, conglomerate

5-Pre-Mississippian - slate, sandstone, shale

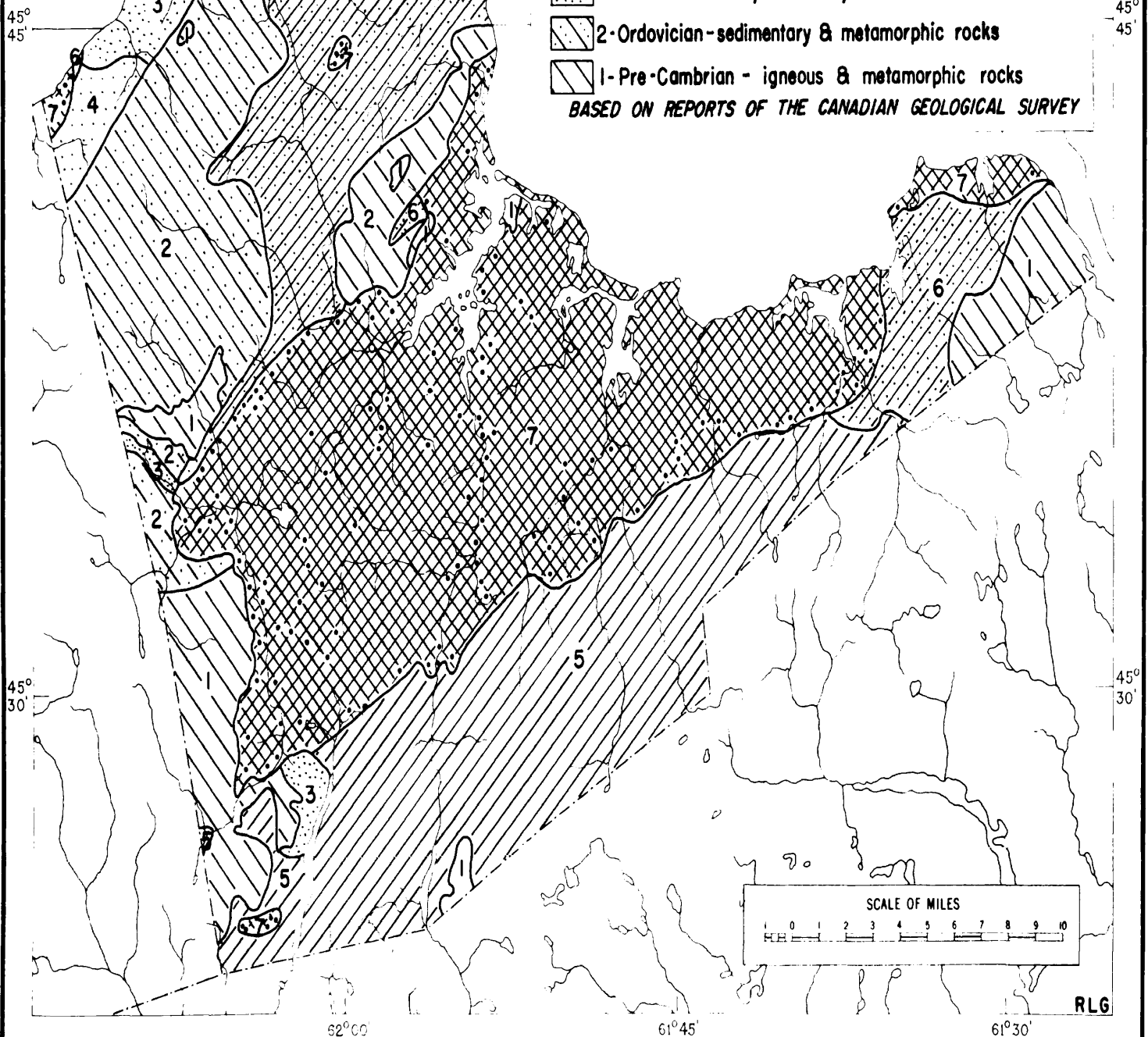
4-Devonian - sandstone, slate, conglomerate

3-Silurian - shale, sandstone, limestone

2-Ordovician - sedimentary & metamorphic rocks

1-Pre-Cambrian - igneous & metamorphic rocks

BASED ON REPORTS OF THE CANADIAN GEOLOGICAL SURVEY



62°00'

61°45'

61°30'

RLG

elevation is about 800 feet but near Arisaig it is more nearly 900 feet. The lowland of Antigonish and Guysborough counties lies south and east of the upland. Approximately three-quarters of Antigonish county lies in the lowland belt.

1. The Upland Area. Geologically, the upland area is underlain by Precambrian and Ordovician igneous and metamorphic rocks (Map 4). The Precambrian sections of the upland (Photo 1)¹ contain the following igneous rocks: granite, syenite, felsite, diorite and porphyry. The Ordovician comprises metamorphosed, sedimentary, volcanic and intrusive varieties. The Brown's Mountain Group, consisting of argillites, slates and greywacke is regarded as of Lower Ordovician age. Locally associated with the sediments are interbedded volcanic flows and tuffs, and cutting them is a stock of granite and dikes and stocks of rhyolite and quartz porphyry. In the Arisaig section, strata of this group are overlain by coarse conglomerate and grit of the Malignant Cove formation which is believed to be of Middle Ordovician age (I,1; p. 112).

The best section of Silurian strata in Nova Scotia is at Arisaig, where there is an almost continuous exposure, about 2½ miles long, of 3,800 feet of sandstone, calcareous sandstone and shale known as the Arisaig series. The basal beds rest upon a flow of rhyolite (Photo 2) probably of late Ordovician age and the series is overlain by the Knoydart formation considered to be lower Devonian. The Arisaig beds are highly fossiliferous. Sections on the shore and in the stream valleys show the strata to be crumpled, faulted and in places overturned. The main structure is that of a syncline broken and folded along its axis, and this has been complicated by minor faults and folds (I,1; pp. 114-116).

¹All photographs are indexed on Map 2a.

PHOTOS 1 - 4

PHOTOS 1-4 (GEOLOGY)

1. The Precambrian sections of the Antigonish upland contain various igneous rocks, including granite, felsite and diorite. These are granite boulders on the upland in the eastern part of the county near Auld Cove.
2. The Antigonish County shore at Arisaig is famous in geological circles for the many examples it provides of volcanic materials such as surface flows, volcanic bombs and volcanic ash. The flows of rhyolite shown here are characteristic of the shoreline for more than three miles east of Arisaig.
3. Some of the best agricultural soils in Antigonish County have developed from the limestones and shales of the Windsor group. Limestone outcrops in the Windsor are common. This one occurs near Big Marsh.
4. Another characteristic of the Windsor formation is the presence of beds of gypsum, especially in the belt from James River northeastward along the Canadian National railway tracks for about 15 miles. The beds shown here occur near the Brierly Brook station.



1



2



3



4

2. The Lowland Area. The lowland area of the county is underlain by Mississippian conglomerates, shales, sandstones and limestones and pre-Mississippian slates, shales and sandstones (Map 4). These extend eastward through the lowland belt and occupy the lowlands on Cape Breton Island. The Mississippian strata belong to two groups, the Windsor and the Horton. The latter is made up of two formations, a lower, known as the Horton Bluff, consisting of dark shale, sandstone and conglomerate, and an upper, the Cheverie, made up of red and gray shales. The Horton Bluff rests unconformably on Precambrian metamorphic and igneous rocks. The Cheverie rests with angular unconformity on the Horton Bluff and is succeeded, also unconformably, by the Windsor group of marine sediments. These comprise limestone, (Photo 3), gypsum (Photo 4), shale, sandstone and limestone conglomerate. The limestone members are rich in fossils (I,1; p. 124).

The best agricultural soils in the county have developed from the glacial till of the limestones and shales of the Windsor group and to a lesser extent from the till of the shales and sandstones of the Horton group. The belt of pre-Mississippian sediments extending along the southern boundary of the county consists mostly of metamorphic rocks such as slate associated with sandstones. The type of till found here has given rise to thin soils whose use for agriculture is largely marginal.

The important part played by the Windsor geological formation in the development of agriculture in the county will become increasingly evident as the subsequent sections of this study are unfolded. The area in the county underlain by rocks of the Windsor group represents one-third of the total land area of the county but it contains 60 percent of the total rural population and two-thirds of the improved land. The Windsor area is outlined on all important maps, including the population map (Map 8) and the map of improved land (Map 13), so that its relation to the material presented may be seen at a glance.

CHAPTER 3

MORPHOLOGY

Uplands¹

The uplands of Nova Scotia, mentioned in the previous chapter, have an interesting physiographic history. They are known collectively as the Atlantic Upland (Map 3) and present a surface of striking uniformity (Photo 5). This surface cuts straight across the complex rock structure of the province, a structure which shows that the province was occupied by high mountains in early geological ages. Accordingly, it is believed that the upland is a peneplain, formed by the wearing down of mountains. Inasmuch as the Atlantic Upland now rises from sea level along the southern coast of Nova Scotia to 1,200 feet in Cape Breton, it is evident that it has gained its present altitude through a general upwarping of the region (I, 6; p. 4).

Today the Atlantic Upland appears only in detached fragments, separated in some places by lowlands of considerable width. The division of this once continuous plain into its several fragments has been accomplished since its elevation, and mainly by renewed erosion wearing away those parts of the uplifted plain which were occupied by the least resistant rocks (I, 6; p. 4).

Finally, the whole region sank, letting the sea creep in over the lower part of the dissected upland and spread widely over the new lowlands. By the time subsidence ceased, the sea had pushed the outer shore line inland nearly 100 miles, from Sable Island to its present position (I, 6; p. 5).

Late in the geological history of Nova Scotia, the region was covered by the great North American ice sheet which spread seaward

¹ Summarized in the main part from J. W. Goldthwait: Physiography of Nova Scotia (I, 6; pp. 4-6, 27-29). Specific references are indicated at the end of each paragraph.

over it from centers probably in Quebec and Labrador. By erosion of a type peculiar to ice sheets, and more especially by the shifting and re-arrangement of the mantle of surface deposits, the continental glacier gave the finishing touches to the outlines of the shore and the forms of the land (I,6; pp. 5-6).







Uplands in Antigonish County. One of the smaller remnants of the Atlantic Upland in Nova Scotia are the Highlands of Pictou and Antigonish counties. The Cobequid Mountains, another remnant (Map 3), terminate about ten miles southwest of the town of Pictou. For about ten or twelve miles, the crystalline rocks of the "mountains" disappear beneath a cover of the softer bedded rocks that compose the encircling lowlands in Pictou County. About five miles south of the city of New Glasgow, the hard rocks (and with them the uplands) reappear, spreading out widely over the eastern part of Pictou County and projecting northeastward to Cape George in Antigonish County (I, 6; pp. 27-28).

A large part of the upland is occupied by the quartzites and slates of the Ordovician period. These bedded rocks are closely folded and the structure is displaced by granite stocks. In addition, the strata are punctured in many places by smaller intrusions of dense, fine-grained rocks which are the necks of ancient volcanoes. The lava is of two or three different kinds indicating several periods of injection of magma as well as repeated folding (I,6; p. 28).

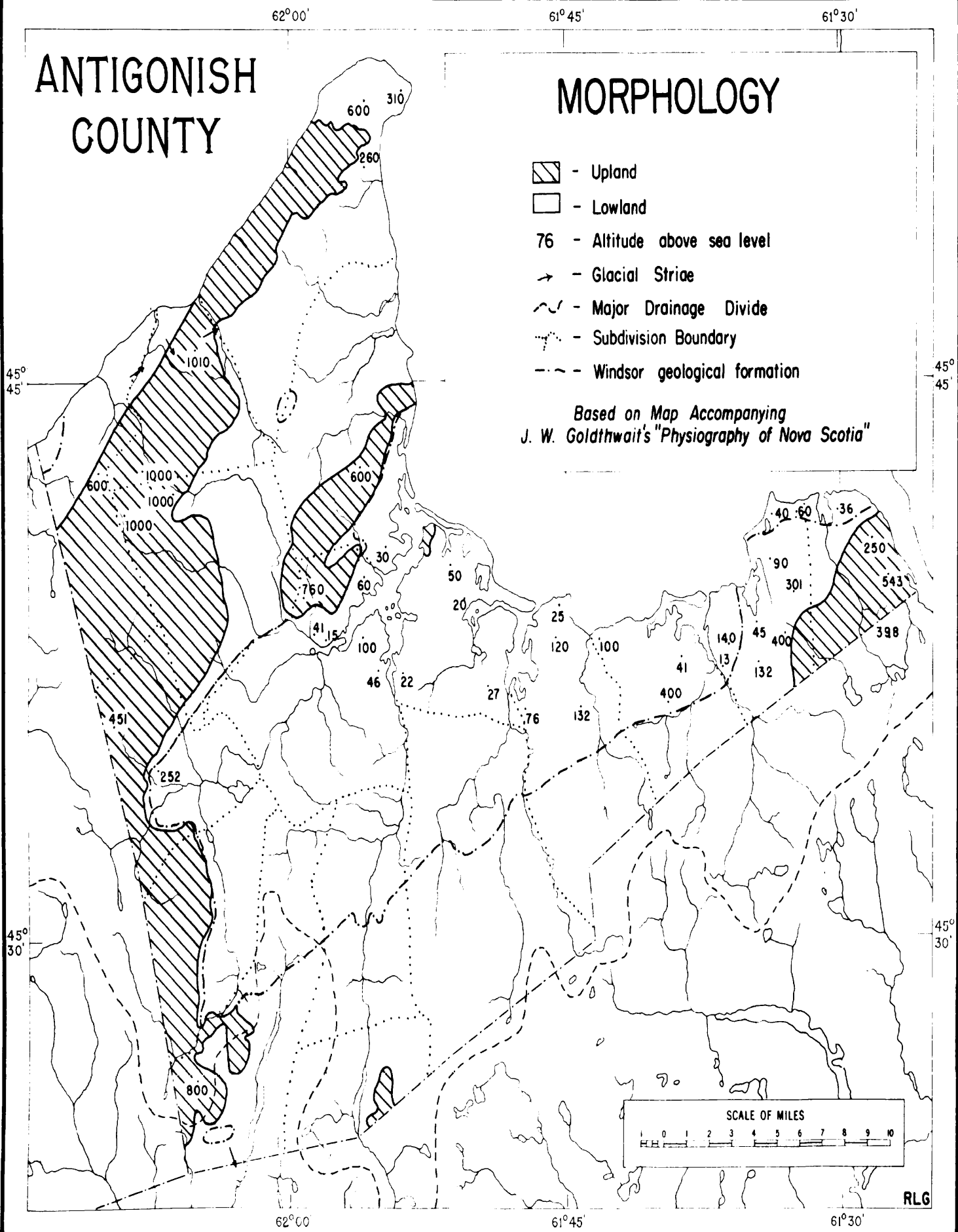
Since the upfolding of the old marine sands and muds into anticlines and synclines, and the squeezing of igneous masses through them, the structure has been worn down to a peneplain surface as in the other upland districts. Following this denudation, the land has again been elevated and redissected by its streams which reduced the neighbouring districts of softer rock to lowlands. During the Glacial

ANTIGONISH COUNTY

MORPHOLOGY

-  - Upland
-  - Lowland
- 76 - Altitude above sea level
-  - Glacial Striae
-  - Major Drainage Divide
-  - Subdivision Boundary
-  - Windsor geological formation

Based on Map Accompanying
J. W. Goldthwait's "Physiography of Nova Scotia"



period these highlands were covered by the ice sheet which moved over it first eastward and later southward, but without greatly altering its surface (I,6; p. 28).

In the southern part of the upland (Map 5), the average altitude is 800 feet above sea level, but in the Arisaig district, it reaches 900 feet. The borders of the upland are well defined although the scattered arrangement of volcanic plugs and other resistant masses of rock cause irregularity in outline. From the Canadian National railway line, a good view can be had of the escarpment that forms the southern boundary of the central section of the upland between James River and Antigonish (Map 2). Streams have excavated deep gorges and valleys in the uplifted surface through which they descend with many rapids and falls from the boggy summit of the upland to the well-drained plains of the lowland (I,6; p. 28).

At two or three points near the northern border, the hilltops exceed the general altitude sufficiently to be termed "mountains". Thus McNeil Mountain, a hard volcanic plug two miles south of Malignant Cove reaches a height of 1,010 feet, the highest point on the Nova Scotia mainland. Sugarloaf Mountain, one mile north of McNeil Mountain, reaches a height of 680 feet and has a similar structure which shows part of the enclosing slate structure still sticking to the sides of the lava-filled neck of the old volcano. Another Sugarloaf Mountain, two miles north of Antigonish town, is a denuded volcanic plug like the other two, though formed of black lava (diabase) instead of felsite. It reaches 760 feet in agreement with the nearest parts of the upland from which it is detached (I,6; pp. 28-29).

The uplands occupy one-quarter of the total area of the county but contain less than five percent of the improved land (Maps 8, 13). In Table 4, three types of land use for the county and its subdivisions

ANTIGONISH COUNTY

COUNTY SUBDIVISIONS

Total County Area - 541 sq. miles
- 346,240 acres

Figures on map indicate area
in square miles of each subdivision

*Based on Maps of the Federal Census-
Areas measured by the author*

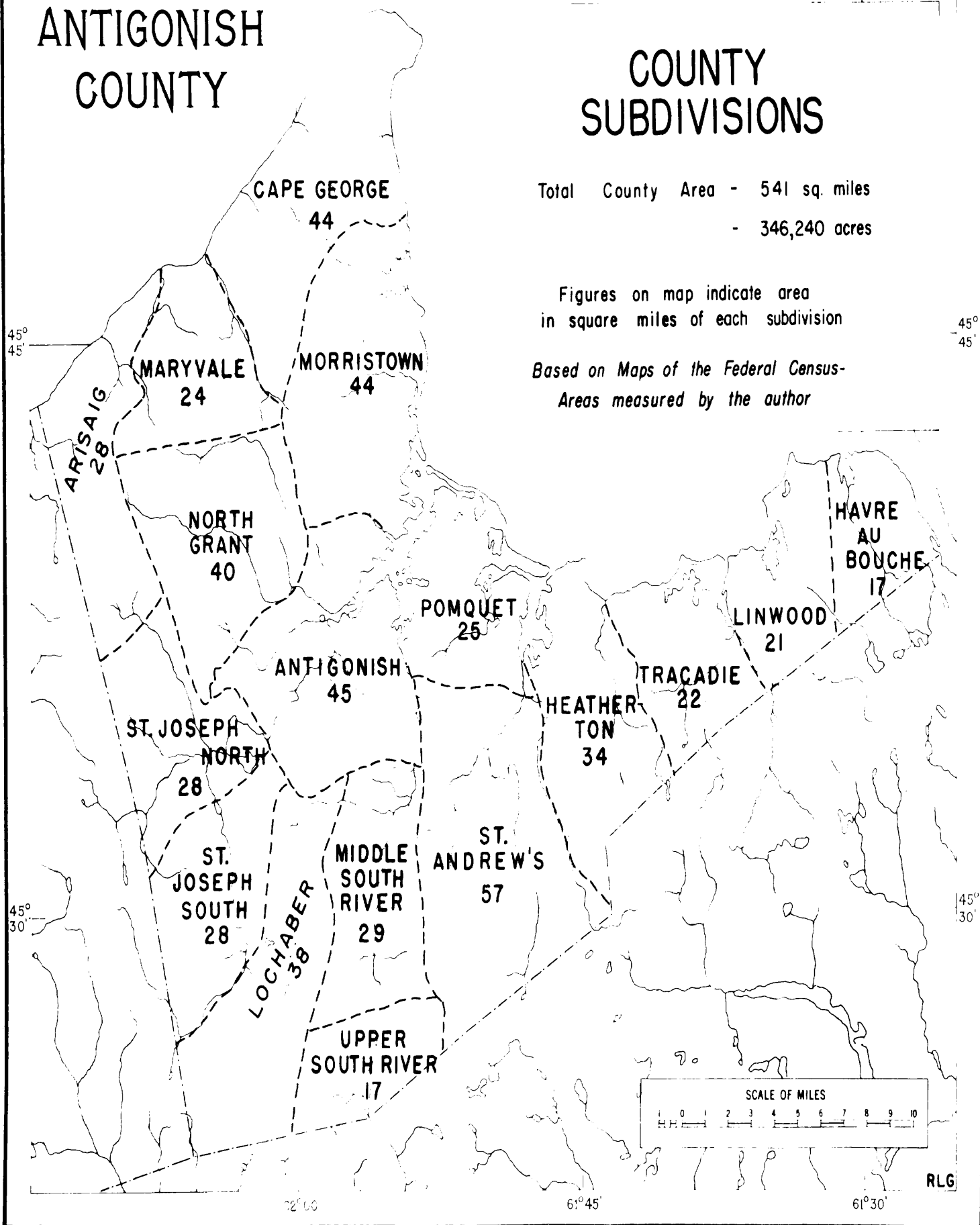


TABLE 4 - Areas and Occupied Farmland, by Subdivisions, Antigonish
County, Nova Scotia, 1941.¹

County and Subdivisions	Land Area		Area Occupied as Farmland		Area Improved		Area in Crops	
	Acres	%	Acres	%	Acres	%	Acres	%
Antigonish Co.	346,240	100.0	175,001	50.5	44,310	12.8	27,887	8.1
Antigonish	28,800	8.3	21,923	76.1	5,428	18.8	3,999	13.9
*Arisaig	17,920	5.2	5,199	29.0	1,509	8.4	994	5.5
*Cape George	28,160	8.1	9,581	34.0	2,626	9.3	1,839	6.5
*Havre Bouche	10,240	3.1	5,426	53.0	1,056	10.3	915	8.9
Beatherton	21,760	6.3	11,179	51.4	4,247	19.5	1,762	8.1
Linwood	13,440	3.9	7,324	54.5	1,284	9.6	1,234	9.2
Lochaber	24,320	7.0	13,372	55.0	3,650	15.0	1,574	6.5
*Maryvale	15,360	4.4	5,278	34.3	728	4.7	611	4.0
*Morristown	28,160	8.1	10,734	38.1	3,165	11.2	1,630	5.8
*North Grant	25,600	7.4	10,545	41.2	3,401	13.3	1,830	7.1
Pomquet	16,000	4.6	9,238	57.7	2,646	16.5	1,894	11.8
St. Andrew's	36,480	10.5	22,949	62.9	4,647	12.7	3,062	8.4
*St. Joseph N.	17,920	5.2	8,544	47.7	2,130	11.9	1,253	7.0
*St. Joseph S.	17,920	5.2	9,267	51.7	2,021	11.3	1,553	8.7
Middle S. River	18,560	5.4	9,136	49.2	1,438	7.7	1,425	7.7
Upper S. River	10,880	3.1	6,329	58.2	2,663	24.5	822	7.6
Tracadie	14,080	4.1	8,977	63.8	1,671	11.9	1,490	10.6

¹ Data from Agricultural Census of Nova Scotia, 1941, except for Land Area measurements which were computed by the author.

* Subdivisions in which a significant portion of the area is in upland (See Maps 5,6).

(Map 6) are listed. The unsuitability of the upland area for agricultural purposes is evident. The subdivisions of Arisaig, Cape George (Photo 6), North Grant and Morristown which contain 60 percent of the upland area rank lowest in the matter of area occupied as farmland, area improved and area in crops. In the county as a whole, 50.5 percent of the area is occupied as farmland, 12.8 percent of the area is improved and 8.1 percent of the area is in crops. In Maryvale, a division in which most of the area is upland, only 34.3 percent of the area is occupied as farmland, 4.7 percent is improved and 4.0 percent is in crops.

Lowlands¹

Below the level of the uplands in Nova Scotia and serving to emphasize the relief are belts and broader areas of lowland. They are underlain in every case by less resistant rocks (Map 3) that have been worn low since the upwarping of the Atlantic Upland. During the period which followed the uplift, these detached areas of weaker rocks were reduced to a fairly smooth surface, interrupted only by a few residual ridges where less easily weathered grit and sandstone strata rose in ancient folds to a level above that of the new plain (I, 6; p. 49).

Before the lowlands had been reduced to base level, an uplift occurred reviving the lowland rivers and increasing their eroding powers. By the beginning of the Pleistocene, these new valleys had been entrenched along both main streams and branches, to depths varying from 10 feet to 300 feet or more, according to their proximity to the coast. Glaciation did not greatly change the character of the surface. The smooth rocks were buried under a blanket of drift which covered the surface but was not thick enough to conceal the forms of

¹Summarized in the main from J. W. Goldthwait: Physiography of Nova Scotia (I, 6; pp. 49-50, 56-57). Specific references are indicated at the end of each paragraph.

the pre-Glacial river valleys, nor even to deflect or obstruct the larger streams. Subsidence of the coast in more recent geological time has let the sea overspread the outer, lower tracts (I, 6; p. 49).

The lowlands do not belong to one inclined plane that slants south-eastward like the plane of the upland. There are several more or less separate districts, eroded below the general level, which slope toward the section of the coast that is nearest. Evidently, the reduction of these lowlands was accomplished by river systems that headed on the upland divides, essentially where they are now (I, 6; pp. 49, 50).

Lowlands of Antigonish County. South and east of the uplands which reach towards Cape George lies a considerable area of soft Mississippian rocks bordered on the south by a wide strip of harder, pre-Mississippian beds (Map 4). These two areas make up the lowlands of Antigonish County (Map 5). In the Mississippian zone, sandstones, shales and limestones predominate. They present a low undulating surface, traversed by crooked ramifying valleys. Near the northern border, in the central part of the county, the Canadian National railway line emerges from a transverse valley in the upland to the west near the settlement of James River and runs northeastward for 18 miles or so along a belt of gypsum in which a narrow valley (Photo 7) has been worn by solution. Sink holes, honeycombed plaster cliffs and disappearing streams indicate the character of the underlying rock (I, 6; p. 56).

The broad belt of harder rocks in the southern part of the county is made up of undifferentiated pre-Mississippian slates and sandstones. The result is a more varied relief than is found in the lowlands farther north, with the hills rising to 300 and 400 feet. Even here, however, rounded slopes, in part the result of glaciation, soften the appearance of the landscape (Photo 8).

The large rivers of the lowland, such as the West River at Antigonish,

occupy wide, open valleys on whose broad flood plains or intervalles they meander freely, trimming away the bordering scarps of terraces which mark the old flood plains spread out by over-loaded rivers at the time the ice sheet was melting away. The coarse gravels of which these flood plains were built appear in railway cuts near Antigonish station. Farther up the valleys, crooked, steep-sided ridges and knolls of gravel (called "hogbacks" locally) mark the courses of temporary streams which ran between walls of ice when the ice sheet covered the region (I,6; p. 57).

The lowland area of Silurian and Devonian rocks around Arisaig in the northwestern corner of the county, is almost a distinct physiographic unit in itself. It lies between Northumberland Strait on the north and "the Hollow" on the south. "The Hollow" marks the location of a great fault (Photo 9) which divides the plateau of Ordovician rocks to the south from the lowlands of later age to the north. The bottom of the valley is flat; to the south rises the scarp of the upland and to the north more gentle slopes overlook the valley.

The main features of the topography in the Arisaig area are characteristic of a mature erosion cycle and subsequent minor uplift. Beneath the well graded valley bottoms, the streams were later incised and now occupy rock walled gullies many feet in depth. In the western section these are characterized by falls or rapids a short distance back from the sea shore. On the less resistant Silurian rocks to the east, falls and rapids are unknown and the lower portions of the streams often meander through a flood plain deposit of gravel four to six feet thick (I,10; pp. 44,45).

Approximately three-quarters of the area of Antigonish County is in lowlands. These contain more than 95 percent of the improved land. Within the lowlands, the till developed on the Windsor geological

PHOTOS 5 - 9

PHOTOS 5 - 9 (MORPHOLOGY)

5. The uplands of Antigonish and Pictou counties, in common with the rest of the Nova Scotia uplands, present a surface of striking uniformity. This upland surface appears in the background of this view of Clydesdale, a small settlement in the lowland.

6. Most of the upland area in the county is not adapted to agricultural use despite the efforts of some operators to prove otherwise. This area of steep slopes and rock hills east of Livingstone's Cove, supposedly in pasture, is being reclaimed by spruce bushes.

7. Near the northern border of the lowlands in the central part of the lowlands is a belt of gypsum in which a narrow valley has been worn by solution. Shown here is a part of the valley as it appears at Brierly Brook.

8. The lowlands in the southern part of the county are characterized by a varied relief and rounded slopes, as shown in this scene south of Fraser Mills.

9. Visible in the background of this picture is the great fault which divides the plateau of Ordovician rocks to the south from the lowlands of later age to the north in the northern part of the subdivision of Arisaig.



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formation has given rise to the most productive agricultural soils in the county. The subdivisions of Antigonish and Pomquet, wholly within the formation, except for a small part of upland area in the former (Maps 5,6) have the highest percentages in areas in crops (Table 4). In addition, Antigonish and Tracadie (where agriculture is largely confined to the northern half of the subdivision) have the highest percentages in area occupied as farmland. All the lowland in the subdivisions of St. Joseph North and St. Joseph South is underlain by Windsor beds, an important factor in explaining the high percentages listed in the table for these two areas despite the fact that they contain a large proportion of upland.

Glaciation

In most of Nova Scotia, the glacial deposits are thin and the composition of the drift is closely related to the underlying bedrock.

It is probable that the high mountains of Gaspé and the deep valley of the St. Lawrence River obstructed the advance of the glaciers and protected much of the Maritime area, so that the amount of foreign material carried in by the ice was greatly reduced (1, 1; p. 334).

Terminal moraines are uncommon in Nova Scotia and do not form extensive deposits. Till constitutes most of the glacial material and occurs mostly as ground moraine. Gravelly outwash plains and kamey materials occur in many places but glacial lake deposits are few and not large. The glacial striae in the province indicate that the ice moved from the northeast, north and northwest. There are also a few striae that indicate a west-east or east-west movement. The relative age of these various movements is not clear. Striae in Antigonish County indicate movement from the northwest and west (Map 5).

1. Erosion by the Ice Sheet. The most characteristic effect of glaciation on bedrock is the scouring of its surface. In the soft rock regions of the county, the ice rounded and smoothed off the hills

and ridges. Thus the hills of the shale and limestone areas possess gracefully curving profiles, both lengthwise and crosswise. These "drumlinoids" or "False drumlins" are characteristic of the lowlands. Erosion by the ice is a minor phenomenon in the lowlands, however, compared to deposition. In the highlands, the reverse is true. Extensive rock outcrops and shallow moraine deposits bear witness to the scouring work done by the ice.

2. Transportation by the Ice Sheet. The movement of ice across the Nova Scotia mainland appears from observations of the courses of the striae to have consisted in: (1) a southeastward movement from New Brunswick and (2) a southward movement from the Gulf of St. Lawrence (the Acadian Bay lobe). The most distinct and numerous glacial grooves occur where the ice reached a belt of softer rock, like slate, soon after it had passed over an area which provided many hard fragments like quartzite and granite. In the lowland rocks of Antigonish County, there is a scarcity of grooves. The best striae in the county are found in the Arisaig area. Two sets of grooves just south of Arisaig (one on the upland and the second on the Devonian lowland) indicate an eastward movement. A third set of grooves on the upland in the same area indicates a southeastward movement. Another set of grooves on the pre-Mississippian slates in the southwest corner of the county also indicates a southeastward movement.

The Arisaig shore contains a number of peculiar rocks foreign to the district, including a few which resemble rocks of the region north of the St. Lawrence River. The 300 mile journey of these rocks is attributed to the action of the Acadian Bay lobe. Some of the erratics at Arisaig may have come from the Cobequid Mountains to the west which are in line with the eastward movement out of New Brunswick. Various geological reports indicate further south and southeastward

movements across the county (I,6; p. 80). In 1878, it was reported that boulders from the fossiliferous section of the Arisaig shore had been transported south 30 degrees east. This was confirmed by later work which indicated the presence of Silurian fragments in the drift near Ecum Secum River, 30 miles south of Arisaig. More recently attention was called to the fact that fragments from the volcanic plugs of the Arisaig highlands trail southeastward, in some places to points much higher than their source.

The movement on the east side of the Acadian Bay lobe is indicated by the greater and greater easterly divergence of striae across Cape Breton Island. At Hastings, on the strait of Canso just across from the Antigonish coast, beautifully striated roches moutonnees show a southeastward movement of the ice (I,6; p. 81).

3. Deposition by the Ice Sheet. Depositional ice forms or drift in this area is of two kinds: the unstratified drift or till which was deposited underneath the ice and the stratified drift or fluvio-glacial material which was deposited by water, mainly during the recession of the ice from the region.

Most of the covering of drift which is spread out over the surface of Antigonish County is ground moraine. The ground moraine consists of "lower" and "upper" till (I,6; p. 88). The "lower" till is firmly compacted by pressure and well supplied with ice-worn stones, distinguished by their flattened, scoured and striated faces. The "upper" till is looser and is composed of more angular fragments with a larger percentage of far-travelled stones. The percentage of purely local stones in the till varies and is especially dependent upon the character of the bedrock locally. It varies from 85 to almost 100 percent in most of the county. Erratics are few in number and there is a marked correlation between the till of the ground moraine and bedrock.

There are no drumlins in the county. Since drumlins usually occupy a place near the periphery of the ice sheet during the last stage of occupancy, this is to be expected. Drumlins are found, however, in Guysborough County to the South. Due to the seaward movement of the ice sheet, both in the New Brunswick and the Acadian Bay lobes, it is probable that no terminal and recessional moraines were deposited on the mainland of Nova Scotia. At least no evidence of such moraines has been found to date. Thus the question of glaciation in Nova Scotia is quite obscure. It is almost inconceivable, for example, that there would be any great correspondence between ground moraine and underlying bedrock in an area covered by a moving ice sheet. Yet this seems to be the case in Antigonish County, and a comparison of Map 4 (Geology) with Map 7 (Soils) bears this out.

Clearly, much work remains to be done before the significance of glacial activity in Antigonish County and the rest of Nova Scotia may be appreciated. The same is true in the whole morphological field. The author's purpose here has been to draw attention to what little is known of the geology and morphology and to present this as a requisite to the discussion that follows on soils. The parent materials of the soils in the county are largely moraine till, a product of glaciation. The till, in turn, seems to be mostly of local origin and bears a distinct relationship to the underlying bedrock.

CHAPTER 4

SOILS

Due to glaciation, the parent materials of Nova Scotia soils are largely the till of the ground moraine, or similar material which has undergone modification by water action. However the greater percentage of the materials in the till are of local origin and have not been transported any great distance. Thus there is a marked correlation between soil type and underlying rock (Compare Maps 4,7).

The mature soils in the province are generally podsoils with a well developed ashy A horizon. In Antigonish County, however, the true podsol is scarce, due in large part to the relatively low sand content of the soils. Even in the lightest soils in the county, the A₂ horizon is a light grey or pinkish grey sandy loam. Antigonish soils must be termed "podsollic" rather than "podsol". In addition, two or three of the larger rivers have wide graded valleys and much of this "intervale" land is cultivated.

The whole of Antigonish County is included in the Central Section of Halliday's "Acadian Forest Region" (I,3; p. 38). Virgin stands have long since been removed in the lumbering process. Mixedwood associations make up most of the forest cover and are mainly composed of red spruce, yellow birch, sugar maple, beech and balsam fir (Photo 10). The tendency seems to be for the balsam fir to occur on the upper elevations and thinner soils and red spruce on the lower slopes. Red pine, wire birch and red maple are found on gravelly soils and ridges. Black spruce occurs both in the general mixture and also with cedar, tamarack and white birch in swampy areas. Near the drainage divide in the south-central part of the county is a belt of hardwoods, severely culled. Maple and beech predominate but aspen and wire birch are very common (Photo 11). Fires throughout the county increase the

PHOTOS 10 - 13

PHOTOS 10-13 (SOILS)

10. Mixedwood associations make up most of the forest cover in Antigonish County and are composed of red spruce, balsam fir, maple and beech. This mixed stand is located on the Woodbourne soils south of Furlbrook.

11. In the south central part of the county is a large area of hardwoods, severely culled. The association is maple-beech but aspen and wire birch are very common as in this stand east of Upper South River.

12. Soils developed from water deposited material make up nearly 5 percent of the total land area of Antigonish County. Of this, more than half are coarse textured and poorly sorted soils unsuitable for agriculture. This gravelly stream bed indicates the nature of the soil material along a river course south of St. Andrew's.

13. The silt member of the Cumberland soils, developed from water deposited materials, ranks among the best agricultural soils in the county. It is found along principal river courses such as that of the South River shown here near the settlement of Lower South River.



10



11



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proportion of white birch, aspen, large-toothed aspen and wire birch.

A detailed study of vegetation in this section of the province would be most helpful in an appreciation of the soils in the region. Unfortunately, such work remains still to be done. In the subsequent section on soils, therefore, only passing references can be made to vegetation cover.

Soils of Antigonish County

The present chapter deals only with the descriptions and distribution of the individual soil classes and their physical (and to some extent, chemical) characteristics. Some reference is made to the use of the different soils in agriculture but the full discussion of land use and management of Antigonish County soils occurs in a subsequent chapter on rural problems (Section III, Chapter 2).

The Nova Scotia Soil Survey has grouped the soils of the county into four divisions depending upon the character of the till from which they have developed. The classification is given in Table 5, together with a listing of the acreages occupied and the percentage in improved land for each association. The distribution of the various soils is shown in Map 7; a tabular description is given in Table 6. The results of chemical and physical analyses of representative soil samples are presented in Table 7 and Figure 3.

A general description of Antigonish County soils, based on field notes of the Nova Scotia Soil Survey, follows:

1. Soils developed from reddish brown clay loam till.

(a) Queen's Association. The soils of the Queen's association (Map 7) are the heaviest textured soils in the county (Photo 14), and have very little stone in the profile (Fig. 3). Topography varies from gently undulating to rolling. Surface drainage is good but internal drainage tends to be slow and the soils are generally regarded

TABLE 5 - Areas of Antigonish County Soils with Percentages in Improved Land.¹

<u>Parent Material and Soil Association</u>	<u>Acreage</u>	<u>% total land area</u>	<u>% total improved area</u>	<u>% in improved land</u>
<u>1. Soils developed from reddish brown clay loam till</u>				
(a) Queens Association	30,500	8.8	12.1	17.7
(b) Woodbourne Association	53,600	15.5	8.5	7.1
(c) Millbrook Association	72,900	21.1	19.7	12.1
(d) Barney Association	3,100	0.9	2.0	29.0
(e) Joggins Association	800	0.2	0.4	25.0
<u>2. Soils developed from reddish brown sandy loam till</u>				
(a) Merigomish Association	20,100	5.8	15.4	34.3
(b) Mansford Association	13,700	4.0	0.7	2.2
(c) Westbrook Association	13,100	3.8	6.3	21.4
<u>3. Soils developed from greyish brown sandy till</u>				
(a) Halifax Association	9,700	2.8	0.2	1.0
(b) Thom Association	91,900	26.5	7.4	3.6
(c) Kirkhill Association	19,600	5.6	2.7	6.1
<u>4. Soils developed from fluvioglacial and alluvial materials</u>				
(a) Hebert Association	6,000	1.7	8.7	65.0
(b) Cumberland gravelly loam	3,700	1.1	4.0	48.8
(c) Cumberland silt loam	7,000	2.0	11.9	75.7
<u>5. Sand beach</u>	1,100	0.3		

¹All area measurements by the author. Figure shown (acreage) is the average of four readings on a polar compensating planimeter.

TABLE 6 - Description of Antigonish County Soils.¹

Soil Association	Depth of Topsoil	Depth of Subsoil	Topography	Parent Material	Origin of Till ²	Surface Drainage	Under-drainage	Texture of Topsoil	Texture of Subsoil	Structure of Topsoil	Structure of Subsoil	Colour of Topsoil	Colour of Subsoil	Veg-eta-tion
Queen's	9"	19"	Undulating	Red clay loam till	Calcareous sh (W)	Good	Fair to poor	Clay loam	Clay loam	Friable	Compact	Reddish brown	Dark red	Maple, Hemlock, Spruce Poplar
Woodbourne	7"	12"	Strongly rolling	Gravelly clay loam till	sh, ss, sl (pre Miss)	Good	Good	Sandy loam	Loam	Friable	Friable	Light brown	Reddish brown	Fir, Spruce Hem., Pop., Birch, Maple
Millbrook	9"	20"	Rolling	Weak red clay loam till	sh, ss (W, H)	Good	Fair	Silt loam	Clay loam	Friable	Firm	Brown	Reddish brown	Spruce, Fir Hem., Maple Birch
Barney	-	-	Strongly rolling	Shaly till	-	Good	Good	Loam	Loam	Friable	Firm	Yellowish brown	-	-
Joggins	-	-	Rolling	Clay loam till	sh (W, H)	Fair	Poor	Loam	-	Firm	-	Light brown	-	-
Merigomish	8"	18"	Undulating	Sandy loam till	ss (H)	Good	Fair	Sandy Loam	Loam	Friable	Firm	Light brown	Reddish brown	Spruce, Fir Birch, Pop. Pine
Pansford	7"	15"	Gently rolling	Sandy loam till	ss (H)	Good	Good	Stony loam	Sandy loam	Loose, Open	Loose	Greyish brown	Reddish brown	Spruce, Fir Maple Birch
Westbrook	7"	15"	Hilly	Gravelly sandy till	congl (H)	Rapid	Variable	Sandy loam	Sandy gravelly loam	Loose	Friable	Light brown	Yellowish red	Maple, Beech, Hem. Fir, Spruce
Halifax	5"	16"	Strongly rolling	Gritty sandy till	ss, qtz, (pre-Miss, pre-Cambrian)	Variable	Good	Stony, Sandy loam	Sandy loam	Open	Firm	Medium brown	Yellowish brown	Spruce, Fir, Birch Maple, Pine
Thom	8"	16"	Hilly	Coarse sandy till	Meta and Igneous	Rapid	Variable	Sandy loam	Sandy loam	Open	Firm	Light brown	Greyish brown	Maple, Fir Birch, Hem. Spruce
Kirkhill	7"	16"	Hilly	Shaly till	sl, sh (pre-Miss)	Good	Good	Shaly loam	Loam	Friable	Friable	Greyish brown	Yellow. brown	Maple, Fir Birch, Hem. Spruce
Hebert	-	-	Level	Gravelly outwash	-	Variable	Variable	Gravelly sandy loam	-	Open	Open	Grey	Greyish brown	-
Cumberland gravel	-	-	Level	Shaly gravel	-	Fair	Good	Gravelly silt loam	-	Open	Open	-	-	-
Cumberland silt	10"	26"	Level	Recent alluvium on shaly gravel	-	Fair	Fair	Silt loam	Silt loam	Friable	Friable	Reddish brown	Reddish brown	-

¹ Data from field notes of Nova Scotia Soil Survey. Descriptions based on average conditions within each association.

² Column abbreviations: W-Windsor, H-Horton, Miss-Mississippian, sh-shale, ss-sandstone, sl-slate, congl-conglomerate, qtz-quartz, meta-metamorphic

TABLE 7 - Chemical and Physical Analysis of Representative Soil

Samples, Antigonish County, Nova Scotia.¹

Soil Association Depth in Inches	Loss on Ignition %	PH	Lime Required CaCO ₃ tons/acre	Available Nutrients				Gravel (pounds per acre) %	Physical Analysis			Clay (below 0.002mm) %	
				(pounds per acre)					Coarse Sand (2.0-1.0 mm) %	Sand (1.0-0.05 mm) %	Silt (0.05 0.002 mm) %		
				Ca	Mg	K	P						
Merigomish													
A ₂ - 2 to 4	3.1	4.1	3.9	146	72	14	4	3.9	1.5	50.6	40.4	9.0	
B ₁ - 4 to 10	4.9	4.3	3.9	79	79	23	5	11.0	4.9	52.8	34.0	13.2	
B ₂ - 10 to 20	2.4	4.4	2.1	44	55	18	2	11.9	2.6	54.6	33.8	11.6	
C - 20 -	2.7	4.6	2.1	79	120	41	12	17.2	1.5	44.4	40.8	14.6	
Millbrook													
A ₂ - 3 to 6	6.0	4.2	12.0	430	120	125	6	13.2	2.7	21.6	57.6	20.8	
B ₁ - 6 to 12	11.0	4.8	14.5	710	112	195	10	15.6	2.0	23.2	46.4	30.4	
B ₂ - 12 to 23	6.6	4.8	8.1	240	79	60	7	24.5	3.7	28.4	49.2	22.4	
C - 23 -	3.7	4.9	4.0	410	120	19	5	20.2	2.8	24.4	43.2	29.2	
Hoodbourne													
A ₂ - 2 to 4	6.7	4.1	15.0	840	160	89	16	34.9	3.2	22.4	50.2	27.4	
B ₁ - 4 to 9	10.4	4.6	11.3	400	108	85	22	42.9	5.8	27.4	46.6	26.0	
B ₂ - 9 to 16	8.2	4.7	8.3	254	65	57	20	34.6	6.8	32.4	39.0	28.6	
C - 16 -	4.2	4.5	5.4	332	175	85	22	42.7	7.2	29.8	39.0	31.2	
Queen's													
A ₂ - 1 to 5	4.5	4.1	5.6	285	38	18	4	3.5	3.1	29.8	48.4	21.8	
B ₁ - 5 to 10	3.2	4.2	3.1	67	67	23	4	1.5	1.5	28.0	49.4	22.6	
B ₂ - 10 to 19	4.1	4.4	3.9	308	74	25	2	8.0	3.0	19.8	46.0	34.2	
C - 19 -	3.9	4.6	3.5	285	125	49	9	6.2	2.5	34.4	35.2	30.4	
Thom													
A ₂ - 2 to 5	3.5	3.6	4.6	170	105	55	5	38.0	10.0	38.6	49.4	12.0	
B ₁ - 5 to 11	15.1	4.2	14.5	182	135	29	4	53.5	8.5	51.6	40.6	7.8	
B ₂ - 11 to 20	7.7	4.4	8.1	91	38	19	4	43.3	9.0	42.8	49.2	8.0	
C - 20 -	4.8	4.8	4.2	55	19	22	16	48.0	9.2	44.0	44.4	11.6	

¹From information supplied by Chemistry, Soils and Fertiliser Division, Nova Scotia Department of Agriculture.

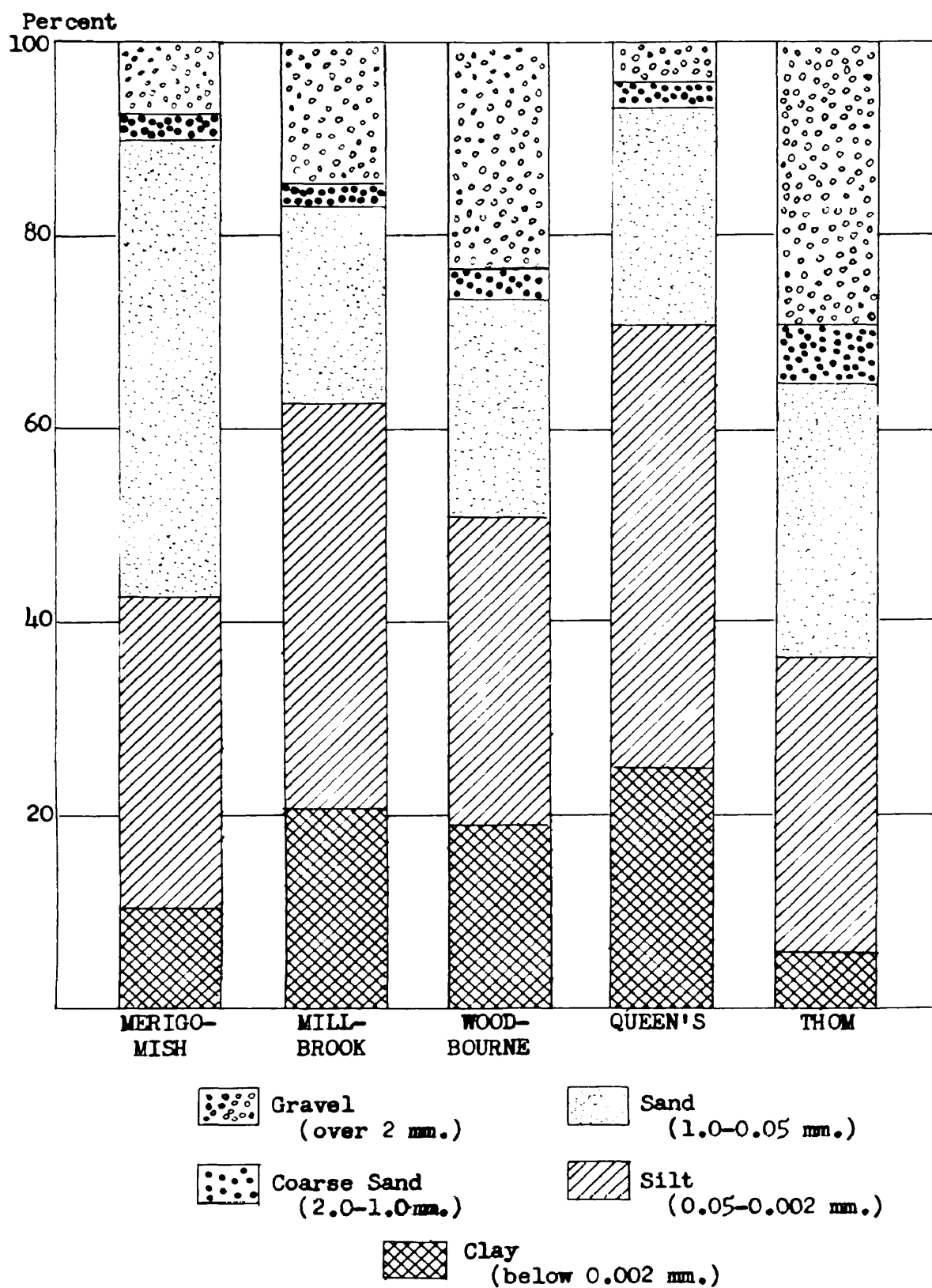


Fig. 3. AVERAGE PHYSICAL CONDITIONS IN SELECTED SOIL ASSOCIATIONS, ANTIGONISH CO., N.S.

as being imperfectly drained. On the more level areas, water will usually stand for some time after a rain and poor drainage is common. Hardpan formation in the B horizon is widespread. Nearly 16 percent of the Queen's association is in improved land (Table 5). Forest cover consists of red maple, hemlock, spruce and poplar.

Under forested conditions, the surface soil is composed of semi-decomposed leaf litter, needles and moss. This layer is felty and held together by numerous roots. Under this one inch layer the A_2 horizon is a pinkish gray clay loam having a weakly developed platy structure. It is usually quite friable when wet and may be slightly mottled. When the soil is cultivated the two layers are mixed to form a light brown loam to clay loam surface soil which tends to bake dry and puddle when wet.

The upper B horizon is a reddish brown clay loam with a coarse nuciform structure, usually mottled with yellow streaks. The lower B horizon is a reddish brown clay loam, somewhat darker in color and more mottled. It is quite plastic and often has a massive structure which restricts the percolation of water. The parent material which lies at a distance of 16-19 inches below the surface is a dark reddish brown to dusky red clay loam till. Surface textures of the Queen's include loam, silt loam and clay loam.

The major problem connected with Queen's soils is drainage. The natural fertility of these soils is comparatively low; they are deficient especially in phosphorus and potash (Table 7). The soils are very acid and the organic matter content is low. Hay and grain are the principal crops and the soils respond to good management.

(b) Woodbourne Association. The soils of the Woodbourne association (Map 7) occupy over 15 percent of the land area of the county. The topography varies from undulating to strongly rolling to hilly.

Drainage on these soils is usually good. On the steeper slopes, runoff may be excessive and the soils are subject to considerable erosion. Internal drainage is moderately rapid, except in places where the bedrock comes close to the surface or the texture of the parent material is somewhat heavier than normal. The stone content of these soils is relatively high (Fig. 3). In the eastern part of the county, the stone is large and interferes with cultivation (Photo 17).















Approximately seven percent of this soil has been improved. The forested areas are covered with a mixed stand of fir, spruce, hemlock, poplar, birch and maple. Under forest cover, the surface layer consists of one to two inches of black, semi-decomposed organic matter held together by a thick root mat. This is underlain by a pinkish gray or light reddish brown sandy loam A_2 horizon to a depth of two to four inches. Cultivation of these layers develops a light brown sandy loam surface soil to plough depth. The B horizon is a brown to reddish brown loam becoming darker in color and heavier in texture with depth. This horizon is quite porous and plant roots are able to extend through it with ease. The parent material occurs at a depth of twelve to sixteen inches and is weak red gravelly clay loam till. Surface textures vary from sandy loam to loam and occasionally clay loam.

Topography is the limiting factor in the use of these soils. Although many of the steeper slopes have been cleared they have become badly eroded. This is particularly evident in the lower South River valley. Gully erosion is very prevalent here. Drainage is not usually much of a problem. On some of the longer slopes, seepage spots occur.

The Woodbourne soils are generally suited for all crops grown in the area. Hay, grain, potatoes and roots are grown but the principal acreage is devoted to hay and grain or pasture. This soil requires

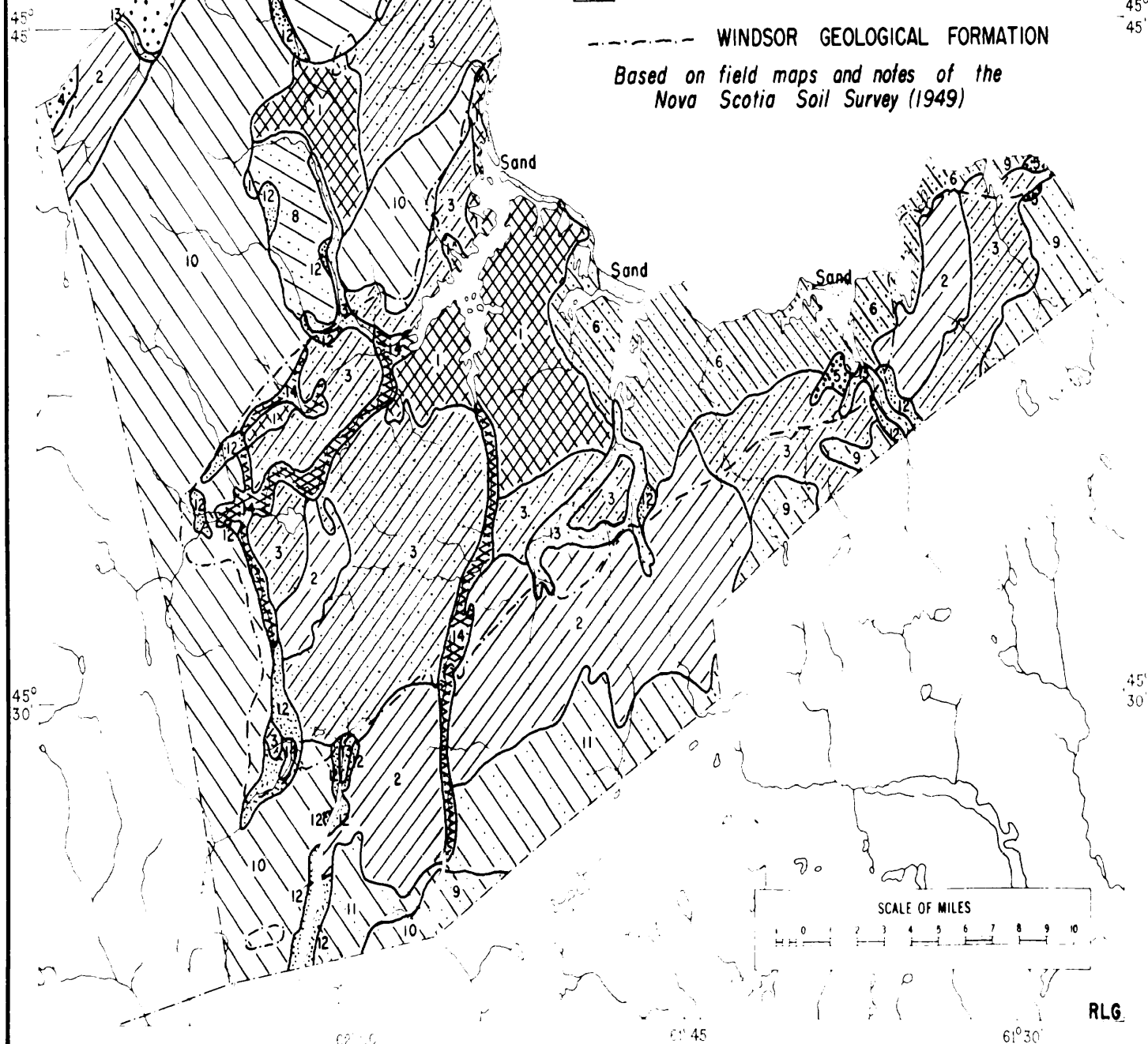
ANTIGONISH COUNTY

SOIL ASSOCIATIONS

- | | |
|--|--|
|  1-Queens |  8-Westbrook |
|  2-Woodbourne |  9-Halifax |
|  3-Millbrook |  10-Thom |
|  4-Barney |  11-Kirkhill |
|  5-Joggins |  12-Hebert |
|  6-Merigomish |  13-Cumberland (gravel) |
|  7-Hansford |  14-Cumberland (silt) |

WINDSOR GEOLOGICAL FORMATION

*Based on field maps and notes of the
Nova Scotia Soil Survey (1949)*



RLG

good management especially in view of its erosive tendencies. It needs organic matter, lime and fertilizer. Steeper slopes should be forested or left in permanent pasture.

(c) Millbrook Association. The Millbrook soils (Map 7) occupy 21 percent of the land area of the county. They are medium textured, contain less stone than the Goodbourne and are not as hilly. Considerable areas of these soils are imperfectly drained. Hardpan formation is common. The slopes of the hills usually provide adequate surface drainage, but the tops of the hills are wet and internal drainage is slow. The topography varies from undulating to steeply rolling and in general, stone does not interfere with cultivation. Vegetation consists of spruce, fir, hemlock, maple and birch in a mixed stand. 12 percent of these soils are improved.

Under forest cover, the surface layer is black and composed of fairly well decomposed organic matter. In the well drained portions, it is two to three inches in depth and permeated with roots. The A₂ horizon is a pinkish gray or light reddish brown sandy clay loam and contains some gravel. The texture of the cultivated surface is usually a loam, but in the vicinity of St. Andrew's the surface is sometimes a clay loam. The B horizon, at a depth of six to twelve inches below the surface, is a strong brown sandy loam to sandy clay loam becoming reddish brown and heavier in texture with depth (Photo 15). The parent material at a depth of 18 to 23 inches is a reddish brown to weak red clay loam till having a medium blocky structure and is usually very firm. Most of the Millbrook soils are used for hay or pasture. In the vicinity of St. Andrew's the soils are somewhat heavier than normal and better yields seem to be obtained. In general, low yields are the rule unless lime and fertilizer have been used, but due to the moisture holding capacity of these soils, yields in

dry seasons may be better than on some of the other soils in the area. The Willbrook soils respond well to fertilization and good crops of grain have been grown where lime and fertilizer were applied. One of the most marked deficiencies is available phosphate. Some of the soils are well suited to permanent pasture.

(d) Barney Association. The soils of the Barney association (Map 7) are developed from a shaly till and occupy less than one percent of the county's land area. The surface layer is underlain by a greyish leached horizon of loam to silt loam texture. The B horizon is a dark yellowish brown loam with many shale fragments. The C horizon is firm but pervious to water and most of these soils are well drained. The topography varies from rolling to hilly and many shallow areas are common. Where the soils are deep and the topography favorable, as in the northwest corner of the county, good farming is possible. In most cases, however, topography is a limiting factor to cultivation and the soils erode easily when cleared.

(e) Joggins Association. The soils of the Joggins association are also not very extensive in the county, occupying only 0.2 percent of the land area. They are developed from a heavy textured till derived from soft shales. The topography is undulating; surface drainage is variable but internal drainage is slow. This poor drainage is accompanied by a low natural fertility. The Joggins soils are used for hay and sometimes for grain but yields are usually low.

2. Soils developed from reddish brown sandy loam till.

(a) Merigomish Association. The soils of the Merigomish association (Map 7) occupy about 6 percent of the county's area but contain more than 16 percent of its improved land (Table 5). They are developed from a modified till of sandy loam texture. In some places, particularly around Bayfield and Tracadie, the till is somewhat

heavier and may be a sandy clay loam in texture. The topography is undulating with gentle knolls which sometimes have a drumlin-like appearance. Both external and internal drainage is generally good, but even here there is a tendency to hardpan formation, a problem common to most of the agricultural soils in the county. The Merigomish soils are light and quite free from stone (Fig. 3), but fragments of gray and brown sandstone may be scattered through the profile. Over a third of these soils are in improved land. The forest cover, where present, consists of second growth spruce, fir, birch, poplar and occasional pine.

Under forest cover, the A_2 horizon is a light gray or pinkish gray sandy loam usually two to five inches deep, loose and porous in character. The upper B horizon is a brown to reddish brown loam or sandy loam with a medium nuciform structure and a friable consistency. This grades into the lower B horizon which becomes darker in color and slightly heavier in texture and contains angular cobbles of sandstone. The parent material, at a depth of 16 to 20 inches, is a reddish brown sandy clay loam till, firm in place but permeable. Surface textures on the Merigomish soils may vary from sandy loam to loam or silt loam. In general, the cultivated surface layer is an easily workable light brown sandy loam to plough depth.

Merigomish soils, among the most productive in the county, are well suited for growing the crops common to the area. Besides hay and grain, potatoes and truck crops may be grown with good results. Crop rotations are generally shorter on these soils than on most of the soils of the county. Some of the farmers here are part-time fishermen who do not accord their land the treatment necessary for maximum production. The soils are acid and require lime, organic matter and fertilizer (Table 7). Proper precaution must be taken to prevent erosion which may be severe with hoed crops.

(b) Mansford Association. The soils of the Mansford association (Map 7) occupy five percent of the county land area but less than one percent of the improved land. They are developed from a reddish brown sandy loam till derived from coarse textured gray and brown Horton sandstones. The topography varies from gently undulating to gently rolling and the open nature of the soil permits free drainage. In most cases there is a considerable amount of stone in the profile, a factor limiting cultivation. Vegetation consists of mixed stands of spruce, fir, maple and birch. Where they are cleared these soils are used for hay and pasture. Small acreages of potatoes and small grains are sometimes attempted, but yields are low. Natural fertility is low and most of these soils are of doubtful agricultural value.

(c) Westbrook Association. The soils of the Westbrook association (Map 7) make up nearly four percent of the land area of the county. They are developed from a gravelly or sandy till derived mostly from a reddish brown Horton conglomerate (Photo 16). The soils are associated with a hilly topography and are often shallow, with numerous outcrops occurring in the fields. Small areas of finer material on the lower slopes of the hills are suitable for cultivation. Both surface and internal drainage is usually quite rapid. Stones do not generally interfere with cultivation, but shallowness is often a determining factor. Tree cover consists principally of maple, beech, hemlock, fir and spruce.

Over 21 percent of these soils are classed as improved land but most of this is used for pasture and much of it should never have been cleared. Steep slopes and the shallow nature of the soil facilitate erosion and a good part of the area is badly eroded. Small areas on the lower slopes, which contain finer materials, are suitable for the production of hay and grain, but these areas are not very extensive. Forestry is the best use for most of these soils.

PHOTOS 14 - 18

PHOTOS 14-18 (SOILS)

14. The soils of the Queen's association are the heaviest textured in the county. Topography is gently undulating and the texture of the surface soil is usually a clay loam as in this field on the Mount Cameron farm near Antigonish.

15. The Millbrook soils are medium textured and are developed on till derived from shale and sandstone. In this profile, south of Lanark, the B horizon is distinguishable as a brown silt and sandy loam becoming heavier in texture with depth.

16. The soils of the Westbrook association are developed from a gravelly till and are characterized by the presence of many gravel pits such as this one south of Pleasant Valley.

17. The soils of the Woodbourne association have a relatively high stone content. In the eastern part of the county, where this picture was taken, the stone is large and interferes with cultivation.

18. The Kirkhill soils in Antigonish County are associated with a hilly topography, although large areas have been cleared, especially in the subdivision of Upper South River. Past experience, however, indicates that this soil will not stand up under prolonged cultivation, as borne out by these "rock hills" east of Upper South River.



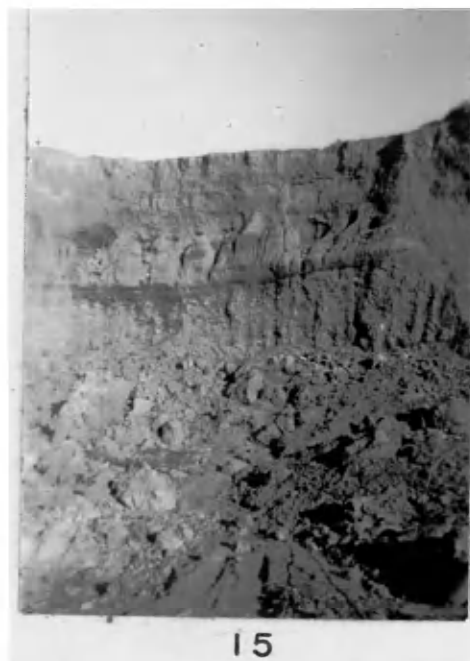
14



16



18



15



17

3. Soils developed from greyish brown sandy till.

(a) Halifax Association. The soils of the Halifax association (Map 7) are found along the southern border of the county. These soils have developed from a gritty, sandy till derived principally from pre-Mississippian sandstones and Precambrian quartzites and slate. The topography varies from rolling to hilly. Drainage over large areas is variable. Short stony ridges are interspersed with swampy or poorly drained areas. On the ridges, the open porous nature of the soil facilitates good internal drainage. Halifax soils are generally very stony and shallow. The bedrock is often exposed and boulders are frequent on the surface and throughout the profile. Only small areas of these soils are cleared and vegetation consists of spruce, fir, birch, maple and pine.

The Halifax soils are regarded as non-agricultural but a few small local areas have been cleared and hay and grain are grown. The stoniness of the soil and its aimless drainage pattern precludes the clearing of any large well drained areas, even though the stone may be removed. The best use of the Halifax is for forestry.

(b) Thom Association. The soils of the Thom association (Map 7) occupy over 26 percent of the area of the county but contain less than eight percent of the improved land. The soils are the principal ones occupying the Antigonish highlands and are a continuation of the Thom soils of Pictou county. They are developed from a coarse textured till derived from Precambrian and Ordovician metamorphic and igneous material. The till is usually quite shallow and the soils are associated with a hilly topography. Steep slopes are common. Drainage is usually good but poorly drained depressions occur where the nature of the topography or the tightness of the subsoil restricts the movement of the water. Stoniness is variable and the whole profile is acid throughout. Sur-

face textures vary from sandy loam to loam (Table 7, Fig. 3). The principal tree cover consists of maple, birch, spruce, fir and hemlock.

The Thom soils are used principally for pasture but some hay is grown. The pH and natural fertility of these soils are low and poor yields are obtained unless lime and fertilizer are used. The porous nature of the soil and its hilly topography result in too rapid drainage and in dry years crops fail from lack of moisture. Although Thom soils support a good forest growth, they quickly deteriorate under cultivation. Some of the area formerly cleared is reverting to forest and this is the best use for this soil. Areas at present used for grazing could be greatly improved by the addition of lime, organic matter and fertilizer. Erosion is severe on the steeper cleared slopes.

(c) Kirkhill Association. The soils of the Kirkhill association (Map 7) are developed from a shaly till derived from pre-Mississippian slates and shales. In some places the shales are thinly bedded and the resultant till is deeper and heavier textured, while in others the shale is coarse and blocky and the till is stony and shallow. In general, the topography of the Kirkhill soils is hilly (Photo 18). There is usually considerable stone on these soils, but where the till is deeper the slopes are smooth. Forest cover consists of maple, birch, spruce, fir and hemlock. The hardwoods are predominant on the higher slopes.

The Kirkhill soils have been widely cleared especially in the subdivision of Upper South River but only six percent of this association can be classed as improved land (Table 5). Hay and pasture are the chief uses and many of the areas are reverting to forest. Past experience seems to indicate that this soil will not stand up under prolonged cultivation. Organic matter disappears rapidly after clearing

and steep slopes are easily eroded. Kirkhill soils are better suited to forestry than to agriculture. Small areas where the texture of the soil is somewhat heavier than usual may be suitable for permanent pasture. Since most of the Kirkhill occupies a watershed or drainage divide, leaving these areas in forest would also provide for some degree of erosion control.

4. Soils developed from fluvio-glacial and alluvial materials.

(a) Hebert Association. Most of the soils belonging to the Hebert association in Antigonish County have developed on gravelly outwash plains and kames along principal river courses throughout the area (Map 7). The largest deposits occur along the Ohio River and around James River. In many places the deposits are very coarse-textured and poorly sorted and unsuitable for agricultural purposes. The soils are derived from a variety of materials, usually mixtures of sedimentary and igneous rocks. Forest cover, where it exists, consists of spruce, fir, pine, poplar and birch.

Hebert soils, though largely occupied - 66 percent are in improved land - are sub-marginal for agriculture due to their stoniness, excessive drainage and consequent droughtiness. There are some areas, however, in which the soil contains enough fine sand to hold moisture sufficient for crop growth but even these require organic matter, lime and fertilizer for best results.

(b) Cumberland Association. The soils of the Cumberland association are developed from the more recent alluvial materials deposited in the flood plains along principal river courses (Map 7). They have a level topography but are usually well drained, although subject to flooding. The gravelly member of the Cumberland (Photo 12) is quite similar to the Hebert, but the silt member (Photo 13) ranks among the best agricultural soils in the county.

The Cumberland soils are too immature to have developed profile characteristics. The surface soil of the silts is a dark reddish brown fine sandy loam to silt loam to a depth of eight to ten inches. This is underlain by a reddish brown or dark reddish brown silt loam to a depth of 28 to 30 inches. These deposits usually rest on shaly gravel at a depth of 28 to 30 inches, but a wide variation in the depth of the deposit occurs and in some cases the gravel is only a few inches from the surface. Cumberland silt soils are suitable for a wide variety of crops but their usefulness may be limited by their tendency to flood. Hay and grain are the main crops grown.

Summary. The soil descriptions for Antigonish County, presented in this chapter, round out the discussion of the physical factors termed "inherent" in the introduction to this Section. No attempt has been made to classify the soils according to their agricultural capabilities in the area. This will be done in a subsequent chapter (Section III, Chapter 2). Sufficient information has been presented, however, to enable the reader to refer to the soil basis when relationships are drawn in the following Sections. In summary, most of the farming in the county is done on the Cumberland, Millbrook, Queens and Merigomish soils. Some of the areas in Woodbourne are well suited for agriculture but shallowness or topography imposes limitations in most cases. This applies also to the soils on the uplands, the Thom, Halifax and Kirkhill associations. The Hebert soils are generally too coarse textured for agricultural purposes but in many places where the sand is fine enough they may be suitable.

II

RURAL DEVELOPMENT

INTRODUCTION

The occupance of any region is a dynamic process involving the human element and the factors of space and time. The character of the people and the way in which they have modified the landscape are especially important. Also to be considered is the time during which man's influence has been active. This, briefly, is what the writer has attempted to describe in the first two chapters of this section. Once these human elements have been collected, they are set beside the physical elements already discussed and the first step is taken in the regional treatment of the rural economy of the county.

The region is a convenient device used by geographers to keep knowledge of an area within manageable proportions. The land use regions drawn up in chapter 3 are based on one criterion -- use of the land according to the writer's own mapping in the field. The very existence of a certain type of land use, however, is witness to a temporary end result of the interplay of physical and human factors. Once these regions are delimited on a map, comparison in terms of specific items such as soils, population and agriculture is facilitated.

The map of land use patterns, however, is not to be regarded as a final goal. It is an intermediate step in the attempt of the geographer to understand an area not only as it now exists but also as it might exist if the potentialities of the physical and human elements were to be more fully utilized. The final goal of the geographer is multiple-purpose correlation, not only of the present pattern but of future patterns which may develop from this. Synthesis of the present

pattern, however, is a useful and necessary step in the procedure. The characteristics of each region thus singled out can be compared and their place in the life of the whole area evaluated. On this basis, recommendations can be made and some sort of classification devised whose purpose would be to point the way to proper utilization of resources and a fuller life for the community.

CHAPTER 1

HISTORICAL BACKGROUND

Early Settlement¹

The earliest settlement in Antigonish County was made by Frenchmen around the year 1776, at Tracadie. Benoit and Delore, names of the original settlers, are still common in the area today. Pomquet was settled at the same time and a little later, Havre au Bouche was settled by Leblancs and DeCostes. These early settlers, largely Acadians returning to the province after their expulsion in 1775, were later joined by immigrants from Quebec and other French settlements (II, 14; pp. 4,53).

In the autumn of 1783, a volunteer regiment under Colonel Hierlihy which had been raised to fight on the side of the British in the Revolutionary War was called to Halifax and disbanded. A grant of 26,000 acres was made to Colonel Hierlihy and 88 others. Their land lay on both sides of Antigonish Harbour and for a long time was known as the Soldiers' Grant. Only a few of the earlier settlers remained, however. Their descendants, the Hierlihys, Dunns, Kells and Mahoneys, still reside in the county (II, 14; p. 4).

After the Hierlihy regiment, the next party of immigrants to settle in the county were some soldiers of the Montague regiment, made up of a few refugees from the Revolutionary War plus some loyalists. Two men, Williams and Glasgow, took up land on the south side of Antigonish Harbour in 1788 (II, 14; p. 4).

¹The information in this section is, in the main, summarized from the historical sketch of the county by J. W. MacDonald in D. J. Rankin: A History of the County of Antigonish, Nova Scotia (II, 14). Specific references are given at the end of each paragraph.

Wheat was first introduced into the county around 1800 at the Town Point on the Harbour (Map 2). It grew remarkably well for many years, yielding as high as forty bushels from a bushel of seed. Fish were plentiful and a common morning catch was 40 to 50 salmon in inferior nets. Cattle were introduced many years later from Prince Edward Island. The first Episcopal church was built in 1821 at the Town Point (II, 14; p. 9).

The great majority of the inhabitants of Antigonish County were Highland Scotch, driven from their country by the landlord and tenant system. It is probable that some Highland families were settled on the Gulf shore at the time of the landing of the Hielihy Regiment at the Town Point. The first permanent settler along the Gulf shore in Antigonish was probably John Ban Gillies who cleared land near the Arisaig coast. About the same time, a number of disbanded soldiers who had taken up land at Merigomish (in Pictou County) moved to the Gulf shore. They were all Catholics from the island of Barra in Scotland where they had been fishermen. They settled along the shore between Arisaig and the Cape. Their descendants are the different families of MacNeils, Livingstones and Ballantynes now in the area (II, 14; p. 12).

In 1801, the ship "Nova" came from Fort William, Scotland to Pictou with 500 immigrants. Many of these scattered to what is now Antigonish County. In the year 1802, the line of a road was run from Antigonish to Manchester and this tended to induce immigrants to take up land in that direction. The first settlement was called Manchester Road (now Marydale). The rich 1300 acre tract of land at Meadow Green was taken up by John MacDonald and his three sons (II, 14; p. 12).

In the year 1795, Alexander Fraser had moved from Pictou to the West River area and was the first settler in that district. In 1805,

John Smith, one of the early settlers of Merigomish, also moved to the lower part of the West River. Induced by rich intervale land and the valuable timber along the river banks, other settlers soon came into the area. Between 1812 and 1819, the timber trade was extensive and the whole valley of the West River was quickly settled (II, 14; p. 15).

The area around Lochaber Lake was settled around 1810 by natives of Lochaber, Scotland (MacMillans and Camerons) who cleared the land and gave the lake its name. In the year 1805, the Ohio River had received its first settlers - MacInnises, MacGillivrays and MacLeans. There was then no road but a blaze between the head of Lochaber Lake and the Ohio River, following which the Indians carried their canoes (II, 14; p. 15).

As early as 1807, the Highlanders were so numerous that they were the means of deciding an election of the county representative to Halifax. Colonel Fraser, an immigration agent at Pictou, was responsible for bringing to the county a large number of families, chiefly from Strathglass and Lochaber in the old country. Fraser's immigrants settled chiefly at the Gulf, Cape George and Manchester Road. By 1871, out of a total population of 16,512 in the county, 11,277 were of Scottish descent. The census of that year listed 13,999 Catholics, 1,788 Presbyterians, 356 Anglicans, 279 Baptists and 87 Methodists (II, 14; p. 34).

In the year 1804, a small group from New Hampshire sailed from Salem and landed in Antigonish in June of that year. They took up a grant of 25,000 acres adjoining the western boundary of the Soldiers' Grant. The settlement of which they were pioneers went by the name of Yankee Grant; it is now called Clydesdale. Most of the settlers took up land at the foot of Brown's Mountain. Today there are no families left here and the area is grown up to woods. The eastern section of

the old Yankee Grant is today included in the county subdivision of North Grant (II, 14; p. 17).

The village of Antigonish began to increase in importance after an attempt to establish a town at the Town Point had failed. The new village, situated at the junction of the West and Wright's Rivers, down whose waters large quantities of timber were floated during the brisk timber trade from 1812 to 1819, soon gained ascendancy over the Town Point. In 1827, there were 45 dwellings besides other buildings in the village. The first merchant in Antigonish was a man named Symonds, from New Hampshire, who engaged in the manufacture of potash. He bought up ashes for two years and then manufactured them into potash (II, 14; p. 27).

Population

1. Population Trends. The population story in the county of Antigonish has been one of rapid growth in the early settlement period followed by steady decline once the peak was reached. In 1827, the population of the county was 7,103. By 1881 it had grown to 18,060. This was the period of self-sufficing agriculture when most activities were centered on the farm and the land needed only to be cleared to render full support to its occupants. The population of the county was limited only by the amount of its land that could be made to yield some agricultural return to the farm family. At first, even the advantage of location was not great. Some settlers actually preferred the hills because clearing was easier and the location provided a greater degree of safety. But as agriculture advanced to a stage where some operators were able to sell products and as the village of Antigonish became a trading center, the location of the farm and the quality of the land became more important.

After 1881, population steadily declined until it reached its lowest point, 10,073, in 1931. A comparison of the population by

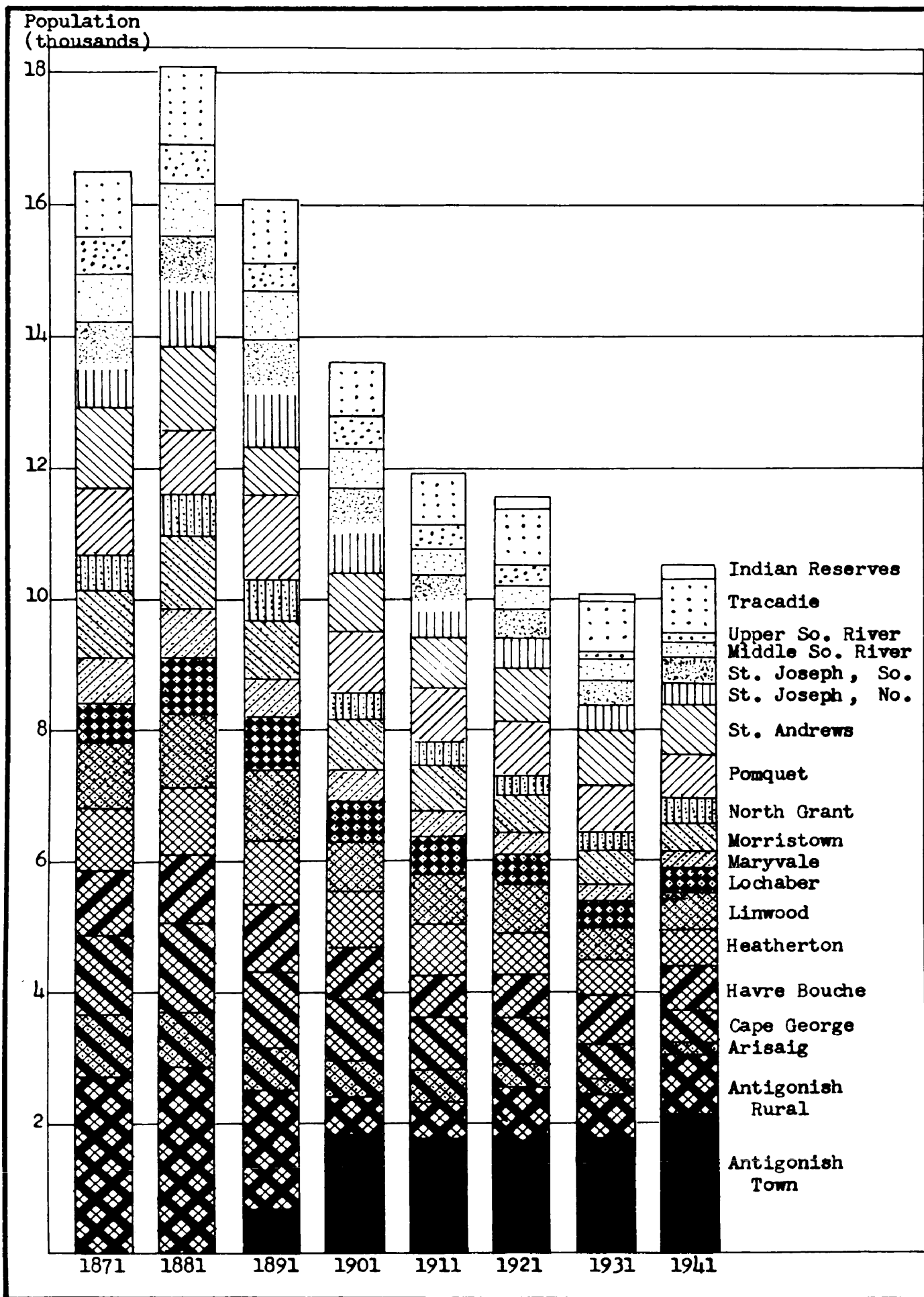


Fig. 4. POPULATION, ANTIGONISH COUNTY, BY SUBDIVISIONS - 1871-1941.

TABLE 6 - Population by Subdivisions, Antigonish County, Nova Scotia, 1871-1941

Subdivision	Population								Decrease 1881-1941 as % of 1881 pop.	Population per square mile. 1941
	1871	1881	1891	1901	1911	1921	1931	1941		
Nova Scotia	387,800	440,572	450,396	459,574	492,338	523,837	512,846	577,982	431.2	-
Nova Scotia (rural)	365,718	377,030	373,403	330,191	306,210	296,779	281,192	310,422	17.7	15.0
Antigonish County	16,512	18,060	16,114	13,617	11,962	11,680	10,073	10,546	41.6	-
Antigonish Co. (rural)	16,512	18,060	16,421	11,779	10,175	9,834	8,309	8,388	53.6	15.5
Antigonish ²	2,739	2,886	1,811	590	552	818	683	908	68.5	20.2
Arisaig	871	883	745	551	469	350	254	207	76.6	7.4
Cape George	1,254	1,348	1,063	946	801	698	511	523	61.2	11.9
Havre au Bouche	957	1,047	1,066	795	675	671	764	686	34.5	40.3
Heatherton	932	959	912	846	755	639	539	548	42.8	16.1
Linwood	996	1,086	1,094	781	741	747	473	530	51.2	25.2
Lochaber	627	832	834	596	579	448	416	361	56.6	9.5
Maryvale	712	723	606	503	388	349	272	254	64.9	10.6
Morristown	1,061	1,089	856	767	639	545	446	492	59.4	10.0
North Grant	580	628	598	403	337	325	314	362	42.4	9.1
Pomquet	1,055	1,025	947	910	854	829	669	666	35.0	26.6
St. Andrew's	1,242	1,279	1,077	988	784	797	817	767	40.0	13.5
St. Joseph N.)	(1,270	1,700	1,446	1,285	923	447	373	332	(61.1	11.9
St. Joseph S.)	(428	366	329	(11.8
Middle So. River	722	798	737	544	411	369	313	271	66.0	9.3
Upper So. River	544	603	564	474	383	344	158	149	75.3	6.8
Tracadie	950	1,174	1,066	800	654	816	763	815	30.6	37.0

¹ Data from Census of Canada. Population densities computed by the author.² Beginning with 1891, the subdivision of Antigonish does not include Antigonish Town.

subdivisions (Fig. 4, Table 8) shows a definite decrease in each subdivision. However, those subdivisions with a large proportion of their area in upland - Arisaig, Cape George, Maryvale, Morristown and the St. Josephs - and those within the poor soil associations of the lowlands - Middle South River and Upper South River - show the greatest decreases. This indicates that to some extent, depopulation in the county has been a result of contraction of agriculture on to the better land. But the rate of decrease has been so high that further consideration is warranted, even though it involves events far outside the borders of the county. In addition such investigation is necessary before we can gauge the relative influences of physical factors and social conditions on happenings in the county.

Rural depopulation is not a problem peculiar to Antigonish County or Nova Scotia. It has been occurring throughout most of the United States and Canada since the turn of the century. In a small area like a county, population movements are merely local symptoms of the operation of national forces. Therefore some reference must be made to these forces, especially in their effect on the larger political unit of which the county is a part, in this case the Province of Nova Scotia.

2. Some Aspects of the Economic History of Nova Scotia.¹ The Maritime Provinces had developed as commercial colonies of the overseas British empire in an age when the chief instruments, both of world and local commerce, were sails and wooden ships. By 1850, the tide of immigration that had swept over British North America during most of the first half of the nineteenth century had virtually ceased in the Maritime colonies. In addition, the colonies were soon to be

¹Most of the historical material in this section is summarized from S. A. Saunders: The Economic History of the Maritime Provinces (II, 16).

affected by the revolution in transportation: "railways were to unite inland communities; steam was to challenge the age-old supremacy of sail; and the iron ship was to displace the wooden ship". (II, 16; p.1).

The period 1850-1880 was one of economic as well as political transition for the Maritime colonies. "The 'pull' seawards which had dominated the early economic history of the Maritime colonies reached its maximum during this period and then began rapidly to decline". (II, 16; p. 3). The peak of the shipbuilding industry was reached in 1864, Confederation took place in 1867, the Intercolonial Railway was completed in 1876, and the national policy of tariff protection was inaugurated in 1879. By 1880 too, the whole North American continent was being rapidly covered by railroads.

The period 1880-1900 was marked by a drastic reduction in the rate of growth of population in the Maritime Provinces, by far reaching changes in the economy of the region, and by a growing integration with the rest of Canada. The effect of transportation changes and the national tariff policy was felt severely and adjustments had to be made during a time of world-wide depression. However, toward the end of the century Canada began to experience one of its most significant periods of expansion. The years 1900-1920 witnessed the rapid settlement of the Prairie Provinces, the construction of a large railway mileage and the arrival of large numbers of immigrants. Nova Scotia was affected by the forces of expansion and by the dislocations that came with World War I and the post-war period.

The most noticeable developments in the province in these two decades took place in the coal and iron and steel industries. From 1851-1881 the center of population in Nova Scotia had moved westward two miles. From 1881-1901, it moved eastward three miles and from 1901-1921, eastward ten miles. "This eastward movement indicates the

strong pull of the coal mining industry, the iron and steel industry and the railway industry; and through these, the pull of the St. Lawrence economy upon the economy of Nova Scotia". (II, 16; p. 27).

The rapid development of the Prairie Provinces during this period had far reaching effects upon the agriculture of Nova Scotia. Many of the farmers of the province moved west, selling, renting and abandoning the farms they once worked. This hastened the process in Nova Scotia of selecting the better land for agricultural purposes and of adopting the type of agriculture best suited for the different areas within the limit set by market conditions.

The decade of the 1920's started out badly for Nova Scotia, a reflection of almost world wide maladjustments. However, Nova Scotia, in contrast to most other parts of the world, and Canada especially, failed to experience recovery and prosperity by the end of the decade. The period was one in which the province had to make many economic readjustments. For the first time since 1871 the total population, rural and urban, suffered a decrease (Table 8). During the decade, the iron and steel industry experienced serious reverses due to its failure to readjust itself to changed conditions in the country. The opening of the Panama Canal introduced competition from the Pacific Coast in the lumber industry. The precarious position of the highly specialized sugar industry in the Caribbean region had its repercussions upon the demand for Nova Scotia fish.

From 1929 to 1933 Nova Scotia sank with the rest of Canada into depression, and from 1933 to 1937 laboriously tried to fight its way back to the level of relative prosperity enjoyed in 1929. In 1939, came World War II, ushering in a period of prosperity that became general over the whole country, and which is still present today.

The complex economy of Nova Scotia can be described as one which "tends to be the end of a whip" (II, 12; p. 150), in the Canadian

economy. Geography and geology seem to have conspired to make the Maritime region a particularly exposed one. "The position of the peninsula, combined with the resources at its own disposal, involves a situation where it is affected by industrial development in Canada, Great Britain and the United States, whose manufacturing products it must buy, and by the major economic changes affecting the West Indies and other markets for its export products." (II, 13^a; p. 31). The industrialization of Canada since Confederation has shifted Nova Scotia from a maritime outlook based on export markets and a carrying trade to dependence on a continental development in which maritime export trades have received secondary consideration as compared to the protected industries of the interior. The transition has imposed on the region a succession of hardships greatest for those less able to resist them - the primary producers.

Of great significance throughout this whole transitional development has been the movement of young people out of Nova Scotia to the continent. This loss has resulted in an age distribution in the province that is weighted towards the unproductive very young and very old, thus reducing the taxable capacity of the population and at the same time increasing the need for public welfare services.

3. Population Decline in Antigonish County. In a detailed study of 219 counties and census divisions in Eastern Canada, made for the purpose of attempting to single out factors responsible for the behavior of rural population (II, 7), it was found that rural population decreased 33 percent in the period 1881-1931. Seventeen counties experienced population decreases above this average rate. Of these, four were in Nova Scotia and one of these, Antigonish, showed the highest decrease, 54 percent, in the list of seventeen. Thus the county of Antigonish has the dubious distinction of being able to

claim a higher rate of decrease than any other county that reached its maximum population in 1881.

The actual composition of the county's emigrant population is not known, although, in general, the young migrate and the older members of the family stay home. In some private research work conducted in February, 1928, by M. C. Foster, an Inspector of Schools in Annapolis County, Nova Scotia - a county whose rural economy is quite similar to that of Antigonish, Mr. Foster states:

In 1927, 38.5 percent of the young people enrolled in the rural schools in 1915 were in the United States. In some sections of the county, 55 percent of those enrolled had crossed the border. The parts of the county that were affected most were those where the educational standing of the people was highest. It was the most educated, the most adventuresome, the most enterprising that left the county.

The movement out of Antigonish County has been very similar to that out of Annapolis County in the quality of its emigrants. This drainage of the "select" out of the county has been encouraged by the very make-up of the Antigonish population. The early Scotch Highlanders who settled most of the county brought with them a devotion to higher education which has persisted to this day. This devotion is accompanied by what can most kindly be described as a lack of any agricultural tradition. To a large extent, Antigonish County farmers have used the land merely as a means of educating their children, so that they could move off the land, usually to other parts of Canada and the United States to take up their positions in the professions or in religious life. It is significant that the single county of Antigonish has produced five of Canada's fifty or so Catholic bishops.

The factors responsible for the decrease in the county's rural population can be summarized at this stage in two groups: (i) those that the county has in common with the other counties of Eastern Canada and (ii) those that make the county unique and help explain its

very high rate of decrease. The factors given for both categories coincide in part with those listed in the 1936 Antigonish County Study (II,9).

(i) The rural population of the county has decreased in common with all the other counties in Eastern Canada because of: (1) The decrease in rural non-farm population, due largely to the establishment in urban centers of large industries against which the small rural non-farming industry could not compete; (2) The decrease in the size of the family, including the farm family; (3) The abandonment of much land that should not have been opened up at all or that was of such low productivity that it could not remain in cultivation in face of competition from land in western Canada.

(ii) The rural population of Antigonish has decreased more than any other of the counties that matured in 1881 because of some of the following reasons: (1) Factors in the peculiar Maritime economy that have brought about sizeable migrations to other parts of Canada and the United States. These migrations have been encouraged by the Scottish emphasis on higher education to the disregard of the development of any agricultural tradition; (2) Poor farm management and poor farm practices in the county. This development (or rather, lack of development) is due in part to the Scottish attitude cited above and in part to adverse climatic and soil factors. The former involves such items as the short growing season and occasional summer drought; the latter involves rolling topography and stony conditions. It is sufficient to say here that there has been no marked change in the type of farming; there has been much soil deterioration; and there has been a notable lack of mechanization in agriculture; This theme is more fully developed in the following chapters. (3) The county's non-farm population is the lowest in any of the counties that matured

in 1881. There is no large urban center within its borders. It is and always has been a purely agricultural county.

4. Present Population. The census of 1941 lists a population of 10,073 for the county of Antigonish. Of this, 8,388 were rural. The distribution of the county's population is shown on Map 8. Comparison of this population map with the soil map (Map 7) reveals that to an extent, population conforms with physical factors. The pattern in Map 8 is strikingly linear, indicating the close relationship between settlement on the one hand and river valleys and roads on the other. Close to 16 percent of the rural people in the county live on the alluvial soils - the Cumberland silt, the Cumberland gravel and the Hebert association. More than half of the total rural population is located on the four soil associations, the Millbrook, the Merigomish, the Cumberland silt and the Queen's. Close to 21 percent are on the Millbrook and more than 14 percent on the Merigomish. Less than 9 percent of the total rural population is located on the Thom, Kirkhill and Halifax associations. Approximately 60 percent of the total rural population and the entire urban population of Antigonish County are in the area of the Windsor geological formation, as shown on Map 8.

Another feature in population pattern is the concentration in the three French subdivisions, Pomquet, Tracadie and Havre Bouche. The density of population in these three areas varies in direct proportion to the percentage of French in each area and, strangely enough, in inverse proportion to the agricultural worth of the soils in each area. The subdivision of Pomquet, with some of the best soils in the county had a population density of 26.6 per square mile in 1941 (Table 8). The French, however, are concentrated in the eastern half of the subdivision; if only this section of the district were considered, the density would be much higher. The concentration in the Tracadie sub-

ANTIGONISH COUNTY

POPULATION

1941

Total Population - 10,545

Rural Population - 8,388

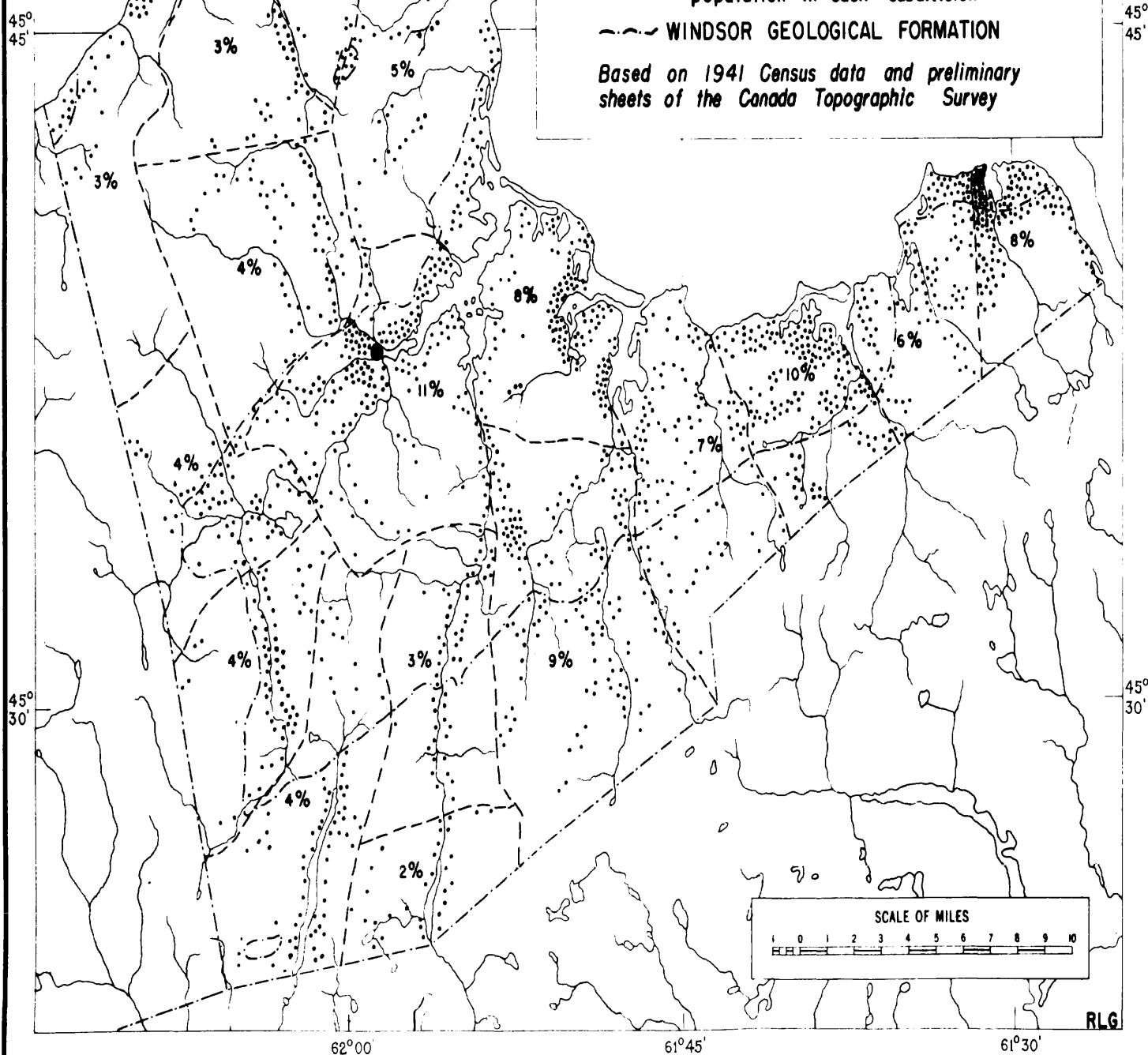
Urban Population - 2,157

Each dot represents 5 people (rural)

Figures on map indicate % total rural population in each subdivision

--- WINDSOR GEOLOGICAL FORMATION

Based on 1941 Census data and preliminary sheets of the Canada Topographic Survey



division - 37 people per square mile - is the second highest in the county. The soils here range from fair to good. The subdivision with the highest population density - 40.3 per square mile - is Havre Bouche in the eastern part of the county. The area has a high proportion of French and some of the poorest agricultural soils in the county.

The close relationship between population density in 1941 and the decrease in population in the period 1881-1941 is evident from Table 8. The average population density for the county is 15.5 and the average decrease in population since 1881, 53.6 percent. The French divisions mentioned above, Pomquet, Tracadie and Havre Bouche all have population densities much higher than the average and population decreases much lower than the average. Subdivisions with most of their area in upland or poor lowland soil - Arisaig, Cape George, Maryvale, Morristown, the St. Joseph's, Middle South River and Upper South River - all show population densities considerably below the average and population decreases above the average.

Three of the subdivisions of the county - Antigonish, North Grant and Tracadie - actually show sizeable population increases in the decade 1931-1941. These increases continued in the post-war period and may indicate the beginning of a new period in the population story of the county. This might be termed the "resettlement period", a time in which that portion of the unoccupied land still suitable for successful agriculture in the county may be settled again. Something of this sort is necessary not only in Antigonish County but also in the rest of Nova Scotia. World War II, by opening up economic opportunities in certain sections of the province and in other parts of Canada, merely postponed the structural change that is necessary if Nova Scotia is to absorb even a fair proportion of its own natural

increase of population. "By hastening a rural-to-urban shift that involved the abandonment of farms on an increased scale, it (the war) has perhaps made the ultimate adjustment more difficult, for any hope of absorbing the increase must rest largely on the development of rural areas". (II, 13a; p. 34).

The development of rural areas, in turn, involves the adjustment of people to the land resources, the development of those resources and the relation of the resulting returns to the content of living of the population. Rural development, too, will depend on the prosperity of the urban centers and fishing and lumbering communities that provide markets for agricultural products.

CHAPTER 2

LAND USE AND AGRICULTURAL PRODUCTION (I)

Agricultural Development

1. Early Agriculture.¹ The early settlers in Antigonish County relied upon their axes, their hoes, and their rakes for cultivation of the soil. Potatoes were planted in the ground upon which the trees had been chopped down and burned. Wheat was scattered among the stumps and covered with a hoe. For many years these formed the only crops and, combined with fish and wild animals, made up the diet of the day (II, 14; p. 41).

Early agriculture was primarily concerned with the growing of food for immediate needs. For a time lumbering was the more profitable enterprise and the development of farm lands did not receive much impetus. Agricultural development made its greatest strides between 1827 and the end of the century, reaching a peak about 1891. This was in common with agricultural development in the rest of the province and coincided with the development of manufacturing and better methods of transportation.

The writings of "Agricola" (II, 18) which appeared during the early days of settlement had considerable influence on the improvement of agricultural methods, the use of manure and lime and the introduction of better tillage implements. The influence was one that was felt in other parts of the province much more than in Antigonish. W. J. MacDonald, writing in 1876, states; "The great fault with our people in this county is that they depend entirely upon the natural power of the land, forgetting that thought and skill and labour are

¹The preliminary material in this division is taken, in part, from D. J. Rankin: A History of the County of Antigonish, Nova Scotia (II, 14). Specific references are given at the end of each paragraph.

required to make the most profit out of their farms, and at the same time keep them from losing their fertility." (II, 14; p. 45).

Agricola's writings, however, did lead the people of the county to turn their attention to the cultivation of oats. The provincial government at the same time offered a bounty to the person who should first establish a mill for the manufacture of oatmeal. This was awarded in 1822 and from that time, oats cultivation proceeded rapidly. Production of the crop rose from 28,000 bushels in 1827 to 264,000 bushels in 1871.

The gradual clearing of the timber from the river sides brought into use the "intervale or bottom land of the county. This led to the rearing of cattle, horses and sheep which with dairy produce formed the principal exports of the county until the turn of the century. Trade with Newfoundland in butter, cattle and lumber began as early as 1811. However the uncertainty of this market became a contributing factor to the poor rate of progress of agriculture in the county. At times, the market was very good, but more often it was bad. It frequently happened that cattle sold in St. John's at prices which did not pay the expense of taking them there. In an average year, if an ox sold for sixty dollars, expenses came to twelve dollars. Besides the trade with Newfoundland, Antigonish every year sent numerous droves of cattle and sheep to the Halifax market, but the drawbacks of transportation were as great as those of the Newfoundland trade (II, 14; p.42).

The population of the county more than doubled in the period 1827-1871. The cultivated area increased from 31,000 acres to 108,000 acres in the same period. Wheat production increased from 17,000 to 22,000 bushels, hay from 10,000 to 29,000 tons and potatoes from 233,000 bushels to only 241,000 bushels. MacDonald (II, 14; p. 44) has this to say concerning the potato crop in the county:

Antigonish's low position in potato culture is due in large part to the lack of skill on the part of the farmer, rather than to any soil deficiency. Hitherto the farmers of the county have not had inducements enough to lead to improvements in agriculture. It is hoped that the coming of the railway will provide such an inducement.

Mr. MacDonald's hopes, however, were not to be realized. True, the coming of the railway brought with it a boom in agriculture, but this was short lived and was not accompanied by any improvements of note in agricultural practices.

The coming of the railway, however, did have a profound meaning for agriculture in the county and in the whole province. Improvement in transportation brought competition with the products of central Canada and the new West. This in turn brought hardships to the agriculture of the county. Technological developments in agricultural production placed the hill farms especially at a tremendous disadvantage. Declining yields and declining agricultural prices on the one hand and increasing opportunities in industry and in other sections of the country on the other hand, led to significant decline in both population and agricultural production in the county after 1891. These developments are more fully treated in the following sections on trends in land use, crop production and animal production.

2. Changes in the Utilization of Farmland, 1871-1941. The most striking feature to be observed from a study of the graph and table on changes in land use (Fig. 5, Table 9) is the peak in agricultural activity that was reached in 1891. The acreage in field crops fell away quickly after reaching a peak of 64,300 acres in 1891; the acreage in 1941 was 27,900. The number of farms reached a high of 2,710 in 1891 and has since declined to 1,420 in 1941. The actual area of occupied farmland decreased from 264,000 acres in 1891 to 175,000 acres in 1941. The acreage of improved land also reached its lowest point in 1941 - 44,300 acres. This figure however is not comparable

Acres
(thousands)

400

350

300

250

200

150

100

50

Total County
Area

Fig. 5

CHANGES IN UTILIZATION
OF FARMLAND
ANTIGONISH COUNTY, N.S.
1871-1941.

Improved
Land:

Other
Pasture
Cropland

Unimproved:

Marsh, Waste
Woodland
Pasture

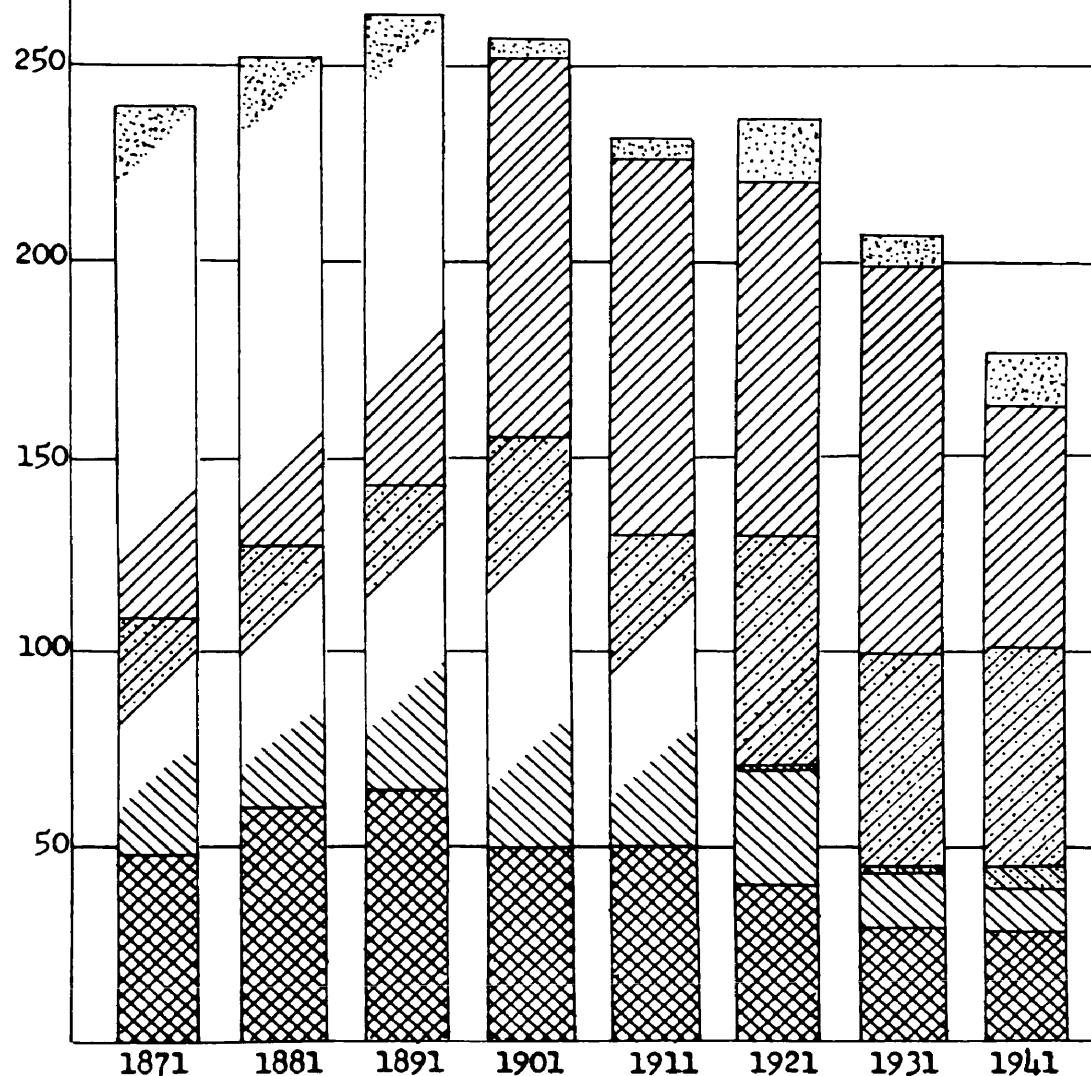


TABLE 9 - Utilization of Farmland in Antigonish County, Nova Scotia 1871-1941.¹

	1871	1881	1891	1901	1911	1921	1931	1941
Total Land Area	346, 240 acres							
Occupied farmland (acres)	240,491	252,580	264,002	257,225	231,498	236,084	207,467	175,001
Average per farm	104.1	99.7	97.4	107.9	102.7	113.6	117.5	122.3
Number of farms	2,311	2,534	2,710	2,383	2,264	2,079	1,765	1,424
Number of owners	2,210	2,451	2,620	2,252	2,201	2,028	1,700	1,394
Number of tenants	92	76	86	68	50	23	31	20
Number of part owners, part tenants	9	7	4	63	3	28	34	7
Area Improved (acres)	107,990	127,749	142,588	90,704	110,545	70,202	46,246	44,310
Average per farm	46.7	50.4	52.6	38.1	49.0	33.8	26.2	31.1
Area in field crops	48,854	60,119	64,816	50,501	49,937	39,168	29,316	27,887
Area in pasture	59,264	67,198	77,712	104,292	-- ²	28,372	11,921	11,413
Area in orchards	272	432	560	573	421	266	240	11
Area fallow	--	--	--	--	--	917	820	286
Other	--	--	--	--	--	--	--	4,698
Area Unimproved (acres)	--	--	--	--	120,953	165,882	161,221	130,691
Woodland	--	--	--	--	96,172	91,808	97,345	61,928
Natural Pasture	--	--	--	--	--	59,260	53,968	56,048
Marsh or waste	--	--	--	--	6,657	14,814	9,908	12,716

¹ Data from Census of Canada² Before 1921 (with the exception of 1901) "Improved Land" includes non-tillable land used as pasture.

-- Information not available.

to earlier figures due to a change in census definition. Before 1921 (with the exception of 1901), "improved land" included non-tillable land used as pasture, so that figures for these years are disproportionately high.

The period 1921-1931 was the most serious, economically, for the county, but it included a period of industrial activity elsewhere in Eastern Canada (Chapter 2 of this Section). Improved pasture, for which figures are available only since 1921, shows a big drop in acreage from 1921-1931. Unimproved pasture, on the other hand, has remained fairly steady, at least until 1941. Woodland on farms decreased from 97,000 acres in 1931 to 62,000 acres in 1941.

Accompanying the agricultural decline since 1891 has been the population decline discussed in Chapter 2. In 1881, the total population of the county, 18,060, was classified as rural. In 1941, the total rural population was only 8,390 (Table 8). In the sixty year period 1881-1941, Antigonish County experienced a decrease in rural population of 53 percent, a decrease in number of farms of 44 percent and a decrease in area of occupied farmland of 30 percent.

One of the serious problems facing the county today is rapid land abandonment. In 1881, 73 percent of the county was in occupied farms; in 1941 the percentage was 51. Early settlement of such a large proportion of land area (higher in Antigonish than in any other county in Nova Scotia) was possible under the self-sufficing system of rural life of the times. This does not mean, however, that such lands are suited for the commercial type of agriculture which has now developed. Adverse climatic conditions, the rolling topography of the country, the stoniness and shallowness of the soil, the degree of soil depletion and the inaccessibility to markets have all been factors in the abandonment of areas or farms. Throughout the period of abandonment,

the opportunity of obtaining part of the living from fishing, from lumbering and from work on the roads and other places has been an important factor tending to retard the movement.

One of the significant features shown in Fig. 5 is the important place occupied by woods and pasture in the agriculture of the county. In many places, it is difficult to tell where the woods begin and the "pasture" stops. The rapidity with which the land goes back to woods is an amazing characteristic of the Maritime area. Farmers must constantly work to keep spruce bushes from gaining footholds on pasture lands. Once the farmer gets behind in the struggle, he is in danger of losing whatever pasture he had. This constant striving against the inroads of the spruce is but another factor that has contributed to the abandonment of Antigonish County farms.

3. Trends in Crop Acreage and Production, 1871-1941. The most significant feature in the crop picture of the county has been the dominant position occupied by hay, oats and potatoes (Fig. 6, Table 10).

Total crop production reached a peak in 1881 but total acreage was higher in 1891. Value per acre (based on standardized production as explained in a footnote to Table 10) was highest in 1931 and 1941 but both acreage and total production in these years were well below those of the peak years of 1881 and 1891. The decrease in both production and acreage is especially marked in the decade 1911 to 1921 and again from 1921 to 1931. The negligible amount of roots and corn for feed is a particularly noticeable item. There is a definite trend, however, toward an increase in the production of roots; the production per farm in 1941 averaged 69 bushels, as compared with 11 in 1881 and 14 in 1891.

The hay crop reached an acreage peak of 38,275 in 1911. The lowest acreages occur in 1931 and 1941. The production peak for the crop

Acres
(thousands)

Dollars
(thousands)

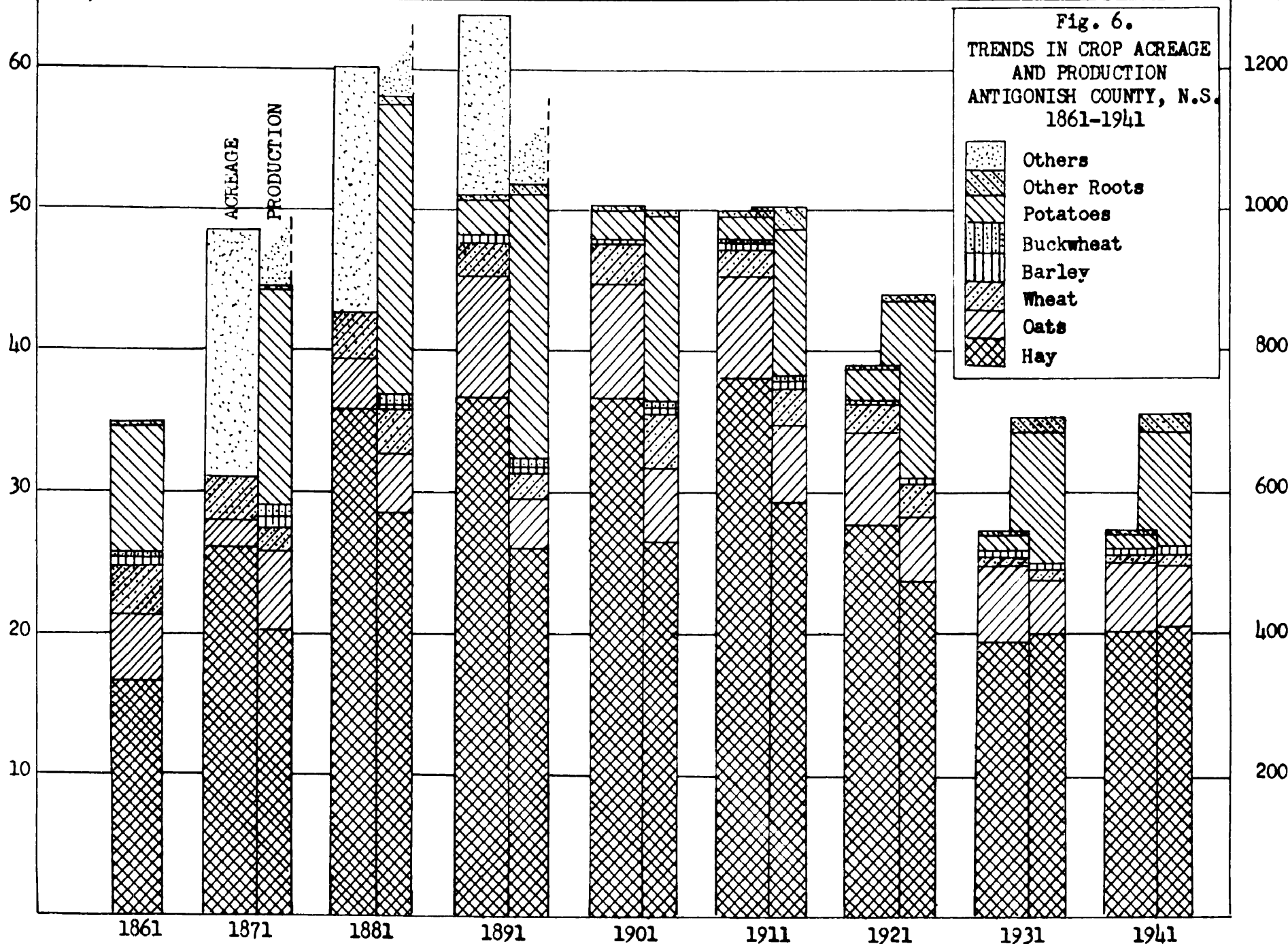


TABLE 10 - Crop Acreage and Production, Antigonish County, Nova Scotia, 1861-1946¹

	1861	1871	1881	1891	1901	1911	1921	1931	1941	1946
Hay										
Acreage	--	26,814	36,141	26,838	36,864	38,276	27,945	19,747	20,265	23,310
Tonnage	23,635	26,680	41,164	37,510	38,060	42,038	24,371	26,339	28,643	
Dollar Value	329,490	404,320	576,296	525,140	532,700	586,532	41,194	401,198	415,856	
Oats										
Acreage	--	722,942	153,676	8,508	8,021	7,296	6,793	6,240	4,977	4,200
Bu. Yield	183,973	116,460	79,911	150,017	208,060	212,676	80,060	160,884	167,380	
Dollar Value	95,665	116,460	79,911	67,609	108,186	110,591	53,642	63,504	87,038	
Wheat										
Acreage	--	2,048	3,640	2,229	2,840	1,952	1,105	694	493	160
Bu. Yield	43,866	22,422	41,687	25,680	49,868	36,842	30,632	11,661	10,228	
Dollar Value	65,760	33,633	62,531	38,370	74,802	54,513	40,388	17,492	15,342	
Barley										
Acreage	--	15,969	10,811	686	249	247	265	470	671	440
Bu. Yield	12,192	12,296	8,324	11,086	5,828	6,726	1,769	12,762	16,402	
Dollar Value	9,388	12,296	8,324	8,356	4,488	5,179	4,442	9,819	12,630	
Mixed Grain										
Acreage	--	--	--	--	--	23	37	73	66	170
Bu. Yield	--	--	--	--	140	815	708	1,924	1,945	
Dollar Value	--	--	--	--	91	850	460	1,251	1,264	
Corn										
Acreage	--	222	271	656	44	5	1	2	5	
Tonnage	131	222	271	656	44	61	12	24	54	
Dollar Value	656	1,110	1,356	5,280	220	306	60	120	270	
Buckwheat										
Acreage	--	--	--	--	--	261	48	19	5	
Bu. Yield	4,431	13,846	15,228	10,665	8,041	5,562	918	411	38	
Dollar Value	5,229	16,341	17,968	12,467	9,488	6,863	1,083	485	68	
Potatoes										
Acreage	--	3,147	3,263	2,564	2,002	1,611	745	984	871	640
Bu. Yield	146,206	340,545	319,946	292,632	206,686	160,302	1432	138,868	123,602	
Dollar Value	186,806	310,303	412,730	377,495	269,205	206,790	1,237	179,140	159,447	
Other Foods										
Acreage	--	--	--	--	--	336	270	231	274	280
Bu. Yield	13,267	9,797	28,271	39,831	26,098	108,134	34,164	79,191	97,282	
Dollar Value	2,980	2,939	8,481	11,949	7,629	32,440	9,249	23,757	29,185	
Peas, Beans										
Acreage	--	--	--	--	--	50	16	14	5	
Bu. Yield	1,385	1,357	1,244	2,090	489	421	467	727	727	
Dollar Value	--	--	--	--	--	--	--	--	--	
Totals										
Acreage	608,139	49,854	80,119	64,316	50,501	49,990	19,246	27,439	27,617	29,200
Dollar Value	608,139	606,252	1,266,246	1,041,566	1,006,698	1,006,136	69,694	716,161	720,762	

¹ Data for 1861 - 1941 from Census of Canada; 1946 data from annual report

² Production has been standardised according to the following formulae of average yields assigned to the different crops:

Hay - \$14.00 per ton; Oats - 52¢ per bu.; Wheat - \$1.50 per bu.; Barley - 77¢ per ton; Buckwheat - \$1.18 per bu.; Potatoes - \$1.29 per bu.; Other Foods - 30¢

-- Information not available.

also occurs in 1911 (42,000 tons) but yield per acre is highest in 1931 and 1941 (approximately 1.4 tons per acre as compared to a yield of 1.1 tons per acre from 1881 to 1911) indicating a concentration of production on the better lands of the county. The hay crop on many farms is light (from one-half to one ton per acre) usually because the land is left in hay too long, often as long as seven to ten years. The use of rotation in crops together with the plowing under of lime and phosphate and the application of manure is necessary to restore the soil before better hay yields can be obtained.

The peak in oats acreage was reached in 1891 - 8,600 acres. The production peak was in 1911 - 212,700 bushels. Production was still high in 1941 with 167,400 bushels of oats grown in the county. Yields were highest in 1941 when more than 33 bushels per acre were obtained. The yield in 1891 was 15 bushels and in 1911 it was 29 bushels.

Antigonish County, together with the rest of agricultural Nova Scotia, is today faced with the problem of deciding to what extent dependence should be placed on home grain and to what extent it is feasible to adopt an all out program of importing Western grain and developing grass and hay farming exclusively. In 1941, the first year of the federal freight assistance policy, one million bushels of feed grain were imported into Nova Scotia. In 1946, over six million bushels came in. Obviously the best course to be followed in the province and in the county, is a compromise between home grown grain and grass and hay farming. It would seem most advisable to take advantage of the low price of Western grain and at the same time increase grain production at home by increasing the low yield per acre. Intensive grain growing methods and shorter rotations can easily increase the yield of oats from 30 to 50 bushels per acre.

Potatoes in the county reached an acreage peak of 8,300 acres in

1881 and a production peak in the same year of 320,000 bushels. In 1941, acreage was 871 and production 123,600 bushels. Yield per acre has thus increased from 97 bushels in 1881 to 142 bushels in 1941.

As is evident from Fig. 6 and Table 10, for a livestock area, there is a striking lack of feed crops in the county. In 1941, the average farm produced only 20 tons of hay on 14 acres, 117 bushels of oats on three and one-half acres, 20 bushels of other grain on less than one acre, 88 bushels of potatoes on one-half acre and 69 bushels of other roots on 0.2 acre. This is certainly a very small production on which to maintain a livestock industry in any farming territory. In 1891, the average farm produced 14 tons of hay on 14 acres, 48 bushels of oats on three acres, 14 bushels of other grain on slightly over an acre, 108 bushels of potatoes on one acre and 23 bushels of other roots on one-tenth of an acre.

Most farms in the county lack any systematic rotation. For that matter crop rotation is a practice that has long been delayed throughout all of Nova Scotia and the whole Maritime area. One reason for the delay may have been the early emphasis on the four-field system which involves having one-quarter of the land in hoed crops. Farmers found it impractical to cultivate this large area of hoed crops and consequently neglected rotation altogether. A way out of the difficulty is the use of other effective rotations, for example a three year rotation of grain, clover and hay, or a division of the farm so that several rotations can be included in the cropping system.

4. Changes in the Number of Livestock, 1861-1941. The peak year in the number of animal units in the county was 1881 when the number of units reached a total of 26,800 (Fig. 7, Table 11). In 1941, the total number of units was 16,760; in 1946 it was 20,240. The high figure shown for 1921 was due in large part to the stimulus of war-

Animal Units
(thousands)

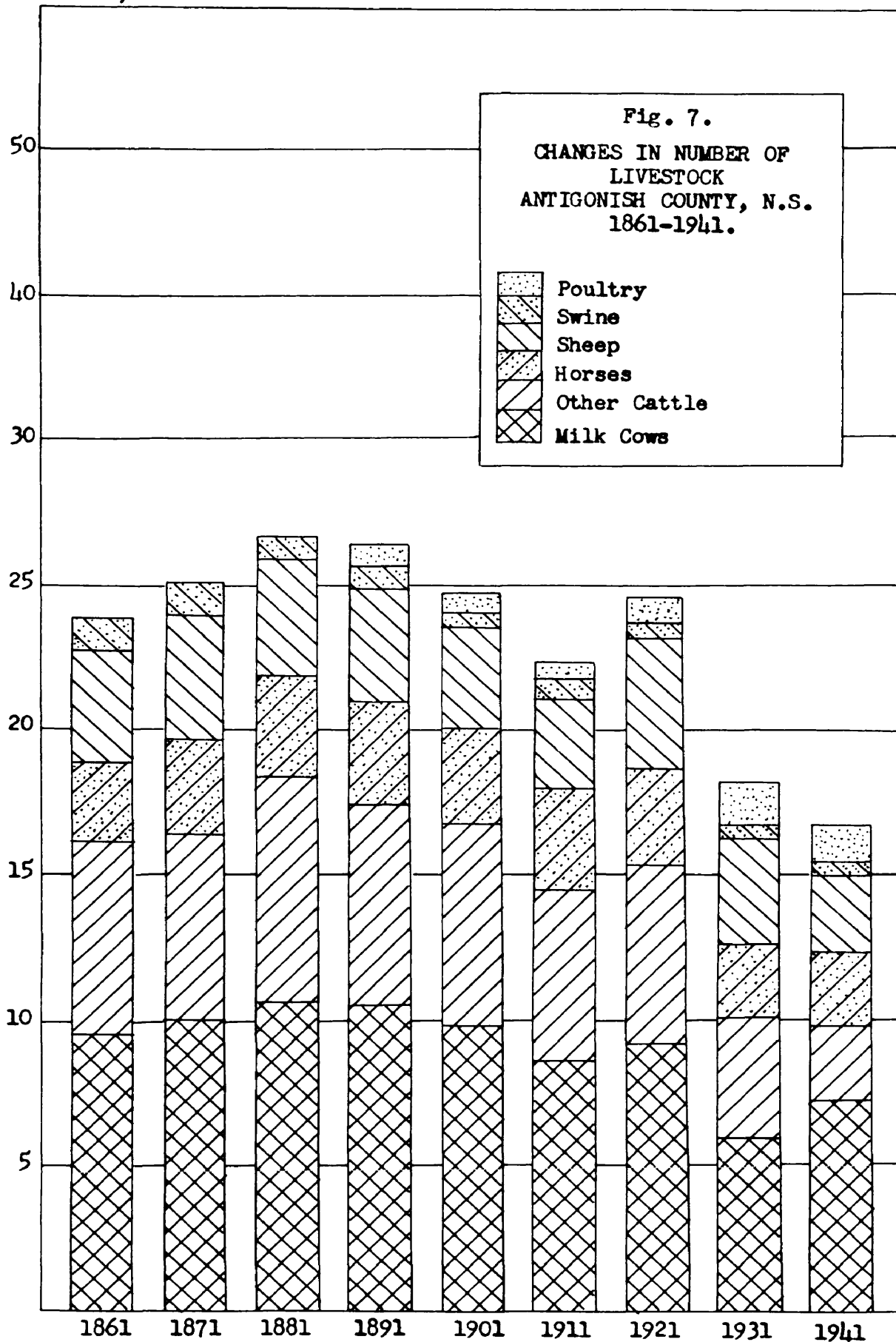


TABLE 11 - Number of Livestock¹, Antigonish County, Nova Scotia, 1861-1946.²

Livestock	1861	1871	1881	1891	1901	1911	1921	1931	1941	1946
<u>Milk Cows</u>										
Total No.	8,759	9,259	9,776	9,680	8,879	7,914	8,449	5,582	6,553	7,190
Animal Units	9,635	10,185	10,754	10,648	9,767	8,705	9,294	6,140	7,208	7,909
<u>Other Cattle</u>										
Total No.	13,503	12,724	15,576	13,816	14,003	12,086	12,282	8,258	5,371	5,150
Animal Units	6,752	6,362	7,788	6,908	7,002	6,043	6,141	4,129	2,686	2,675
<u>Horses</u>										
Total No.	2,695	3,338	3,487	3,617	3,342	3,446	3,368	2,560	2,431	2,950
Animal Units	2,695	3,338	3,487	3,617	3,342	3,446	3,368	2,560	2,431	2,950
<u>Sheep</u>										
Total No.	27,113	29,369	27,671	27,113	24,799	21,390	30,898	25,626	19,405	23,120
Animal Units	3,873	4,196	3,953	3,873	3,543	3,056	4,414	3,661	2,772	3,303
<u>Swine</u>										
Total No.	4,531	4,574	3,414	2,983	2,217	2,301	2,119	1,798	1,812	1,100
Animal Units	1,133	1,144	854	746	554	575	530	450	453	275
<u>Poultry</u>										
Total No.	--	--	--	38,047	32,247	33,925	48,902	74,028	60,340	151,380
Animal Units	--	--	--	761	645	678	980	1,481	1,207	3,228
<u>Total</u>										
Animal Units	24,088	25,225	26,836	26,553	24,853	22,503	24,727	18,421	16,757	20,240

¹ For purposes of comparability, the following values, based on feed consumption, have been assigned to the different livestock classes: Milk cows - 1.1, Other cattle - $\frac{1}{2}$, Horses - 1.0, Sheep - $\frac{1}{7}$, Swine $\frac{1}{4}$, Poultry - $\frac{1}{50}$.

² Data for 1861-1941 from Census of Canada; 1946 data from annual report (1946) of N. S. Department of Agriculture.

-- Information not available.

time prices. The term "animal unit" is explained in a footnote to Table 11.

Since 1881, the greatest decline in animal units has been shown by beef cattle. The total number of "other cattle", which provide the only means of tracing the changes in beef cattle, declined from 15,600 in 1881 to a little over 5,000 in 1946. The decline is especially marked after 1921. At the turn of the century, Newfoundland was an important market for Antigonish production, especially for beef cattle. With the development of transportation methods, however, the big packing concerns of central Canada moved in and took over the Newfoundland trade.

There has been a slow but definite dropping off in the number of horses, from 3,500 in 1881 to 2,400 in 1941. The horse is still prominent in agriculture in the county, however, especially in the more rugged parts where the use of machinery is limited. The number of horses actually increased from 1941 to 1946 with the increase in agricultural activity during the war.

Milk cows have also shown a tendency to decline but evidences of revival are seen in 1921 and 1941. The 1941 figure has an added meaning when it is contrasted with that of 1946. This increase in the dairying industry in the county has been the outgrowth of the increasing demand for whole milk from the town of Antigonish and from the Sydney urban area. The growth of Sydney has had and will continue to have great significance for the shipper of whole milk in the county. This whole question of markets and the importance of the increase of milk consumption in Sydney is discussed in a subsequent chapter (Section II, chapter 4).

Swine and sheep show a small decrease in numbers since 1881. The peak in sheep numbers occurs in 1921, a departure from the regu-

lar pattern but the drop from 1921 to 1941 is a marked one. Hog raising has never been a very sizeable enterprise in the county. Most farmers raise their own pork but little is shipped outside. In the mid 1930's young pigs were brought from Prince Edward Island for sale in the county and the surrounding area. Even today, farmers in the county are not taking full advantage of the local market. The high cost of feed, especially in the post war years, and the small amount of grain grown in the county are factors contributing to the lack of interest in hog raising.

Sheep are naturally adapted to Nova Scotia conditions. They are economical to house and feed and are the only class of animal that can be finished on good pasture. In spite of this, the sheep population has steadily declined both in the county and in the whole province. Too often in the past, sheep (which are easy animals to manage) have been left to themselves entirely. This resulted in trouble with parasites and dogs and in a poor quality lamb that tended to spoil the market. With proper care and management, including the renewal of mineral-deficient pastures with fertilizer, many more sheep could probably be kept in the county and in the whole Maritime area.

The poultry industry today ranks second to dairying in the county. The rise in poultry numbers has been most significant in the period 1941-1946. The increase has been due mainly to specialization since the war in the subdivisions of Pomquet and Antigonish. During the war years, prices were stabilized and feed prices subsidized, giving impetus to the industry. In addition, co-operative marketing and government grading brought the farmer a better price for his product and poultry raising fits in well with a program of diversified farming on the small farms of the county. The Sydney area provides a favorable market.

5. Summary. As a summary of this chapter and an introduction to the next, the characteristics and trends of agricultural development in Antigonish County may be listed as follows:

(a) The peak in agricultural activity in the county was reached in 1891. By that time, the more suitable farm lands had been settled. The years that followed witnessed the abandoning of the less suitable areas.

(b) In the process of abandonment, agriculture tended more or less to concentrate on the better lands. Yields in the hay crop increased from 1.1 tons per acre in 1881-1911 to 1.4 tons per acre in 1941; the yields in the oats crop increased from 15 bushels per acre in 1891 to 33 bushels in 1941; potato yields increased from 97 bushels per acre in 1881 to 142 bushels in 1941.

(c) Agriculture in the county has revolved around three crops - hay, oats and potatoes. Few farms carry out a systematic rotation. The county is a deficiency area in feed grains, wheat and wheat flour, cheese and meat.

(d) The character of the soil and the available markets in recent years have resulted in a degree of specialization in the dairy industry and in the poultry industry. The specialization in dairy centers around the shipment of whole milk, an all year industry. The whole milk industry, in turn, depends for future development upon the growth of the urban market in the Sydney area.

CHAPTER 3

LAND USE AND AGRICULTURAL PRODUCTION (II)

Some Characteristics of the Present Agriculture

1. Size of Farm. At the present time, approximately half of the land area of Antigonish County is occupied by farms (Table 4). The Census of 1941 lists 122 acres as the average size of farms in the county. However, 33 percent of the farms are 51 to 100 acres in size and 36 percent are from 101 to 200 acres in size. On the average, 20 acres per farm is in cropland; eight acres is in improved pasture; 43 acres is in woodland and 39 acres is in rough pasture. Actually these figures vary greatly from farm to farm and in different parts of the county. These variations are discussed in some detail later on in the chapter.

TABLE 12 - Value of Farm and Forest Products, Antigonish County, 1941¹

<u>Farm Products</u>			<u>Forest Products (on farms)</u>		
	Dollar Value 000's	% Total		Dollar Value 000's	% Total
Field Crops	536.7	49.6	Used on Farm	64.5	69.1
Animal Products	251.2	23.2	Firewood	59.5	63.8
Stock Sold Alive	106.2	9.8	Other	8.0	5.3
Forest Products	93.3	8.6			
Stock Slaughtered	77.7	7.2	Sold	28.8	30.9
Vegetables and Fruits	17.0	1.6	Firewood	2.2	2.4
			Pulpwood	3.2	3.4
Total	1,082.2	100.0	Other	23.4	25.1
Total (1946) est.	1,800.0		Total (87% of farms)	93.3	100.0

¹Data from Census of Canada, 1941.

2. Farm and Forest Products. The value of farm and forest products in the county in 1941 is given in Table 12. Field crops and animal products together make up three-quarters of the value of farm

products. The next most important item is stock sold alive, whose value is slightly less than 10 percent of the total. An important part of nearly every farm in the county is the farm woodlot, although its value is more in the potential than in the actual. In 1941, forest products made up over eight percent of the total value of farm products. Of this, more than two-thirds was used on the farm. The rest was sold for firewood, pulpwood, pit-props and other uses (Table 12). In the war years following 1941, the amount of timber sold off farms increased appreciably and the boom began to taper off only as late as 1949. In the interim, of course, many farms in the county suffered from neglect on the part of the operator who could get along nicely on the returns from his timber operations alone.

3. Farm Woodlots. The poor management of farm woodlots is characteristic not only of Antigonish County but also of the rest of Nova Scotia. Cutting is indiscriminate and forest management on some sort of yield basis is non-existent. Management and its possibilities are practically unheard of in the county. No one as yet has seriously considered even the likelihood of farmlot management on the smallest scale. The provincial Department of Lands and Forests has made some start in bringing the matter to the notice of the farmer, but lack of facilities hampers the work and results so far are negligible. The Antigonish County farm with over forty acres in woodland is very much in need of some sort of program to maintain this particular resource and to derive the potential benefits that would accrue from its proper utilization.

4. Fishery Products. An important source of income for the coastal population of the county are fishery products, especially lobster (Table 13). In 1941, a poor year for fish, the marketed value of all fish products in the county was over \$95,000. This figure rep-

resents close to 19 percent of the total farm revenue in the county. In 1946, the catch almost tripled in value due to a good season and high prices. The total number of men in the industry has changed little since 1921. Approximately ten to fifteen percent of the farm operators in the county are fishermen-farmers or farmer-fishermen. In most cases, the combination does not work too well. The fishing season coincides with agricultural activities to such an extent that the land is usually neglected, even where it is quite suitable for farming. The main fishery product in the county is lobster which accounted for 63 percent of the marketed value of all fish products in 1941 and over 73 percent in 1946.

TABLE 13 - Value of Fishery Products, Antigonish County, 1921-1946.¹

	1921	1931	1941	1946
Total				
Landed Value (Dollars)	60,100	106,500	78,900	242,100
Marketed Value "	126,300	175,600	95,800	286,300
Lobster				
Landed Value (% total)	45.0	59.2	66.1	73.0
Marketed Value "	71.7	62.2	62.6	73.6
Total No. Men	357	458	349	342
Total No. Boats	214	328	317	247
Total No. Lobster Traps	45,500	64,000	60,000	64,000

¹From Fisheries Statistics of Canada, 1946 (II, 2) and information supplied by Dominion Bureau of Statistics.

5. Farm Values. The value of all occupied farms in the county in 1941 was \$3,345,000 (Table 14). This is the Census figure but it does bear some resemblance to the county's assessment figure of a little over \$3,000,000 for all occupied farms. The Census, however, lists 1,424 occupied farms in the county in 1941; the assessor lists 1,869. The difference is probably due to incomplete enumeration by

the Census. In the case of farm values, even the county assessor agrees that the Census figure is probably more correct, although both are too low. In the tables referred to in this chapter, the assessor's figure is used for the number of farms and the Census figure for farm values.

The distribution of farm values by subdivisions (Map 9) follows a pattern set in previous maps, particularly the soils map and the population map (Maps 7 and 8). The subdivision of Antigonish, largely within the Queen's and Millbrook soil associations, ranks first in farm values and first in population. St. Andrew's is next in farm values and also ranks high in percentage of population. The soils in the division, however, are only fair. The area's wealth in farm values is largely a result of accumulation on the part of the fathers and grandfathers of the present operators. There is little relation between farm values and present farm operations. In the Morristown subdivision, farm values are concentrated most heavily along the coastal positions in the southern part. In the French districts of Havre Bouche and Tracadie, farm values are comparatively low but population is high. In both cases there is correspondence between values and soils. The subdivision of Pomquet ranks third in farm values; here the bulk of the farms are located along the eastern and western sections, on Millbrook and Queen's soils. The upland divisions of Cape George, Maryvale, Arisaig, and the St. Joseph's all rank low in values and population. This is also true of Upper and Middle South River, both of which are in large part on poor soils.

6. Non-Resident Farm Properties and Crown Land. An important problem in the rural economy of Antigonish County is the high rate of farm abandonment (Photos 48-52) that has been characteristic of this part of Nova Scotia since the turn of the century. In 1948, over 21

TABLE 14 - Farm Values¹, Occupied Farms and Non-Resident Farm Properties, Antigonish County.²

Name of Division	Values Occupied Farms	%	Farms Total No.	Farms Occu- pied	Non-Resident Total No.	% of Division total	Farms % of County total
Antigonish Co.	3,345	100.0	2,293	1,799 ³	494	21.5	100.0
Antigonish Rural	468	14.0	253	215	38	15.0	7.7
Arisaig	99	3.0	78	55	23	29.5	4.7
Cape George	186	5.6	128	89	39	30.5	7.9
Havre Bouche	146	4.4	205	178	27	13.2	5.5
Heatherton	196	5.9	197	165	32	16.2	6.6
Linwood	125	3.8	152	127	25	16.4	5.1
Lochaber	247	7.4	112	75	37	33.0	7.5
Maryvale	85	2.5	48	30	18	37.5	3.6
Morristown	268	8.0	120	87	33	27.5	6.7
North Grant	172	5.1	100	72	28	28.0	5.7
Pomquet	281	8.4	145	132	13	9.0	2.6
St. Andrew's	377	11.3	184	140	44	23.9	8.9
St. Joseph N.	142	4.3	91	80	11	12.1	2.2
St. Joseph S.	122	3.7	83	50	33	39.8	6.7
So. River Middle	141	4.2	106	88	18	17.0	3.6
So. River Upper	104	3.1	54	36	18	33.3	3.6
Tracadie	185	5.5	237	180	57	24.1	11.5

¹"Farm Values" include values of land, buildings, implements and livestock.







²Data on Farm Values from Census of Canada, 1941. Data on "Total Farms", "Farms Occupied" and "Non-Resident Farms" from county assessment records, 1948.

³The Census of 1941 lists the number of occupied farms as 1424 (Table 7) due apparently to incomplete enumeration.

ANTIGONISH COUNTY

FARM VALUES

(Land, buildings, implements, livestock)

	Under \$ 100,000		\$ 200,000 - \$ 300,000
	\$ 100,000 - \$ 150,000		\$ 300,000 - \$ 400,000
	\$ 150,000 - \$ 200,000		Over \$ 400,000

Figures on map indicate % total county values in each subdivision

Total county values - \$3,345,000

--- WINDSOR GEOLOGICAL FORMATION

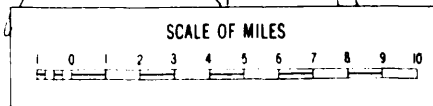
Based on 1941 Federal Census figures.

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percent of the farms in the county were unoccupied (Table 14). The estimated value of these non-resident properties was equal to ten percent of the value of the occupied farms, in terms of land and buildings. In 1933, over 25 percent of the farms in the county were vacant; in 1941, over 23 percent were vacant. Since the number of farms in these years was also greater than in 1948, it would appear that the rate of abandonment is decreasing. This is not strictly true. Another factor that must be considered is the amount of land that has reverted to government ownership in the period due to arrears of taxes. Between 1933 and 1941, the provincial government acquired over 10,000 acres (mostly in 1940) at Tax Sales or in purchases from individual owners. Between 1941 and 1948 the amount acquired was over 12,000 acres (Table 15). Thus when Crown Land purchases are considered together with the figures for non-resident farm properties, it would appear that the rate of farm abandonment has actually increased in the period 1933-1948. This whole question of farm abandonment is taken up again in Chapter 4 of Section III.

TABLE 15 - Crown Lands, Antigonish County, Nova Scotia, 1932, 1940-48.¹

Transferred to Crown (acres)		Total Area (acres)	Leased Area (acres)	Forest Reserve (acres)
1932	-	2,353	2,261	92
1940	8,208	12,622	-	12,622
1941	-	12,622	-	12,622
1942	5,144	17,766	-	17,766
1943	423	18,189	-	18,189
1944	3,255	21,444	19	21,425
1945	1,540	22,984	38	22,946
1946	1,020	24,004	38	23,966
1947	380	24,384	38	24,346
1948	367	24,751	38	24,713

¹Information from Annual Reports of the Nova Scotia Department of Lands and Forests.

The distribution of non-resident properties in the county is shown on Map 10. Table 14 contains additional information, also on the subdivision basis. A comparison of Map 10 with previous maps reveals that the majority of the vacant properties are distributed in line with the physical basis discussed in Section I. Due allowance must be made for the part played by poor farm management in hastening abandonment. This is especially important in cases where vacant farms occur on good land. These will be noted later. For the present, however, it is necessary to point out, that in most instances of farm abandonment, management does not seem to have played a primary role. The subdivisions with the highest proportion of their farms vacant, Cape George, Maryvale, Arisaig, St. Joseph South, Loehaber, Upper South River and Morristown, are either largely in the upland area or contain a large area of poor soils. The low figures in Antigonish Rural and Pomquet conform with the soils in these divisions but in Havre Bouche and Linwood, soils seem to be a secondary factor. More important is the high proportion of French population which remains on the land in the face of obstacles that would prove discouraging to any other group of farm operators. Less than 38 percent of the vacant farms are in the area associated with the Windsor geological formation (Map 10) although this area contains approximately 60 percent of the county's farms.

Reference has already been drawn to the Crown Lands of the county. In 1948, these consisted of 24,751 acres. This is an increase since 1932 of 22,398 acres (Table 15). Of this amount, more than 20,000 acres has been obtained by purchase either from the owner or from the municipality at tax sales. Considerable of this purchased land has been either burned or cut over before it was obtained and thus will not be of any merchantable value for some years to come.

ANTIGONISH COUNTY

VACANT FARM PROPERTIES

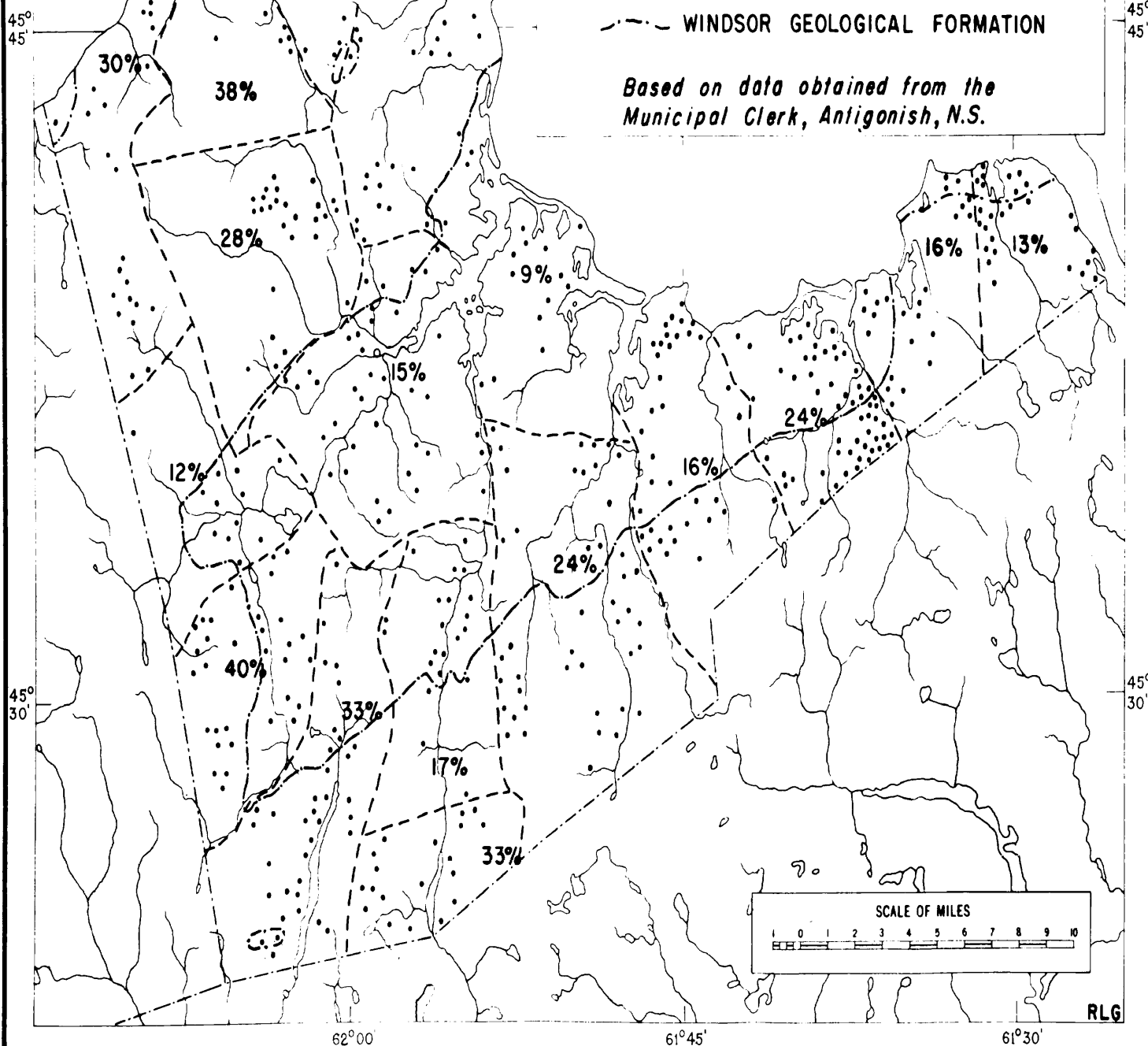
1948

Total Farm Properties - 2,293
Total Occupied Farms - 1,799
Total Vacant Farms - 494
Vacant Farms as % of Total - 22%

Figures on map indicate vacant farms as % of total properties in each subdivision.

--- WINDSOR GEOLOGICAL FORMATION

*Based on data obtained from the
Municipal Clerk, Antigonish, N.S.*



ANTIGONISH COUNTY

CROWN LANDS 1948

Total Acreage in Crown Lands

1932 - 2,353 ac.

1948 - 24,751 ac.

--- WINDSOR GEOLOGICAL FORMATION

*Based on map accompanying Annual
Report (1948), Nova Scotia Department
of Lands and Forests.*

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SCALE OF MILES

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The distribution of Crown Lands in the county is shown on Map 11. A large proportion of these lands are in areas such as the Keppoch, Rear Georgeville and Rear Arisaig where the farms have been abandoned and the land allowed to go for taxes or sold to the Crown (i.e., the provincial government). They include cleared fields and pastures which are now coming up well in spruce reproduction and will be valuable as timber land some day. Due to this system of purchasing odd lots the Crown has many small lots scattered over the entire county, as shown in Map 11. The blocks range in size from 50 to 500 acres and the largest lie in the districts of Brown's Mountain, Georgeville, Keppoch and College Grant. Most of the Crown Land occurs on the Thom soils of the uplands (Maps 5 and 7); a secondary concentration is found in the south-central part of the county on the Woodbourne soils of Middle South River and St. Andrew's and the Kirkhill soils of St. Andrew's. A small percentage of the Crown Lands do occur on the better soils, however, notably on the Millbrook soils of the southern part of Antigonish Rural and the northern part of Lochaber.

The Crown has been purchasing land in Antigonish County since 1933 at a set price of a dollar per acre, regardless of quality. This is in keeping with the government's policy of trying to increase its holdings to one-third of the land area of the province. At present, the Crown owns less than one-quarter. The perfect balance is thought to lie in having one-third of the forest in Crown Land, one-third in private holdings over 1,000 acres and one-third in farm woodlots.

Land Use Regions


The foregoing treatment of some of the rural characteristics of the county has been set down to serve, in the main, as an introduction to the discussion which now follows on land use regions in the county. The land use map (Map 12) drawn up by the writer is an attempt to gen-

eralize land use activity in the county. No attempt was made to base the individual regions on the farm unit, as such mapping was not feasible in the field. The mapping is one of groups of fields rather than one of groups of farms, just as a detailed land use map depicts individual fields rather than individual farms. The broad regions delineated in Map 12 are to be taken only as an approximation to the actual land use pattern; they are to be regarded as "major activity" areas, characterized in each case by the type of farming or type of land use that is dominant and that has been used in the delineation. These regions are not to be confused with the "type of farm" classification used in the federal census (Table 16). The latter is based on the main source or sources of gross revenue, a "type" being established when fifty percent of the revenue is derived from the source shown. The "land use region" is based on the main type of activity of groups of operators in relation to the land and natural resources. The census classification is based on the individual farm; the land use map is based on the major activity within a region. There is a degree of correspondence between the two, however, and this will prove useful in the discussion of individual regions.

Another map based on regional grouping rather than on precise location is Map 13 which shows the distribution of improved land. The distribution as shown represents districts of land which are for the most part improved, rather than fields of improved land on individual farms. Improved land within the rural subdivisions and in relation to the various soil associations has already been discussed in previous chapters (see Tables 4 and 5). The map is presented here because of the importance of improved land as a factor in the comparison of the land use regions. More than two-thirds of the Improved Land lies within the area underlain by the Windsor formation (Map 13).

ANTIGONISH COUNTY

LAND USE REGIONS

-  1-Lumbering - Subsistence
-  2-Fishing - Subsistence
-  3-Lumbering - Farming
-  4-Fishing - Farming
-  5-Mixed Farming
-  6-Dairying (Whole Milk)

--- WINDSOR GEOLOGICAL FORMATION

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SCALE OF MILES

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ANTIGONISH COUNTY

IMPROVED LAND

Total Acreage - 46,800

Percentage of Total Land Area :

Occupied as farmland - 51%

In Improved Land - 13%

In Cropland - 8%

Figures on map indicate cropland as %
of total land area in each subdivision

--- WINDSOR GEOLOGICAL FORMATION

*Based on data from the Federal Census (1941)
and field work of the author (summer 1949)*

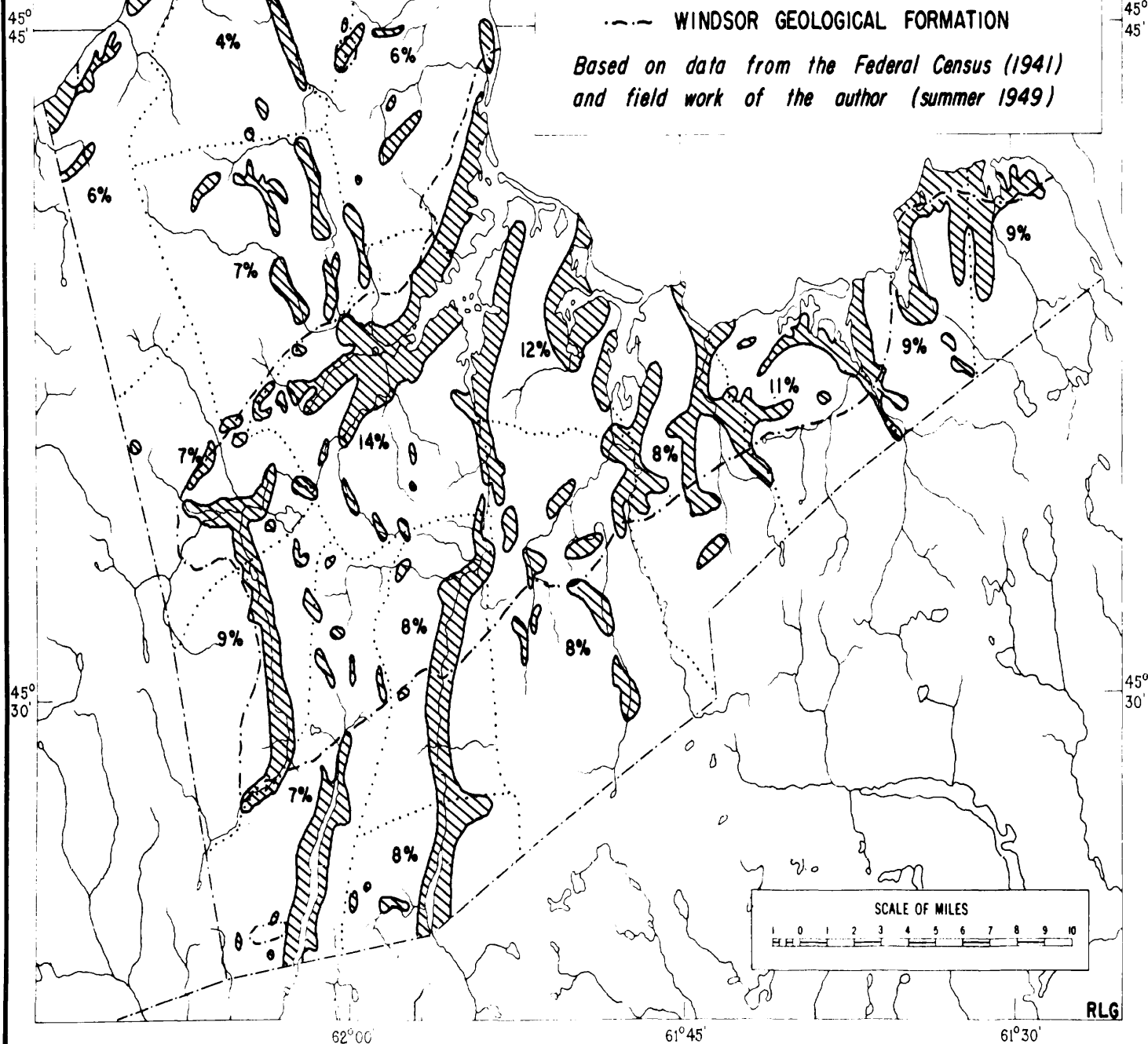


TABLE 16 - "Type of Farm" and "Work off the Farm" (Census), Antigonish County - 1941.¹

<u>Type of Farm</u> ²			<u>Work off the Farm</u>		
	No.	%		No.	%
All Farms	1,424		All Operators	774	
Subsistence and Combined Sub-			Manufacturing, Repairs and Construction	428	55.3
sistence	987	69.3	Transportation, Commerce	49	6.3
Part Time	135	9.5	Agriculture	47	6.1
Livestock	95	6.7	Forestry	36	4.7
Mixed Farming	82	5.8	Fishing	33	4.3
Dairy Products	36	2.5	Services	30	3.9
Poultry	25	1.8	Other	5	0.6
Grains, Hay	24	1.7	Not Given	165	21.3
Other	13	0.9			

¹From Census of Canada, 1941.

²"Type of Farm" classification is based on the main source or sources of gross revenue, a "type" being established when 50 percent of the revenue is derived from a particular source.

The land use regions are shown on Map 12 and may be listed as follows:

1. Lumbering - Subsistence.
2. Fishing - Subsistence.
3. Lumbering - Farming.
4. Fishing - Farming.
5. Mixed farming.
6. Dairying (whole milk).

1. Lumbering - Subsistence. This region is the largest in the county, and agriculturally it is the least important. It occupies over 60 percent of the land area but contains only 6.2 percent of the improved land (Table 17). It has almost half of the vacant farms in the county and over 80 percent of the Crown Land. Approximately half of the land area of the county is in land unoccupied by farms. Most of this lies within this region. Lumbering is the principal activity

and farming is on a subsistence basis.

The lack of agriculture in the region is traceable to the soil associations that occur within it. Over 40 percent of the area lies within the Thom association of upland soils; in fact, over 85 percent of all the Thom soils in the county are in this region. Close to another 25 percent of the area lies within such poor associations as Kirkhill, Hensford, Halifax and Westbrook. Another 11 percent occurs on the Woodbourne soils. However, there are places in which large tracts of good land have grown up to woods or brush. The soils here are suitable for agriculture but the cost of clearing would make this prohibitive in a large number of cases. Close to 30 percent of the region is in Millbrook soils and another 23 percent is in Queen's soils. These areas occur to the east and west of Antigonish (Map 7).

The forest land in the region is of varying usefulness. The best land is the hardwood belt from Brown's Mountain through James River, most of which has been cut during the past few years. The remainder of the region is mainly covered by a softwood type, and this is not of good quality in most places. There is a large percentage of fir in the stand which shows a great deal of red stain. The spruce in many places is also very poor. One of the best timber stands in the region occurs on the land owned by the Augustinian Fathers at the Monastery near Tracadie. This is a stand of over 150 acres of fine spruce and mixed deciduous hardwoods, beech, birch and maple (Photo 12). The monks of the monastery clean it out regularly and follow a program of forestry development not only here but on all their timber holdings, which comprise over 500 acres. Most of these other lands, however, contain only young trees and much of this was destroyed by fire in the summer of 1946.

The monastery land furnishes the only example in the county of

any sort of forestry program. The work consists mainly of clearing the woods of fallen trees and other accumulated growth that keeps back the better trees. This not only results in a better quality tree but also in a faster annual growth. One of the main discouragements to successful cleaning is the lack of similar action by owners of the adjoining woodlands. Here debris piles up and constitutes an ever-present fire hazard to the forests on the monastery land.

In the lumbering process in the region, stands have been culled over and over again in search of birch, maple, beech and other species that may have happened to be in demand at the time. The quality of the timber growth has thus declined steadily, especially in the last ten years. The greater proportion of these are growing up to brush and will have no valuable timber on them for years and years to come.

Most of the men in the region who can be classified as farmers would be included in the "subsistence" group of Table 14. This term is applied in the Census to farms on which the value of products used by the household amounted to more than 50 percent of the gross revenue. However, about 25 percent of the properties in the region have no cows and even more have no hens. It is thus inaccurate to speak of these as subsistence farms. A number of them are merely rural homes without much attempt at either subsistence or part time farming.

2. Fishing - Subsistence. This region is located along the northern shore of the county from Cape George westward to Arisaig. Fishing is the main activity supplemented by agriculture and lumbering. In the Georgeville area, the main catch is lobster but around Arisaig, salmon and lobster are of equal importance. Both lobster and salmon fishing involve expensive outlays and in a poor season some of the men are faced with a loss on their operations. There is relatively little fishing activity in the section around the head of the Cape.

Of minor importance in the fishing industry in this region is the herring catch and the cod and hake catches.

Farming here does not do well in combination with fishing. In addition to the fact that the seasons clash, the soils in this region are among the poorest in the county. These include the Westbrook, Thom, Barney and Woodbourne associations. As a rule, relief varies from very rolling to steep. The land is very stony and fields are very small. Any agriculture is on a subsistence basis (Photo 21). A few farmers who do little if any fishing may have some surplus which can be sold in the summer. Occasionally, some operator will successfully combine fishing and farming. One man in the Arisaig area, fishes lobster in the spring and herring in the fall. In addition, he keeps 60 sheep and a herd of nine cattle. In the summer, he has four cows giving milk and manages to ship two 40 pound cans of cream to a creamery in the next county. The feed for the cattle is largely hay, cut on his own farm and on two or three other farms (vacant) in the community. However, even this enterprising individual admits that he has to work off the farm if the fishing season is poor. Timber operations in fact are an important activity for most of the operators throughout the whole region. Most of the large stands in the area have been cut out but work continues on individual woodlots. During the war years and in the post war period when the demand for lumber was high, the men would spend the whole winter and a good part of the rest of the year in the lumber camps south of the region. In the last year or so, most of these camps have been closed and the men have had to cut on their own lots. The main forestry products have been pulpwood and pit props.

The farms average over 100 acres in size. Of this less than 20 is in hay, about 60 is in woods and the rest is in unimproved pasture.

The proportion of abandoned properties is high. The region occupies less than four percent of the land area of the county; it contains nearly five percent of the vacant farms and over six percent of the Crown Land. Almost six percent of the improved land of the county is in the region but much of this is stony and has low production value. Some of the steeper slopes that were once cleared have been seriously eroded and should be left to go back to woods. Most of the farms in the region are listed by the Census (Table 16) as "subsistence" and in some cases as "combinations of subsistence". The latter term is applied in the Census to farms on which the value of products used by the farm household and the revenue from another main type amounted to more than 50 percent of the gross farm revenue. Subsistence is most characteristic of the area around the head of the Cape. Here the farms are smaller than they are further west and are occupied in many cases by older people who keep a few cows and chickens for their own use. Once these present owners pass off the scene, their lands will be abandoned and in time will be sold to the Crown at tax sales.

The region as a whole is one where life is hard. Fishing is not too dependable and has to be supplemented by farming and work in the woods. Agriculture suffers from a double handicap, that of poor soils and that of having to compete with the fishing industry. Lumbering which has enjoyed a decade of prosperity is now on the wane and the result can only be further hardship for a region that already knows the meaning of the word.

3. Lumbering - Farming. This region is located in the subdivisions of Lochaber and the St. Josephs along Lochaber Lake and the Ohio River Valley and in Morristown along the river valleys in the northern part. Lumbering is the chief activity and the main source of revenue comes from timber operations, usually on the farm woodlot. The owners

do their own cutting and haul to mills in the area. In the last year or so, mill activity in the whole county has been rapidly decreasing. In the process of lumbering the more valuable trees and species have been removed. Stands have been culled in search of the more desirable trees. The quality of the timber growth has thus steadily declined and in many places, cull and weed trees have become dominant. This situation not only checks total annual growth of the younger trees but also reduces the quality. Areas growing up to brush are of considerable value, potentially, if properly thinned. But no operators in the area do any thinning. As a result, stands are of little value because of the existing competition of growth.

Timber operations are supplemented by mixed farming operations. Some farmers keep a few dairy cattle and ship cream in the summer; others keep poultry on a small scale; and still others keep a few "beef cattle" or sheep. Most farms are a mixture of one or more of these activities. Farms are generally located on the lands in the river valleys - on the Hebert and Cumberland in the southern part of the county and on the Millbrook and Queen's in the district of Morristown. Timber operations are carried on in the uplands away from the streams and adjoining the farmlands, on the Thom and Kirkhill soils (Maps 12 and 7).

This region contains 7.1 percent of the land area of the county, 12.7 percent of the improved land, 9.9 percent of the population, 9.0 percent of the vacant farms and 1.3 percent of the Crown Land (Table 17). In the Ohio Valley, the average size of the farm is 150 acres, of which 20 acres is in cropland (mostly hay), 80 in woodland and 30 in unimproved pasture. Around Lochaber Lake, the average farm contains over 180 acres, of which some 20 are in crops, 40 in woodland and 95 in unimproved pasture. In both these cases, unimproved

TABLE 17 - Comparison of Land Use Regions, Antigonish County,

Nova Scotia.¹

Land Use Region	Acreage	Improved Land %	Popu- lation %	Crown Land %	Vacant Farms ²	
					% in county	% total farms in the region
1. Lumbering - Subsistence	60.2	6.2	22.6	81.4	46.9	44.8
2. Fishing - Subsistence	3.7	5.9	6.4	6.2	4.7	15.6
3. Lumbering - Farming	7.1	12.7	9.9	1.3	9.0	19.4
4. Fishing - Farming	3.3	9.0	7.9	0.9	5.1	13.8
5. Mixed Farming	20.5	45.3	38.6	9.3	25.7	14.4
6. Dairying (whole milk)	4.9	20.9	14.7	1.3	8.6	12.5

¹Data expressed as percentage of total in the county except in the last column.

²The number of farms in each region was not actually determined. For use in the second column here, it has been based on the proportion of rural population within the region.

pasture is usually land that has been cleared but is now returning very little to the farm operator. A sizeable portion of this land is in the uplands and should never have been cleared at all. In many cases it is reverting to spruce and this is the best use for it (Photo 19). It is significant that the Ohio operator with a larger acreage of woodland is much more prosperous than the Lochaber operator with his large tracts of cleared land which at best, yield very meagre pasture. In most cases, grazing livestock probably use up more energy walking over these tracts than they receive from feeding there. In the Morristown sections of this region, the farms average 130 acres in size, with 20 acres in cropland, 40 in woods and 50 in unimproved pasture. The situation is intermediate between that of the Ohio farms and that of the Lochaber farms. In all cases, most of the crop-

land is in hay - usually about 18 acres - with the remainder in oats and potatoes.

Most of the farms in this region are classed as "combinations of subsistence" farms by the Census (Table 16). In spite of the "subsistence" label however, most of the operators in this region are relatively prosperous, especially in the Ohio valley. The men are very hard workers and very thrifty. The Highland Scots, as mentioned before, have no farming tradition. Perhaps this helps to explain why they have done relatively well in the Ohio area where lumbering is the main activity and agriculture is only secondary.

The main problem in this region is concerned with the decline of the lumber industry in the county in the last few years. The problem is not only one of loss of markets but also one of improving the natural resources of the districts concerned through some sort of scheme that would involve forest management and the integration of this management with a more intensive agriculture. In the past many of the upland areas were cleared; erosion followed, and now many of these lands are suitable neither for agriculture nor for timber operations in the near future. Today, the greater part of these areas are in the process of abandonment. Future generations may profit if these areas are enabled to grow up to timber under a sound management policy.

4. Fishing - Farming. This region includes most of the coastal portions extending southward and then eastward from Ballantyne's Cove. Fishing is the main activity and agriculture is secondary (Photo 20). Most of the revenue comes from the lobster catch, the mainstay of the area. The average lobster catch per fisherman varies from a few hundred dollars to as high as two thousand dollars in a good season. Unfortunately the lobster season (May and June) coincides with harrowing and seeding time on the farm, so that agriculture invariably

PHOTOS 19 - 23
(Land Use)

19. In the lumbering process in the "Lumbering - Subsistence" region, stands have been culled over and over again in search of merchantable timber. This saw mill in the eastern part of the county was on the point of closing operations in 1949.

20. One of the best timber stands in eastern Nova Scotia is located on the lands of the Augustinian Fathers south of Monastery. These lands furnish the only example in this section of the province of any sort of forestry program. Trees include fine spruce and mixed deciduous hardwoods.

21. The "Fishing - Subsistence" Region in the county is one where life is hard. Agriculture is limited not only by competition from fishing but more seriously by poor soils. This sheep pasture, east of Livingstone's Cove is on shallow soils of the Westbrook association.

22. Fishing is the main activity and farming is secondary in the "Farming - Fishing" Land Use Region. Most of the revenue comes from the lobster catch. Shown here are a few fishermen's homes and the two fish plants at Havre Bouche.

23. In the "Lumbering - Farming" Land Use Region, farms are generally located along river valleys or on level land bordering a lake, while timber operations are carried on in the uplands. In many places, as around Lake Lochaber, the uplands have also been cleared. These are now reverting to woods as shown here on the far side of the lake.



19



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suffers. The daily routine of the farmer in this region who would combine agriculture and fishing requires that, during May and June, he be out to his lobster traps by four in the morning, get back to his house by early afternoon, hitch up his team and work on the land till dark.

The soils in this region are, in general, well suited for agriculture. South of Ballantyne's Cove, the farm land lies largely in the Queen's and Millbrook associations. Along the shore east of Pomquet, most of the land is in Merigomish. In the Havre Bouche area, the soils are a mixture of Merigomish and stony Millbrook and Woodbourne. This results in a type of farmland that is much harder to work productively than in the Pomquet and Ballantyne's Cove districts. Farms in the Havre Bouche section are small, less than 50 acres in size. Of this, approximately 20 acres are in hay and the rest in woodland and poor pasture. Pasture fields are small and full of big stones. Farmers must wage a constant struggle to keep out the invading spruce bushes. One of the suggestions commonly made is that sheep raising would fit in well with fishing - farming operations. In Havre Bouche, however, lack of pasture makes this impossible. The average farm carries about three cows and during the summer some cream is shipped to the creamery. Hogs and chickens are also kept, but these are largely for home use. As if to make up somewhat for the poor land in the area, this section is the only place in the county where Irish Moss may be harvested. The harvesting is an inexpensive procedure, requiring only a rake and a small boat. The average catch is a ton and in 1949 this returned the operator about four hundred dollars.

The average fisherman's farm in the Ballantyne's Cove section includes over 30 acres of cropland, with 25 in hay and the rest in oats. Most of the farms also have a small garden and potato patch for home use. The stock includes four or five cattle, usually of mixed breed,

about twenty to twenty-five sheep and two horses. There was an effort at one time to develop a beef strain in the area. Such efforts have been abandoned however with the shipping of cream to Antigonish. In the Pomquet section of the region, farm conditions are much the same as in the Ballantyne's Cove section. The land is better suited to agriculture however and more vegetables and root crops are grown for home use. In addition, cream may be shipped all year round. Yields in hay and grain crops are about the same, in spite of the difference in soils.

The "Fishing - Farming" region contains 3.3 percent of the land area of the county, 9.0 percent of the improved area, 7.9 percent of the population, 5.1 percent of the vacant farms and less than one percent of the Crown Land. Close to 14 percent of the farms are vacant. Most of the operators in this group are included in the Census types, "combined subsistence" and "part-time" (Table 16). "Part-time" farms in the Census are farms on which 50 percent or more of the gross revenue is obtained from work performed off the farm (in this case, fishing).

5. Mixed Farming. This is the main agricultural region in the county from the point of view of numbers engaged in agriculture and total agriculture revenue. It occupies a little over 20 percent of the land area of the county but contains over 45 percent of the improved land and over 38 percent of the population. It also has over 25 percent of the county's vacant farms but less than ten percent of the Crown Land.

The most extensive soils in the region are the Millbrook and hoodbourne associations. Each of these occupies a little less than a third of the area of the region. The Merigomish makes up close to 20 percent of the area and the Queen's 10 percent. The Merigomish are the best

soils in the region. The Millbrook rank next in agricultural productivity but in places tend to be very stony, as in the Havre Bouche district. The Woodbourne soils are generally suited for all crops but require good management because of their erosive tendencies. The Queen's soils where they occur in this region are generally associated with a hardpan development.

The whole "Mixed Farming" region is just what the name implies in the regional sense. It is a mixture of different types of farming spread out over an extended area; no one type is localized enough or in itself extensive enough to warrant separate classification. Cream shipping is common throughout the whole region (Maps 14,15) and the following types of farming achieve local importance in certain areas: (a) Poultry farming (b) Part-time farming (c) Livestock farming and (d) Small fruit specialty.

Poultry farms are largely concentrated in the French districts of Pomquet, Tracadie and Havre Bouche. The expansion of the poultry industry in the county since 1939 has been due in large part to its growth in the Pomquet district. The co-operative store was built near the railway station for the purpose of handling eggs. The community used to ship 60 to 70 crates a week in the early years of the war. Since then the industry has declined and now the store receives less than one-tenth of this amount. Factors in the decline have been the increasing cost of feed and the inability of most of the farmers to control disease. In all probability there was too much of a rush to get into poultry once it started to be profitable. As a result little precaution was taken to insure healthy flocks over a long period. When disease came, farmers were either unable to cope with it or decided it was easier to move out entirely.

Farmers in the Pomquet area have long combined a number of en-

deavours in addition to poultry. The typical farm in the area carries a flock of 150 to 300 hens, three or four cows and a few hogs. Cream is shipped to Antigonish, in many cases all year round (Maps 14,15). The farms are small, usually about forty acres in size. Half of this is cropland and there is only a small acreage in woodlots. The main activity in the district, however, is not farming but work off the farm. Most of the Pomquet men are skilled carpenters and work in the construction industry in nearby areas or in Antigonish. In the type of farm listing in Table 16, all the Pomquet farms would be classed as "part-time farms". In the work-off-the-farm listing on the same table, all of Pomquet's operators are included in the class "Manufacturing, Repairs and Construction".

The poultry farm in the Tracadie district (Photo 24) is also a diversified venture. There are two big operators in the area with flocks of 800 to 1000 layers. On these farms, poultry is combined with a specialty in truck crops, especially suited to the light Merigonish soils (Photo 25). The market for these crops - cabbage, roots, beans and corn - is local. However, the characteristic activity in the district is dairying with the shipment of cream and the raising of hogs. The average size of the farm is about 90 acres, with 15 in crops (mostly hay), 30 in woods and 40 in unimproved pasture. Work off the farm is common.

Also typical not only of Tracadie but also of the whole region is the type of farm that has been associated with agriculture in Eastern Nova Scotia since 1900 (Photo 26). These farms are larger than average, about 150 acres in size with 25 acres in crops. Usually about 15 of these are in hay and the rest in oats and potatoes. A herd of eight or nine cattle is kept and the chief products sold off the farm are cream and dairy steers for beef. In times past, sheep were also an

PHOTOS 24 - 27
(Land Use)

24. An important specialty within the "Mixed Farming" Land Use Region is the poultry industry. This poultry house is located on a farm near Tracadie and is part of an enterprise involving a flock of 800 layers.

25. On the most successful farms in the "Mixed Farming" Region, truck crops such as cabbage, roots and berries play an important part. These are especially suited to the light Merigomish soils in the eastern part of the county. This is part of a field of corn, with strawberry plants in the foreground, near Tracadie.

26. The farm whose buildings are shown here is typical of the type that has been associated with agriculture in eastern Nova Scotia since 1900. Soil deterioration is a common characteristic. Fertility elements have gone to pay for the education of children raised here and have not been replaced.

27. In the Havre Bouche section of the "Mixed Farming" Region, cream shipping is an important activity. Most of the soils in the area, however, are stony and pasture, as indicated here, is limited.



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important part of the farm economy but these have largely passed off the scene. Associated with these farms have been large families, members of which all received a better than average education and then moved away from the area. One farm family of twelve (and this is common) are now in the following occupations: Doctor (1), Priests (2), Machinist (1), Nuns (2), Teachers (6). It is easy to see why most of the soils in the district have deteriorated. Their fertility has gone to pay for the education and establishment of the former children of the area. Very little has been put back in as replacement.

In the Havre Bouche district, poultry is a specialty on a few farms but dairying is a part of most of them. Poultry has declined in the last few years and is found now only on two very small farms whose operators do a good deal of outside work, and on a third farm where cream shipping is of equal importance. Most of the soils are stony and fields are small (Photo 27). The average farm is less than 40 acres in size. Of this, eight is in cropland, 25 in woodland and five in unimproved pasture. Yields are low and in many cases the use of lime and fertilizer is not a profitable venture.

Part-time farming has already been mentioned as an important characteristic in some of the above areas. In the St. Andrew's subdivision, this same type of activity assumes a different form. Work off the farm does not supplement farm activity; it is meant to replace it. St. Andrew's is an old established farm district whose people have held pretty well to the old type of farming, the raising of mixed herds for both beef and cream, sheep and some hogs. This mixture of "live-stock farming" and "dairying" has been kept in large part because it does not demand a great deal of work on the part of the operator who can turn to other activities for a source of revenue. Usually this activity involves some sort of part-time job such as road work or

whatever else is available in the surrounding area. The income of the local people, in large part, comes from sources not directly related to the farm. In turn, no return is made to the farm as happens for instance in Pomquet. Farm values in the subdivision are a result not of present activity on the land but of a more active type of agriculture practised in the past.

The beef raised in the area today is dairy beef. There is very little real beef anywhere in the division. The common practise is to keep a few cows for cream and then kill a few steers in the fall. In recent years, with a shortage of Western beef, the demand for this product has been high. When regular supplies of beef are again available, the St. Andrew's "beef" men will have to turn to some other pursuit. Most of these beef farms also carry a flock of about 25 sheep. Lambs and wool are regularly sold.

Bachelor farms are common in the subdivision. Usually the operator has a sister or maiden aunt keeping house, though in some cases he may be doing it himself. Once the present occupants of these farms are gone, the land in all probability will be abandoned. The average size of farms in the area is large, about 160 acres. Of this, 20 is in cropland, 56 in woodland and 70 in unimproved pasture.

The same situation prevails in other sections of this region as are found in St. Andrew's, a mixture of livestock farming with the main revenue coming from irregular outside work. This is true in the parts of the region that occur in Maryvale, in Middle and Upper South River, north of South Side Harbour, in North Grant and in the area around Gaspereaux Lake. In some of these sections, cream shipments are of major importance. In the Morristown section north of Antigonish Harbour, some of the farmers have had real beef herds - Hereford and Shorthorn - but these have given way to dairying.

A fourth type of farming that is found within the region is a specialty in small fruit - strawberries. There is some activity in strawberries in the St. Andrew's district now but the major part of the strawberry crop is grown on the western shore of Lake Lochaber and on a small section of the eastern shore. Strawberry cultivation started here about ten years ago. There are now about twenty operators who grow the crop. The area occupied is about 25 acres. The soils are all Hebert but the association seems to contain less gravel here than is the case elsewhere in the county. The strawberry growers also ship cream in the summer and work in the woods in the winter. The strawberry crop is marketed locally in Antigonish, although some does find its way to the Sydney area.

6. Dairying. This region is discussed in some detail in the following chapter on the dairy industry in the county. However, a few brief items will be set down here for the purpose of comparison with the other regions. This area is the most prosperous in the county and the most progressive agriculturally. The greater part of the region is located on the Queen's, Millbrook and Cumberland soils north and west of Antigonish. Other scattered sections occur on the bottomland soils around Bayfield, on the Cumberland silts along South River and north of Lochaber Lake, on the Queen's soils at Big Marsh and on the bottomland and Queen's soils in North Grant. The soils named are heavy soils for the most part and rank as the most highly productive in the county. Over 80 percent of the whole milk shippers are in the area of the Windsor formation (Map 16).

The location of this region within the subdivision of Antigonish Rural is responsible for this division having the highest farm values in the county (Map 9). The region contains less than four percent of the land area of the county but has more than 20 percent of the improved

land and almost 15 percent of the population (Table 17). It contains over eight percent of the vacant farms but less than two percent of the Crown Land. All the "dairy products" type of farms listed in Table 14 are in this region as well as many in the "mixed farming" and "combined subsistence" types.

The average size farm in the region is 150 acres, with 30 acres in cropland (20 in hay, 8 or 9 in oats and the rest in potatoes and roots), 50 acres in woods and 50 acres in unimproved pasture. In addition, some eight or nine acres of the farm is in improved pasture. Crop yields in this region are the highest in the county.

CHAPTER 4

THE DAIRY INDUSTRY

Recent Growth of the Industry

Income from the sale of dairy products surpasses all other branches of agriculture in Antigonish County. In 1941, the latest Census year, dairy products accounted for one-quarter of the cash income from the sale of farm products. Net farm revenue in the county was \$338,000. Of this, over \$81,000 came from dairy products. Cattle sales ranked second in importance with a sale of \$72,000 and poultry and egg sales were third with \$60,000 worth of products sold.

More significant, however, than the part played by the dairy industry in the agriculture of the county up to 1941 is the development of the industry since that year. The growing importance of the dairy-ing industry in Antigonish County in the last few years has been one of the outstanding developments in Nova Scotian agriculture. In 1941, the total amount of milk sold in the county was approximately six million pounds in milk equivalent. Of this total, about one-fifth went for fluid milk; the rest was mostly used for cream. In 1949, the Antigonish creamery alone handled about 10 million pounds of milk or milk equivalent. Of this, some seven million pounds were distributed as fluid milk to the Antigonish and Sydney markets. The rest was bought as cream for use in the manufacture of butter. The Antigonish creamery is estimated to handle 90 percent of the fluid milk sold in the county and about 60 percent of the cream sold. Thus dairy sales in 1949 in the county may be estimated as follows: 7,700,000 pounds of fluid milk and 680,000 pounds of cream (equivalent to 4,500,000 pounds of whole milk). This represents an increase of 540 percent in fluid milk sales and a decrease of 15 percent in cream sales since 1941. The increase in total milk sales has been over 100 percent.

One of the chief reasons for this increase has been the growth during the war of the urban population in the Sydney area. With the pressing Sydney demand for milk the most progressive farmers, already situated on soils well suited for dairying, turned from the shipping of cream to the year-round whole milk business. Today more than half of the fluid milk produced for sale in the county goes to the Sydney area. The market is one whose potentialities are only now being fully realized; it offers the farmer producing fluid milk in Antigonish a bright ray of hope for the future of his industry. The Sydney market has been at the doorstep of the Antigonish farmer for a long time but it took the demands of war to make him realize it.

Another reason for low milk production during the early 1940's was the intolerable situation that existed with reference to cream collection in the county. Antigonish County was served by two creameries (and a few years before this by three) which sent trucks in all summer, but ceased to collect cream once early autumn came. The burden of this wasteful competition in collecting facilities was borne largely by the farmer and was reflected in the low price paid for butterfat. As a result many farmers found it profitable not to ship cream at all and to depend for their income on the sale of cattle and other animal products. In 1945, the farmers of the county through co-operative organization subscribed some \$20,000 to buy up the two creameries. In 1947, a new drive was launched to finance the building of a new creamery and pasteurizing plant. The building was completed in 1949 at an approximate cost of \$80,000 (Photo 28). Financing is based on a five year plan by which each member pays \$25 a year for five years. Milk shippers pay an additional sum based on the average amount of milk shipped per day. With the facilities afforded by the new plant the part played by the dairy farmers of the county in supplying the industrial areas of Cape Breton should greatly increase.

The Shipment of Cream

Approximately 470 farmers shipped cream to Antigonish in July of 1949. The location of these shippers, who account for approximately 60 percent of the county's cream sales, is shown in Map 14. A comparison of this map with the land use map in the previous chapter (Map 12) shows that most of the cream shippers are located in Land Use Region 5, the Mixed Farming region. These operators, in most cases, combine dairying with other farm enterprises such as the raising of hogs and the most successful supplement their activities with off-the-farm work. Most of the farms have only two, three or four cows milking and production is low. In July of 1949, the peak month in cream production, 24,800 pounds of butterfat were shipped to Antigonish. This means an average of 53 pounds of butterfat per shipper and a monthly cream cheque of about \$32.00. The highest shipment was 115 pounds of butterfat.

The small volume of cream shipped per farm is a reflection of the low price paid for butterfat. This low price in turn means that the farmer cannot winter-feed his cattle or even supplement their pasture feed in the summer to any extent. Thus returns in milk production are low and the vicious circle is closed. It is doubtful, however, whether even increased cream production can appreciably increase the price paid for butterfat. The use of milk for cream exists for the most part in areas beyond the fluid milk districts, characterized by diversified rather than specialized farming. In Antigonish County, indeed in all of Nova Scotia, cream is the marginal use for milk. Any attempt to appreciably increase the return from milk production on the part of the cream shipper would of necessity involve a change in the type of farming. In short, the cream shipper would have to become a shipper of whole milk for the fluid trade.

ANTIGONISH COUNTY

CREAM SHIPPERS JULY 1949

--- WINDSOR GEOLOGICAL FORMATION

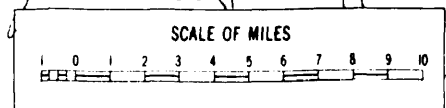
*Based on data obtained from records of
the Antigonish Creamery Co-operative. Each
dot indicates a shipper to the creamery.*

45°
45'

45°
45'

45°
30'

45°
30'



RLG

The cream shipper, in most instances, is in no position to transfer his business to the specialized demands of the fluid trade. In the majority of cases, the resources at his disposal argue effectively against this. However, when cream production is effectively combined with other operations, it can make a significant contribution to the farm economy. In the Pomquet area, for example, cream production fits in well in a system of diversified farming that includes poultry and hog raising. The major source of income, however, is off the farm (as mentioned in the previous chapter). But the very nature of farm operations in the area is one that permits off the farm work. Increased income in this way can be used to purchase feed to allow for cream production all year round. The Pomquet division is the major source of winter cream in the county (Map 15).

Only 80 farmers shipped cream to Antigonish in February of 1949. Over one-third of these were located around Pomquet. Cream shipments to the Antigonish creamery in the period September 1948 - August 1949 ranged from 1,750 pounds butterfat in February to 24,800 pounds of butterfat in July. Total shipments in the twelve month period totalled 108,600 pounds of butterfat or approximately 350,300 pounds of cream.

The Whole Milk Industry

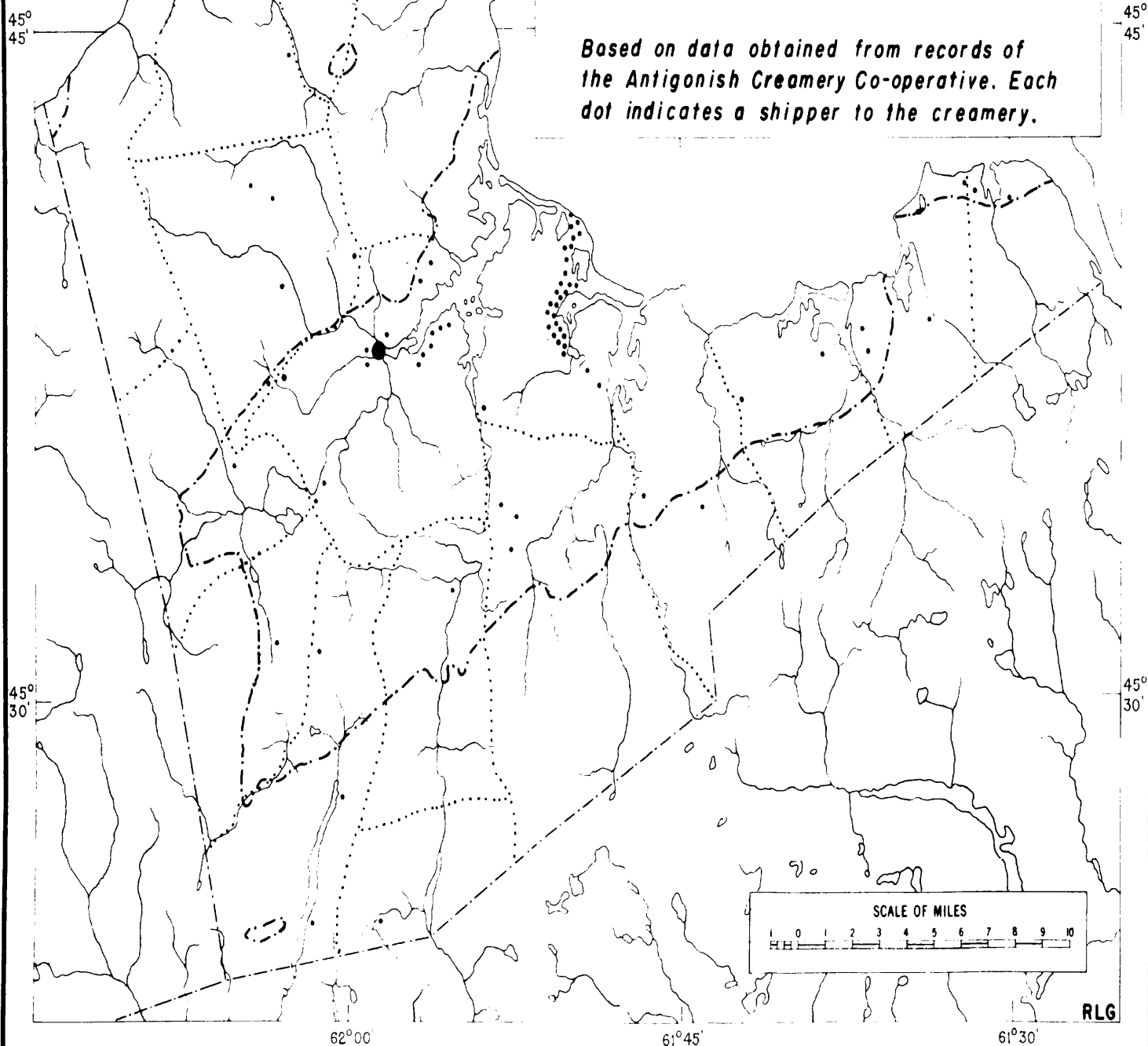
In July of 1949, 136 farm operators in Antigonish County shipped whole milk for use in the fluid trade to Antigonish town and the Sydney area. (For the purposes of this discussion, only those operators who shipped more than 1,000 pounds in this month have been considered as whole milk shippers). Of these, 60 shipped to Antigonish and the remaining 76 to Sydney. Their location in the county is shown on Map 16. The distribution, of course, coincides with the "Dairying (whole milk)" region of Map 12. Most of the operators are located on Queen's, Millbrook or Cumberland soils (Map 7), the heaviest soils in the county.

ANTIGONISH COUNTY

CREAM SHIPPERS FEBRUARY 1949

--- WINDSOR GEOLOGICAL FORMATION

*Based on data obtained from records of
the Antigonish Creamery Co-operative. Each
dot indicates a shipper to the creamery.*



ANTIGONISH COUNTY

WHOLE MILK SHIPPERS 1949

●-Shippers to Antigonish

■-Shippers to Sydney

Total Number of shippers - 136.

--- WINDSOR GEOLOGICAL FORMATION

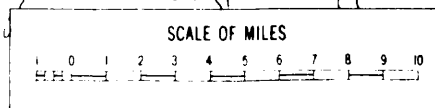
Based on data obtained from records of the Antigonish Dairy Co-operative. Each dot indicates a farm operator who shipped more than 1,000 pounds of milk in July, 1949.

45°
45'

45°
45'

45°
30'

45°
30'



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The most successful dairy farmers in the county are located near the town of Antigonish. Three of the best dairy herds in eastern Nova Scotia are found in this area, at Harbour Centre, Erierly Brook and Lower South River. The Harbour Centre herd consists of 10 purebred and 40 grade Ayrshire cattle. About 33 cows are in milk throughout the year. (In the early years of the modern dairy industry in the county, Dr. Hugh MacPherson of the College in Antigonish, brought in some high class Ayrshire cows and began a breeding program on the college farm (Photo 29). He soon began to distribute young bulls, carrying this inheritance of high production to the farmers of the county. As a result the county has been ahead of many other sections of the province and has had this great advantage of high quality stock).

The Harbour Centre farm consists of more than 300 acres within the Millbrook and Queen's soil associations. 40 acres are in clover and timothy hay which yields an average of three tons to the acre. 25 acres are devoted to oats and barley with an average yield of 55 bushels per acre. 50 acres of the farm are in pasture, 20 improved and 30 permanent. Milk production per cow averages 7500 pounds per year with some cows giving as much as 12,000 pounds. (The Nappan Experimental Farm has concluded from many years of experiment that a good Ayrshire cow should average 7,000 pounds of milk a year).

The Erierly Brook farm (Photo 30) has a herd of 45 Ayrshires, 22 purebred and 23 grade. An average of 30 are milked throughout the year with a milk production of six to eight thousand pounds per cow. The farm consists of 200 acres, of which 40 are in hay, 30 in oats and four in potatoes. The soils on the property are a mixture of Millbrook and Cumberland silt. Cropland is on the flat intervale Cumberland lands and pasture on the more rolling Millbrook. Plans

are under way, however, to convert some of the good hay land into improved pasture and also to bring in new land in the more rolling sections as permanent pasture. At present there are 20 acres of improved pasture and 20 of permanent pasture on the farm.

Hay yields are relatively low, less than two tons to the acre, due in large part to the diversion of the better hay land into pasture in the last year, the beginning of the plan mentioned above. Oats yield 45 to 50 bushels per acre. Enough oats are grown on the farm for use in the dairy ration, but bran, crushed barley and oilcake have to be purchased. This is true of most of the better dairy farms in the county, although in a few cases sufficient barley is also grown on the farm.

The Lower South River farm has an average of 30 cows, mostly Ayrshire, in milk throughout the year (Photo 31). Production per cow in the last few years has averaged 9,000 pounds. Most of the farm is in flat low-lying queen's soils but there is enough of a mixture with the lighter Millbrook members that drainage is not a serious problem. Of the farm's 150 acres, 60 are in cropland (40 in hay and 20 in oats) and 35 in improved pasture. Hay yields three to four tons per acre and oats 45 bushels per acre. This is the only farm in the county that puts up silage. In normal years, the second cutting of clover is put in the silo. If dry weather retards clover growth, the silo is filled with oats and vetch. Twelve acres of clover produces 45 tons of silage. In the last year, another silo has been constructed, reflecting the success of silage operations. The second cutting of clover, ensiled a year ago, contained 19 percent protein and when fed to the cows resulted in a decreased consumption of grain and meal.

The three farms described above are not typical of the county's whole milk farms. They represent the best farms in the county (Photo

PHOTOS 28 - 33

PHOTOS 28 - 33

(Dairying)

28. In 1947, the farmers of Antigonish County, through co-operative organization, launched a drive to finance the building of a new creamery and pasteurizing plant, in Antigonish. The plant, shown here, was completed in 1949 and provides facilities for the handling of increased milk production in the county.

29. In the early years of the modern dairy industry in the county, Dr. Hugh MacPherson began an Ayrshire breeding program on the college farm, carrying an inheritance of high production to the farmers of the county. These are Ayrshire cattle on the college farm today.

30. One of the most successful dairy farms in the "Dairying (whole milk)" Region is located at Brierly Brook. Its dairy barn, shown here, serves a herd on 30 milk cows. The silo is not used.

31. Another successful dairy farm, near Lower South River, also has an average of 30 cows, mostly Ayrshire, in milk throughout the year. This is part of the herd.

32. The number of farm operators in the county who have 20 cows or more in milk throughout the year is probably between 20 and 25. This is the farm layout of one of these operators located south of Lower South River.

33. The typical milk shipper in the county keeps an average of seven to ten milk cows. This is the dairy barn of such a shipper in the subdivision of Heatherton.



28



29



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31



32



33

32). The total number of Antigonish farms in this class is about 26. The typical milk shipper in the county (Photo 33) keeps an average of seven to ten cows milking. The average production per cow is between 6,000 and 7,000 pounds of milk per year. This is a relatively high production for a small herd and is dependent for the most part upon bought feeds. North of Antigonish along the Cloverville road, the milk shipper has only eight acres in grain out of a total cropland acreage of thirty. Yields are less than 35 bushels per acre. The land is rolling and gravelly and tends to dry out in the summer. Pasture land is in a general state of deterioration. Farmers who depend upon pasture alone for summer feed obtain a small milk return from their herds.

In the Heatherton subdivision, the average size of herd is eight to ten milk cows, with smaller herds the rule around Bayfield. Most farms are 150 acres in size with 30 acres in cropland. Eight of this is in grain which yields about 40 bushels to the acre. Hay yields two tons per acre. The soils here are lighter than in the Antigonish division (Millbrook and Merigomish) and not as well suited to the fluid milk speciality. However, farm management is good and lime, fertilizer and manure applications play an important part in cropping practices. In addition, some of the farms in the southern part of the division have a significant part of their acreage in heavy soils and this is fully utilized.

In the St. Andrew's division west of Heatherton, an important pocket of milk shippers is located at Meadow Green. There are three shippers here each of whom may be classed as a "big operator". The average milking herd is 18 cows, mixed Guernsey and Ayrshire. Production per cow averages 8,000 pounds per year, due largely to bought feeds. The soil in this area is a gravelly loam (Cumberland gravelly

loam) which imposes the handicap of poor pastures on the farm operators. The average acreage per farm in cropland is 32, of which 12 are in oats.

Most of the dairy farms along the South River have herds of from 10 to 12 Ayrshires. There are two big operators in the upper part of the valley. Dr. Hugh MacPherson introduced the Ayrshire to this section of the county on farms near Fraser Mills around 1920. Despite the fact that the soils in a large part of this area are very well suited to milk shipping (Cumberland silt), farmers have not ventured into the industry to any large extent. Milk production per cow averages 6,000 per year. It is significant that there is relatively little dependence here on bought feeds - only oil cake and bran are purchased for use in the dairy ration. The average size of farm is 120 acres. 30 are in hay and 12 in oats. The latter yields 45 bushels per acre.

The whole milk farms along the South Side Harbour road are all characterized by small operations. The average number of cows milked throughout the year is five or six. Milk production per cow averages 5,000 to 6,000 pounds per year. The farm enterprise here is more varied than in other milk areas in the county. Most of the operators are working toward a goal of 10 milk cows, 15 or 20 sheep, 6 hogs and 400 hens on the farm. Farm size varies from 100 to 160 acres. Of this, 30 acres are in cropland including 10 in oats. Hay yields are over two tons per acre and oats yield 45 to 50 bushels per acre.

One of the most interesting sections in the "Dairying (whole milk)" region in the county is the group of shippers at Big Marsh. These stand out as a pocket on the northern fringe of the main part of the region. The Big Marsh story tells of the transformation of the type of farming in the area from subsistence, with some shipment of cream during the summer months, to fluid milk specialization. The

change was effected in less than a year's time in answer to the demand for milk from the Sydney area during wartime. The operators have persisted in the specialty in the face of great difficulties - distance from market, lack of electric power, small farms and lack of equipment. The farms average 30 acres of cropland, of which only five are in oats. All this grain is fed green as roughage; none is threshed. The result, of course, is a high feed bill. On the average, one pound of feed is necessary for every three pounds of milk produced.

The farm buildings are very inadequate. Most of them are "left-overs" from the days of subsistence. The necessary capital to put up new barns and sheds, however, has not yet been accumulated. None of the operators owns a tractor. Ploughing is done by the team; harrowing in the spring is done on a custom basis. Water is another problem. Wells and springs are not located near the barn in most cases and water has to be carried as much as a hundred yards to its destination.

The soils are a mixture of Queen's, Millbrook and Mansford. The latter is suited only to permanent pasture and in many cases is severely eroded. The problem of farm management is one that requires intelligent planning, something of which the Big Marsh operators are quite capable. The area is well known for its breeding of Ayrshires and has one of the three calf clubs in the county (the other two are at Heather-ton and Fraser's Mills). The number of cows milked throughout the year varies from 10 to 18. Milk production per cow averages about 6,500 pounds a year.

Another problem facing the Big Marsh shippers is that of winter transportation. Big Marsh is located on a second class road (Map 17) facilitating shipments in summer. In the winter, however, heavy snows create an obstacle. Big Marsh is about three miles from the Maryvale road, which is kept open all winter (Map 18). Under adverse weather

conditions, therefore, the Big Marsh shippers must bring their milk to the Maryvale road by sled. Here they transfer it to a truck which is left with one of the farmers along the road during the winter season.

The road system in the county is an important factor in the consideration of the whole milk industry. It is generally agreed that the rural family anywhere in the county needs a good road for all year-round travel. The removal of snow and the maintenance of roads, however, brings with it problems in public finance. The service must of force be selective when funds are limited. In the selection, the welfare of the greatest number is considered. At the same time, certain groups depend upon the roads for the successful operation of their business. The whole milk shippers in the county are such a group. Comparison of Maps 16 and 17 indicates that all milk shippers are within reach of first or second class roads. More important, however, is accessibility to roads that are kept open all year round (Map 18). A definite effort is made to enable whole milk shippers to get their product to market. A comparison of Maps 16 and 18 indicates to what extent this effort falls short of realization. The hardships faced by the Big Marsh operators have already been cited. Other groups facing similar hardships include shippers from the localities of Meadow Green, Bayfield, Fraser Grant, the South River Valley, South Side Harbour, Cloverville and Ashdale. The extension of all-year road services to places such as these is an absolute necessity in any program involving the expansion of the fluid milk industry in the county.

Factors in the Expansion of the Dairy Industry

1. Farm Productivity. Future development and growth of the dairy industry and of other agricultural enterprises in Antigonish County, depend to a large extent upon increased production per farm. The farm of the typical milk shipper in the county is characterized

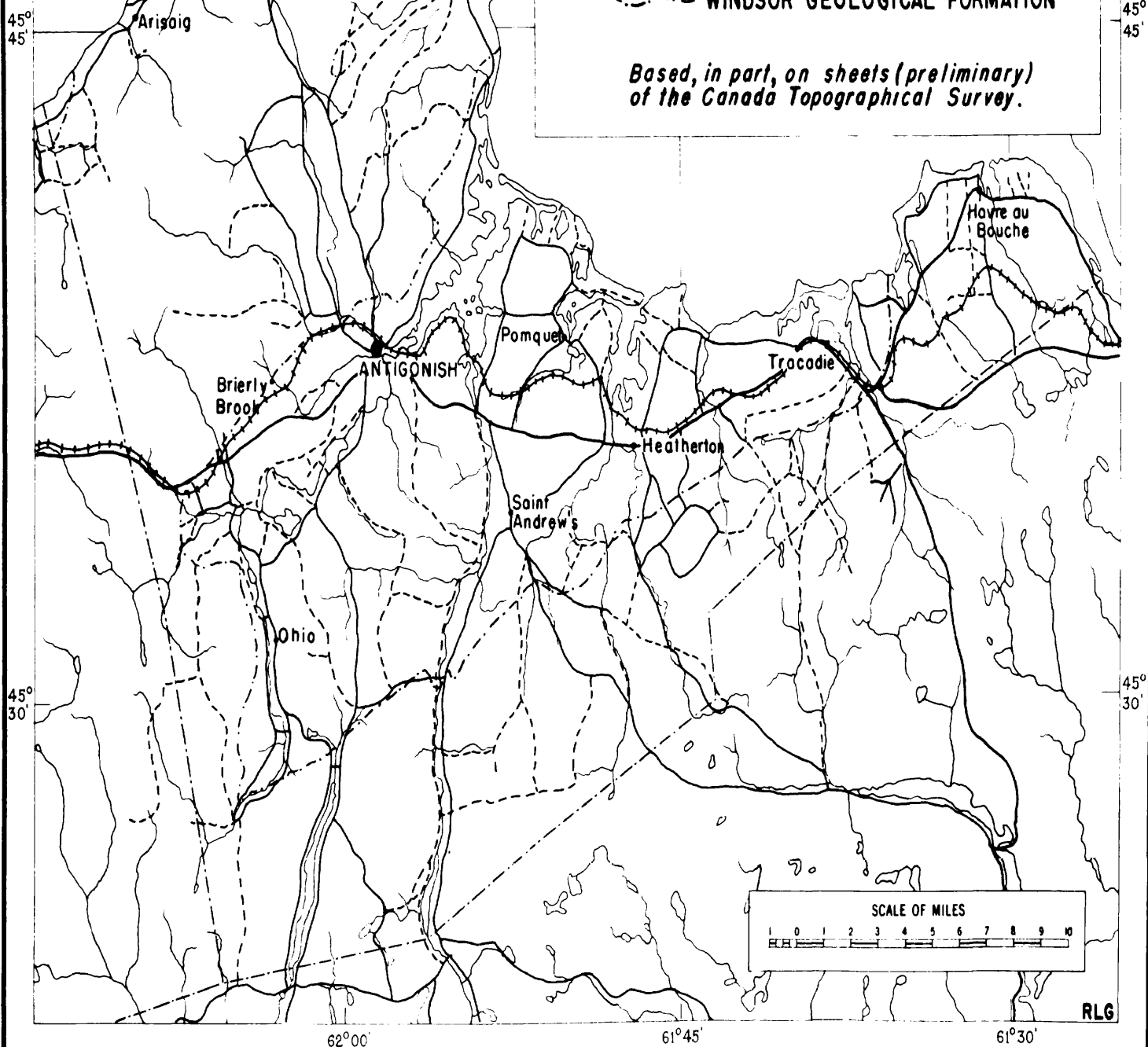
ANTIGONISH COUNTY

CLASSES OF ROADS

- Class 1 — Paved highway
- Class 2 — Gravel
- - - Class 3 — Dirt or narrow gravel
- + + + + - C.N. Railway line

- - - WINDSOR GEOLOGICAL FORMATION

*Based, in part, on sheets (preliminary)
of the Canada Topographical Survey.*



ANTIGONISH COUNTY

ROADS OPEN ALL YEAR

Figures on map indicate
order in which the roads
are kept open in winter

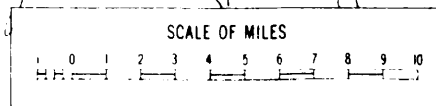
*Based on information obtained from
County Office, Department of Highways,
Antigonish.*

45°
45'

45°
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30'

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30'



RLG

by a low improved acreage, a small dairy herd, extensive crop operations, a low capital investment and poor pastures. The number of acres in improved land is seldom above 40. The small number of acres tilled is reflected in the small size of most herds, about 10 cows in milk. The farm unit specializing in milk production requires intensive utilization for fully profitable operations. But the typical farm in the county devotes most of its improved acreage to one of the most extensive types of utilization possible - the cultivation of hay. The grain crop, mostly oats, occupies between six and ten acres and yields about 40 to 45 bushels per acre. It is significant that successful milk production in the majority of cases is closely tied in with large purchases of feed. Garvin notes that in Nova Scotia,

..small farms, small herds and extensive utilization are items in the inheritance from a past which tied agriculture to other industries so closely as to hinder independent development. The modern problem is one of adjustment to new conditions resulting from the commercialization of farming and development of large urban markets.(II, 6; p. 123).

The average yield of hay on the farms of the milk producers is about one and one-half tons. This could easily be doubled. Leaving the land in hay too long is a common fault of all agriculture in the county. Grain serves as a nurse crop in reseeding hay areas; the oftener haylands are reseeded, the greater will be the area in the production of grain. At the same time, the larger percentage of newly seeded (and fertilized) area will yield a greater amount of hay per acre. Increasing grain yields per acre is another way of increasing grain production. Intensive grain growing methods and shorter rotations can easily increase yields of oats from 40 to 60 bushels per acre. The whole question of lime, fertilizer and manure application will be taken up in a subsequent chapter (Section III, Chapter 2).

Little barley is grown in the county, due in large part to the hay and oats tradition born of the intimate association of agriculture

and lumbering before the turn of the century. Barley, since it is the best substitute for corn in the dairy ration and since it provides the heaviest yield of digestible nutrients per acre, should precede even oats as the grain crop on the dairy farm. The most beneficial solution would seem to lie in converting the oats acreage to mixed grain (oats and barley) as has been done on Prince Edward Island and in Central Canada.

It is of course extremely doubtful if the farmers of Antigonish County, or of Nova Scotia for that matter, will ever be in a position to raise all the grains that their livestock will consume. The limited area of fertile lands and the short growing season make self-sufficiency in this respect almost impossible. The remedy lies in the bringing in of grain and mill feeds from Western Canada. The barrier here is high freight rates. "This obstacle is made all the more irritating and indefensible by the fact that the normal export rate on such feeds is very materially less than the rate paid by the Nova Scotia farmer to have the same feeds delivered to him." (II, 13b; p. 34).

Grass silage in the province of Nova Scotia is only in the experimental stage but its possibilities justify careful investigation. It may be the answer to the feed problem in Antigonish County in view of the fact that climate and growing conditions are particularly suited to grass growing. At present, there is only one farm in the county using a silo. Clover, oats, and vetch are used as ensilage. If grass is to play a major part in the revivification of agriculture in the county, however, there must also be a complete review and overhaul of the most abused item in the county's agriculture - pastures.

In 1941 (and the position has changed little since then), the total acreage in pasture, improved and unimproved, in Antigonish County was 67,500 acres. The total number of animal units on this

pasture was 15,100 in 1941 and 16,700 in 1946. This means that the number of acres of pasture per animal unit was 4.5 in 1941 and 4.0 in 1946. Since it is possible to carry one animal unit per acre of land throughout the grazing season, these figures show that the county has large areas of unproductive pasture. Pastures have never been regarded as a crop in the same manner that hay or grain has, due probably to the fact that the grass is grazed off as it grows and therefore the total yield is not seen in its entirety.

The first grazing areas in the county (and this is true to a degree today also) were the woods. Throughout the first settlements, an extensive system of common pasturage was followed. Cattle, sheep, horses, hogs and goats ranged the partially cleared plains and the uncleared hills and uplands. With the advent of the "hay and oats" culture, the pasture crop was incidental and no special effort was made to cultivate it. Land too poor to grow grain and meadows too badly "run out" to grow good hay were given over to pasture.

Since the turn of the century, the grass crop, including both hay and pasturage have supported practically all types of agriculture in the county. This bears striking testimony to the efficiency of the crop as a conserver of soil fertility. Colby states: "With the use of very small quantities of supplemental fertilizer, the grass crop is able to extend the reserve supply of native fertility over a long period of years. This in sharp contrast to tilled crops which exhaust the reserve of natural soil fertility in a relatively short period." (II, 4; p. 16). (This pamphlet, which deals with pasture conditions in Massachusetts, sheds a great deal of light on the problem in Nova Scotia as well).

Pastures have continued to deteriorate since the turn of the century. Permanent pasture was, and still is, the last use to which land

is put before it reverts to timber. Much of this land is badly depleted before being given over to pasture and land abandonment follows. Colby (II, 4; p. 25) lists four factors in the failure to prevent general deterioration of pasture lands in Massachusetts. These apply with equal vigor to conditions in Antigonish County. The first reason has to do with the great scarcity of manures of all kinds. Most of the available supply of barnyard manure was used on the arable land to maintain satisfactory crop yields. The farming system was one of a slow transfer of the fertility of the grassland to the cropland.

Another important factor was the existence of large areas of cheap grasslands. Farmers discovered that it was cheaper to clear or buy and exploit new lands than it was to renovate old land. Still another reason for deterioration of pasture land is the belief among farmers that since pasture would produce something even on poor land and would also stand a great deal of abuse in management, this was the most profitable way to handle them. A final factor is the slowness with which pasture land frequently responds to treatment and the difficulties involved in measuring the response.

It seems likely that permanent pastures will never again occupy the position of prominence they once held. Run out pasture soils cannot be restored to fertility because of the destruction of organic matter and the degradation of the soil's physical condition. In pastures where the soil is retentive of moisture and where moderate regular applications of fertilizer will maintain a good blue grass-white clover sod, much good grazing may be had during the spring and fall. Some sort of supplementary pasture during midsummer, however, would still be a definite necessity, especially in view of the near-drought condition that prevails at this time of year.

Adequately fertilized, well managed semi-permanent pastures seem

to offer the best possibility to meet the scarcity of good grazing during the summer months in the county. In nearly all cases, it would be necessary to plow lime and fertilize before seeding. The process would have to be repeated every five years or so. Of the legumes tried for use in semi-permanent pastures, Ladino clover has been used with the greatest success over a wide variety of soil conditions. It is definitely superior, says Colby (II, 4; p. 40), to bluegrass and white clover. Yields are higher, seasonal fluctuations are not as great and, what is most important, production is maintained at fairly high levels during the summer months.

Well managed semi-permanent pastures have great potentialities toward the solution of the pasture problem from the standpoint not only of high levels of production but also from that of high feeding values. They also have a great bearing on problems relating to soil fertility and soil conservation. Once every few years, the farmer has an opportunity to deal directly with his soil problems through fertilizing, liming, applying manure and plowing. The cost of improving land for pasture in the county is presented in Appendix B.

2. Markets. The growth of the milk industry in Antigonish County has been made possible by the demands of the Sydney area. Sydney, 120 miles from Antigonish town, is the largest and most central of a cluster of cities and towns near the extensive coal fields of the eastern part of Cape Breton Island (Map2). The concentration of urban population in this area is the greatest in the Maritime Provinces, being approached closely in size by the Halifax area but not at all by any other urban group. The population of the Sydney area was approximately 88,000 in 1937; by 1948, it had increased to an estimated 108,000. Coal mining and the manufacture of iron and steel provide most of the employment in the area.

A survey of the Sydney market in 1937 (II, 15) indicates that it consumed somewhat over \$5,000,000 of farm products in that year. Based on the reduced value of the dollar and the increase in population, this means that the county of Antigonish has a \$12,000,000 market, one of the highest priced in Canada, virtually at its door. The future growth of the market is based on a number of factors whose full significance has never been thoroughly investigated. Chief among these is the condition of the iron and steel industry in the area. The McKee report notes that

the development of the iron and steel industry in Nova Scotia, as compared with other localities, has been retarded by its distance from places where large quantities of steel are consumed, by inherent qualities in the local raw materials that have made their conversion an especially difficult metallurgical procedure, and by the lack of sustained, dependable and satisfactory performance from labour, especially in the coal mining phase of the industry. (II, 13d; p. 12).

The most important of the difficulties listed are being solved through the reduction of manufacturing costs. At the same time, however, the cost of labor has increased significantly. It is most important that production costs be reduced all along the line. When the cost of producing steel is reduced sufficiently, some of the world's best markets would be available by virtue of deep water shipping. Clearly, the whole problem of the future growth of the iron and steel industry is one requiring full study and carefully planned development before the full significance of the Sydney market can be evaluated.

The problem of future growth, however, does not detract from the fact that the Sydney area provides a substantial market today. It is this present market that offers a basis for the expansion of commercial agriculture in Antigonish County. In the past Antigonish farmers did not have sufficient volume, or did not have products in continuous supply or could not meet the requirements of quality and grade to sup-

ply the market. The present activity of the Eastern Co-operative Wholesale (Section 3, Chapter 1) is designed in part to help remedy this situation. Figure 8 and Table 18 indicate the sources of supply of farm products in the Sydney area, based on the findings of the 1937 survey (II, 15). The minor position occupied by Antigonish County is evident. The county supplied less than one and one-half percent of the total value of farm products received into the area. It supplied no vegetables, very little meat, a little over nine percent of the livestock (mostly lambs), 11 percent of the eggs, and a little over one percent of the dairy products. During the war, there was a considerable increase in the amounts supplied of the last two items but the market is still one that could be greatly expanded.

Table 19 indicates the insignificant part played by Antigonish dairy products in the Sydney area. In 1937, county farmers shipped only 73,000 pounds of butter, 9,000 pounds of cream and no whole milk to Sydney. The table also reveals some interesting aspects of milk consumption in the Sydney area. One of these is the large extent to which canned milk was used. An amount equivalent to 51 percent of the value of fluid milk was consumed in the area in 1937. One of the reasons for the high percentage of canned milk was that pasteurizing plants were not yet well established at the time. Much of the milk that was distributed was of very poor quality. In addition, many householders did not have any form of refrigeration to keep fresh milk. In recent years, there has been a decrease in the amount of canned milk and a doubling in the consumption of fluid milk (Table 20). The problem of clean milk production, however, is one that persists not only in the Sydney milk shed but in most of Nova Scotia. Pasteurization, although practiced by the Sydney dairies and the creamery at Antigonish, is not compulsory. Health requirements, an exclusively local matter, are practically non-existent with regard to conditions in dairies and

Percentage
Values

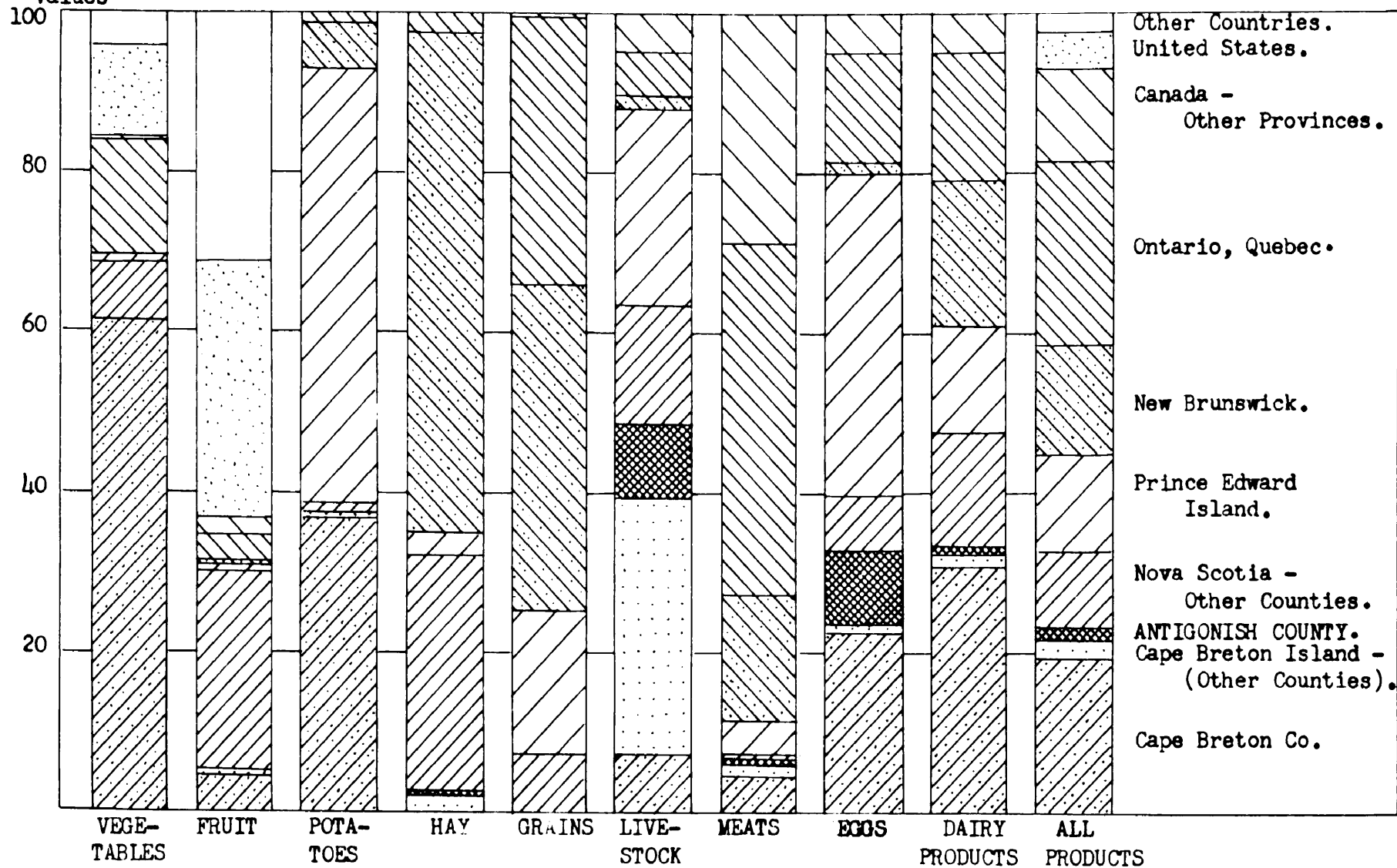


Fig. 8. VALUE OF RECEIPTS OF FARM PRODUCTS IN THE SYDNEY MARKET AREA, BY SOURCES OF SUPPLY, 1937.

TABLE 18 - Value of Receipts of Farm Products in the Sydney Market Area From Principal Sources of Supply - 1937¹

Area of Origin	Vegetables	Fruit	Potatoes	Hay	Grains	Livestock	Meats	Eggs	Dairy Products	All Products	All Products Dollars (000's)
Cape Breton Co.	61.5	4.5	36.7	-	-	7.0	4.6	22.3	30.4	19.7	1,053.3
Cape Breton Is. (other counties)	0.1	0.3	0.4	1.9	0.2	32.1	1.3	1.4	1.8	2.0	99.8
Antigonish Co.	-	-	0.2	0.6	-	9.1	0.4	11.0	1.2	1.4	75.6
Nova Scotia (other counties)	6.7	25.3	0.9	29.7	7.5	14.1	0.6	5.2	14.3	10.7	503.3
Prince Edward Is.	1.2	0.6	54.6	2.9	17.4	24.4	4.5	40.0	13.1	12.3	655.5
New Brunswick	-	0.4	5.6	62.7	35.7	1.0	15.5	1.2	18.4	13.7	735.3
Quebec	2.7	-	0.8	2.3	18.6	0.0	14.2	3.2	5.8	7.5	401.6
Ontario	11.6	3.7	0.5	-	20.1	4.4	30.3	10.7	10.1	15.5	828.5
Canada (other provinces)	1.4	2.0	-	-	0.4	5.1	28.6	5.0	4.9	11.3	-
United States	10.5	41.8	0.3	-	0.1	0.1	-	-	-	4.9	260.6
Other Countries	4.3	21.4	-	-	-	-	-	-	-	2.4	129.1
Total Values (000's)	372.6	526.8	262.7	87.7	188.6	105.1	1,656.2	311.5	1,809.1	-	5,343.7
Total Weight -lbs. (000's)	15,220	11,509	22,642	14,925	8,751	1,176	12,959	1,818	19,325	-	108,341

¹From Reid and Hopper: The Market for Farm Products in the Sydney Area - Nova Scotia (II, 15).

TABLE 19 - Receipts in Sydney Area of Dairy Products by Areas of Origin, 1937¹

Area of Origin	Butter		Cream	Milk			Other ²	Total Pounds (000's)	Total Value Dollars (000's)
	Creamery lbs. (000's)	Dairy lbs. (000's)		Whole lbs. (000's)	Canned lbs. (000's)	Powdered lbs. (000's)			
Cape Breton Co.	2.7	56.6	168.1	11,264.9			361.0	11,873.3	547.4
Cape Breton Is. (other counties)	51.3	58.3	45.4	7.2			0.2	162.4	33.1
Antigonish Co.	73.1	0.2	9.4	-			-	82.6	22.6
Pictou Co.	292.1	0.1	7.1	51.2	3.5		7.8	361.7	90.6
Colchester Co.	95.2	-	282.3	288.6	926.9		162.7	1,775.7	159.4
Nova Scotia (other counties)	14.6	1.8	0.4		1.7	6.8	15.1	42.4	8.9
Prince Edward Is.	828.4	1.5	-		-			857.4	237.1
New Brunswick	1,151.4	0.9	-		0.2	26.0	27.6	1,244.8	333.0
Quebec	291.5	-	-		1.4	6.8	132.5	432.2	104.9
Ontario	63.6	-	-		1,944.5	4.4	161.0	2,173.5	183.3
Manitoba	176.5	-	-				1.5	178.0	49.3
Saskatchewan	139.8	0.1					-	140.0	39.5
United States	-	-	-		0.3	0.2	-	0.5	0.1
Total Pounds (000's)	3,180.2	119.5	512.7	11,611.9	2,878.6	46.2	909.4	19,324.6	
Total Value (000's)	891.4	26.1	78.2	409.4	207.8	8.6	190.8		1,809.1

¹From Reid and Hopper: The Market for Farm Products in the Sydney Area of Nova Scotia (II,15).²"Other" includes cheese, buttermilk, ice cream.

on the milk shippers' farms. There is no enforcement of grading rules for consumer purchases regarding the butterfat content of fluid milk.

In view of the above conditions, it is perhaps not too surprising that milk consumption in Sydney is very low. Table 20 indicates the amount of milk sold in quarts in the Sydney area in the years 1937, 1943-1948. Since population in the area was 85,000 in 1937 and 105,000 in 1948, per capita consumption has increased from 0.30 pints in 1937 to 0.46 pints in 1948. Most of this increase is due to improvement in the quality of milk due to pasteurization and better dairy services. (The decrease in milk sales in the area since 1945 is due to the movement away from Sydney of military service personnel). Even with the increase, however, Sydney people drink less milk than other Nova Scotians and other Canadians. Average milk consumption in Nova Scotia is 0.66 pints per person per day; the Canadian average is 0.98 pints per person per day.

TABLE 20 - Milk sold in quarts in the Sydney Area.¹

	Quarts
1937	4,521,266
1943	8,178,795
1944	9,280,676
1945	10,071,550
1946	11,407,647
1947	9,174,652
1948	8,700,816

¹ Data from Dairy Services division, Nova Scotia Department of Agriculture.

The low per capita consumption of milk in the Sydney area suggests the need for an educational policy urging the greater use of milk. Consumption could be doubled and still be below the national average. The potential market is such that the step would seem a natural one to

take. Any educational program would involve not only the co-operation of all distributors in the area but also the resolve on the part of local and government officials to eliminate the serious sanitation problem that now exists in regard to fluid milk. Whole milk shippers in Antigonish County should be prepared for the day when trained sanitary inspectors will be appointed to carry on educational and inspection service among the producers. Such a day, it is to be hoped, is not too far distant.

III

SOLVING PROBLEMS OF LAND USE

INTRODUCTION

Any study in the physical and social sciences today usually gains significance in its field to the extent that it takes cognizance of existing problems and attempts to provide approaches to their solution. Lack of this "problem approach" in a great deal of regional geographic research has been a contributing factor to the less-than-high quality of some of the writing in this field. Not only does an awareness of problems give purpose to a study; it also charges the author with a responsibility to search for specific causes and even propose certain possible solutions.

Solutions need to be proposed if only to bring a greater appreciation to bear on the problems under discussion. And since the attempt to propose solutions is, in the author's opinion, the final step in the study, all significant preceding material must be considered and, if possible, synthesized so that a convenient basis is provided for making recommendations. This is what has been attempted in the chapter on Land Classification (Chapter 2). The Land Classes in the county have been based on Soils and Land Use. Soils afford the most convenient device to synthesize the physical factors considered in Section I; land use similarly brings together the different effects of human and economic activity examined in Section II.

In any discussion dealing with the solution of regional problems, it is also essential that sufficient attention be given to agencies already working toward this end in the area. In Antigonish County (and throughout all of Nova Scotia), the important agencies are the provincial government and the Co-operative Movement. The latter is

described in Chapter 1 and special reference is drawn to the part played, or to be played, by the Government with regard to land use. The program of the provincial government toward agriculture is described in Chapter 2 and its effectiveness assessed in the framework of land classification.

CHAPTER 1

THE ANTIGONISH MOVEMENT

The Need for Co-operation

The commercial development of the primary industries - agriculture, lumbering and fishing - in eastern Nova Scotia has been continually handicapped by an excessive individualism on the part of primary operators. The lack of co-operation is illustrated in economic relations by a reluctance or refusal of most of the producers to agree to any system of standardization of their natural products. In the case of the farmers of Antigonish County, this individualism is a characteristic handed down from a self-sufficing era. In agricultural technique too, the farmers of the county seem to have made little progress since early settlement times. The people, to a large extent, are still under the spell of their earlier habits.

An important factor in the slow progress of agriculture in eastern Nova Scotia has been the rolling and often rugged topography of large parts of the area. This has meant, in the words of D. J. MacDonald before the 1934 Royal Commission (III, 9; p. 163), "small patch plots and small patch mentalities". Of the two, the latter characteristic is as difficult, if not more difficult, to overcome than the former. Adding to the difficulty is the relative isolation of the eastern part of the province from the sources of scientific knowledge in the western part - the Agricultural College at Truro and the Experimental Farms at Kentville and Nappan. D. J. MacDonald states:

Scientific agriculture in this country is moving eastward and since we are on the fringe, we have been the last to be affected by it. Our culture has not been subjected to it as have been the western parts of the provinces. Many of our farmers know little or nothing about it. Many are not devoting the various kinds of soils found on their farms to the production of the things for which they are most economically suited. The remedy for this, of course, is agricultural education. (II, 9; p. 164).

The Antigonish Movement (III, 2,3) is a program of adult education designed in part to help overcome these handicaps to agricultural progress - lack of agricultural education and excessive individualism - not only in Antigonish County and the rest of eastern Nova Scotia but in the whole Maritime area. The Movement was launched with the opening of the Extension Department of St. Francis Xavier University in the year 1928. Although its program is primarily educational, it strives to achieve its goal largely through economic co-operation. The shocking lack of co-operation in many fields of economic activity in the Maritimes has made this a wise and most necessary move.

The Development of Co-operatives in Nova Scotia

The co-operative movement in Nova Scotia is generally considered to have begun in 1861 with the opening of a co-operative store in Stellarton. But the early history of co-operation in the province is marked with failure rather than success. Of the eleven co-operative stores in the province before 1900, only one survived beyond this date. In most cases, the reason for failure was that the mining towns with which the stores were associated closed down. By 1925, all that remained of attempts to organize co-operatively over a period of 75 years were a few semi-co-operative farm societies, including apple marketing co-operatives in the Annapolis Valley and one miners' consumer co-operative. In the period before the first world war, every creamery in the province was a farmer-owned organization. By 1930, there was not one such plant in the province, indicating the transference to private ownership that had taken place. In recent years, the trend has definitely been back to the original type of farmer-ownership.

When the Extension Department of St. Francis Xavier University (Photo 34) initiated its program in 1928, it found co-operative fail-

ures throughout the whole province. This was especially true of farmer groups. Involved in Antigonish County were the stores in Antigonish and Heatherton. The failures had begun when stores were organized on a semi-political basis without proper co-operative legislation, without co-operative education, without an auditing system and without good management. Co-operatives in the province today have been organized under special legislation; they are characterized by a wide educational basis; a uniform accounting system and proper auditing service are available to all stores; the need for alert and competent managers is recognized in all quarters. In addition, the movement is topped by a wholesale organization with control down to member level, providing the integration which the scattered co-operatives of the past did not have.

Perhaps the greatest lack in the set-up of the pioneer co-operatives was that of education. This is where the Extension Department of St. Francis Xavier University has taken the lead in sponsoring and befriending co-operatives since its beginning in 1928. Extension leaders saw in co-operative organizations a means of counteracting the decline in Maritime life accentuated by the economic conditions following the first world war (Section II, Chapter 2). Education was carried to the people through study clubs organized throughout the rural areas. The problems of the community formed the basis of discussion under the guidance of local leaders and volunteer educators. The Extension Department gets information to the study clubs by mailing mimeographed and printed materials and setting up "kitchen libraries". In recent years, frequent use has been made of radio broadcasting to supplement the discussion circle. The rural program "Life in These Maritimes" is an excellent example of the way in which the Extension Department carries agricultural education to the people. Once a week during the winter

season, a studio panel consisting of agricultural leaders and local farmers discusses improvement in farm practices. (An example of a "Life in these Maritimes" study bulletin is presented in Appendix C.) Throughout the broadcast area, groups of farmers organize into study clubs to listen to the broadcasts and then go over the material presented among themselves. During the 1948 season, there were 33 study groups registered in Antigonish County with average memberships of five to ten people.

The Movement in Antigonish County

1. Co-operative Stores. For the farmer, adult education and improvement in agricultural practices begin to mean something when they can be translated into a better return for hogs, lambs, poultry or butterfat, cheaper fertilizer and a means whereby short time credit can be obtained. This helps to explain why the co-operative movement plays such an important part in the work of St. Francis Xavier Extension. In addition, the co-operative store, or consumer co-operative, serves an important function as a center or nucleus for educational activity in any area. It is significant that adult education is least advanced in those communities that lack a co-operative store.

The location of co-operative stores in Antigonish County is shown in Map 19. It is interesting to note their distribution in relation to the agricultural activity of the county. The five stores between the town of Antigonish and the settlement of Tracadie serve the important agricultural area of the county. This lies in the "Dairying (whold milk)" and "Mixed Farming" land use regions (Map 12) and is occupied for the most part by the best soils in the county, the Queen's Millbrook and Cumberland associations (Map 7). The stores are thus located to the advantage of farm operators who stand to profit most from contact with the Antigonish Movement. This is a reflection of

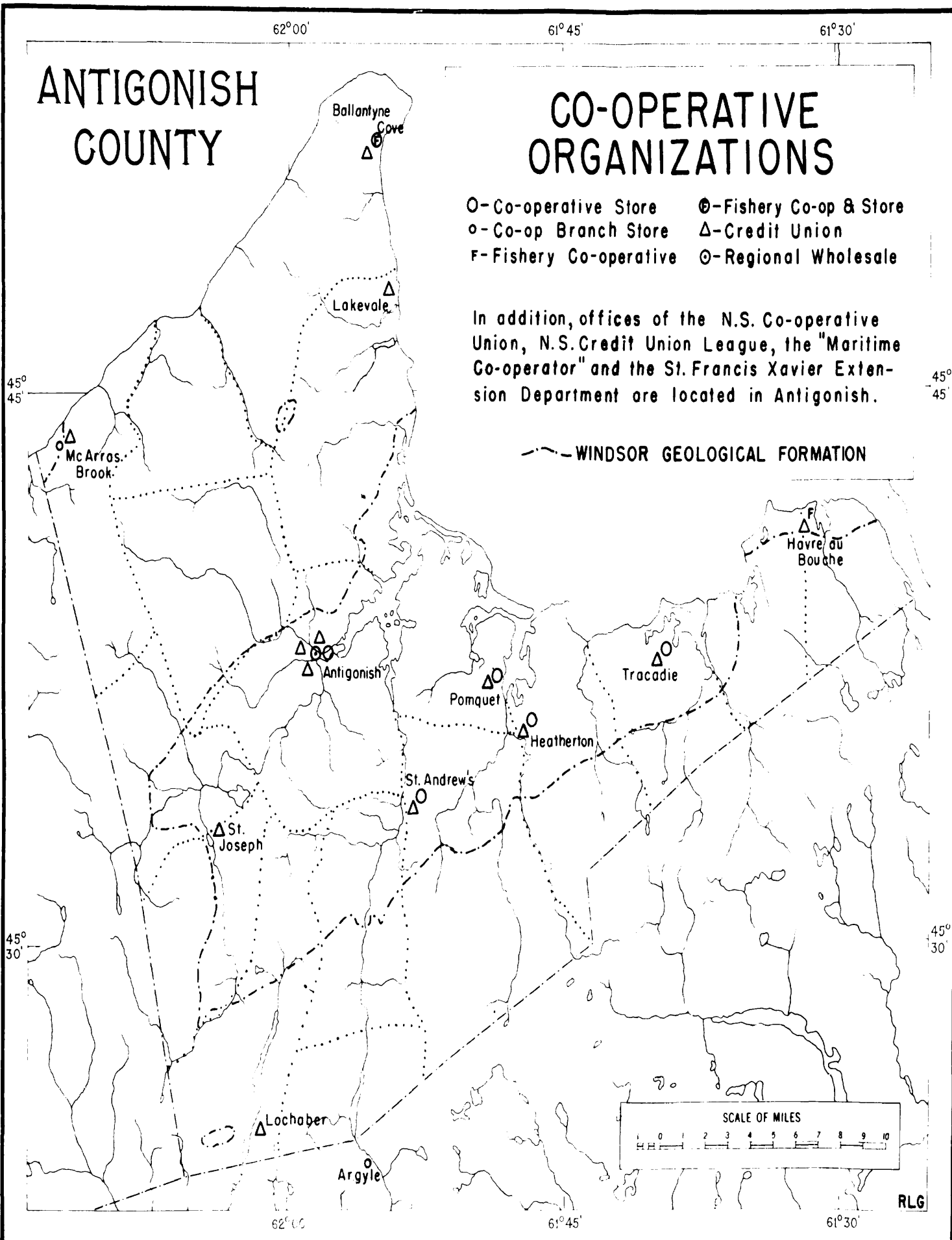
ANTIGONISH COUNTY

CO-OPERATIVE ORGANIZATIONS

- | | |
|------------------------|-------------------------|
| O-Co-operative Store | ⊙-Fishery Co-op & Store |
| o-Co-op Branch Store | Δ-Credit Union |
| F-Fishery Co-operative | ⊙-Regional Wholesale |

In addition, offices of the N.S. Co-operative Union, N.S. Credit Union League, the "Maritime Co-operator" and the St. Francis Xavier Extension Department are located in Antigonish.

--- WINDSOR GEOLOGICAL FORMATION



Percentage
Increase

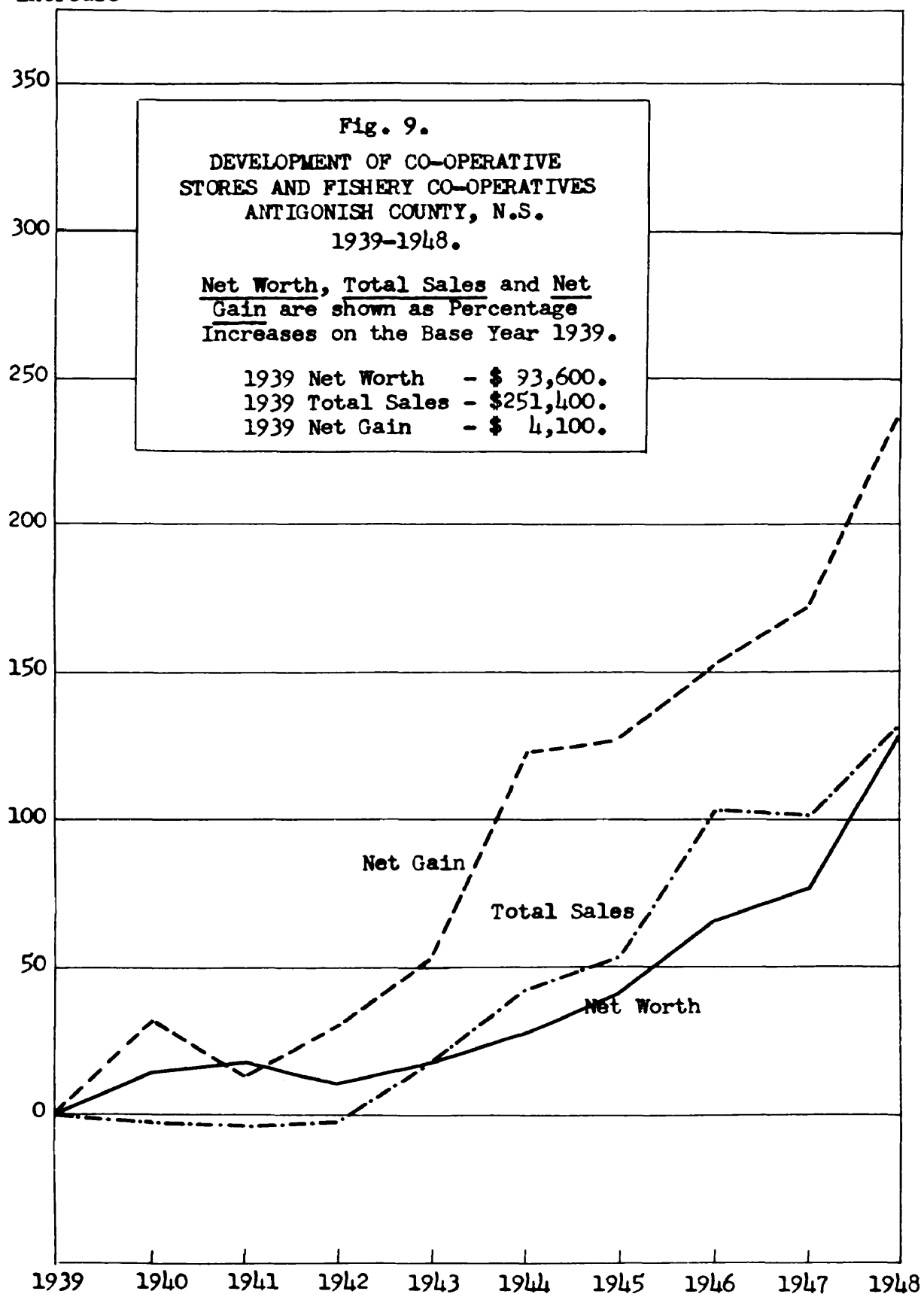


TABLE 21 - Development of Co-operative Stores and Fishery Co-operatives, Antigonish Co., Nova Scotia, 1939 - 1948.1

Co-operative Store	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948
Antigonish Town										
Membership	556	565	556	556	616	450	33.3	41.9	49.2	55.4
Net Worth	34.7	37.6	37.9	26.1	28.1	30.2	31.7	158.4	141.3	151.5
Total Sales	93.3	78.0	68.0	51.5	47.9	66.1	81.1	144.2	141.3	151.5
Net Gain	0.4	2.2	2.9	1.4	0.4	2.8	3.1	4.2	5.9	11.6
Gain % of sales	0.6	2.8	4.3	2.7	0.8	4.0	3.7	2.7	4.2	7.3
Heatherton										
Membership	120	140	172	120	141	141	22.8	22.4	20.7	24.3
Net Worth	15.8	17.2	17.2	16.7	21.3	21.8	22.8	42.9	50.9	64.1
Total Sales	27.4	39.3	34.7	41.1	59.5	60.0	56.3	83.4	90.8	94.1
Net Gain	1.6	2.0	1.4	2.5	4.6	3.4	3.4	8.0	7.5	8.4
Gain % of sales	5.4	5.0	4.0	6.1	7.5	5.6	5.4	9.6	8.3	8.4
Pomquet										
Membership	36	36	36	40	45	45	11.5	13.9	13.4	14.6
Net Worth	1.7	2.6	4.3	4.7	6.9	8.5	59.7	62.0	49.3	53.6
Total Sales	20.2	23.0	26.7	28.4	40.3	57.3	53.2	41.4	42.0	53.3
Net Gain	0.5	0.9	1.3	0.9	1.1	3.2	6.2	7.1	4.0	5.8
Gain % of sales	2.2	4.0	4.8	3.3	2.7	5.5	11.5	17.1	9.5	10.8
St. Andrew's										
Membership	224	234	235	235	253	252	52.0	55.3	30.8	31.8
Net Worth	32.6	42.0	40.9	42.2	44.6	49.5	52.7	125.8	156.2	161.0
Total Sales	74.3	85.6	74.0	84.2	93.5	109.6	109.7	125.1	156.2	161.0
Net Gain	8.2	9.3	6.1	7.0	8.2	9.1	10.1	11.1	7.1	11.9
Gain % of sales	8.3	9.3	8.1	8.2	8.6	8.1	9.1	8.8	4.5	7.3
Tracadie										
Membership	60	60	60	60	67	67	2.7	2.2	10.7	13.4
Net Worth	0.5	0.5	1.3	1.3	1.0	1.8	2.7	2.7	10.7	13.4
Total Sales	0.2	0.2	0.2	0.3	1.0	1.8	10.2	29.7	67.1	61.6
Net Gain	0.2	0.2	0.2	0.3	0.8	1.0	1.5	1.7	2.3	4.3
Gain % of sales	100.0	100.0	100.0	100.0	80.0	55.6	14.7	5.7	3.4	6.9
Ballantyne's Cove²										
Membership	21	22	32	32	32	32	7.4	8.2	30	30
Net Worth	2.3	2.8	3.6	3.6	4.5	5.8	7.4	8.2	10.8	12.5
Total Sales	19.1	12.0	13.6	16.6	22.2	27.0	42.2	57.2	43.9	74.4
Net Gain	0.2	0.1	0.6	0.6	1.1	1.2	1.3	1.9	1.7	1.3
Gain % of sales	1.0	0.8	4.7	3.6	4.9	4.4	3.1	3.2	3.8	1.7
Havre Au Bouche³										
Membership	90	85	36	36	60	60	7.7	5.6	20	20
Net Worth	6.6	6.2	6.0	6.0	4.2	6.8	7.7	5.6	6.3	8.0
Total Sales	17.1	9.6	11.2	16.5	22.2	26.6	24.2	34.6	19.5	24.3
Net Gain	1.0	0.4	0.1	0.9	0.1	1.5	1.6	-1.3	1.2	0.4
Gain % of sales	5.6	3.8	0.6	5.3	0.3	5.6	6.7	-3.7	6.2	1.7
Totals										
Membership	1,057	1,142	1,065	1,079	1,214	1,047	137.4	165.1	1,339	1,359
Net Worth	93.6	107.8	109.8	103.5	109.6	121.4	137.4	165.1	165.1	190.0
Total Sales	251.4	246.6	241.6	246.6	299.9	333.0	388.0	510.8	507.2	589.4
Net Gain	10.1	13.6	11.6	13.3	15.5	22.5	23.0	26.4	27.7	34.3
Gain % of sales	4.1	6.0	4.8	5.3	5.1	6.7	5.9	5.1	5.4	5.8
Gain (average)										

¹ From Annual Reports of Co-operative Associations in Nova Scotia (III, 8) and financial statements of the individual stores.

² "Net North", "Total Sales", and "Net Gain" expressed in thousands of dollars. "Net Worth" is the difference between total assets and current liabilities.

³ The co-operative organizations at Ballantyne's Cove and Havre au Bouche are Fishery Co-ops. The former started store operations in 1945.

- Figures not available.

the very nature of the co-operative store. Its appearance in any community is an answer to the demands of the inhabitants of that community. It is the progressive farmers, those most eager to improve not only their own but also the community standing who are the first to realize the benefits to be had through adult education and economic co-operation.

The development of co-operative stores in Antigonish County from 1939 to 1948 is shown in Fig. 9 and Table 21. In general, there has been a steady increase in all the items listed - Membership, net worth, total sales, net gain. A good part of the increases expressed in dollars is due to the inflationary tendency in the post war period. As a check on these figures, it is necessary to consider the net gain amounts as a percentage of the total sales (Table 21). This percentage also gives an indication of the amount paid out in rebates to store members.

The co-operative organizations at Ballantyne's Cove (Photo 35) and Havre au Bouche are fishery co-ops. The differences between the two are borne out by Table 21, especially in the matter of net worth and total sales. In addition, the membership of the Havre Bouche plant decreased from 80 to 20 since 1944 while that at the Cove remained at about 30. The decline of the former co-operative and the continued growth of the latter is in large part the result of differences in management and a greater opposition on the part of private operators in the Havre Bouche area. This same opposition has thus far delayed the setting up of a store in this district. The lack of a store, in turn, makes contact with Extension workers all the more difficult. The rise of the co-operative at Ballantyne's Cove, however, demonstrates what such an organization can do once it is properly established. In the 1930's the Cove community was one of the most depressed

in the county. Today the district is the most prosperous on the Antigonish coast. In 1945, store operations were begun to serve the growing demands of the members.

The other five co-operative stores in the listing all serve farming communities although the Antigonish store derives most of its support from the townspeople. The St. Andrew's store is the oldest in the county and the only one of the old stores whose operation since the beginning (1917) has been marked with success. This has been due to good management and the unique position of the store; it became well established fairly early and the lack of any competition was very important in allowing it to maintain its prominent position. The growth of the Pomquet store (Photo 36) was associated with the rise of the poultry industry in the area. The store served as a shipping outlet for eggs and hens and as a receiving station for chick and feed supplies. The store showed a temporary halt in development in 1947 with the decline of the industry.

The Heatherton store (Photo 37) has had a checkered career marked by varying degrees of success especially before 1939. The whole community has had a struggling history however, and the early reverses in store management were probably a reflection of this. In addition, farmers in the area had some bad experiences with creameries in the county in the 1930's when too many creameries meant a very low price for butterfat. The Heatherton division is not too well endowed with soil resources (there is a large area of Goodbourne in which topography limits cultivation) and this has meant a long uphill fight in both co-operative education and agriculture progress. In recent years, however, the store has made remarkable progress (Table 21). With this recent development and in large part contributing to it, has been an improvement in farming practices. The activity of the Extension

PHOTOS 34 - 38 (Co-operatives)

34. The Extension Department of St. Francis Xavier University has taken the lead in sponsoring and befriending co-operatives both in Antigonish County and in the rest of Nova Scotia. The offices of the Department are located in this section of the University's administration building.

35. St. George's Co-operative Ltd. at Ballantyne's Cove is a fishery co-operative through which fishermen of the area sell their lobster and buy equipment. In 1945, store operations were begun to serve the growing needs of the members.

36. The growth of the Pomquet co-operative store, shown here, has been associated with the rise of the poultry industry in the Pomquet division. The store was built near the railway station to serve as a shipping outlet for eggs and hens and as a receiving station for chicks and feed supplies.

37. The co-operative store at Heatherton has had a checkered career marked by a varying degree of success, especially before 1939. In recent years, however, the store has made remarkable progress.

38. In 1945, five co-operative stores in Antigonish County set up their own wholesale, Eastern Co-operative Services. Through its central office, shown here, Eastern Co-operative Services serves as a wholesale, marketing and service organization for its members.



34



35



36



38



37

workers is apparently showing some concrete results in the subdivision of Heatherton.

Another community that has been exposed to an almost continual educational barrage from the Extension Department and the provincial department of agriculture has been Tracadie. For the first seven or eight years nothing happened. In the last eight years, slow but sure improvements have been noted. A co-operative store was opened in 1940. Growth was steady up to 1946 but since then it's been almost phenomenal. In addition, community harmony has been developed to a new degree. Improved agricultural practices are beginning to play an important part in the area, although the location of the subdivision and its good soil resources indicate that advancement could be only in the initial stages. Perhaps the farmers of Tracadie are on the verge of realizing the capabilities of their resources. The Antigonish Movement could ask no greater reward.

2. Eastern Co-operative Services. The co-operative plan in the Antigonish district provides not only for stores but also for organization in the wholesale and manufacturing fields. In 1940, the co-operative stores of Antigonish County - St. Andrew's, Antigonish, Heatherton, Pomquet and Tracadie - set up their own wholesale, Eastern Co-operative Services (Photo 38). The Antigonish stores were later joined by the stores of Guysborough County. When eventually the amount of business conducted through wholesale channels is sufficient, the member stores plan to go into manufacturing.

The co-operative selling of farm products began in Antigonish in 1915 when a collective sale of wool was held under the leadership of Dr. Hugh MacPherson. This was followed by collective sales of lamb. In later years, shipping clubs were organized with car shipping services for livestock sales and car door services for their purchases.

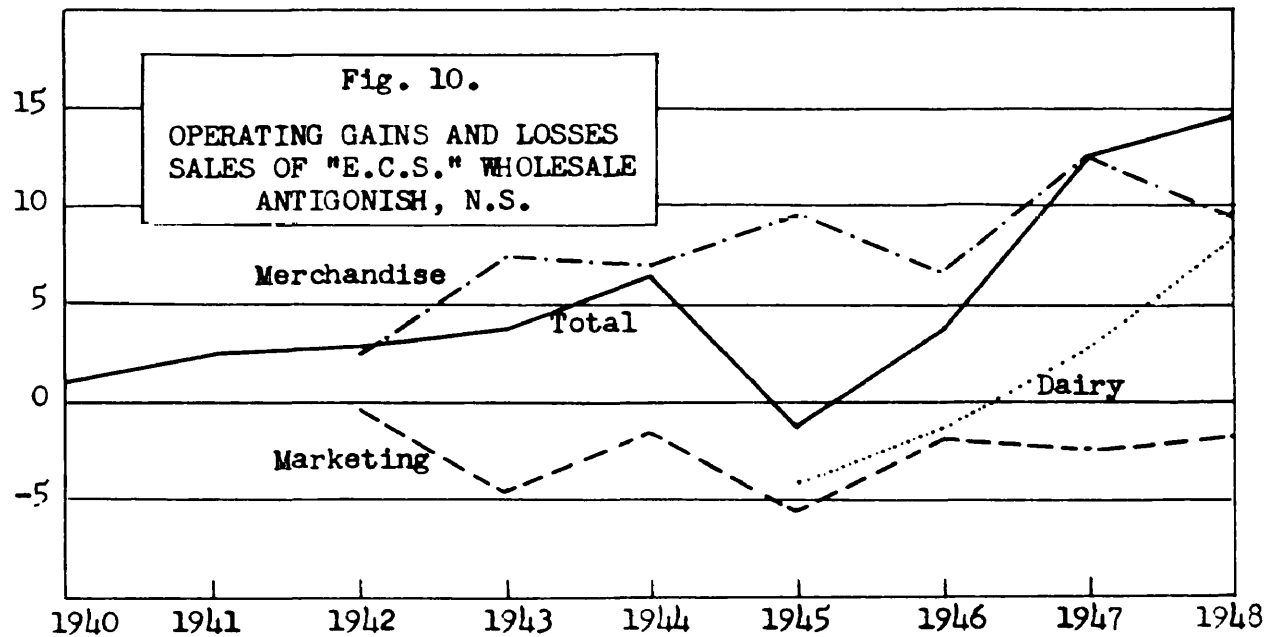
The old shipping clubs gave way to the incorporated co-operative stores whose marketing activities are now handled by the wholesale organization of which they are all members, Eastern Co-operative Services.

The purpose of Eastern Co-operative Services according to its charter and by-laws is "to promote the economic welfare of its members by utilizing their united funds and efforts for the production, processing, distribution, purchase and sale of commodities and products of good quality, and for the performance of services in the interest of its members in the most economical way". As a wholesale it supplies flour, feed, fertilizer, seeds, hardware and building supplies. As a marketing organization it sells wool, poultry, lamb, hogs, beef, vegetables, milk and dairy products for the farmers. As a service it hatches chicks, grades and packs poultry and eggs, trucks and ships hogs, assembles and processes butterfat and pasteurizes and markets milk.

The growth and development of Eastern Co-operative Services is shown in Figs. 10, 11 and Table 22. It is evident that merchandise sales have been the standby of the organization. These have consistently shown a sizeable operating gain since the wholesale began operations in 1940. The strength of merchandising in the organization has enabled Eastern Co-operative Services to carry on in the marketing and dairy fields where the lack of volume, especially in the early years, meant operating losses in these operations.

Co-operative marketing through Eastern Co-operative Services is still conducted under the handicap of insufficient volume. The lack is one that can be made up only by the farmers themselves. Slowly, more and more of them have come to realize the benefits to be had under a system of co-operative and graded marketing. The quality of hogs, lambs and poultry sold co-operatively has improved steadily until

Thousands
of Dollars



Thousands
of Dollars

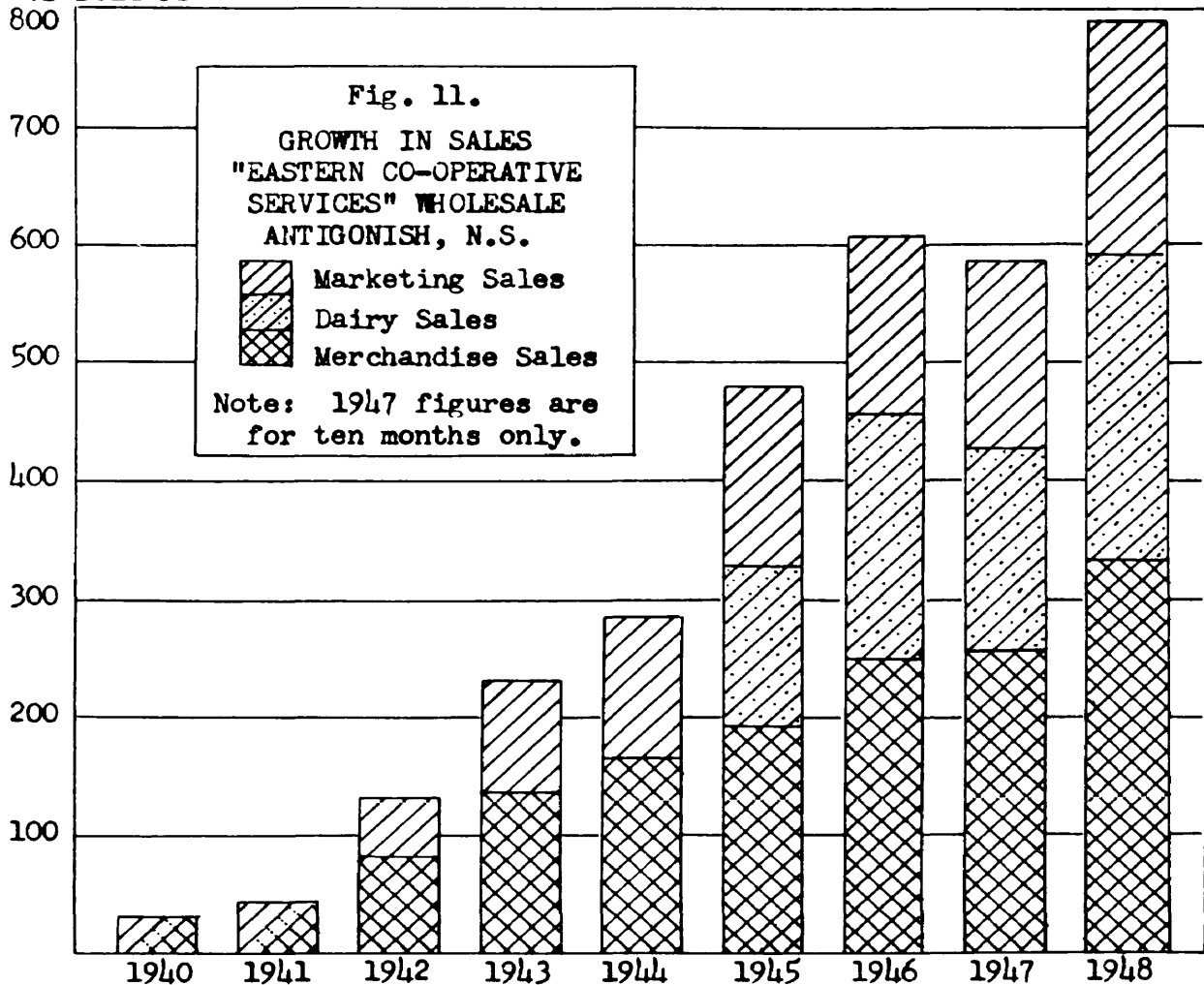


TABLE 22 - Development of "Eastern Co-operative Services" Wholesale, Antigua, in terms of items selected from Annual Financial Statements 1940-1948.¹

End of Period	Total Assets 000's	Accounts Payable 000's	Paid Up Capital 000's	Total Sales 000's	Opera Gain 000's	Merchandise		Dairy		Marketing	
						Sales 000's	Gain 000's	Sales 000's	Gain 000's	Sales 000's	Gain 000's
January 31, 1949	231.5	103.7	66.8	785.8	14.	333.1	9.6	258.7	8.1	194.0	-2.0
January 31, 1948 ²	137.5	66.5	44.5	587.0	12.	260.2	12.5	168.7	2.9	168.1	-2.7
March 31, 1947	124.6	75.1	41.5	607.3	3.	252.4	6.8	204.2	-1.5	146.7	-1.9
March 30, 1946	111.5	61.1	40.5	480.8	1.	193.2	9.7	134.0	-4.1	150.5	-5.8
March 31, 1945	66.5	38.2	15.6	286.3	6.	165.4	7.0	-	-	116.7	-1.5
March 31, 1944	38.3	18.5	12.4	228.4	3.	134.0	7.9	-	-	89.6	-4.6
March 31, 1943	33.2	19.3	9.1	131.6	2.	86.4	2.5	-	-	45.1	- 0.3
March 31, 1942	23.8	9.4	7.7	44.5	2.	-	-	-	-	-	-
March 31, 1941 ³	18.4	14.5	0.6	31.2	0.	-	-	-	-	-	-

¹From financial statements (semi-annual) of Eastern Cooperative Services.

²Only ten months in period ending January 31, 1948 due to change in date of financial statement.

³Nine months in period ending March 31, 1941.

today, farmers in the county receive a price for these products equal to the best price paid in any part of Eastern Canada. This is a far different situation from that which prevailed in the period after World War I when farmers in the county and in the rest of Nova Scotia received a price for hogs equal to only 75 percent of what was received by farmers in Ontario and Quebec, a price for lamb that was five cents a pound under the Montreal price and a price for poultry that was seven cents a pound less than the average price in the other provinces. There is still no organized marketing of beef in Nova Scotia; the price is as low as that in any part of Canada.

The place of prominence that Eastern Co-operative Services has come to occupy in the dairying industry in the county in the last five years offers striking evidence of how co-operative organization can benefit the farmers. In 1945, the farmers of Antigonish County through their co-operative stores at Antigonish, St. Andrew's, Heatherton, Pomquet and Tracadie subscribed \$20,000 to buy the two creameries then operating in the county, neither of which could collect sufficient butterfat to make operation profitable. For the next two years, dairy operations through Eastern Co-operative Services were carried on at a loss but the initial expenditure was absorbed by 1947. By January 31, 1949, the operating gain from dairy sales was over \$8,000 (Fig. 10, Table 22). Plans were also launched in 1947 for the building of a new creamery and milk plant. This is financed on a five year plan by which each member contributes \$25 per year over a period of five years, 1947-1952. Milk shippers subscribe an extra sum based on the amount of milk shipped. The plant was completed in the summer of 1949 at a cost of \$80,000. It serves Antigonish, Guysborough and east Pictou counties and is equipped to produce pasteurized milk, homogenized milk, cottage cheese and butter.

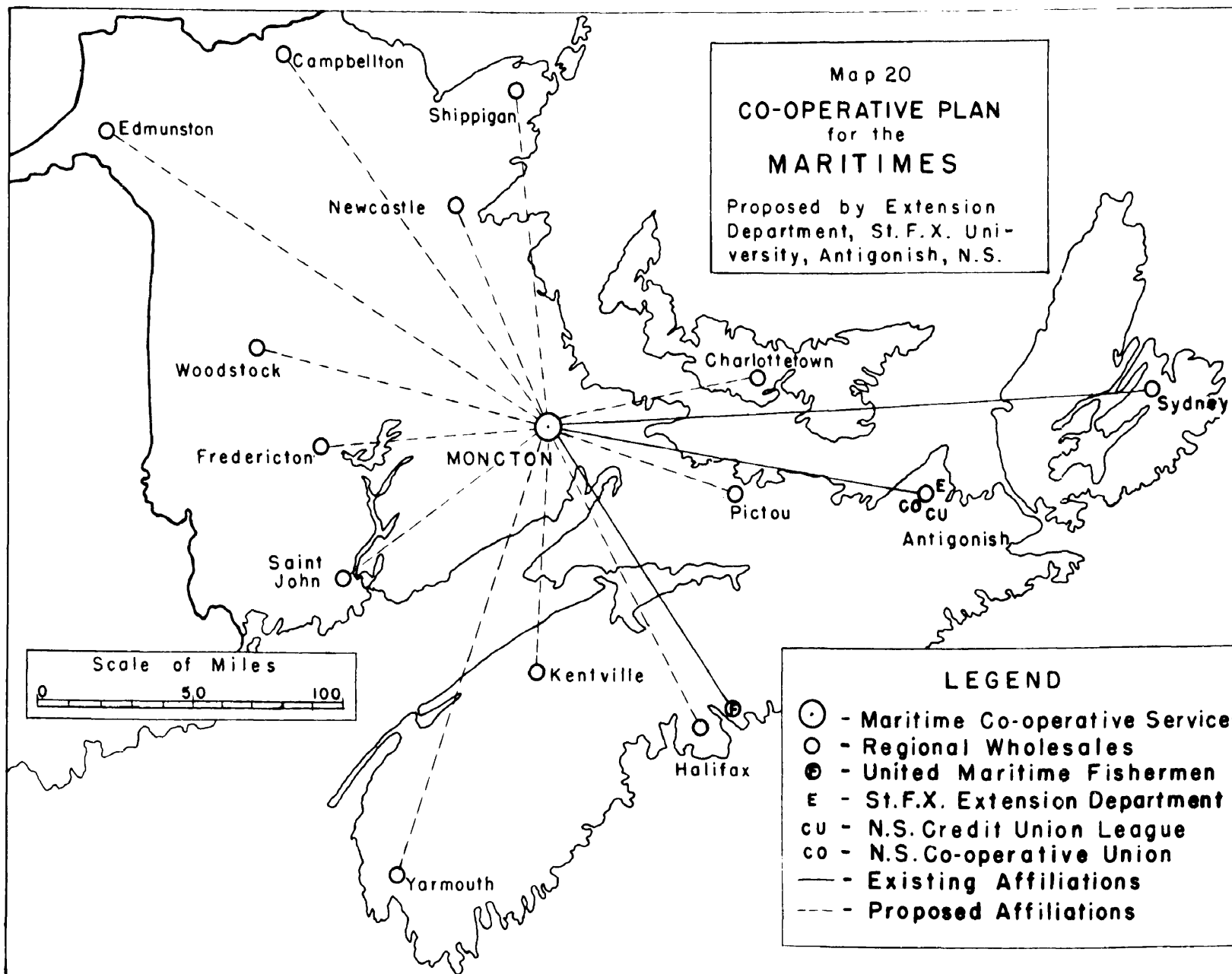
The new milk plant is of vital concern not only to the future development of the dairy industry in the county but also to the future regional development of the co-operative movement in eastern Nova Scotia. Eastern Co-operative Services is a regional wholesale covering a particular territory. It is affiliated with the central co-operative marketing agency for the Maritime area, Maritime Co-operative Services at Moncton. In the suggested co-operative plan for the Maritime Provinces (Map 20), approximately 12 regional wholesales are planned. To date, only two are in operation, the one at Antigonish and another in Sydney. The day is envisioned when Maritime Co-operative Services and its affiliated regional wholesales will become strong enough to join other co-operative wholesales in Quebec, Ontario and Western Canada to form a national organization.

3. Credit Unions. A unique characteristic in the development of the Antigonish Movement has been the important part played by the credit union, a co-operative society which furnishes its members with a convenient and secure means of saving money and of obtaining credit at reasonable rates of interest (III, 12). Credit unions pool the savings of the people in agricultural and fishing communities and put their money to work right there. In its loan service, credit unions have provided a service that was not always available to primary producers in the Maritime area. At the present time, banks show more eagerness than they did in the past to cater to small character loans; credit unions have shown this to be good business.

Credit union borrowing on the part of a co-operative store may be done either by the society or the individual member. If a store needs new capital to carry on, it may borrow the whole amount directly from the credit union; but a much sounder and safer way is usually followed. A group of members borrow small sums individually, invest

Map 20
CO-OPERATIVE PLAN
for the
MARITIMES

Proposed by Extension
Department, St. F. X. Uni-
versity, Antigonish, N.S.



LEGEND

- ⊙ - Maritime Co-operative Services
- - Regional Wholesales
- ⊖ - United Maritime Fishermen
- E - St. F. X. Extension Department
- cu - N.S. Credit Union League
- co - N.S. Co-operative Union
- - Existing Affiliations
- - - Proposed Affiliations

this in the store, and then pay back the money to the credit union over several months. The credit union has also proved a boon to farm operators and fishermen who need money seasonally and can repay short term loans when their operations for the year are over.

The location of credit unions in Antigonish County is shown in Map 19. Their growth and development is indicated in Fig. 12 and Table 23. In the county as a whole, there have been steady increases in all the items listed; membership, total assets and loans. The rate of increase in assets and loans is now (1947-1948) higher than ever before. The rate in membership increases is as high as it has ever been. In general, those credit unions that have been associated with the important co-op stores (Antigonish, Tracadie, Pomquet, St. Andrew's and Heatherton) are in the most advanced stages of development. The largest credit union in the county is the one at Antigonish; only a part of its support, however, comes from the rural population in the area.

One of the most striking features of credit union growth in the county has been the development of the Tracadie organization (Fig. 12, Table 23). The full significance of events in the Tracadie area is hard to gauge but when the progress of co-operative organizations, like the credit union and the store, is considered together with the apparent awakening of the district to improved farming practices, it is evident that the efforts of Extension workers are beginning to bear some fruit. In the case of the St. Andrew's group, which was organized in 1933, it has only been in the last few years (Fig. 12) with a general educational program and the provision of better facilities that the credit union has become an active force in the community. In the period 1946-1948, loan service grew from \$6,500 to more than \$17,800.

The Pomquet credit union has had a steady growth characterized

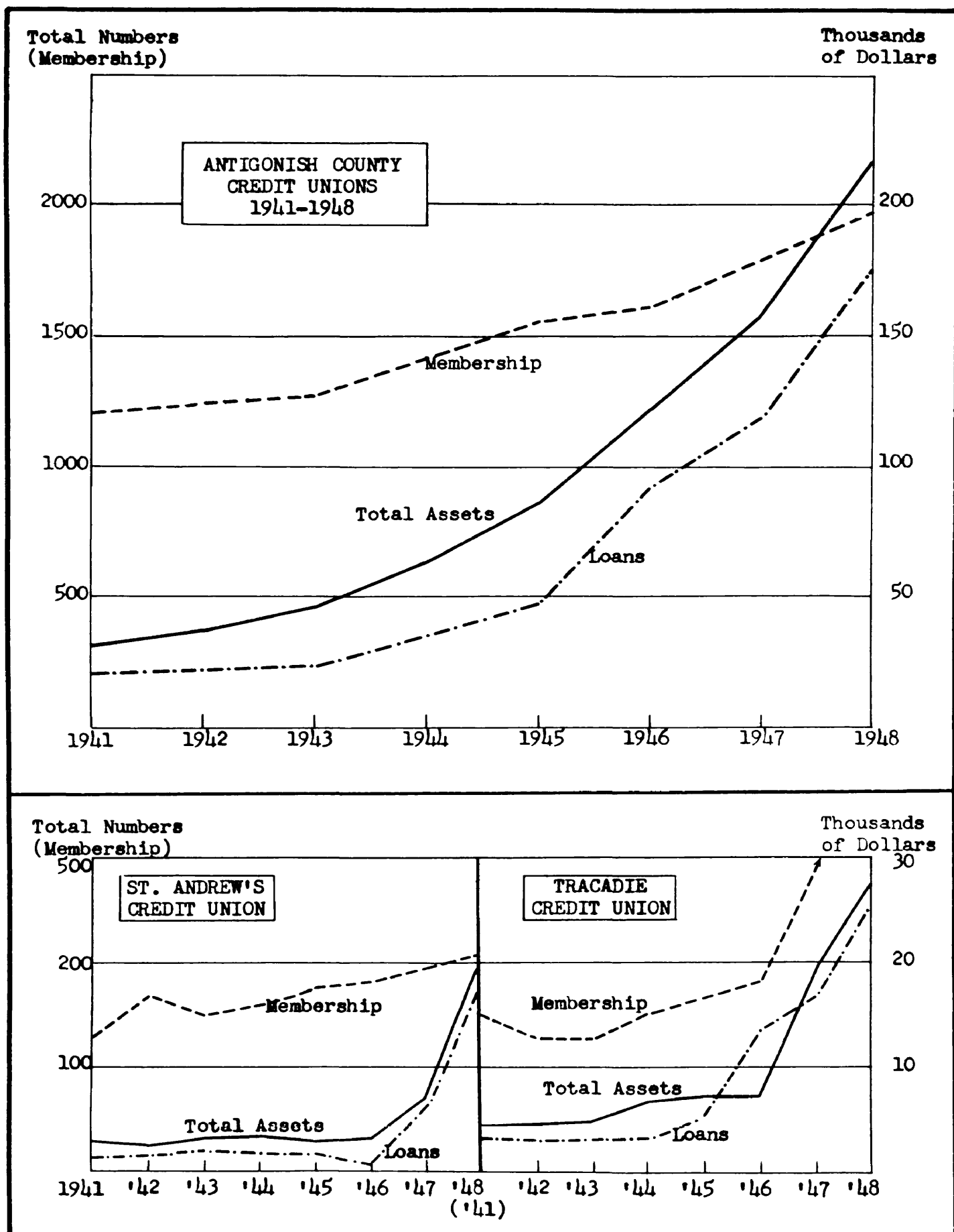


Fig. 12. CREDIT UNIONS IN ANTIGONISH COUNTY, N.S. THE UPPER GRAPH illustrates the development of the eleven credit unions in the county in the period 1941-48. THE LOWER GRAPHS illustrate the growth of two credit unions, selected from the eleven.

TABLE 23 - Development of Credit Unions, Antigonish County, Nova Scotia 1941 - 1948.1

Credit Union	1941	1942	1943	1944	1945	1946	1947	1948
<u>Antigonish Town</u>								
Membership	216	231	245	299	349	420	464	520
Total Assets	71.0	82.4	112.8	213.7	322.4	561.6	649.2	792.8
Loans	530	60.9	79.7	173.2	287.8	542.5	624.0	694.8
<u>Bay of Fundy</u>								
Membership	120	114	110	151	167	167	148	168
Total Assets	25.8	30.3	34.0	46.4	86.6	116.7	114.4	149.0
Loans	10.9	14.9	10.4	7.5	9.6	146.1	23.6	134.2
<u>Georgetown</u>								
Membership	123	123	141	121	120	120	146	165
Total Assets	27.0	40.4	31.1	36.4	40.6	64.2	92.8	202.6
Loans	21.2	24.0	14.4	21.9	21.4	32.8	82.9	167.0
<u>Lochaber</u>								
Membership	40	40	31	30	30	30	20	25
Total Assets	13.8	12.7	13.6	11.8	14.7	16.4	15.0	19.3
Loans	6.8	2.5		4.5	3.2	3.7	2.9	5.1
<u>LePavele</u>								
Membership	34	40	43	42	48	46	55	69
Total Assets	3.1	4.9	6.6	6.6	10.7	11.9	14.3	35.8
Loans	1.3	3.3	3.7	4.7	3.4	3.0	14.0	35.8
<u>Pomquet</u>								
Membership	157	169	197	241	240	260	259	285
Total Assets	32.0	41.6	66.2	97.2	84.7	110.7	166.4	199.9
Loans	19.6	19.0	35.9	31.0	30.2	54.1	79.2	129.9
<u>Ohio</u>								
Membership	104	106	111	123	123	126	120	120
Total Assets	36.3	46.1	64.8	119.7	143.6	167.9	202.3	276.5
Loans	33.0	26.6	34.9	37.6	43.1	48.9	117.6	121.2
<u>McArries Brook</u>								
Membership	67	63	63	64	66	66	67	71
Total Assets	31.9	30.8	35.7	37.6	39.3	40.3	42.4	46.6
Loans	19.5	13.3	14.6	14.0	13.7	19.0	18.9	27.6
<u>St. Andrew's</u>								
Membership	130	168	180	159	175	180	194	208
Total Assets	26.9	25.7	29.2	29.6	26.0	27.0	72.2	197.1
Loans	13.2	16.6	20.1	14.9	13.5	4.6	64.6	176.1
<u>Ballantyne's Cove</u>								
Membership	68	58	48	37	38	36	35	60
Total Assets	9.2	9.0	8.8	6.6	8.6	8.4	8.2	12.0
Loans								
<u>Totals</u>								
Membership	1,209	1,241	1,269	1,419	1,549	1,918	1,802	1,968
Total Assets	317.4	367.9	468.5	840.6	860.2	1,237.2	1,574.3	2,174.2
Loans	207.7	214.6	246.2	346.4	481.2	930.3	1,196.2	1,666.5

1 Data from Nova Scotia Credit Union League. Credit Unions at St. Francis Xavier University and at St. St. Bernard College, both in Antigonish town, are not included.

2 "Total Assets" and "Loans" figures in hundreds of dollars.

until very recently by a hesitancy on the part of the members to do much borrowing. The same was true in Heatherton and has been more or less characteristic of all the credit unions in the rural areas, with the exception of Tracadie. The value of short term credit in the operations of the farmers and fishermen of the county has been an important item in the educational barrage coming out of the Extension Department. In the last two years, there has been a noticeable change in attitude and most of the credit unions now have more loan applications than they can handle. Thus Extension is slowly preparing the ground for the time when its members will be ready to enter the bigger financial field and deal in long-term loan operations.

It should be borne in mind that a successful credit union is not necessarily a sign of successful co-operative activity. For example, the Ohio credit union ranks third in the county in total assets, but it serves an area that is poorly organized co-operatively. To its members here, the credit union is not a rallying point for co-operative ventures but simply a convenient and worthwhile way of saving money. The same is true of the Havre Bouche area. There is no co-operative store at either place and it is the co-op store that usually serves as a center for co-operative education in the community. The credit union is not satisfactory for this purpose as dealings here are individual rather than collective. The credit union means most to the people it serves when it works in a framework of co-operative activity, an important supplement in the conduct of financial affairs.

Integration - St. Francis Xavier and Government Extension

Participation in only one or two phases of co-operative activity does not solve economic problems. A fundamental principle that is repeatedly stressed by Antigonish workers is integration - integration within the Movement in merchandising, marketing, services and credit

and integration of the Movement with other extension programs that may benefit the co-operator and his community. In this latter connection, the program of the Extension Services of the provincial Department of Agriculture is especially important. The program itself is discussed in a later chapter (Chapter 3 of this section). It is mentioned here only to draw attention to the part played by the Antigonish Movement in bringing it before the people and educating them to its full significance. In recent years, agriculture and co-operation in Antigonish County and in the rest of eastern Nova Scotia have joined forces to such an extent that in the future, they must rise or fall together.

The Antigonish Movement is furnishing something that primary producers in the county have never had before - an educational basis for their activity. It is providing farmers, fishermen and lumbermen with a technique that enables them to face their problems with a confidence and skill they did not possess in the past. The most encouraging sign of the co-operative movement's verity, in the words of the 1944 Royal Commission report (III, 10a; p. 83), "is not its increased membership or the steadily mounting volume of business but its ability to adjust itself readily to new problems as they arise for settlement." The basic equipment for the economic future of any region is its people plus its material resources. But equipment is useless unless it is put to work and its activity directed in the light of regional and inter-regional demands. The co-operative movement is an attempt to educate and organize the people that they may more thoroughly and intelligently use their resources in the best interests of society.

CHAPTER 2

LAND CLASSIFICATION

One of the final steps in a survey of the land resources of an area is land classification. In Antigonish County, the land has been divided into five general classes based on the intensity of present and probable future uses, relative to the normal or average intensity of use of the region. The method of classification follows, in a general way, the one that has been used in the work of the New York State College of Agriculture at Cornell University (III, 6). The two principal types of information used in the classification were the character of the soil and the present land use. A third factor, the condition of the farms and buildings, was also used but not in sufficient detail to warrant its inclusion as a principal item in the classification. The size and condition of farms and buildings was noted in a particular area but no attempt was made to classify and map every farm in the county. The land classification map as drawn up by the author thus lacks the authority of detailed investigation, not only in the matter of the condition of farm buildings but also in the matter of soils and land use. In the time available, only a reconnaissance survey of the items used in the classification was possible. This means that the classification itself can only be very general and tentative. It is hoped that further study may some day provide the details for a more complete and detailed classification. The one presented in this chapter can only point the way.

Description of Economic Land Classes

1. Economic Land Class I. This class (Map 21) is primarily adapted to forestry (Photo 39). It contains a large proportion of woodland and occupies more than one-third of the area of the county (Table 24). Three-quarters of the land class is made up of soils of

the Thom association (Table 26); Halifax and Kirkhill soils make up the rest. The abandoned farms in this land class, almost one-third of the total number in the county, make up more than 75 percent of the total number of farms in the class. In addition, it contains more than two-thirds of the county's Crown Land. (Crown Lands, it will be remembered, are lands under provincial government ownership. In Antigonish County, these consist of lands acquired, largely since 1932, (Table 15) at Tax Sales or in purchases from individuals).

2. Economic Land Class II. This class is better suited to forestry than to farming, although a good deal of farming is done. Most of the farms are located along the north shore from Arisaig to Cape George and are of the subsistence type. In no place in this class is farming the main activity. Along the north shore, it supplements fishing; elsewhere in the county, it supplements lumbering.

Land Class II is made up of a variety of soils but three predominate - the Woodbourne, Mansford and Westbrook. Combinations of stoniness, steep topography and droughtiness characterizes those parts of the associations included in this class. But while these soils are not very suitable for crop production, they support a good forest growth and like the soils in Class I, should be set aside where possible for this purpose. Land Class II contains more than 17 percent of the land area of the county but only six percent of the improved land; it has more than 15 percent of the county's vacant farms (Photo 40) and 16 percent of the Crown Land. Over one-third of the farms in this class are vacant. Land Classes I and II together make up over half of the land area of the county; they contain less than 18 percent of the population, 13 percent of the improved land, close to half of the vacant farms and over 80 percent of the Crown Lands in the county. Almost 60 percent of the farms in these two land classes are vacant.

ANTIGONISH COUNTY

ECONOMIC LAND CLASSES

NON AGRICULTURAL

I Forestry

II Forestry (some agriculture)

AGRICULTURAL

III Marginal

IV Mixed Farming

V Specialized Farming (whole milk)

• Location of farms used in comparison of agricultural land classes

Names on map locate sample areas used in comparison of soil conditions in the classes

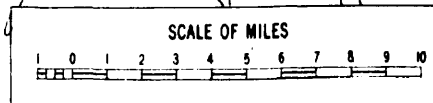
WINDSOR GEOLOGICAL FORMATION

45°
45'

45°
45'

45°
30'

45°
30'



RLG

TABLE 24 - Comparison of the Five Land Classes, Antigonish County,
Nova Scotia.

	Percent of County				
	Class I	Class II	Class III	Class IV	Class V
Land Area	34.2	17.4	24.5	16.0	7.9
Rural Population	9.0	8.7	30.0	30.9	21.4
Improved Land	7.0	6.1	30.5	31.0	25.4
Whole Milk Shippers	-	-	16.1	29.9	54.0
Crown Land	67.3	16.1	9.7	4.9	2.0
Vacant Farms	31.7	15.5	26.5	19.8	6.5
Vacant Farms (% of total farms in the land class) ¹	76.2	38.7	19.0	13.8	6.5

¹The number of farms in each land class was not actually determined. It has been based on the proportion of the rural population within the class.

TABLE 25 - Comparison of Agricultural Land Classes based on sample
farm selections.

	Class III	Class IV	Class V
Number of farms in sample. ¹	13	13	11
Size of farm (acres)	160	135	220
Cropland (acres)	23	36	50
Land in Hay (acres)	16	24	31
Hay Yield (tons per acre)	1.6	2.0	2.5
Land in Grain (acres)	6	9	16
Grain Yield (bu. per acre)	40	48	52
Land in Improved Pasture (acres)	-	8	15
Use of Lime (tons/acre cropland)	1.5	3.8	4.1
Gross Income ²	\$3,400	\$6,600	\$9,100
Net Income ³	\$ 900	\$1,500	\$2,800

¹Farms selected represent the best in each land class. Data are expressed as an average of farms selected in the class. Farms were assigned to the land class in which most of the cropland was located.

²"Gross Income" includes income from all sources.

³"Net Income" indicates income after farm expenses.

TABLE 26 - Soil Associations in the Five Land Classes, Antigonish
County, Nova Scotia.

Soil Association	Percent of Land Class					Percent of the County
	Land Class I	Land Class II	Land Class III	Land Class IV	Land Class V	
Queen's	-	1.7	17.2	13.9	28.7	8.8
Woodbourne	-	41.5	29.9	7.5	-	15.5
Millbrook	-	9.8	26.9	63.2	42.2	21.1
Barney	-	4.9	-	0.8	-	0.9
Joggins	-	-	0.7	-	-	0.2
Merigomish	-	-	3.5	11.6	-	5.8
Hansford	-	27.9	1.0	0.3	-	4.0
Westbrook	-	13.2	5.6	-	-	3.8
Halifax	7.0	-	0.3	-	-	2.8
Thom	76.5	-	0.9	-	-	26.5
Kirkhill	15.1	-	1.3	-	-	5.6
Hebert	-	-	8.2	0.7	-	1.7
Cumberland (gravel)	-	1.0	4.4	2.0	-	1.1
Cumberland (silt)	-	-	-	-	29.1	2.0

PHOTOS 39 - 42 (Land Classes)

39. Economic Land Classes I and II are primarily adapted to forestry. In no place in these land classes is farming the main activity. Shown here are the remains of a saw mill, located on Class I land east of Cloverville.

40. Land Classes I and II contain less than one-fifth of the farm operators in the county but have nearly one-half of the vacant farms and over four-fifths of the Crown Land. This steep slope reverting to spruce is on Class II land in the subdivision of Heatherton.

41. Economic Land Class III which makes up about one-quarter of the land area of the county is marginal for commercial agriculture. Forestry or work off the farm must supplement the returns from land such as this in the central part of the subdivision of St. Andrew's.

42. In Land Class III in the eastern part of the county, soils tend to be stony and are associated with a very rolling topography. Fields are small and good pasture is limited.



39



40



41



42

3. Economic Land Class III. Land in classes III, IV and V is agricultural land classified according to intensity of present and possible future use. The higher the number, the more intensive the use. Land Class III which makes up about one-quarter of the land area of the county is marginal for agriculture on a commercial scale (Photo 41). If the land class map (Map 21) is compared with the land use map (Map 12), it will be seen that land use in this class is of three types - fishing with agriculture, lumbering with agriculture and mixed farming. In the latter type, many of the farm operators have to work off the farm to obtain a return adequate to meet their needs. It is obvious that some sort of supplementary activity is necessary in this land class to enable farmers to carry on. Where such supplementary activity is well organized, as in the fishing area of Ballantyne's Cove and the lumbering area of the Ohio River, the return to the operator is usually adequate to enable him to realize a profit on his operations.

In the mixed farming area of this land class, there is no organized attempt to supplement farming with another activity such as forestry. This is especially true in the eastern section of the county, in the southern part of the divisions of St. Andrew's, Heatherton and Tracadie. As a result there has been a high rate of farm abandonment. It is significant that in this land class - an agricultural class - are to be found more than one-quarter of the vacant farms in the county. Almost one-fifth of the total number of farms in the class are vacant.

In the thirteen farms picked as a sample for this land class, net farm income was only \$900 (Table 25). This figure represents not an average for the land class but the return on the best farms in the class. In the choice of sample farms in the three agricultural classes, those farms were selected that would give an indication of the poten-

tialities of each class. Thus the \$900 figure is above average. The acreage in cropland is 23, with 16 of this in hay. Yields are low - 1.6 tons of hay per acre and 40 bushels of oats - and lime application light.

The soil composition of this land class is extremely diverse, with almost every soil association in the county represented. The Woodbourne, Millbrook and Queen's are the most important, however, and make up almost three-quarters of the area of the land class. The Woodbourne soils here are stony and associated with a very rolling topography. The Millbrook soils retain more moisture than the Woodbourne but also tend to be stony especially in the eastern section of the county, in the divisions of Havre Bouche and Linwood (Photo 42). The Queen's soils in this land class are associated with poor drainage. There are also areas of Millbrook and Queen soils north of Antigonish with good topography and drainage which because of distance from market and poor roads have been put in this class. The area of Queen's between Lower South River and Heatherton has also been included here because it is heavily forested. The Hebert soils make up more than eight percent of the land area in this class. They are composed of gravelly or sandy outwash materials and are usually too well drained or too coarse textured to rank high agriculturally. However, in many places the sand is fine enough to permit good moisture holding capacity and fair crop returns are realized.

4. Economic Land Class IV. This class (Photo 43) makes up 16 percent of the land area of the county. Most of the land in this class is included in the Mixed Farming region of Map 12. The shipment of cream and poultry farming are important activities. In addition, this class contains 30 percent of the whole milk shippers in the county. These, however, are the smaller shippers, with less than 10 cows milking.

In general, conditions of soil and relief advise against specialized milk farming. The best course would seem to lie in a system of diversified dairying or in such specialities as poultry and vegetables and small fruits.

The main soil associations in this land class are the Millbrook, Queen's and Merigomish. Both the Millbrook and Queen's are heavy textured soils and are better suited to hay and grain crops than other soils in the county. The Millbrook often occupies long slopes while the Queen's is heavier with less slope but drainage is imperfect. The Merigomish is an excellent soil, particularly for cash crops (Photo 44). It is easily tilled but the nature of the topography, which has a mounded appearance, sometimes makes it difficult to obtain large continuous fields.

The average acreage in crops on the 13 farms sampled in this land class was 35. Of this, 24 was in hay and nine in oats. Yields were higher than in Land Class III and lime application more than twice as heavy. Over 13 percent of the total number of farms in this land class are vacant, a result in large part of the small size of the farms and the consequent inability of the operators to take full advantage of the resources at their disposal. The layout of one of the farms making up the sample for this class is shown in Fig. 13. It will be noted that fields are small and broken up and that the total area in crops is inadequate for a dairy enterprise of any size. On this particular farm which is located near South River, there are approximately eight cows in milk during the summer and the milk is shipped as cream. This permits retention of the skim milk which is fed to the hogs. Expansion of crop acreage would definitely be necessary if farm operations were to attain any scale. However it is doubtful if the operator of such a farm could ever specialize successfully in whole milk production. The

rolling topography and the existence of considerable light soils, characteristics of most of Land Class IV, advise against this.

In addition to the land devoted to mixed farming, some tracts of forested land have also been included in this class. This is an instance where land use is in the potential rather than the actual. Most of this land, which lies largely to the south of Antigonish and is made up of Millbrook soils, is both advantageously located and physically suited for large scale dairy enterprises. The initial expense of clearing and putting up suitable buildings would not be warranted however unless the market for fluid milk were assured.

5. Economic Land Class V. This class is characterized by the most intensive type of land use in the county, fluid milk production. It occupies less than eight percent of the land area of the county but contains more than 21 percent of the rural population, 25 percent of the improved land, and over half of the fluid milk shippers. Less than seven percent of the farms in this class are vacant. The average size of farm in the sample selected was 220 acres, with 50 acres in cropland. Of this, 31 acres was in hay and 18 in grain (Photos 45-47). The hay yield was two and one-half tons per acre and the oats yield 52 bushels per acre. Over four tons of lime were used to the acre of cropland and about two tons to the acre of improved pasture. Only in this land class did farmers regularly lime pasture, although relatively small quantities were used.

The farm layout for this land class is shown in Fig. 14, the plan of a fluid milk farm near Fraser's Mills. The farm represented is smaller than the average indicated for Land Class V in Table 23 but plans are underway for an expansion of cropland and improved pasture. The dotted lines on the sketch show the proposed layout of the farm as drawn by the Farm Management agent serving the farmers in this sec-

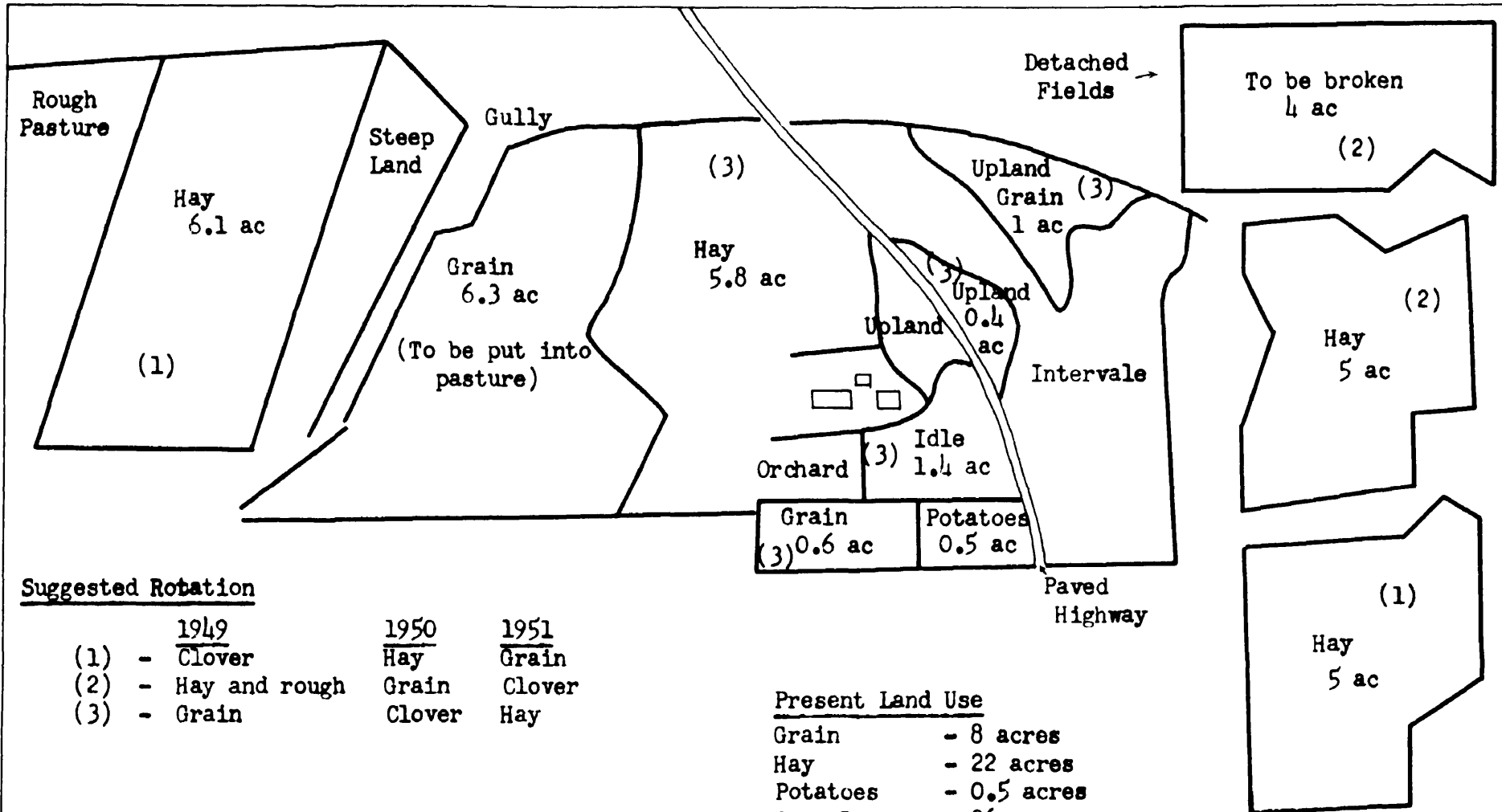


Fig. 13.
LAYOUT AND SUGGESTED ROTATION
DAIRY FARM (CLASS IV), LOWER
SOUTH RIVER, ANTIGONISH COUNTY

PHOTOS 43 - 47 (Land Classes)

43. Crop yields on the best farms in Economic Land Class IV average 48 bushels per acre for oats and two tons per acre for hay. On this farm in the northwestern corner of the county, the grain crop is being threshed in the field.

44. In general, conditions of soil and relief advise against specialized milk farming in Land Class IV. The best course here seems to lie in a system of diversified farming with a specialty such as truck crops. This field of potatoes is located on light Merigomish soils near Afton.

45. Land Class V in Antigonish County is characterized by the most intensive land use in eastern Nova Scotia - specialization in whole milk. The amount of cropland on the better farms in this land class averages 50 acres. Of this, 30 acres are in hay. The hay field shown here is part of a successful dairy farm near Harbour Centre.

46. The Cumberland silt soils in Land Class V are among the most fertile in the county. This grain field is on "intervale" land along the South River near Fraser Mills.

47. The hay and grain yields in Land Class V are the highest in the county, averaging two and one-half tons per acre and 52 bushels per acre, respectively on the best farms in the land class. This is a second cutting of clover on the Harbour Centre farm mentioned above (Photo 45).



43



44



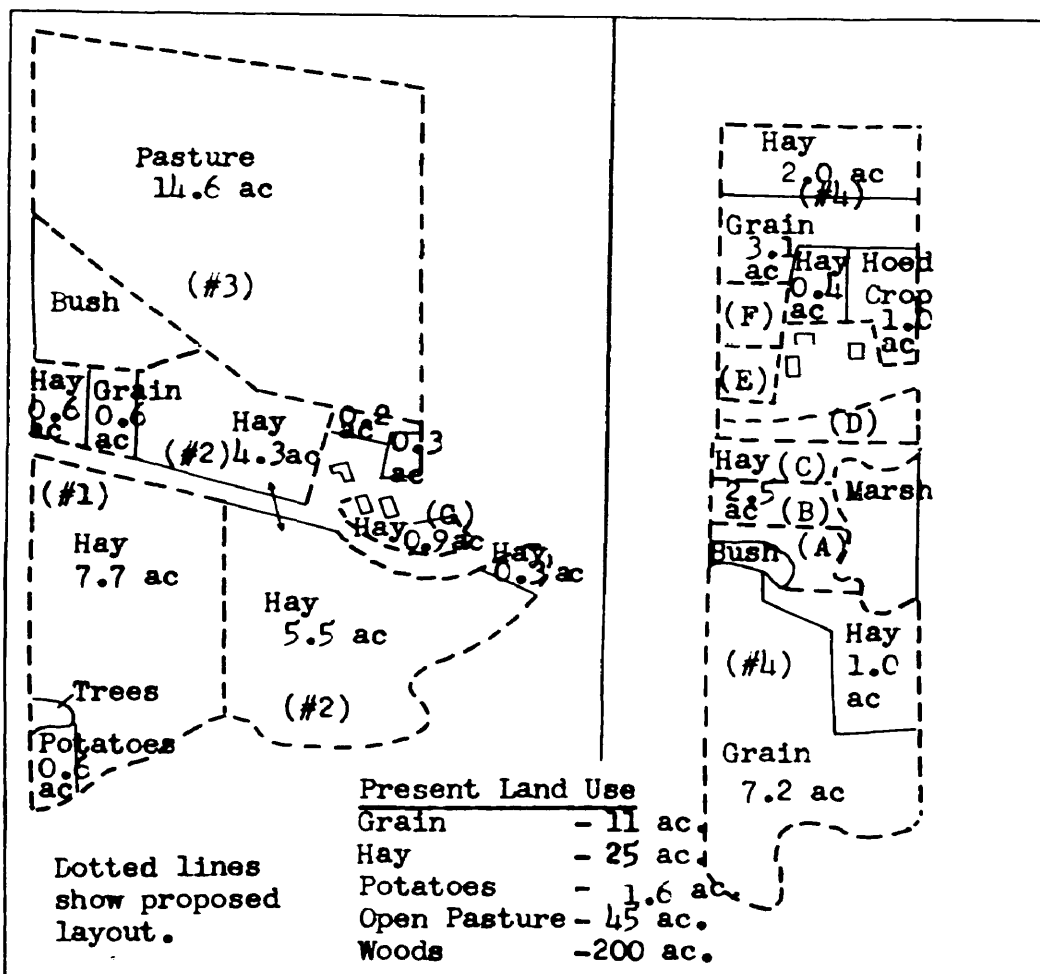
45



46



47



Proposed Rotations

I. Four Year Strawberry and Potato Rotation

	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>
(A)	Potatoes	Strawberries	Strawberries	Buckwheat
(B)	Buckwheat	Potatoes	Strawberries	Strawberries
(C)	Rough	Buckwheat	Potatoes	Strawberries
(D)	Rough	Rough	Buckwheat	Potatoes

II. Three Year Root Rotation

(E)	Roots	Grain	Clover
(F)	Grain	Roots	Grain
(G)	Hay	Hay	Roots

III. Four Year Rotation - Grain and Hay

(1)	Grain	Clover	Hay	Hay
(2)	Hay	Grain	Clover	Hay
(3)	Pasture	Pasture	Grain	Clover
(4)	Clover	Hay	Hay	Grain

Fig. 11. PRESENT AND PROPOSED LAYOUT OF DAIRY FARM (CLASS V), FRASER MILLS, ANTIGONISH COUNTY.

tion of the province. The activities of the Farm Management workers in the county will be described in more detail in the following chapter.

Only three soil associations make up this land class, the Millbrook, Queen's and Cumberland silt. The Queen's and Millbrook, mentioned in the discussion of the previous land class are quite similar here in appearance and texture, although the Millbrook seems to contain more gravel in places. However, it tends to have a certain amount of seepage which makes it moist throughout the season. The Cumberland silt soils (Photo 46) are probably the most fertile in the county. They generally have good drainage, are free from stone and are easily cultivated. These soils are subject to flooding but are suitable for crops during the growing season.

The Soils Problem in the County

The economic land classes described above serve as a very helpful framework in the discussion of land use problems in the county. Not only is comparison between the different classes possible but in addition, some criterion is provided that will help determine to what extent problems are a result of environmental handicaps on the one hand or poor management on the other. In Antigonish County, most of the problems in land use can be considered in a survey of the causes of farm abandonment. Before entering on such a survey, however, the most important factor in abandonment - the soils problem - will be considered separately.

Cropping practices within the county do not vary significantly in the three agricultural land classes, especially if the big operators in Class V are excluded. Farming methods, particularly in Land Class III and to some extent in Land Class IV, are still basically those introduced by early settlers. In Land Classes IV and V, the use of mod-

ern machinery, rotation farming and the use of more lime and better seed has improved crop yields but in no land class has soil management been given sufficient attention.

1. Available Nutrients. Soils in all the land classes have been cropped continuously until almost no lime or phosphate or potash is left. In Table 27, the results of some of the "Farm-to-Farm" surveys of the Soils Division of the Nova Scotia Agricultural College have been grouped on the basis of areas that present a high degree of uniformity in soil conditions and agricultural practices. These areas in turn are included in a specific land class. Results are expressed as a percentage of the number of samples in each category and averaged for the whole land class. One of the most striking features in the table is the high percentage of samples that are low in phosphate in all three land classes listed. In Land Class V, 77 percent of the samples were low in available phosphate. This was true of 83 percent of the samples in Class IV and of 81 percent of the samples in Class III. The only sample area in which the figures are not overwhelmingly on the low side is the Addington Forks-West River area in Class V. Even here, more than half of the samples were low in phosphate.

The lack of available potash, although not as striking as that in phosphate is a serious one. Again, there is little difference between the land classes, although the percentage of samples low in potash is a bit smaller in the two more intensive classes, IV and V than in III. Strangely enough the sample area with the smallest percentage of its samples low in available potash was the Clydesdale-North Grant area in Class III. The Addington Forks-West River area ranks second and the Tracadie-Barrio Beach area third. In the latter district, many of the operators in years past hauled kelp from the seashore and applied it to their fields, thus maintaining the amount of available potash in the soil.

TABLE 27 - Available Phosphate, Available Potash and pH in selected sample areas by Land Classes, Antigonish County, Nova Scotia.¹

Land Class and Location of Sample Area	No. of Samples	Available Phosphate			Available Potash			pH			
		High	Med	Low	High	Med	Low	6.4-7.0	5.8-6.3	5.2-5.7	4.6-5.1
		%	%	%	%	%	%	%	%	%	%
V. Harbour Centre - Antigonish - Lower South River.	151	4	5	91	18	23	60	17	17	27	39
Addington Forks - West River	72	8	36	56	40	23	36	4	13	58	25
Brierly Brook	24	5	9	86	25	21	54	21	29	21	29
Average - Class V		6	17	77	28	22	50	14	20	35	31
IV. Bayfield - Afton - Heatherton	84	1	2	96	26	25	49	-	5	25	70
Tracadie - Barrie Beach	311	5	15	80	36	22	42	13	19	31	37
Ashdale	33	-	27	73	12	27	61	3	6	55	36
Average - Class IV		2	15	83	25	25	50	5	10	37	48
III. Ballantyne Cove - Lakevale	154	-	9	91	10	18	72	2	11	36	51
Linwood - Frankville	102	5	14	81	22	14	64	12	14	30	44
Clydesdale - North Grant	158	8	21	71	39	33	28	2	11	27	60
Average - Class III		4	18	81	24	22	54	5	12	31	52

¹ Data from "Farm-to-Farm" Surveys of the Soil Division, N.S. Agricultural College (1941-1944).

2. Soil Acidity. The most significant measure of the chemical condition of soils in the county, however, lies not in the amount of nutrients available to them but in their degree of acidity, as expressed in the pH readings in Table 27. A high acidity means that any phosphate applied to the soil is absorbed and made unavailable by the iron and alumina. It is thus necessary to correct soil acidity before fertilizer is put on the soil. Phosphate applied to strongly acid soils is thrown away for the iron ties it up immediately. Limestone or marl is necessary to catch it first and release it slowly to the plants.

The average percentage of samples with low pH in Land Class V is, decidedly lower than that in the other land classes. 31 percent of the samples in Class V had a pH of less than 4.6 as compared to 48 percent in Class IV and 52 percent in Class III. The Brierly Brook area in Class V had the best pH record with 29 percent of its samples below 4.6 and 50 percent below 5.7. These relatively low figures are in large part the result of heavy use of marl which is obtained from pits located in the area. Two other districts with relatively low percentages were the Harbour Centre-Antigonish-Lower South River area in Class V and the Tracadie-Parrie Beach area in Class IV. In the former, 66 percent of the samples had a pH of less than 5.7; in the latter, 67 percent of the samples were in this group. A surprising feature of Table 27 is the high percentage of low pH readings in the Bayfield-Afton-Beaumont district. It may be that lime applications since 1941 have brought up the pH of soils in the area. At any rate, there was no indication in the field work of the writer that the soils here were as acid as they appear in the Table.

3. Organic Matter. Acidity and lack of available nutrients are soils problems that are easily solved. Acidity can be corrected with the application of lime and plant nutrients made available through

chemical fertilizers. There is no such simple remedy for another serious soil problem in the county, the deficiency in organic matter. Unfortunately no reliable surveys have been carried out to indicate the extent and seriousness of the deficiency. However, Dr. Hugh MacPherson who for many years has run tests on soil samples for farmers in the county declares that the lack of organic matter is the most serious soil problem faced by Antigonish County farmers. It is not confined to any association or groups of associations but occurs to some degree in all soils. The deficiency is less serious on the heavier members of the Queen's and Millbrook associations and on the alluvial Cumberland silt. These are the three associations that make up Land Class V in the county. In the other two agricultural land classes, lighter soils predominate and lack of proper management has resulted in a dangerously low organic matter content. Rotations, if they are carried out at all, are long and fields near the farm buildings receive more attention (and most of the manure) while those farther away are neglected. This is especially true of the farms along the shore in Class IV and of most of the farms in Class III. Manure piles are generally left out in the open, often under the eaves of the barn. Such farmers are throwing away much of the fertilizer in their manure. The principal value in the manure is the nitrogen which is soluble in water. Nitrogen is worth approximately 17 cents a pound and there are ten to 15 pounds in a ton of cow manure. Chicken manure is even richer and contains up to sixty pounds of nitrogen per ton.

4. Hardpan Development. Another soils problem that is widespread but whose exact extent is not known is that of hardpan development in the soil. Contrary to general opinion on the subject, hardpan formation in the county is not necessarily associated with the heavier textured soils or with the more level areas, but is a phenomenon that occurs in clays, loams and sandy soils and on rolling as well as level areas.

The presence of a hardpan not only prevents downward percolation but also contributes to erosion by facilitating surface wash. The problem is one that has been too long neglected due in large part to the fact that it exists under the ground, beneath plow depth. In large parts of the county, and this is something that applies to all the agricultural land classes, subsoiling may offer a solution. However, it must be noted that subsoiling experiments carried out in the eastern United States have not been too successful. In most cases, hardpan material simply went together again shortly after it had been broken up. Conditions in Nova Scotia may differ somewhat. At any rate, the gravity of the hardpan problem and the results that might be achieved through the use of this relatively simple remedy, merit consideration by Extension Services of the Nova Scotia Department of Agriculture.

5. Soil Management. In the matter of soil management, all the soils used for agriculture in the county have the same basic requirements - the use of lime, the maintenance of organic matter, the use of commercial fertilizers and shorter rotations - in order that they produce good crops. Drainage considerations vary and in the greater part of the county devoted to agriculture, subsoil plowing may prove helpful. These basic requirements must be considered by all farmers from Land Class V down to Land Class III and even by submarginal farm operators in Land Class II. Table 25 indicates that lime application varies from 1.5 tons to 4.1 tons per acre of cropland in the three agricultural land classes. It is probable that the operator in Class III would be much farther ahead if he increased his use of lime and cut down on his crop acreage, if necessary, to meet costs. The marginal farmer, however, is usually in no position to take chances by cutting down his acreage and will be content to crop his present acreage even though it means that insufficient quantities of lime will be applied. Obviously the same recommendations cannot be made to a farmer in Class III

as are made to a farmer in Class V. The difference is one that must be recognized in all Extension work in the county.

In general, the heavier textured soils in the county, like the Cumberland silt, the Queen's and parts of the Millbrook are best suited to hay, grain or pasture. These soils make up all the area of Class V land in the county (Table 26) and under common practices of management will produce good yields more economically than other soils in the county. They are responsive to fertilization and while organic matter content in them is relatively high, this is not being maintained in all sections. Under present conditions, these soils are well adapted to the dairy industry in the county.

The lighter textured soils, like the Merigomish and a good deal of the Millbrook, are less suitable for hay but are well adapted to roots, potatoes and vegetable crops. Land Class IV is made up of these lighter soils mixed in most parts with heavier textured associations. Good yields on these soils are also economically produced and fertilization brings forth a good response. A good supply of organic matter is necessary for best results. Under present conditions, the soils in this land class are best adapted to a system of mixed farming with a specialization in poultry, cash crops or dairying.

The soils in Land Class III are classed as fair crop land. The Woodbourne and Millbrook soils in this class are limited by stoniness and rough topography. The Queen's soils tend to have poor drainage. Other soils in this land class are gravelly and coarse textured and tend to be droughty. Lime, organic matter and fertilizer are necessary for increased production. Farms in this class need to be large as the land is most suitable for hay and pasture. The soils can generally be maintained only if associated with livestock and aggressively managed.

In the submarginal land classes I and II, factors such as steep topography, excessive stoniness, poor drainage and low fertility make

crop production unprofitable. Some of the present cleared areas might make good pasture with careful management, but most of this land should be allowed to revert to forest where possible. The process of farm abandonment which is discussed below probably began and progressed most rapidly on such land where physical handicaps were greatest. The soils which are now being cultivated therefore are not necessarily inherently more fertile than many which are now reverting to woods, but many of the physical obstacles to cultivation are either absent or not too serious.

Farm Abandonment

The abandoned farm (Photos 48 - 52) is a common phenomenon, not only in Antigonish County but also throughout all of Nova Scotia. The economic reasons for abandonment have already been discussed in a previous chapter (Section II, Chapter 1). The actual process and its extent have also been considered in another chapter (Section II, Chapter 3). At this point, abandonment will be examined in the light of land classification and its more important aspects summarized.

In 1948, over 21 percent of the total number of farms in the county were unoccupied (Map 10, Table 14), as compared to 23 percent in 1941 and 25 percent in 1933. In addition, the acreage in Crown Land increased by 10,000 acres between 1932 and 1941 and by another 12,000 acres between 1941 and 1948 (Table 15.). It is thus evident that the rate of farm abandonment has changed little in this period.

Almost half of the vacant farms in the county and over 80 percent of the Crown Lands are located in Land Classes I and II (Table 24) which contain less than 18 percent of the county's rural population and only 13 percent of its improved land. In the case of the farms in these two classes, it is a relatively simple matter to relate abandonment to poor soil resources. An important fact to consider in much of this area is that the farms deserted, particularly those of small

PHOTOS 48 - 52 (Farm Abandonment)

48. Farm abandonment is a common phenomenon not only in Antigonish County but also throughout all of Nova Scotia. These vacant buildings are located on an abandoned farm near Morristown.

49. In much of the abandoned land in the Pleasant Valley area, buildings have long since been blown down and cleared away. Only stone foundations remain to indicate one-time occupancy.

50. An important factor contributing to farm abandonment in the county has been the small size of the farm unit. In the eastern part of the county, the average acreage in cropland is less than 20. These buildings are located on a vacant farm near Frankville.

51. The abandoned Crispo "mansion" at Havre Bouche serves today to recall a time of former prosperity in the fishing industry in this part of the county.

52. On the west side of the South River from the highway south to Fraser Mills, a distance of less than 10 miles, there are 29 vacant farms. The buildings shown here are the best in the group and include a \$7,000 house.



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size, were not really farms in the proper sense of the word. Many of these were simple tracts of land occupied by operators who derived part or most of their living from other occupations such as fishing and lumbering. With the disappearance of the income from these latter activities, or with the beckoning of opportunities elsewhere, the "farm" with its meagre soil resources was left behind.

Land Class III is also characterized in many sections by the same sort of part-time farming, i.e. a significant portion of the income is derived from activities off the farm such as fishing, lumbering and part-time work. Here, however, the natural characteristics of the soil are much more favorable to agriculture than in the first two land classes and changing economic conditions have played a more important part in land abandonment. The role of these changing conditions, as described in Chapter I of the preceding Section, assumes more and more importance as one moves from the less intensive to the more intensive land classes.

Another important factor in abandonment, not only in Land Class III but in all the other land classes of the county, has been the small farm unit. In the twenty year period 1921-1941, the total number of farms of from one to 50 acres in the county decreased 41 percent, farms from 51 to 100 acres decreased 39 percent, farms from 101 to 200 acres decreased 21 percent and farms over 200 acres decreased only 12 percent. The number of abandoned farms, in short, has varied approximately in inverse ratio to their size. Two qualifications must be added however. One of these is that the properties deserted in many cases were not properly farms, as pointed out above. The other is that some of the loss in numbers may have been caused by an amalgamation of small farms, so that no loss in occupied land occurred.

The results recorded in Table 25 indicate that the farm unit in

the county today is still a small one. The best farms in Class III averaged only 23 acres of cropland with six of this in grain; the best in Class IV had 35 acres in cropland with nine acres in grain. This is definitely an extensive type of agriculture. Not only are these land classes capable of more intensive practices but the step is one that needs to be taken if land abandonment is to be reversed. The views of the author can best be expressed in the words of Dr. O. E. Baker, after his visit to the county in the summer of 1949:

Can you expect the farmer's son, especially if he has gone to high school, to take over the farm as his father grows old and feeble - which may mean that the son must wait 15 or 20 years - and then, after the father dies or retires from farming, look forward to an income of only \$1,000 a year? Meanwhile the son will not have enough income to get married on. A farm twice as large in crop area as the present farm and with yields per acre also twice as high will hold most boys on the farm, permit them to marry, and gradually take over the farm as the father's strength declines with age.

Only in Land Class V does farm operation reach an intensity that provides sufficient return to induce most of the farm boys in the area to stay on the farm. This land class has the highest acreage in cropland (Table 25), the highest yields and the largest farm income in the county. It contains less than seven percent of the county's vacant farms although it has more than 21 percent of the rural population (Table 24). In Land Class IV and especially in Land Class III the unit in many cases is not sufficiently large to be economically workable. It would seem to a district's advantage, as well as to the advantage of the individual farmer involved, that when a farm is surrendered for taxes it be offered to the man owning the adjoining farm. Two small marginal farms, in this way, might be converted into a unit of sufficient size to be operated profitably. Considerable areas in Class III land, however, can only render sufficient return if supplementary activities such as fishing and lumbering are also carried out by the operator. In this connection, the farm woodlot could play a

very important part.

In summary, land abandonment in the county has been due to the lure of better opportunities elsewhere coupled with the physical characteristics of the soil and poor farm management. Closely related to this latter item has been the lack of agricultural education in the county, as discussed in the preceding chapter. Any program designed to slow down abandonment and, in turn, encourage resettlement can only be undertaken when the causes for abandonment are understood not only in the province as a whole but also in the county in the framework of land classification. Obviously, it is easier to increase production on good land than on poor land. By either procedure a number of years will be required, but the time will be shorter and the returns greater if most of the effort is directed to the better land.

CHAPTER 3

SOLVING PROBLEMS OF LAND USE

The problems of land use in the county of Antigonish are those of an area which is in large part marginal for commercial agriculture. These problems have been presented and discussed in the preceding chapters. Their solution rests finally with the means employed to achieve the utmost utilization of land resources. These resources vary in different parts of the county. The troubles in agriculture in the county stem from two sources, the marginal farm and the marginal farmer. On the one hand, the needs of the farmer as an individual operator can best be served through the offices of the professional agriculturist. On the other hand, the needs of the land and of the farmer as a member of society involve such questions as long term productive capacity and maximum returns for the farmer in changing economic situations. Here the state must play a part. Here also, the role of the co-operative movement assumes importance. For while the state can only suggest and assist, the co-operative movement can organize its members for action in carrying out the recommendations of the state. More than this, it can educate the people to make demands, in their own interest and in the interest of their communities, on the state. Through co-operative action, the people will be better prepared to see that the state exists for them and not they for the state.

Extension work of the Nova Scotia Government

In Nova Scotia, the farmers can scarcely accuse their provincial government of neglect. No other group in the province has received such assiduous attention. In this chapter, some of the more important government policies toward agriculture and the promotion of full utilization of land resources will be presented, their results in the county of Antigonish thus far evaluated and future possibilities considered.

Throughout, the part played, or to be played, by the co-operative movement will be incidentally described. It is important, of course, that physical limitations as presented in the chapters on Soils (Section I, Chapter 4), Land Use (Section II, Chapter 3) and Land Classification (Section III, Chapter 2) and economic limitations as presented in the chapters on the Historical Background (Section II, Chapter 1), the Dairy Industry (Section II, Chapter 4) and Land Classification (Section III, Chapter 2) serve as a background against which present policy can be assessed and additional recommendations made.

1. Soil Improvement. One of the basic needs of the Antigonish County farmer is to increase and maintain soil fertility. The great fault of soils in the county is their excessive acidity. The simplest remedy is heavy application of lime, but until very recently lime was used only sparingly. The principal hindrances to a more general use of lime on Nova Scotia farms in the past were: (i) the initial cost of the lime; (ii) an apparent lack of appreciation on the part of many farmers of the need for lime; (iii) the need for a wider dissemination of knowledge as to how it could most effectively be used and (iv) the labor of spreading the lime.

In 1933, the provincial government undertook to meet some of these difficulties by arranging for the delivery of lime to any railroad station at a new low price and by inaugurating a selling campaign to increase the use of lime. Lime quotas based on the acreage of improved land in each county were established and an attempt made to reach the goals thus set. It was not until the late 1930's, however, when campaign efforts began to reach their promotional peak, that success was marked. In this connection, it is interesting to note the results achieved in Antigonish County and Cape Breton Island as compared to the whole of Nova Scotia. In the former districts, the Extension Department of St. Francis Xavier University in Antigonish was

instrumental in getting the farmers to use lime. The lime quotas and the lime used in Antigonish County, Cape Breton Island and all of Nova Scotia for the period 1940-1948 are shown in Table 28 and expressed graphically in Fig. 16.

Antigonish County and Cape Breton Island have consistently ranked higher than the province as a whole in the use of lime as a percentage of the quota set. In some years, the percentage in these areas was well over 200. In contrast the percentage in all parts of the province was under 100 in more than half of the years listed. Moreover, with the increase in quotas in 1946, the county of Antigonish maintained its percentage above 100 as compared with the drop experienced both in Cape Breton Island and in Nova Scotia as a whole. The effect of extension work through the Antigonish Movement, as described in Chapter 1 of this Section, is readily evident. An important part of this work consisted in acquainting farmers with the value of marl which is available in quantity in certain sections of eastern Nova Scotia (Photo 53). Marl, however, has no magnesium, so that it has to be used together with limestone.

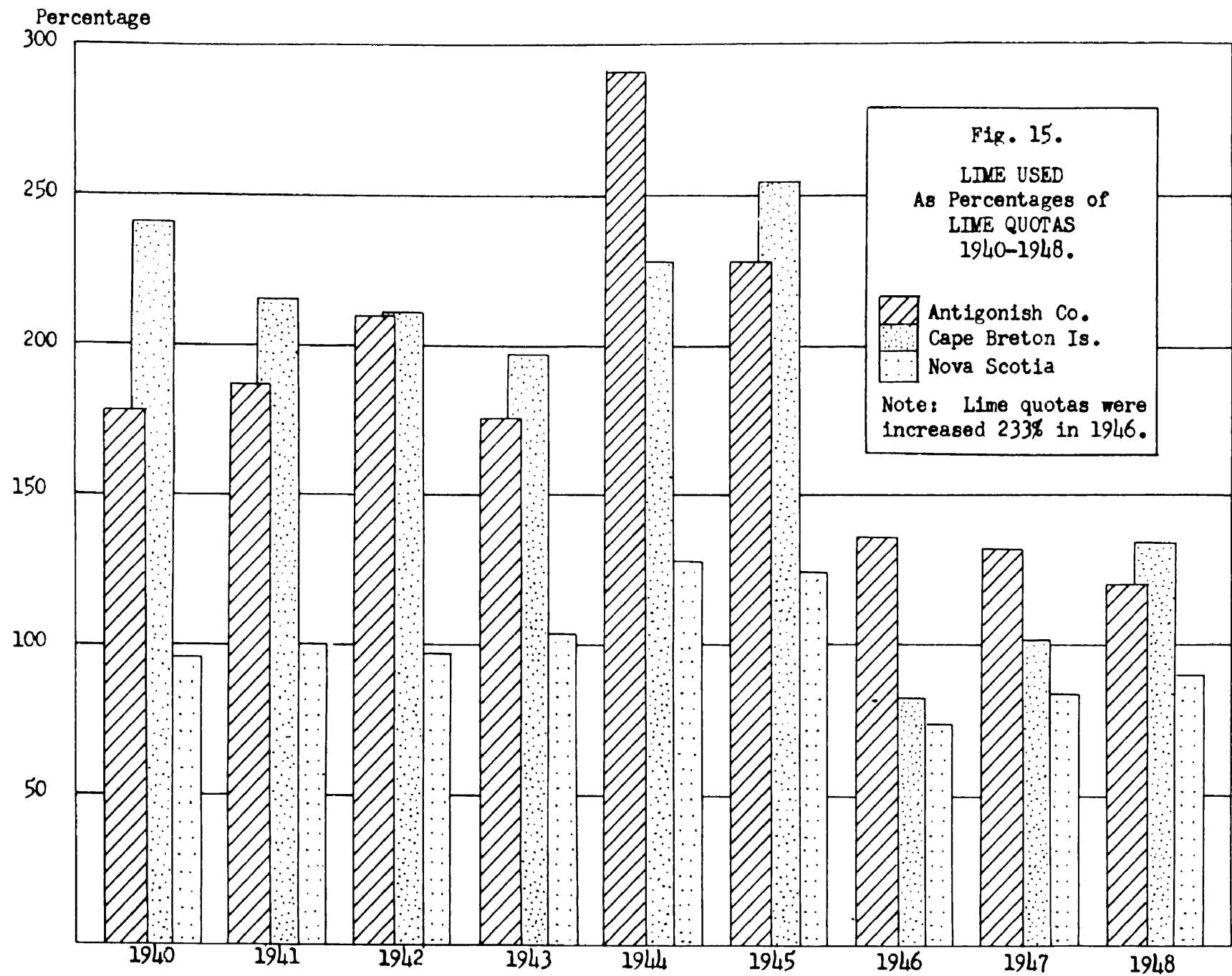
More recently, the Nova Scotia government has embarked on a Grassland Program for the province. The program has four objectives: the maintenance of soil fertility, the practice of good management, summer pasture (Chapter 4 of Section II), and the storing of quality hay and grass silage. Farmers in each county apply for membership in the program through their Agricultural Representative. Judges score the member farms and if the program on a farm meets certain standards, the farmer is given suitable recognition. He also has an opportunity to compare his grassland program with those of other farmers.

The basic recommendations with regard to the maintenance of soil fertility include, besides lime, the use of barnyard manure (eight to

TABLE 28 - Lime Used and Lime Quotas - Antigonish Co., Cape Breton Is.
and Nova Scotia - 1940-1948.¹

Year	Area	Lime Used tons	Marl Used tons	Total Lime Used tons	Lime Quota tons	Use as % of quota
1940	Antigonish Co.	1,450	1,400	2,850	1,600	178
	Cape Breton Is.	4,258	6,631	10,789	4,500	240
	Nova Scotia	20,259	8,431	28,690	30,000	96
1941	Antigonish Co.	1,600	1,400	3,000	1,600	187
	Cape Breton Is.	5,145	4,499	9,644	4,500	214
	Nova Scotia	23,415	6,649	30,064	30,000	100
1942	Antigonish Co.	2,140	1,200	3,340	1,600	209
	Cape Breton Is.	5,131	4,259	9,390	4,500	209
	Nova Scotia	23,227	6,109	29,336	30,000	98
1943	Antigonish Co.	2,200	600	2,800	1,600	175
	Cape Breton Is.	5,726	3,100	8,826	4,500	196
	Nova Scotia	26,907	4,010	30,917	30,000	103
1944	Antigonish Co.	2,100	2,525	4,625	1,600	289
	Cape Breton Is.	5,201	5,051	10,252	4,500	228
	Nova Scotia	30,452	7,967	38,428	30,000	128
1945	Antigonish Co.	1,632	2,000	3,632	1,600	227
	Cape Breton Is.	3,975	7,423	11,398	4,500	253
	Nova Scotia	30,565	9,623	40,188	30,000	134
1946	Antigonish Co.	2,666	2,550	5,210	3,800	137
	Cape Breton Is.	5,840	2,200	8,040	9,700	83
	Nova Scotia	49,954	5,125	55,079	70,000	74
1947	Antigonish Co.	1,533	3,468	5,001	3,800	132
	Cape Breton Is.	5,830	4,084	9,914	9,700	102
	Nova Scotia	50,453	5,877	56,330	70,000	84
1948	Antigonish Co.	2,058	2,570	4,628	3,800	122
	Cape Breton Is.	7,635	5,427	13,062	9,700	135
	Nova Scotia	54,282	8,456	62,738	70,000	90

¹Adapted from Annual Reports of the Nova Scotia Department of Agriculture.



ten tons per acre) and commercial fertilizer (500 pounds per acre). Many of the farmers in the county, as mentioned in the preceding chapter, throw away much of the fertilizer in their manure by leaving it out in the open. Agriculturists in the county are just beginning to impress farm operators with the need to conserve manure to the extent, at least, of keeping the piles under cover (Photo 55). Better conservation and wiser application of available farm manure are items around which the Grassland Program largely revolves. With these go grassland and pasture improvement and the production of a larger quantity of feed per acre. This in turn means that more cattle can be kept on the acreage available at the present time. And more cattle means more available manure.

The use of commercial fertilizer in Antigonish County is generally below the average figure for the whole province. In 1948, farmers in the county used 1,430 tons of commercial fertilizer, or an average of 65 pounds per acre of improved land. The amount used in the whole province in 1948 was 41,258 tons or an average of a little over 100 pounds per acre of improved land. Both the figure for the county and that for the province are well below the goal of 500 pounds per acre aimed at in the Grassland Program. Extension workers have always believed in taking one step at a time, however, and up to now have devoted most of their energies to advocating the use of lime. The next step involves the promotion of manure and fertilizer with emphasis on proper conservation of the former.

In connection with efforts to improve soil conditions in the county, a survey of the extent of hardpan formation and an investigation of the possibilities of subsoiling as a remedy is a necessity at this time. The provincial Department of Agriculture has not yet approached the problem. At Antigonish, however, Dr. Hugh MacPherson of St. Francis Xavier University is attempting to get a subsoil plow built and tested.

PHOTOS 53 - 57 (Solving Problems of Land Use)

53. One of the basic needs of the Antigonish County farmer is to correct soil acidity. Fortunately, marl is available in quantity in certain areas. Pits are located at Lanark, Brierly Brook and Lower South River. Part of the Lanark pit is shown here.

54. An important part of any program for Land Use Development in Antigonish County is the encouragement of improved farm practices. On this farm, one of the most progressive in the county, an ensilage cutter and silo filler are being used to cut up the straw and blow it around the silos in the barn as the grain is being threshed. The two silos on this farm are the only ones in use in the county.

55. Better conservation and wiser application of manure are items around which the provincial Department of Agriculture Grassland Program largely revolves. Manure piles in the county are generally left out in the open, often under the eaves of the barn as shown here on a farm near Purlbrook.

56. Land breaking in Antigonish County has been carried out only on a limited scale but results thus far have not been satisfactory. In these two acres broken at Big Marsh most of the topsoil was removed. The cost for breaking alone, after the payment of a government subsidy, was \$75 per acre.

57. The question of land resettlement in Antigonish County involves detailed investigation before a proper settlement scheme can be launched. Such investigation would consider the potentialities of an area within the framework of land classification. This land, located along the main highway west of Tracadie, is now reverting to spruce but has definite agricultural possibilities. It has been included in Land Class IV.



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In Appendix A of this study, a program is presented for the use of lime and fertilizer on an Antigonish farm. The plan was drawn up by Dr. O. E. Baker and is meant to apply to the typical farm in Land Class IV. The requirements, however, are basic and the differences between the three agricultural land classes would seem to lie not so much in applications per acre of lime and fertilizer as in the acreage to be devoted to cropland and improved pasture.

2. Farm Mechanization. Lack of mechanization is an important factor contributing to low farm production in Antigonish County. The census of 1941 reported 21 tractors, 13 threshing machines and 47 gasoline engines on the 1,424 farms of the county. (The writer estimates that the number of tractors has approximately doubled since 1941). The fact that mechanization has not taken place is evidence that farming methods are backward on many farms and that steep topography in many areas results in small fields which cannot be worked efficiently. The difficulty has been met in part by the practice of owning threshing machines, tractors, binders and other implements co-operatively. The Nova Scotia government, under its Co-operative Tractor Policy, offers to pay one-third of the cost toward tractors and seed bed equipment to any group of six or more farmers who get together to make a co-operative purchase.

Co-operative use of machinery is especially to be recommended in the case of the small farmer who could not otherwise afford the use of a tractor. Farmers in Land Class III have in this device an answer to their power problem. Here farms are small and topography definitely limits the size of fields in crop. In addition farming operations are in large measure supplementary to fishing or lumbering and lend themselves to part-time use of tractors. In Land Class IV, too, this co-operative scheme has proved itself a virtual necessity in increasing

farm production, especially in the case of young farmers who have set out to improve old farms. There are about 20 tractor groups in the county at present.

The Co-operative Tractor Policy has definite limitations with regard to agriculture in Class V, however. Here, the intensity demanded by specialized farming (whole milk) could most profitably be met by the presence of a tractor on each farm. The role that can be played by a tractor on the dairy farm is dramatically demonstrated by the development of one of the county's largest farms in the whole milk industry. This farm, located near Lower South River (and included in the sample for Class V in Table 25), produced only enough hay to feed two cows and a yoke of oxen in 1910. In 1921, the operator purchased a tractor, an extravagance foreign to agriculture in the area at the time. The tractor was used every year for all the farm work - ploughing, harrowing, threshing, filling silos (this is the only farm in the county in which ensilage is put up), pulling the binder and moving poultry houses. (A new tractor was purchased in the summer of 1949). It was the tractor that gave this particular operator the courage and the power to bring the big back fields of his farm into production. These have been brought up from nothing at all to producing luxuriant pastures, three and four ton hay crops and 75 bushel grain crops, by the generous use of marl, good cultivation and plenty of manure and fertilizer. The results that have been obtained on this farm demonstrate, to a degree, what can be done on many of the farms in Land Class V, and to a lesser extent in Land Class IV.

3. Farm Planning. Any system of planning or zoning on a provincial scale naturally involves more planning on the individual farm. Here, too, the provincial Department of Agriculture has come in to help the farmer. Under the Farm Improvement Plan, inaugurated in 1947, an official of the Department is delegated to serve a specific district

in the province. Membership in the Plan is purely voluntary and there is no direct cost to the farmer. As soon as an operator joins, his farm is surveyed by an engineer, a plan of the farm is drawn up and the farmer is advised what rotation to follow and how the farm layout may be altered to increase production (Figs. 13, 14). Supplementing this Plan (although it came first) is the farm-to-farm survey of the soils division of the Department of Agriculture. Acting upon requests from farmers, fieldmen go out into different areas, collect several samples from each farm (at no cost to the farmer) and discuss soil problems with the operator. After the samples are analyzed, the fieldmen return to the area, again contact each farmer and work out with him the treatments for each field.

Approximately 20 Antigonish County farmers had joined the Farm Improvement Plan by the summer of 1949. Only two of these were in Land Class V; the remainder were in Land Classes III and IV with most of them in the IV class. Organization on most of the farms left much to be desired (III, 4), and a common fault was that too few cows were kept with a resulting scarcity of much needed manure for the fields, of cream for a cash crop and of skim milk for a few hogs. An important part of the Plan is the collection from each farmer of detailed records of his farm business on a standard labor income blank. Data thus obtained are not only necessary in the formulation of recommendations but, when published, enable each member of the plan to compare his operations with the average, and the best, in his own district. Recommendations to be followed in farm planning have also been circulated by the Extension Department of St. Francis Xavier University. These are presented, in part, in Appendix C which is a copy of the study bulletin sent out weekly to members of study groups in Extension's University of the Air series (Chapter 1 of this Section).

One of the most important faults of Antigonish County farms and one that has already been emphasized is that cropland acreage is too small. Future efforts of the Farm Improvement Plan, when membership is increased, will undoubtedly stress the necessity of enlarging, wherever possible, the areas devoted to field crops and the improvement of pasture land as well as a more widespread and more scientific rotation of crops. The second item also fits into the government's Grassland Program, discussed above. Good management here involves fencing for controlled grazing, clipping to control weeds and spreading droppings. The estimated cost of improving land for pasture in Antigonish County as drawn up by the Farm Management Division of the provincial Department of Agriculture is shown in Appendix B.

In connection with the need to increase cropland, the breaking up of new land (a wartime expedient) is a project which promises to play an important part. The Department of Agriculture pays part of the cost of land breaking, obtains suitable tractors from the Highways and private individuals, and exercises general supervision over the operation. The Dawson Commission states: "The cost of these operations, if unaided, would be too heavy for many farmers to bear, and as the productive capacity of the country is increased by these improvements, the participation of the government seems amply justified" (III, 106; p. 30).

Land breaking in Antigonish County has only been carried out on a very limited scale. Results have been far from satisfactory. In two acres broken near Big Marsh in the summer of 1949, most of the topsoil had been removed through the carelessness of the tractor operator (Photo 56). The cost for breaking alone, after the government bonus had been paid, was \$150 or \$75 per acre. It is evident that the whole land breaking project is one that must be reviewed further and improved if it is to achieve best results. The possibilities might be explored of

using the power saw for clearing land, especially where bigger trees are involved. In this process, the trees are cut level to the ground and the land used for grazing until the part of the tree left in the ground has decayed sufficiently to permit relatively simple removal. The technique is one that is undergoing experimentation in several sections of the United States.

The need to increase the area of cropland exists in all three agricultural land classes. In the more intensive classes, more cropland and pasture is necessary to ensure successful dairy farming on a relatively large scale. In the less intensive areas, an increase in cropland and pasture improvement is even more essential for here the problem is, in many cases, one of marginal agriculture. The Dawson Commission recommends that:

The assistance now given by the government for the breaking up of new land might be followed up by a bonusing system (such as that used in Quebec for new settlers) available only to small farms below a certain acreage and designed to encourage desirable improvements and new departures. The amount paid out would be small, yet the results over a number of years would be far from negligible. (III, 106; p. 75).

Recommended acreages for farms in the different land classes are given in Appendix A.

4. Land Settlement. The Nova Scotia Land Settlement Board was originally formed in 1932 as an unemployment relief measure to assist in the settlement of vacant and other unoperated farms in the province (III, 7). In the early years, the results of the scheme proved disappointing due in large part to insufficient care in selecting both the families and the farm for settlement. A subsequent change in policy limited settlers to those with enough experience to be able to farm properly. The settlers also had to have some capital of their own to invest in the property. In 1945, the Act was again amended, reducing the interest rate and increasing the maximum amount of the loan.

The aim of the Land Settlement Board today is to assist in establishing farmers, farmers' sons and others experienced in farming, whether residents of the province or immigrants willing to become residents, on farms capable of being made productive. The settlers are also assisted in making a success of their undertaking. The board is prepared to lend any amount of money up to a maximum of \$5,000 to settlers between the ages of 21 and 50, who have some capital of their own to start with. Settlers must be able to put up one-third of the purchase price of the farm. The farm selected must be approved by the Board.

As of September 1949, there were 24 settlers under the Farm Settlement Act in Antigonish County (Map 22). Of these, eight are located in Land Class III, four in Land Class IV and 12 in Land Class V. This is too small a number, of course, to permit discussion of any "pattern". The high number in Land Class V is due more to the desire of settlers to be near Antigonish than to any differences in the land. A factor in the relatively high figure for Land Class III is the availability of farms, coupled with the practice of most of the settlers here of doing work off the farm.

The Land Settlement Board works in a limited sphere, the aiding of farmers' sons or other farmers to establish themselves on separate farms. It is not organized to extend long term credit to established farmers who might wish to make considerable improvement on their properties. Loans are made only for the purchase of the farm. The settler must be in possession of, or in a position to obtain, sufficient stock and equipment to properly operate the farm. The need for long term credit in the county, in the province and in the whole country is something that has been felt for some time (III, 16). As yet, however, negotiations have not progressed beyond the discussion stage.

Workers in the Antigonish Movement have also recognized the need for long term credit and are in the process of exploring ways and means

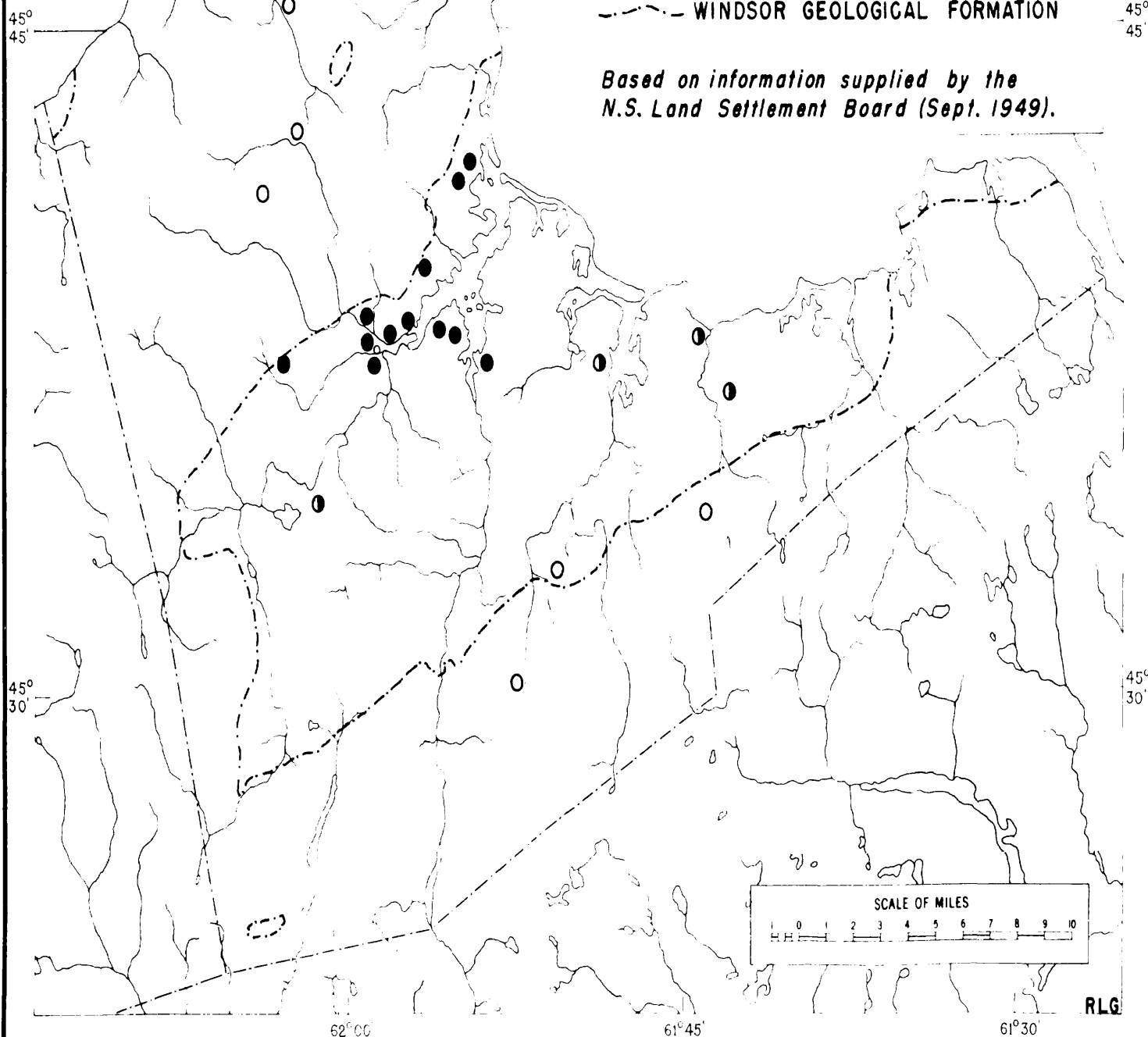
ANTIGONISH COUNTY

FARM SETTLERS UNDER N.S. LAND SETTLEMENT ACT

- O-Settlers in Land Class III
- Settlers in Land Class IV
- Settlers in Land Class V

--- WINDSOR GEOLOGICAL FORMATION

*Based on information supplied by the
N.S. Land Settlement Board (Sept. 1949).*



making it available in the province. Antigonish County farmers in the movement have also played an important part in bringing the question of long term credit to the attention of other farmers and government officials. In the 1948 (December) meetings of the Nova Scotia Federation of Agriculture, an Antigonish farmer had this to say on the subject:

I came up from Cape Breton to Antigonish about five years ago and started on a shoe string. At the present time I have four milking cows, two sows, a team of horses and seven sheep. A good deal of my income must come from work off the farm. In order to give me a decent standard of living, I should have ten good dairy cattle. I could invest \$2,000 in my buildings as they need considerable repair. I need a grainery, a manure carrier, a pumping system and a milking machine. These improvements would not cost less than \$1,500. My house needs repair and I need a hog house. Over and above all that I need considerable machinery - a tractor and other farm implements that would cost within \$1,000. In all, I need \$6,000 to give me a standard of living. How am I going to get this money and if I got it, how could I pay it back? I contend that a long term should be for 40 years, with an interest rate of not more than two and a half percent. At the present time, we have no set-up that will supply credit of this nature. The Land Settlement Board is the nearest thing to it but it is still a long way from the actual thing.

5. Management of the Farm woodlot. The number of acres in woodland on Antigonish County farms in 1941, according to the Federal Census, was almost 62,000 or over 40 acres per farm on the average. The importance of these woodlots to the timber industry of the province is something that no one disputes. Nor is there any question of the need of convincing the farmer to conserve this vital asset, so that it can most effectively serve him and his community. In 1941, forest products made up 8.6 percent of the total value of farm products in the county (Table 12). This proportion could be greatly increased in many cases. In the words of Professor Minville, before the Dawson Commission, the forest "remains the greatest complementary resource of agriculture - the most fitting, in co-ordination with other sources of work and revenue, to establish a sound rural economy." (III, 10b; p. 31).

In spite of the pressing need, little has been done with the farm

woodlots in Antigonish or in any other county in the province. In 1946, an act called the "Small Tree Conservation Act" was passed which forbids the cutting of spruce, pine or hemlock trees less than ten inches on the stump on any operation cutting over 100,000 board feet. This has helped bring the forestry problem before the owners of large private holdings (usually over 1,000 acres) but has little to do with conservation on the farm woodlot.

Toward a Program of Land Use Development

Thus far, the present chapter has been an attempt to describe, somewhat sketchily, the policy of the Nova Scotia government toward agriculture. The trend cited is an encouraging one for it indicates the resolve of the province to do something about the effect that the growth of Canada has had in retarding economic development in the Maritime Provinces (Section II, Chapter 1). Until quite recently, the attitude in this part of the country has generally been one of blaming the Federal government for all distress in the area and expecting this government to provide the solution to any problem that might arise.

The provincial policies are, in the main, policies of expediency. Problems are confronted when the gravity of the situation leaves authorities almost no alternative. It is understood, of course, that the province is a poor one. But the question is raised as to whether piecemeal solutions are, in the long run, more economical than an over-all program. In the words of the Dawson Commission: "The province needs, in short, a policy of development on an even wider scale, with a knowledge which is even more extensive and applied with even more vigour and imagination than has hitherto been attempted" (III, 10b; p. 19).

The writer has attempted to bring one point of view - the geographic - to bear on the setting-up of a long term land use development program.

Such a step involves a comprehensive study of climate, geology, morphology and soils; an examination of the geographic and economic factors that have affected land use and agricultural production since the days of early settlement; an investigation of markets and the suitability of certain areas for specialized activity, such as Antigonish County for the dairy industry; and finally, the synthesis of all these factors into a land classification scheme.

Once the land is classified, a framework is provided for the development of an integrated policy. Such a policy takes the resources of an area as the starting point and goes on from this to examine regional and inter-regional relationships, especially between producing and consuming areas. Within the classification framework itself, a host of problems relating to land use can be studied further and means advanced for their solution. In Antigonish County, such problems include: the reversion of farms to forest (Land Classes I and II); the breaking up of forest or uncultivated land for agricultural purposes; (Land Classes III, IV, V); the most effective use to be made of abandoned farms (all Land Classes); the more intensive development of the fluid milk district, depending of course upon the market situation (Land Class V); the formulation of more flexible schemes of land settlement (Land Classes III, IV, V).

It is evident from the policies discussed in the first part of this chapter that the provincial government, with the aid of the co-operative movement, has already made a start toward the solution of these problems. What is suggested here is that such problems can best be evaluated and remedies best be advanced when viewed as part of a greater whole. The key to this whole is provided in land classification. Not only can problems in the same class be compared but these in turn can be compared to problems in the other classes. The classes,

themselves, however, are not to be regarded as fixed once boundary lines are drawn. As research work proceeds, these lines would be constantly modified and adjusted to suit new findings.

In the matter of soil improvement, policy must be adapted to the land class. All the agricultural land classes need generous lime applications and a minimum of manure and commercial fertilizer. Soils in many parts of the county, and the rest of the province, have deteriorated to such an extent, however, that only systematic measures extending over a period of years will provide necessary rejuvenation. Obviously the operation will not be the same in Land Class III as in Land Class V. In the former class, the marginal position of the farmer is very important. This and the greater ignorance or indifference of farmers in the less intensive classes are factors to be reckoned with in soil improvement operations.

The use of machinery is something else that varies with the land class. The Co-operative Tractor Policy is ideal for the farmers in Class III and many in Class IV but not practical for the dairy farmer in Class V. Here again, therefore, recommendations will vary. The same is true in the field of farm planning. Contact thus far has been with the individual farmer who must generally provide the initiative in joining a program. In large part, the government seems not entirely sure of itself and thus does not care to push a program too far. Obviously, steps need to be taken so that long range plans will be possible. This, in turn, would enable government officials to carry out policies with vigour and confidence.

The question of resettlement, for instance, involves detailed investigation before a settlement scheme worthy of the name is launched. Such an investigation must look to the potentialities of each area, as would be included in a system of land classification, and relate

these potentialities to the broader provincial and sometimes federal picture. Once this is done, land can be set aside to revert to forest, or to be resettled as a full time or part time farm (Photo 57). In the words of the Dawson Commission: "There are in this province promising areas (Northern Queen's, Antigonish and parts of the Annapolis Valley suggest themselves as possibilities) which might be recolonized in numbers if the problem were attacked on a broad scale and with a proper consideration of all the economic and social factors involved". (III, 10b; p. 25).

One grave fault in present government policy, and one that would be brought out in land classification, is the insufficient attention given to marginal farmers in the county and in the province. Yet these operators comprise over 30 percent of the total in Antigonish County (Table 24) and more than two-thirds of the total if those farmers in Land Classes I and II and part of those in IV are included along with those in Class III. The problems here are more complex than in the more intensive land classes and in many cases more than one or two solutions are necessary. It is evident that solutions here depend upon the co-operation of all the primary fields of endeavour in an area. Despite general agreement of the need for such co-operation, there is for instance, little of it between agriculture and forestry. This is especially serious in view of the important part that must be played by forestry in the activity of many marginal farmers (III, 11). The role of the woodlot is due to assume increasing importance. Its conservation (III, 5) is something that requires the concerted co-operation of both forestry and agriculture. Here again, the value of the woodlot and schemes to make the farmer conscious of this value can best be worked out in the framework of land classification.

It is very doubtful, however, whether a really successful attack

on problems of land use can be made without something more than surveys, classification and recommendations. The key to sound practice, whether it be agriculture, forestry or fishing, is education to enlist the support of public opinion, not only among the primary producers but also in urban areas. In this connection, the Antigonish Movement (Chapter 1 of this section), is providing a valuable supplementary service to research and to the solution of problems, not only in the county of Antigonish but in the whole Maritime area. The Movement recognizes that the greatest asset of any area is the people themselves, and these, plus the material resources, form the basic equipment for economic progress. It recognizes further that the people must be informed, that they must know how to use their equipment in the best possible way to meet the demands of their own and other regions. They must understand the complementary inter-regional relationship upon which they and the rest of society in their area and in the rest of the county depend. Once the people understand, the carrying out of proper recommendations should be a relatively simple matter.

IV

SUMMARY

I PHYSICAL GEOGRAPHY

Climate. Antigonish County is included in the climatic region, "Northern Nova Scotia". Only two months, July and August, have a mean monthly temperature above 60° F. The frost-free season lasts approximately 105 days. Precipitation in most years is adequate for all vegetation that can exist within the thermal limits. However, one summer month in which less than one inch of rainfall is received occurs every four to five years. Existing climatic records are too incomplete to permit any detailed appraisal of the effect of climate on agriculture in the county or anywhere in the province. No work has been done in the field of micro-climatology.

Geology. Nova Scotia is a geological patchwork made up of uplands and lowlands. Antigonish County contains both upland and lowland sections. The former is underlain by Precambrian and Ordovician igneous and metamorphic rocks. The latter is underlain by Mississippian conglomerates, shales, sandstones and limestones and pre-Mississippian slates, shales and sandstones. The most important geological formation in the lowland from the point of view of agriculture is the Windsor which contains extensive limestone beds. The area underlain by Windsor occupies one-third of the total land area of the county but contains 60 percent of the total rural population and two-thirds of the improved land.

Morphology. One of the smaller remnants of the Atlantic Upland in Nova Scotia are the Highlands of Pictou and Antigonish counties. In Antigonish, the uplands occupy one-quarter of the total land area of the county but contain less than five percent of the improved land. The rest of the improved land is in the lowland area. Within the low-

lands, the till developed on the Windsor geological formation has given rise to some of the most productive agricultural soils in the county.

In Antigonish County, and in most of Nova Scotia, the glacial deposits are thin and the composition of the drift is closely related to the underlying bedrock. The covering of drift which is spread out over the surface of the county is largely ground moraine. There are no evidences of terminal moraines here or anywhere on the Nova Scotia mainland. The whole question of glaciation in the province is still quite obscure. Much work remains to be done before the significance of glacial activity in the Maritime area can be assessed.

Soils. The parent materials of Antigonish County soils are largely the till of the ground moraine or similar material which has undergone modification by water action. There is a marked correlation between the soils and underlying bedrock. The forest cover is made up largely of mixedwood associations, composed mainly of red spruce, yellow birch, sugar maple, beech and balsam fir.

The Nova Scotia Soil Survey has grouped the soils of the county into four divisions depending on the character of the till from which they have developed. A tabular description of the soils is given in Table 6, p. 43. Most of the farming in the county is done on the Cumberland, Millbrook, Queen's and Merigomish soils. Some of the areas in woodbourne are well suited to agriculture but shallowness or hilly topography impose limitations in most cases. This applies also to the soils on the uplands, the Thom, Halifax and Kirkhill associations. The Hebert soils are generally too coarse textured for agricultural purposes but in many places where the sand is fine enough, they may be suitable.

II RURAL DEVELOPMENT

Historical Background. Most of the early settlers of Antigonish County was made by Frenchmen around the year 1776. The Scottish immi-

grants began to arrive shortly before 1800.

The population of the county grew from 7,103 in 1827 to 18,060 in 1881. After 1881, the population steadily declined until it reached its lowest point, 10,073, in 1931. This decline was due in large part to the operation of national forces which affected the whole Maritime area. The situation in Antigonish County was further aggravated by the lack of any farm tradition in the county and the total dependence of the area upon agriculture and other primary enterprises.

The present population of Antigonish County is 10,845 with 8,388 rural. The population pattern is strikingly linear and with the exception of the French settlements, conforms more or less to physical factors. In the period 1931-1941, some of the subdivisions of the county had population increases which may indicate the beginning of a new era in the population story of the county. This would be the "re-settlement period", a time in which that portion of the unoccupied land still suitable for agriculture in the county might be settled.

Land Use and Agricultural Production. Early agriculture in the county was primarily concerned with the growing of food for immediate needs. With the gradual clearing of timber, the bottom land of the county was brought into use. This led to the rearing of cattle, horses and sheep. These, with dairy produce, formed the county's principal exports until the turn of the century.

Agricultural development in the county reached a peak around 1891, in common with development in the rest of the province. The 1891 peak occurs in all phases of agriculture in the county - in the changes in the utilization of farmland, in the trends in crop acreage and production and in the changes in the number of livestock. Early settlement of a large proportion of the county's land area was possible under the self sufficing system of rural life before 1900, but has not

proved suitable to the commercial type of agriculture which has developed since then. In the process of land abandonment, agriculture tended to concentrate on the better lands. The county's three principal crops, hay, oats and potatoes, have all shown increases in yield.

Farm abandonment has been characteristic of agriculture in Antigonish County and in the rest of Nova Scotia since the turn of the century. The extent of abandonment is measured not only by the numbers of non-resident properties but also by the amount of land that the provincial government has acquired in Tax Sales or in purchases from individual owners. In 1948, over 21 percent of the county's farms were vacant and in the period 1941-1948 over 22,000 acres of one-time farmland was purchased by the government. These Crown Lands are set aside for forestry.

Land use activity in the county is synthesized in a map of land use regions. The six regions delimited are: 1. Lumbering - Subsistence; 2. Fishing - Subsistence; 3. Lumbering - Farming; 4. Fishing - Farming; 5. Mixed Farming; 6. Dairying (Whole Milk). The first four regions contain a combination of lumbering or fishing as a major activity, with subsistence or mixed farming as a minor one. The Mixed Farming region contains a number of different types of farming, including cream shipping, poultry farming, part-time farming and a small fruit specialty. The Dairy (Whole Milk) region provides most of the fluid milk production in the county.

The Dairy Industry. The recent growth of the dairy industry in Antigonish County has been one of the outstanding developments in Nova Scotian agriculture. This growth is largely the result of increased fluid milk sales in response to the demands of the Sydney market. The shipment of cream decreased in the period 1941-1949. Cream shippers in most cases, combine a bit of dairying with other farm enterprises.

Only a fraction of the operators ship cream in the winter.

In contrast to cream shipping, whole milk shipping is a specialized industry. In 1949, 136 farm operators were shipping fluid milk to Antigonish town and Sydney. The typical milk shipper in the county has seven to ten milk cows. The bigger operators may have as many as 30. The most successful farms are on the heavier soils around the town of Antigonish. In other areas where soils are only fair (Big Marsh, Heatherton, Meadow Green), good farm management has been an important factor in the development of the industry.

The expansion of the dairy industry in the county depends upon several factors. Soils and climate are favourable but farm production is low due in large part to the small size of the operating unit and poor farm practices. An appreciation of pasture culture is especially necessary. Another important consideration is the demand, present and future, of the Sydney market. In 1937, Antigonish dairy products played an insignificant part in supplying the Sydney market. Farmers could not meet the market requirements of volume, continuity of supply and grade. The picture has greatly improved since then but there is a great deal of room for further expansion. The low per capita consumption of milk in the Sydney area offers another opportunity for increasing milk sales.

III SOLVING PROBLEMS OF LAND USE

The Antigonish Movement. The Antigonish Movement is a program of adult education through economic co-operation. In Antigonish County and in the rest of eastern Nova Scotia especially, one of its important functions is to provide agricultural education and to combat the excessive individualism of primary producers in the region. The Movement was initiated by the Extension Department of St. Francis Xavier University in 1928. Economic co-operation in the county moves on three fronts -

co-operative stores, a co-operative wholesale and credit unions. Each of these organizations has grown steadily. Through them, adult education and the need to improve agricultural practices have taken on meaning for the farmer.

Co-operative stores, and to some extent credit unions, are regionally organized. The wholesale at Antigonish is a regional one affiliated with the central co-operative marketing agency for the Maritime Provinces which is at Moncton. The day is envisioned when Maritime co-operatives will be strong enough to join other co-operatives to form a national and perhaps an international organization. The Antigonish Movement, however, recognizes that participation in one or two phases of co-operative activity does not solve economic problems. The principle of integration is stressed especially in connection with the extension program of the Nova Scotia Department of Agriculture.

Land Classification. The county has been divided into five economic land classes based upon the intensity of present and probable future uses, in relation to the average intensity of use of the region. Land Class I is primarily adapted to forestry. Land Class II is better suited to forestry than to farming but some farming is done. Land Class III is marginal for agriculture on a commercial scale. Land Class IV is suited to general mixed farming (cream shipping, poultry, small fruits and vegetables). Land Class V is suited to the most intensive type of land use in the county, fluid milk production.

Cropping practices, with the exception of those carried out by the larger milk shippers, do not vary widely in the three agricultural classes (Land Classes III, IV and V). Soils management has not been given sufficient attention in any land class and all soils need potash, potash and lime. Soil acidity is especially significant in classes III and IV. The presence of hardpan and the need to maintain organic matter

are problems faced by most farmers. The process of farm abandonment, a common phenomenon in the county, has proceeded most rapidly where soil handicaps were greatest. Economic factors set the process in motion but poor soils, coupled with poor farm management, determined the extent of abandonment in different sections of the county.

Solving Problems of Land Use. The Nova Scotia Department of Agriculture has made an important beginning toward the solution of land use problems in the county and in the province. A campaign to increase the use of lime has been particularly successful in Antigonish County and eastern Nova Scotia. More recently, the government has embarked on a Grassland Program whose objectives include maintenance of soil fertility and the adoption of better management practices, especially in regard to summer pasture and grass silage. Other policies of the Department of Agriculture include the Co-operative Tractor Policy, the Farm Improvement Plan and the Land Settlement Policy. As yet, nothing has been done toward improving management of the farm woodlot.

The provincial policies, however, are policies of expediency and provide only piecemeal solutions. Problems can best be evaluated and remedies best advanced when viewed as part of a greater whole. The key to this whole may be provided in land classification. Once the land is classified, a framework is provided for the development of an integrated policy. Such a policy takes the resources of the area as a starting point. Further development is then determined by inter-regional relationships, especially those between consuming and producing areas, and by the demands of the national and international situation.

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VI

APPENDICES

Appendix A

Some Suggestions Toward a Farm Program¹

Size of Farm

- (i) Land Class V - 80 acres in crops, 80 acres in pasture.
- (ii) Land Class IV - 40 acres in crops, 40 acres in pasture.
- (iii) Land Class III - 20 acres in crops, 20 acres in pasture.

Rotation

Four year rotation of cultivated crop (corn or roots), small grain crop (oats or barley), clover hay and timothy hay.

(The inclusion of corn in the rotation is open to question. Agriculturists in the province are not in agreement upon its suitability for eastern Nova Scotia. Corn is suggested here to emphasize the need for a cultivated crop in the rotation - to plow under lime and fertilizer, to kill weeds, to improve the tilth of the soil and to produce more value per acre.)

First Cost (per acre) - cropland

(i) Two tons of ground limestone, plowed under -----	\$ 5.00
(ii) Two tons of limestone harrowed -----	\$ 5.00
(iii) 500 pounds of 20 percent P_2O_5 , plowed under ----	\$ 7.50
(iv) 500 pounds of 0-12-12 -----	<u>\$10.00</u>
Initial cost (per acre)	\$27.50

Second Cost (per acre) - cropland

(i) Cultivated Crop

- (a) Potatoes - plow and turn under lime and
600 pounds P_2O_5 and K_2O -
deepen to 10 " ----- \$12.00
- (b) Corn for silage -- 300 pounds 0-12-12 ---- \$ 6.00

¹The suggestions in this appendix with the exception of those dealing with size of farm, were made by Dr. D. E. Baker.

(ii) Small grain

300 pounds 0-12-12 ----- \$ 6.00

(iii) Hay crop

300 pounds 0-12-12 (first year) ----- \$ 6.00

Cost of fertilizer - \$6.00 per acre per year after the initial
cost of \$27.50 per acre.

Estimated Return on Crops (per acre)

- based on the estimated average yield in Land Class IV.

(i) Corn - 8 tons at \$5.00 per ton ----- \$40.00

(ii) Oats - 40 bushels at 60 cents per bu. ----- \$24.00

Barley - 25 bushels at \$1.00 per bu. ----- \$26.00

(iii) Hay - 2 tons at \$20.00 per ton ----- \$40.00

Pasture(1) Lime first - 3 tons of marl at \$2.50 (or ground lime-
stone harrowed in thoroughly) ----- per acre \$ 7.50

(ii) Mow twice to kill weeds.

(iii) Harrow in 500 pounds 0-12-12 ----- per acre \$10.00

Initial cost (per acre) \$17.50

Appendix B

Estimated Cost of Improving Land for Pasture¹

1. Plowing	- at \$2.50 per hour	-----	\$ 2.50
2. Harrowing	- at \$2.50 per hour	-----	\$ 2.50
3. Lime	- 3 tons per acre at \$2.50 per ton	-----	\$ 7.50
4. Fertilizer	- 400 pounds per acre 3-15-6 at \$2.30 per 100 lbs.	-----	\$ 9.20
5. Grass seed	- Red Clover - 5 pounds @ .50	---	\$2.50
	Alsike - 5 pounds @ .40	---	\$2.00
	Timothy - 10 pounds @ .27	---	<u>\$2.70</u>
			\$ 7.20
6. Fence	- 10 acres - 160 rods - \$104.00	---	\$10.40 per acre
	5 acres - 120 rods - \$ 78.00	---	\$15.60 per acre
	1 acre - 50 rods - \$ 32.50	---	\$32.50 per acre
Plowing and seeding - Total 5 acres - \$144.50 -- \$28.90 per acre			
Total (including fencing) - 5 acres - \$222.50 -- \$44.50 per acre			
Harvesting and threshing ----- \$10.50 per acre			
Total Cost of Production first year, including threshing but without cost of fence ----- \$39.40 per acre			
Return on grain crop first year -- 40 bu. oats @ \$1.00----- \$40.00 per acre			

Note: A light to moderate application of manure, in addition to lime and fertilizer, is necessary in order to build up soil fertility.

¹ Estimate by A. J. MacDonald, Farm Management Division, Nova Scotia Department of Agriculture.

Appendix C

Extract from "Life in These Maritimes" - Broadcasts in "University of the Air" Series - Radio Station CJFX and Extension Department, St. Francis Xavier University, Antigonish, Nova Scotia.

Study Bulletin
Broadcast No. 10
January 18, 1950

FARM PLANNING

In any well organized industry the operations are planned well ahead; otherwise confusion and inefficiency would be the result. In urban industry highly trained persons do the planning, and the workers have only to do the jobs assigned to them. On the farm the owner is both manager and worker.

To be a good farmer it is not enough simply to do the jobs immediately at hand; one must look several years ahead and arrange a long time programme. This is not an easy task but one that requires careful thought and study, and business ability on the part of the farmer.

The transition from the old self-supporting type of farming has been slow, but it must be brought about if rural life is to become a good and satisfying way of living. It should be observed that this land of ours has to feed not only this generation but future generations of human beings, and it is a responsibility upon the present owners to see to it that the land they have tilled not only should not have deteriorated but should be left in better condition than they found it.

Now, a well thought out, long time programme will do exactly this. It will improve the fertility and productivity of the soil, and provide a more abundant living for the farmer and his family. This bulletin will describe some of the steps to be taken in planning the operation of the farm.

Land Resources

Find out the number of acres (a) under cultivation, (b) in pasture, (c) in woods. Also (d) the area that could easily be cleared and brought under crop; and (e) the most convenient sources of water for house and stock.

These features should be sketched or mapped, together with the location of buildings and roads. When the main projects to be undertaken have been selected, the new arrangement of fields can be sketched on the map, making the fields rectangular when possible for convenience in ploughing. Help can be obtained from the Farm Improvement Branch, Dept. of Agriculture, by applying to Mr. W. A. Jenkins at the Agricultural College, Truro, or Mr. Alex J. MacDonald, Department of Agriculture, Antigonish.

Markets

In raising produce for sale, regard must be had to the markets available. Here in the East we have one of the best markets in Canada

in the industrial area of Cape Breton. There is a report on this market, made several years ago, and it is still valuable. Groups should have this report and make a detailed study of it. They will probably find in it opportunities for additional community projects. Members should be always in close touch with their co-operative organizations, which are the best agencies for marketing their produce.

In order to hold a market, produce must be of high quality; hence the necessity of being acquainted with "Grades". Selling by "grade" is now common, and it is important to produce goods that will classify in the highest grades.

Marketing should also be well ordered so as not to offer too much of a commodity at one time and thus cause a glut. This has a very deteriorating effect on prices. Access to cold storage facilities is necessary to avoid glutting the market.

Selection of Projects

By this we mean choosing the kinds and numbers of livestock to be kept, and the crops to be raised for use at home, for feeding stock and for market. This is an important part of the planning. Each farmer must do this for himself, taking into consideration his own circumstances.

Markets, transportation, size of farm, and individual preferences have to be considered also. Some products are shipped daily, some weekly and others seasonally, once or twice a year.

Some Suggestions

If the farm has facilities for daily shipment, the main project in these parts will naturally be dairy cows. If cream is shipped, cows and hogs make a good combination.

Where shipping facilities are not favourable, then sheep, turkeys or geese and seasonal cash crops are indicated. In general, besides a main stock project, it is advisable to have some subsidiary cash crop projects.

Adapting the Projects to the Farm Acreage

In general cash crops give higher returns per acre than livestock, but livestock is necessary to improve the fertility of the soil.

Next Monday -- January 23 -- CJFX 7:30 -- Where is our Market?