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SETTLEMENT AND LAND USE IN TUSCARAWAS, HARRISON AND CARROLL COUNTIES, OHIO

by
Arthur D. Earick

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Doctoral Committee:

Professor Kenneth C. McMurry, Chairman
Associate Professor Lyle E. Craine
Professor Charles M. Davis
Associate Professor Douglas D. Crary
Associate Professor Ross N. Pearson

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TABLE OF CONTENTS

Page

LIST OF ILLUSTRATIONS vi

Part

INTRODUCTION 1

I. OCCUPANCE TO 1930 6

Settlement Prior to 1800
Indian occupancy
Moravian settlements

White Occupance, 1800 to 1930
The pioneer era, 1800 to 1832
The canal era, 1832 to 1850
The period of declining rural population, 1850 to 1930

II. LAND UTILIZATION TO 1930. 32

The Indian Era
Forest utilization
The game resources
Indian agriculture

The Pioneer Period
The settlers
Pioneer agriculture

Growth and Decline of the Rural Economy
Evolution of the rural economy
The changing character of agriculture

Factors Influencing the Deterioration of the Rural Economy
The natural environment and the declining economy
Land management and land use in a declining economy
Foreign influences and the declining economy

III. LAND USE AND SETTLEMENT SINCE 1930. 79

The Human Resource
The problem
Beginning of resource renewal

Page

Natural Resource Rehabilitation
Flood control
Water conservation
Soil erosion and depletion
Strip mine reclamation
Reforestation
Recreation

Land Use Trends, 1930 to the Present

Land Use, 1957
Agriculture
Woodlands
Spoils bank utilization
Recreation

Settlement, 1930 to the Present

SUMMARY AND CONCLUSIONS 151

BIBLIOGRAPHY. 157

LIST OF ILLUSTRATIONS

Figure		Page
1.	Location of Tuscarawas, Harrison and Carroll Counties in Ohio	3
2.	Indian and Moravian Towns in the Tuscarawas Valley	8
3.	Population Growth, 1830-1950	14
4.	Map of Drainage with Principal Cities and Towns	16
5.	Canals and Main Roads in the 1830-1850 Period	23
6.	Rural and Urban Population Growth Compared	28
7.	Per Cent of Total Land Area in Row Crops and Small Grains	47
8.	Per Cent of Total Land Area in Forest	47
9.	Per Cent of Total Land Area in Hay	48
10.	Per Cent of Total Land Area in Pasture	48
11.	Per Cent of Total Land Area in Wheat	52
12.	Per Cent of Total Land Area in Corn	52
13.	Number of Sheep Raised (by Thousands)	54
14.	Severity of Erosion in Tri-County Area	61
15.	Topographic Map of Tuscarawas, Harrison and Carroll Counties	64
16.	Conotton Bottom Land and First Terrace, North Township, Harrison County	65
17.	The Conotton Valley, Orange Township, Carroll County	65
18.	Baxter Ridge from County Road 20 Northeast of Dellroy.	66
19.	Looking Toward Messer Run, the Valley Joining Baxter Ridge on the West	66
20.	Lakes of the Tuscarawas Drainage Area	67

Figure		Page
21.	Land Use Problem Areas of Ohio	70
22.	Generalized Soils Map of Ohio with Subsections of Soils of Southeastern Ohio	71
23.	Land Owned by Coal Companies in Harrison County	91
24.	Removing the Overburden in Strip Mining	94
25.	The "Highwall" Left After Stripping of Coal.	94
26.	Air View of Recently Stripped Area South of Cadiz	95
27.	Twenty Year Old Spoils Banks Without Reclamation	99
28.	A Field of Young Pine Trees, Rose Township, Carroll County	99
29.	Area of Over 20 Per Cent Slope	109
30.	Land Use Survey Map of Tuscarawas County	117
31.	Air View of Tuscarawas Valley Near Port Washington	118
32.	Land Use in the Sugar Creek Dairy Region	120
33.	Dairy Farm Near Sugar Creek	121
34.	Gently Rolling Land Northwest of Sugar Creek	121
35.	Trees and Bushes Growing Onto Abandoned Farm Land	122
36.	Woodlot on Rough Land in Sugar Creek Township	122
37.	Strip-Cropped Land on Baxter Ridge, Harrison Township, Carroll County	123
38.	A Ridge Top Farm Near Germano, Harrison County	123
39.	Recently Abandoned Land Near Leesville Lake	132
40.	A Part of the Bar-B Ranch	132
41.	A Seven Year Old Planting of Trees of Hanna Coal Company Land	133
42.	Cattle Grazing on Seeded Spoils Bank, Short Creek Township, Harrison County	133
43.	Strip Mine Lake Along Route 250 South of Cadiz	137
44.	Leesville Lake	137

Figure		Page
45.	Beach at Atwood Lake	140
46.	Park and Picnic Area at Atwood Lake	140
47.	Vacation Cabins at Atwood Lake	145
48.	New Homes on the South Shore of the North Arm of Leesville Lake	145
49.	Air View of North Arm of Leesville Lake	146

INTRODUCTION

The historical factor has long been recognized as having significant influence on the character of a region's present land use pattern. Charles E. Thorne[1] writes in the preface to The Agriculture of Ohio "experience has shown that the human history of a soil may have a more important bearing on its present condition than the source or manner of its formation."[2] In The Land Nobody Wanted the value of past inventories and studies by the Michigan Land Economic Survey and other groups is noted.

> To devise a land use formula is no simple task. One may determine soil types, topography, rainfall, existing cover and its rate of growth and all else there is to observe about a given description; and one may have a complete idea of the land's natural limitations as well as be sure of the many things it may be made to do. But no one can know all about how the land can perform until he has tried or watched someone else try a wide variety of practices on it.[3]

Historical land use studies then perform a valuable service for those interested in improved land use practices. Through the development of the changing patterns of the man-land relationship, the effects of different types of land use can be noted. Present uses may be judged in the light of past successes or failures, and future planning can be guided along the lines of management practices proven good in past years.

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[1]Former director of the Ohio Agricultural Experiment Station at Wooster, Ohio.

[2]W. A. Lloyd, J. I. Falconer and C. E. Thorne, The Agriculture of Ohio, Ohio Agricultural Experiment Station Bulletin 326 (Wooster: Ohio Agricultural Experiment Station, 1918), p. 2.

[3]Harold Titus, The Land Nobody Wanted (East Lansing: Michigan State College Agricultural Experiment Station, 1945), p. 20.

For this study of changing patterns of rural occupance and land utilization three southeastern Ohio counties have been selected. These counties, Tuscarawas, Harrison and Carroll,[1] have been chosen because of their total historical experience and their possession of characteristics that have made them sensitive to changing physical and historical developments both within and without the three county area.

Carroll, Harrison and Tuscarawas Counties are located in the western part of the Alleghany Plateau. Stream erosion has created a varied landscape of gently rolling to steeply sloping hills with broad lower valleys and V-shaped valleys near the headwaters of tributary streams. Prior to white occupancy the area was almost completely covered with a hardwood forest interrupted by scattered openings in which a number of Indian villages were located.

The first white settlements were made along the Tuscarawas River in Tuscarawas County in 1772. Thus white occupancy spans a period longer than that of the United States as an independent nation. The rate of occupancy fluctuated considerably through the early years. The threat of Indian attack, location away from major routes of westward migration and isolation from outside markets were major influences on the rate of settlement. The opening of the Ohio Canal signaled the beginning of a more rapid rate of occupancy. Within twenty years, however, railroads began to supplant the canal as a transportation route. Railroads also provided a means of movement into the more productive and more easily farmed land west of the Mississippi River. At the same time questionable land use methods were largely responsible for the declining productivity of the hill farms of the tri-county area. The lure of the western lands

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[1]In most future reference to Tuscarawas, Harrison and Carroll Counties as a group, the term "tri-county area" will be used.

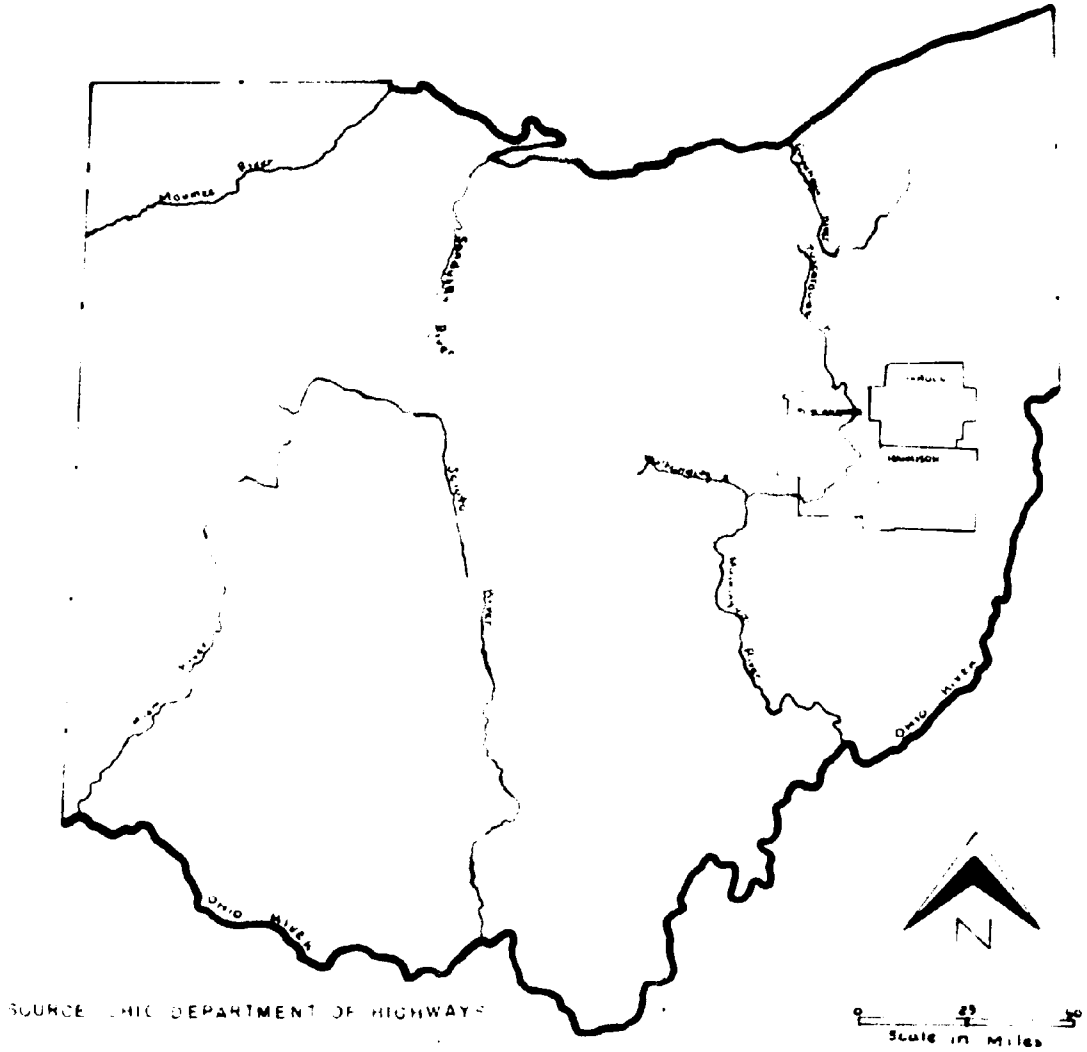

Fig. 1.— Location of Tuscarawas, Harrison and Carroll Counties in Ohio.

combined with the increasing difficulties of local agriculture to cause an outward movement of the rural population. This outward movement was apparent by 1850, and thereafter the number of rural inhabitants slowly declined. An occasional period of agricultural prosperity slowed but did not stop the population loss.

Since 1930, however, there has been a slight upward trend in population growth. Whether this is just another temporary period of recovery cannot, of course, be determined at present; but it is highly possible that the creation of the Muskingum lakes will influence changes comparable to those set in motion by the completion of the Ohio Canal. In this same period new concepts of land use methods have been at work in attempts to stablilize and improve land productivity.

Many factors have influenced rural population trends, but they can be grouped into four general classes: (1) the productive capabilities and methods of using the land within the area, (2) the occupance and economic development of other areas within the United States, (3) the changing of routes and methods of transportation and (4) a changing technology that resulted in increased industrial and urban growth and a highly mechanized type of agriculture.

It is the purpose of this study to examine the changing character of settlement and land utilization as these influences have become operative. The study is divided into three major divisions: (1) occupance to 1930, (2) land utilization to 1930 and (3) land use and occupance since 1930.

A number of dates appear as significant and are used as separation points for the major divisions within Parts I and II. By 1800 the Indian threat had been largely dissipated and, with the exception of a brief period during the War of 1812, was not to be a further obstacle to

white occupance. The completion of the Ohio Canal in 1832 marked the end of the pioneer period and the beginning of a truly agricultural economy. The year 1850 marks two important developments. By this time railroad building had developed to the point that close observers could see the beginning of the end for the canal system. And the 1850 census shows the first evidence of the declining rural population. The end of Parts I and II is given as 1930, for the period since has been significant for the greater importance given to study and application of improved land use practices.

PART I

OCCUPANCE TO 1930

Throughout its occupancy the tri-county area has had a shifting population. Many of the early settlers remained to become the ancestors of many present day inhabitants, but the constant inward and outward movement of people is one of the outstanding features of tri-county settlement geography. Why has this been true? From where did the settlers come? What factors influenced their selection of land? Why did they leave? These are some of the questions to be answered in this discussion of the population of Tuscarawas, Harrison and Carroll Counties.

Settlement Prior to 1800

Indian Occupancy

The tri-county area of the Indian period was almost completely in its natural state. A dense hardwood forest covered the region with only scattered clearings or "savannas"[1] interrupting the almost solid sea of trees. The Delawares, a relatively small tribe,[2] were almost the sole occupants of the Muskingum Valley.

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[1] Pioneers gave the name "savanna" to grass-covered openings without regards to size or origin.

[2] No accurate figure is available on the number of Delawares living in the area, but various estimates place the entire Ohio Indian population at less than ten thousand. It is doubtful if the small Delaware tribe much exceeded one thousand persons.

The Delaware villages were located in the productive bottom lands along the Muskingum and Tuscarawas Rivers northward from the present site of Coshocton. The more important villages, Tuscarawas Town, Beaver Town and Newcomers Town,[1] were located at or near where important trails crossed the rivers. Trails usually crossed near the mouths of major tributary streams where bars of sand and mud had been deposited.[2] By following the crest of these deposits a drier ford could be made than at other points.[3] The extensive post-glacial bottoms and terraces provided the Indians with the land necessary to produce the food to supplement the game supply.

The villages were also well situated with respect to other needs of the Indian economy and for defense. It is doubtful if any other part of the United States equaled the Ohio Valley as a hunting ground. Salt springs or "licks" were located in the Muskingum Valley[4] and these became the foci of important buffalo trails.[5] Other animals followed the trails to the licks.

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[1]These are the Indian villages located within the present limits of Tuscarawas County.

[2]The "Crossing Place of the Muskingum" is frequently mentioned in notes, diaries and journals of those who had occasion to travel the Great Trail prior to 1800. This crossing is where the Big Sandy enters the Tuscarawas. The Muskingum Trail followed the west bank of the Tuscarawas and crossed Sugar Creek at its mouth near Dover. It crossed Stone Creek and Old Town Creek at their junctions with the Tuscarawas and then passed on through Port Washington (Fig. 2).

[3]Archer B. Hulbert, Indian Thoroughfares (Cleveland: Arthur H. Clark Co., 1903), p. 110.

[4]Thomas Hutchins, Topical Description of Virginia, Pennsylvania, Maryland, and North Carolina (London: J. Almon, 1778), p. 21.

[5]A. B. Hulbert, Paths of the Mound-Building Indians and Great Game Animals (Cleveland: Arthur H. Clark Co., 1902), p. 106.

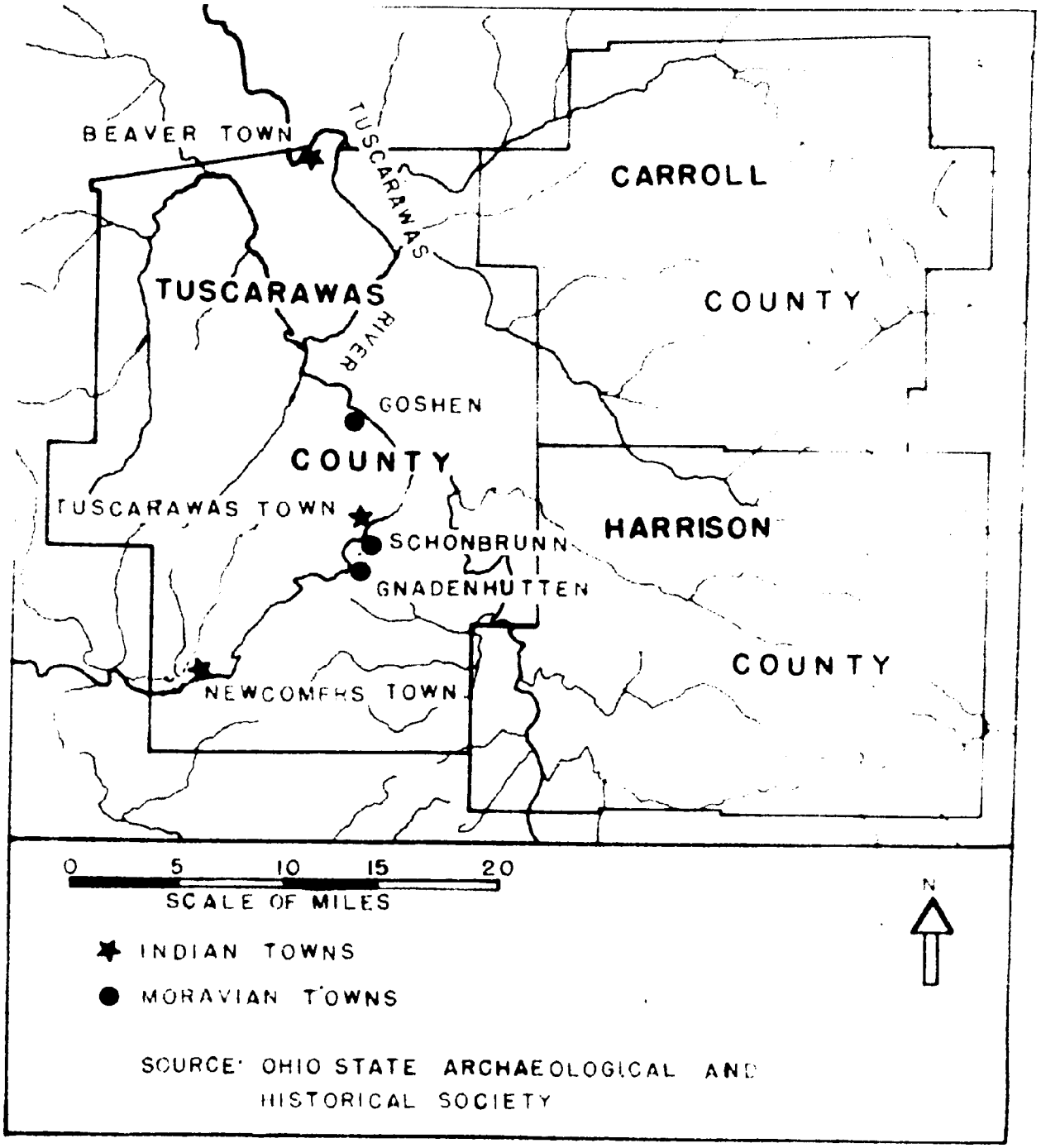

Fig. 2.-- Indian and Moravian Towns in the Tuscarawas Valley.

The location of the villages also illustrates the value of controlling a major communication route. The powerful Iroquois tribe came from New York to hunt in the forests along the Ohio River. To protect their private game preserve they had driven out or subjugated other Indians in the Ohio Valley. Iroquois control thus forced other Indians to build their permanent settlements from forty to sixty miles from the Ohio.[1] The Delaware villages were outside this danger zone and yet near enough to utilize the Ohio Valley for hunting.

Two other factors are noted by Hulbert as influencing the location of these villages. The middle and upper portions of the Muskingum Valley were relatively free of the extensive flooding that periodically covered large parts of the Ohio Valley and lower parts of the Muskingum.[2] When floods did occur in the upper portions of the valley, they were of shorter duration and covered a less extensive area. Thus the Indians were not forced to evacuate their homes as frequently as if they had lived nearer the Ohio River. The second factor was the mode and route of travel. The smaller streams were likely to be turbulent during the spring flood, low in late summer and frozen in winter. Under these conditions the Indian canoe was of limited usefulness, and travel away from the Ohio was primarily by overland routes.[3] Indian trails frequently followed higher ground, where forest growth was lighter. Winds kept the trail free of snow in winter and leaves in summer; travel was easier than in the swampy lowlands, and Indians traveling these high trails could keep a lookout for both game and enemy.

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[1]Samuel P. Hildreth, Pioneer History (Cincinnati: H. W. Derby and Co., 1848), p. 1.

[2]Hulbert, Paths of the Mound-Building Indians and Great Game Animals, op. cit., p. 58.

[3]Ibid., pp. 60-63.

The Indians and those interested in a somewhat similar type of living found the region ideal. One writer describes the Indian's Tuscarawas "With fish and fowl, with vegetables, berries, plums and other wild fruit, this valley was a veritable paradise to the untutored savage."[1] Explorers, traders, missionaries and eventually settlers also found the area attractive. As a result the Delawares were soon evicted from their "paradise."

Moravian Settlements

Moravian missionaries entered Ohio in 1762 for the purpose of locating a suitable site for establishing an Indian mission. The Delaware Indians gave permission to locate in the Tuscarawas Valley, and Gnaddenhutten came into being in 1769. Three years later Schonbrunn and Salem were established (Fig. 2). In the early years the towns were inhabitated largely by the Moravians, Christian Indians from Pennsylvania and Ohio Delaware converts.

In the battle between Indians and whites to control this gateway to the Old Northwest, the Moravian missions became a point of conflict. The Indians distrusted the Moravians, and the whites distrusted the Indian converts. This distrust culminated in the massacre of nearly all Christian Indians living at Salem and Gnaddenhutten in 1782. The Continental Congress in 1787 granted three tracts of four thousand acres each to the Moravian church to be held in trust for the Christian Indians. During the War of 1812 the Christian Indians again came under suspicion and by 1823 nearly all had moved to Canada and their lands sold to the whites.

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[1]John G. Mansfield, The History of Tuscarawas County, Ohio (Chicago: Warner, Beers and Co., 1884), p. 216.

The Moravian settlements were not large and were not of major importance, but they were significant for several reasons. They were the first white settlements in Ohio; they represented an effort to enable the Indian to make a transition to the white man's way of life; and they became the core of future settlements of Moravians from Pennsylvania and Europe.

White Occupance, 1800 to 1930

The Pioneer Era, 1800 to 1832

The settlement of southeastern Ohio followed a pattern that was typical of settlement throughout the Old Northwest.[1] Explorers and traders, keeping always ahead of the constantly moving frontier, made little impression on the Ohio wilderness. They usually lived or traded with the Indian inhabitants and made little attempt to establish permanent homes or preempt the Indian land-holding rights. Their primary contributions to the occupancy of the Ohio country came through their establishment of routes of communications between the older settlements along the Atlantic and the newer ones to the west of the mountains, their writing of notes and journals that served to introduce Ohio to the rest of America, and their passing on to the settlers the knowledge of how to live-off-the-country.

Land acquisition, however, was the first objective of the pioneer. He took over the Indian's land, cleared the forest, cultivated crops and established a home. Eventually he supplanted the Indian completely.

Tri-county area in the westward migration.--Although Ohio's first white settlement was in Tuscarawas County, the area was slow in being

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[1] R. Carlyle Buley, The Old Northwest, Pioneer Period, 1815-1840, Vol. I (Bloomington: Indiana University Press, 1951), p. 27.

occupied. This was largely because of its location in relation to the more important routes of migration.

Migration generally followed three routes over and through the Appalachian ranges. The northern route, through northern New York to the lakes near Buffalo, was utilized by those moving from New England and New York to New Connecticut.[1] The central route extended from the Potomac River across the Alleghany Mountains to Pittsburg. Along this route passed pioneers from eastern Pennsylvania, Maryland and northern Virginia. The southern route led from Virginia through the Cumberland Gap into Kentucky. Many using this route, the Wilderness Road, moved north across the Ohio River to settle in southern Ohio, Indiana and Illinois.

Most of those moving into the tri-county area followed the central route to Pittsburgh or, after the completion of the National Road in 1818, to Wheeling. Whether arriving at Pittsburgh or Wheeling, most chose to locate along the Ohio River passage than to attempt the more difficult trip overland. Those choosing the overland route usually followed Zane's Trace or the Great Trail, but in either situation the tri-county area was by-passed.

Although settlement was not as rapid as in more favorably located sites, the population of the tri-county area was probably in excess of forty-five thousand by 1830.[2] Harrison filled more rapidly than the other

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[1]New Connecticut was the area of the Connecticut Western Reserve. This land was retained by Connecticut after the Federal government had acquired most of the land of the Old Northwest formerly held by the various states.

[2]In this early period the formation of counties was still in progress. Thus population statistics to 1840, the first census after boundaries were stabilized, must necessarily be estimates.

two counties and had almost reached its maximum population growth by this date.[1] Tuscarawas County had a growth rate that, with the exception of the 1830-1870 period, has continued to the present (Fig. 3).

Carroll County filled more slowly. The first settlers did not arrive until 1800 when two land purchases were reported in Lee Township (Fig. 4). Settlement was apparently from southeast to northwest, for the first settlers did not arrive in Brown Township until 1806.[2] Settlement was slowed by the War of 1812 and the consequent hostility of the Indians, but the rate of occupancy again picked up after the end of the war.

In the settling of the tri-county area, as elsewhere, there was a tendency for people of a similar background to locate together in the new community. Moravians and other Pennsylvania Germans settled in Tuscarawas County, giving it a German character that is still apparent. Scotch-Irish and English from Maryland and Virginia were in the majority in Carroll and Harrison Counties. Throughout the settlement period Pennsylvania, Maryland and Virginia continued to provide the greatest number of new occupants.

Selection of land.--In general three factors seem to have governed the pioneer's choice of land: (1) need, (2) his ideas on what constituted the best land and (3) the public land policy. If his choice proved unfortunate, there was always more land waiting in the west; and many, after experiencing the difficulties of farming the hill lands, moved on again.

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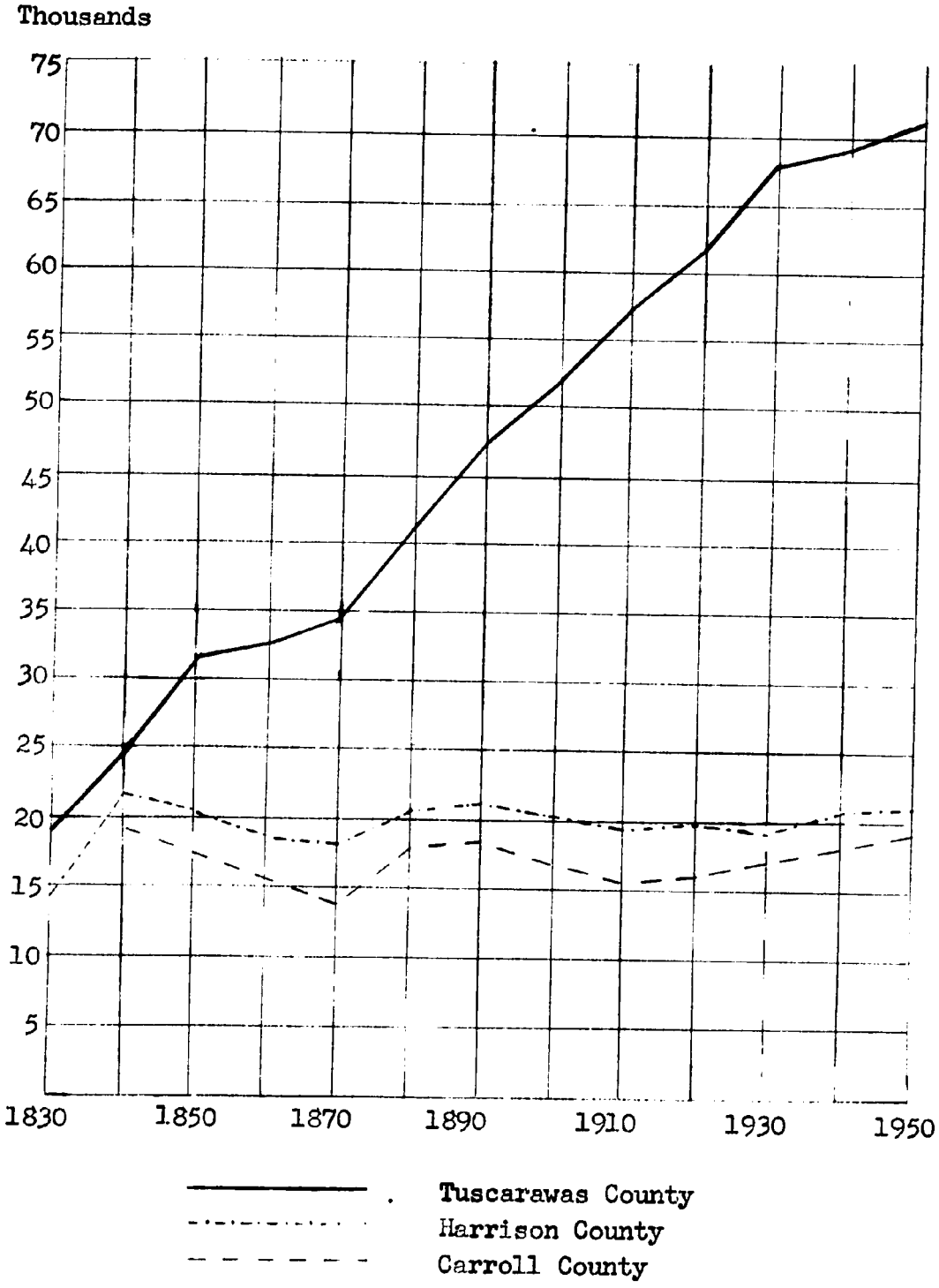
[1]Carroll County was formed in 1833 from parts of Jefferson, Columbiana, Stark, Tuscarawas and Harrison Counties. Since a rather large part of Harrison County was lost to Carroll at this time, an inaccurate picture of Harrison's population growth prior to 1840 is obtained from Fig. 3.

[2]H. H. Hardesty, Illustrated Historical Atlas of Carroll County, Ohio (Chicago: H. H. Hardesty, 1874), p. 20.



Source: United States Bureau of the Census.

Fig. 3.-- Population growth, 1830-1950.

Land selection was often "by heck and by guess." Few settlers had much factual knowledge of the area and, owing either to ignorance or bad advice, frequently purchased land unsuitable for cultivation. There was also the hard fact that most early settlers were extremely poor; and with families to provide for, there was little time to look for the best site. "Most of the newcomers were spurred to their choice by instant need, and so took what could be had with the least delay."[1] Because of this need settlers were often the victims of unscrupulous speculators who saw in the unknowing newcomer an opportunity to dispose of some of his less favored land.

> No one but the surveyors knew enough of the bearings to forecast the trend of travel and they were frequently mistaken. The whimsical advice of a hunter or the weariness of an hour may have decided the conditions of a family even unto the third generation. As a merchant withholds a fine cloth for a special customer, so did the land holders keep their richest tracts for a stronger market, while the small buyer was sent to a remnant of a section of which the major and choice part was held by non-resident speculators, who groaned beneath the slow increase in the value of their investments. Others before leaving the east had bought warrants for lands which were far from convenient settlement.[2]

Settlers were not completely unaware of the character of the land into which they were moving. Their knowledge was general rather than specific and was based on the experience of those living in the new area of settlement. The uplands and slopes were frequently selected in preference to the lowlands of the Tuscarawas, Stillwater and other valleys. The wet prairies, it was commonly held, "bred the 'miasmas' which induced the cursed malaria and ague; it was better to locate the home in the well-drained timber."[3] Flint, an Ohio visitor in 1819, advised would-be settlers:

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[1]Edwin S. Rhodes, The First Centennial Atlas of Tuscarawas County, Ohio (New Philadelphia: Edwin S. Rhodes, 1908), p. 49.

[2]Ibid.

[3]William T. Utter, The Frontier State, 1803-1825, Vol. II of History of the State of Ohio, ed. Carl Wittke (6 vols.; Columbus: Ohio State Archaeological and Historical Society, 1942), p. 146.

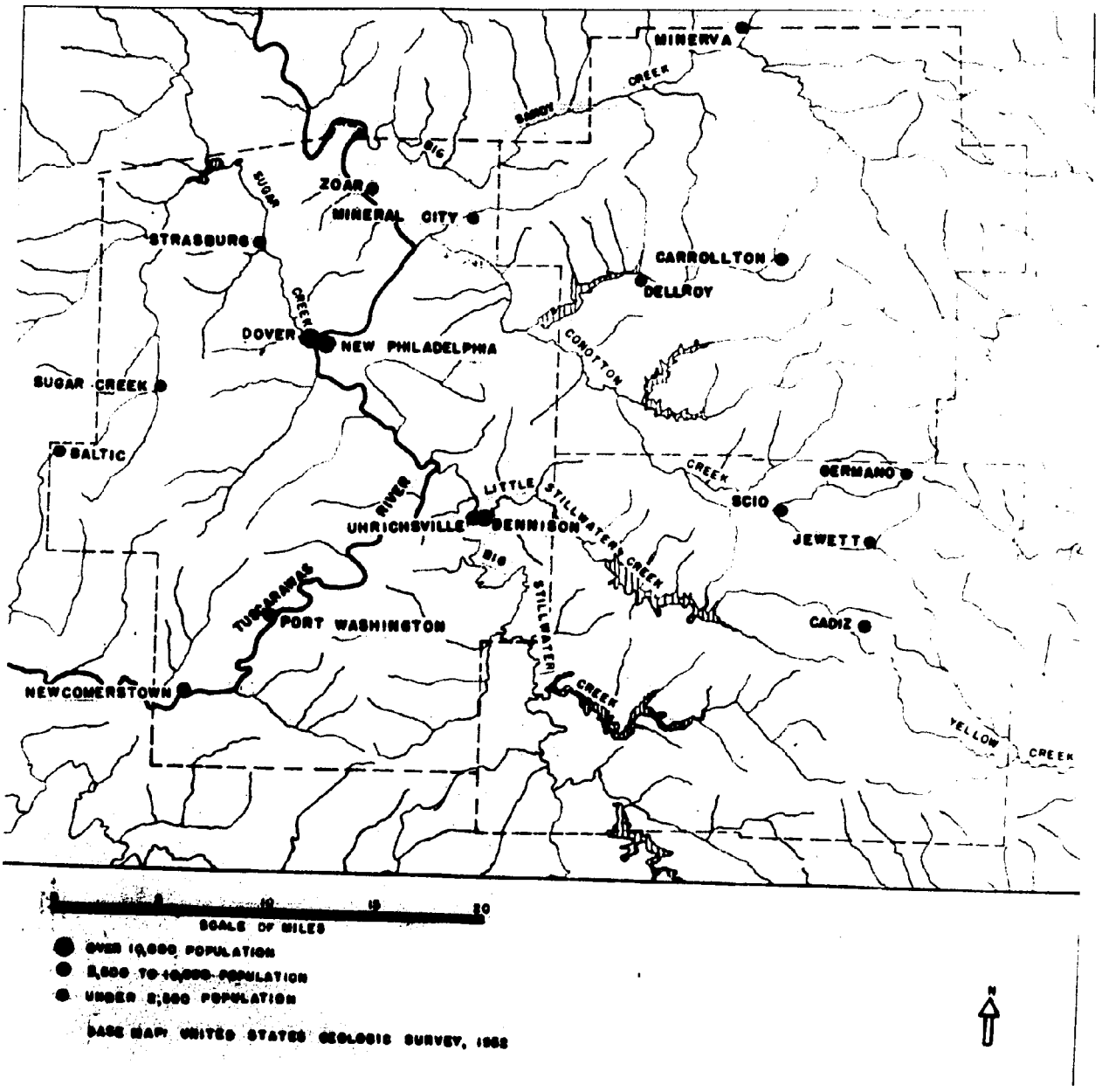

Fig. 4.— Map of Drainage with Principal Cities and Towns.

> Those who would go in search of healthy situations may keep in view, that the object can only be attained, at a distance from swamps, and rivers which overflow their banks; it being well known, when the former are dried up, and when the latter recede within their low-water boundaries, vast quantities of mud and vegetable matter are exposed to the heat of the sun, and a rapid decomposition immediately commences. The gaseous constituents evolved give a perceptible taint to the air, and are understood to form the miasmata that occasion agues, bilious fevers, and liver complaints. The best navigable waters, and the most healthy parts of the country are, in some measure incompatible, and seldom admitting of immediate proximity to each other. Happily, a moderate height of land is usually sufficient to prevent the accumulation of stagnant waters, and to promote a motion in rivers, that lessen the scope of their inundations, or retains them altogether in their banks. A degree of elevation conducive to a comparatively healthy climate, may be usually found within two or three miles of the river; but as the contaminated air is liable to be transported by the winds, and probably not sufficiently diluted with the atmosphere in passing over such a small space; a greater distance from the source of the contagion is no doubt preferable.[1]

There were other practical reasons for locating the new home in the upland timber. Tree growth was likely to be less dense and relatively free of underbrush. Thus clearing the land for agriculture was easier than in the jungle-like lowlands. Springs were also present on the slopes and these influenced the location of the cabin.

Pioneer farmers associated particular forest types with certain soil characteristics. This association was extended and used to indicate those soils best suited for agriculture. Some farmers sought a particular type of forest growth as being most suitable for the growing of a particular crop. Farmers from Pennsylvania desiring to raise wheat "almost invariably selected heavily timbered white oak land on the uplands rather than the richer bottoms."[2] In making these observations the farmer of the pioneer period was following a system that, in a more scientific man-

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[1]James Flint, Letters from America (Edinburgh: W. and C. Tait, 1822), p. 162.

[2]Utter, op. cit., p. 162.

ner, is used in present day land use classification. The editor of the Western Intelligencer gives an excellent summary of this "system."

> The white oak and bitter hickory timber, are considered as an invariable indication of thin soil, usually bottomed on sand or loose gravel, and soon fails, without good management in cultivation; in the parts where the white oak is mixed with other kinds of oak, shell-bark hickory, poplar, etc. the soil is much better, being generally rich and durable. The black walnut, blue ash, and red elm, are always considered as evidences of a rich soil, but not as sure indications of great depth or durability; the spice undergrowth is always taken as certain evidence of a warm soil, and generally very productive of all kinds of crops. The bottom lands in this and all other parts of the Scioto Country, are timbered with hackberry, buckeye, black walnut, butternut, honey locust, box elder, the pawpaw or custard apple-tree, crab apple-tree, hawthorn, meadow plum-tree, and spice bush. In the very level and wet parts of the country, there is much soft maple and white elm--and immediately along the banks of the rivers and creek, the timber is almost wholly of the button ball kind, usually called in this country sycamore.[1]

The accuracy of some of these observations is debatable, but it does indicate that the pioneer farmer, through experience, had come to recognize the existence of a relationship between soils, drainage and the type of vegetation. Many settlers tried to put this knowledge to work when they purchased land for their new home.

Congressional policy in regards to the disposal of public lands in Ohio also had considerable influence on the location and rapidity of settlement. The first public land policy was established by the Land Ordinance of 1785 and provided for the surveying and sale of land formerly claimed by several of the original thirteen states. The survey began at the junction of the western boundary of Pennsylvania and the Ohio River; and as soon as seven ranges (tiers of townships) could be surveyed, the land was to be advertised for sale.

The primary purpose of the sale of public lands was to provide revenue for the Federal Government. Under the first policy established,

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[1] Western Intelligencer (Worthington, Ohio), September 11, 1811.

the land was to be sold only in large tracts. This resulted in the development of numerous colonization schemes, primarily speculative in nature, such as the Ohio Company and the Symmes Purchase. Aside from the tracts still controlled by Virginia and Connecticut or held by the private land companies, the larger holdings were in United States Military Lands and Congress Lands. The Military Lands were to satisfy claims of soldiers of the Revolution. The Congress Lands were to be sold in conformity with laws passed from time to time by Congress.

The greatest part of the land within the tri-county area was within the limits of the Military and Congress Lands. In addition to the three Moravian grants already noted, a tract of 23,040 acres was granted to Henry Dohrman, a wealthy merchant of Lisbon, Portugal, for aid given the United States in the Revolutionary War. These small tracts were all in Tuscarawas County.

In the disposal of the Military Lands, warrants were issued to the soldiers; but these were often sold to speculators, and relatively few of the original holders actually settled on the land. After the warrants expired, these lands were sold in the same manner as the Congress lands.

The method of disposing of Congress Lands varied from time to time. The original plan was to sell alternate townships intact and the intervening ones in sections of 640 acres. This policy virtually eliminated the poorer settlers as possible land owners. Most of the better land could be purchased by wealthy speculators. Land sold so slowly, however, that in 1800 Congress lowered the minimum amount of land that could be purchased to 120 acres and the price to two dollars an acre.[1]

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[1]Lloyd, Falconer and Thorne, op. cit., p. 28.

And in 1820, in hopes of reducing the effects of a serious recession in the west, the minimum amount was reduced still further to eighty acres and the price to $1.25 an acre.

The land policy worked hardship on some regardless of the rules established. Under the policy of selling nothing smaller than a section, only a relatively few were financially able to purchase land; and as noted above, many were forced to buy from speculators who sold to the highest bidder. The poorest settlers were most likely to get the poorest land. On the other hand, those who had purchased the larger tracts at the higher price discovered that when the price was reduced, the taxes amounted to more than the land was now worth.[1] In general, however, the wealthier settlers were able to secure the best land and the better locations. This factor doubtlessly influenced many to move on in hopes of bettering their situation farther west.

Isolation and settlement.--Aside from the physical difficulties of establishing a home, the pioneer was plagued by three basic problems: a lack of capital, a scarcity of labor and inadequate transportation facilities.[2] The solution of the first two was almost entirely dependent on the successful solving of the problem of commodity exchange. Land was relatively cheap and productive, and a surplus could easily be produced. If the surplus could be marketed at a profit, capital could be accumulated. And if the area could be reached more easily, the population would doubtlessly increase more rapidly, thus helping in relieving the labor shortage.

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[1] Caleb Atwater, A History of the State of Ohio (Cincinnati: Glazen and Shepard, 1838), p. 245.

[2] Utter, op. cit., p. 171.

In the early years isolation was not the problem that it was to become later. The cultivated area was small and there was little surplus. What little there was could be sold to new arrivals or to the army. In time, however, the abatement of the Indian threat caused the removal of the army; and the new settlers became producers. Towns were still small. The local market was limited, making it necessary that outside markets be sought. At this point the pioneer economy began floundering under the weight of its own productive capacity. Crouse comments that "The ten to twenty years of desperate struggle to clear the land and produce a crop had been accompanied by debt and hardship resulting from the impossibility of delivering the goods to market."[1] Thus the pioneer period was as much a struggle to build paths for commerce as it was to clear the forests.

Water transportation was available down the Ohio and Mississippi Rivers to New Orleans, but tri-county inhabitants still needed to haul their produce overland to river ports. Overland transportation was slow and expensive. The cost of hauling a bushel of corn one hundred miles was one dollar.[2] Thus the farther one was from market, the lower would be the price received for a product. Often there was no market at any price. "There were, in 1820, not half a dozen points at which wheat could be sold for cash."[3] William Howells, in recording the reminiscences of his pioneer father, writes:

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[1]D. E. Crouse, The Ohio Gateway (New York: Charles Scribner's Sons, 1938), p. 26.

[2]Lloyd, Falconer and Thorne, op. cit., p. 73.

[3]N. S. Townshend, Ohio State Board of Agriculture, 14th Annual Report, 1859 (Columbus: State of Ohio, 1860), p. 481.

> We were thirty-five miles from the Ohio,[1] the nearest point where there were merchant mills, and cash was paid for wheat. Consequently, the price of wheat was the cost of transportation less that on the river. Fifty cents a bushel was a great price for it at the river; and, as two horses and a man were required for four days to make the journey, in good weather, with thirty-five or forty bushels of wheat, and a great deal longer if the roads were bad, it was not to be expected that we could realize more than twenty-five cents in cash from it. But there was no sale for it in cash.[2]

The inadequacies of the transportation system helped slow settlement after about 1820. The difficulties of transportation and the subsequent economic situation prompted greater vigor in finding a solution to the problem. The success of the Erie Canal in New York influenced many Ohio residents to back the building of a system of canals in the state. Fortunately for Tuscarawas County the route selected for the Ohio Canal (Fig. 5) followed the Tuscarawas River. Thus it passed through the middle of the county. The completion of the canal in 1832 placed Dover on a direct water route to New York City. Immediately thereafter settlement in the tri-county area showed renewed vigor, but the pattern developed greater maturity. With the completion of the canal the pioneer period was at an end. The subsistence economy of the pioneer was to give way to an expanding agricultural economy.

The Canal Era, 1832-1850

Growth and stabilization of the population.--In the period preceding 1830 Ohio's population was still largely rural with Cincinnati the only urban area having more than five thousand inhabitants. The greatest concentrations were in the Miami and Scioto Valleys, along the upper Ohio and along the routes of Zane's Trace and the Great Trail.

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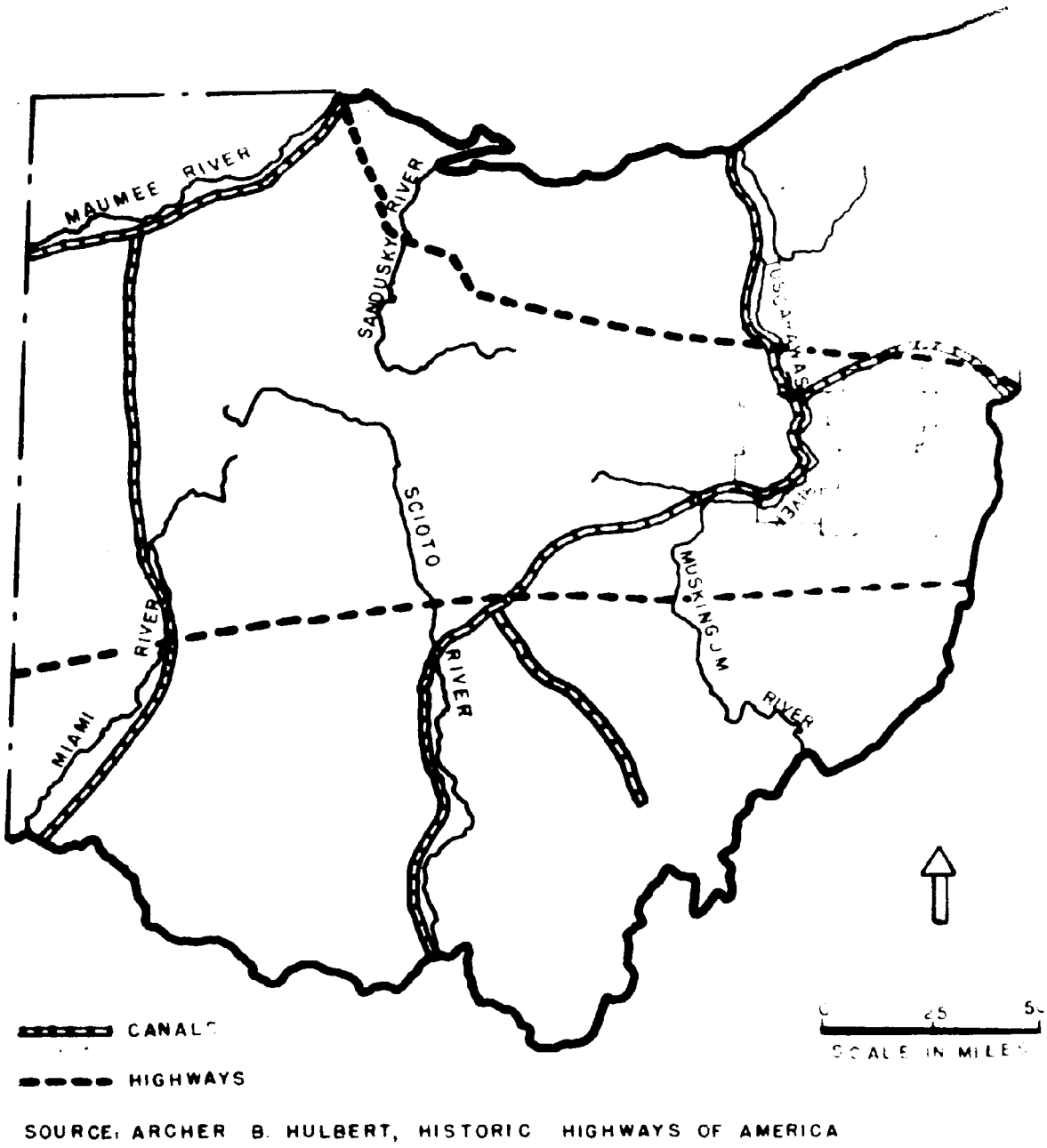
[1]Northeast of the present city of Cadiz.

[2]William C. Howells, Recollections of Life in Ohio, 1813-1840 (Cincinnati: Robert Clarke Co., 1895), p. 138.



SOURCE: ARCHER B. HULBERT, HISTORIC HIGHWAYS OF AMERICA

Fig. 5.-- Canals and Main Roads in the 1830-1850 Period.

The tri-county area, along with Holmes and Coshocton Counties to the west, comprised a pocket of relatively light population. By 1840, however, this pocket had largely disappeared.

In the decade from 1830 to 1840 population in the tri-county area increased from approximately thirty-seven thousand to over sixty-three thousand with Dover and New Philadelphia the only towns having over one thousand inhabitants. Figure 3 shows an increased growth rate for this period over the preceding decade. The 1830-1840 growth rate for Harrison and Carroll Counties roughly parallels that of other rural counties in Ohio. It appears then that population growth in Harrison and Carroll Counties was the natural result of the westward migration.

In this same ten year period Tuscarawas County showed a substantially greater population growth than either Harrison or Carroll Counties. While most of this growth was in the rural areas, urban development became impprtant for the first time. The twin communities of New Philadelphia and Dover, favored by locations on the Tuscarawas River, became leading trade centers. Both urban and rural growth was, to a considerable extent, the result of the vastly improved economic situation brought about primarily by the presence of the Ohio Canal in the middle of the county.

By 1840 most of the land had passed into private ownership; and as the tri-county area filled, the tide of migration by-passed it in favor of more lightly populated land to the west. Many from the area joined the migration, and in Harrison and Carroll Counties the in-migration was balanced by an outward migration. The next census (1850) shows these counties with little change in population. Tuscarawas County continued growing but at a decreasing rate. The 78 per cent population increase for the 1830-1840 period was reduced to 24 per cent for the 1840-

1850 period. In this period of greatest importance for the Ohio Canal, Tuscarawas County's population increased from 14,298 to 31,761. This is a greater numerical increase than for any other twenty year period.

Influence of the Ohio Canal.--The completion of the canal in 1832 provided a means for low cost movement of farm produce. A choice of markets now existed--northward to Cleveland and then to the eastern markets by way of the Erie Canal or southward to the Ohio River and then to New Orleans. Mansfield indicates the importance of the opening of the canal to Tuscarawas County when he writes, "The price of grain rose almost instantly from 25 to 30 cents per bushel to more than double that amount and soon reached $1.00."[1] Grain and produce merchants established business houses at the more important ports along the canal. This account of Dover's growth could, with minor changes, be the story of many canal towns.

> The census of 1820 accredited Dover with a population of forty-six. Jesse Deardoff thinks that in 1824 there were but ten houses in the village. The construction of the Ohio Canal between the years of 1826 and 1830, gave the first stimulus to an active and vigorous growth. Fortunately for Dover's welfare, the canal was located on the west side of the river, for this is to the very gates of the town plat, and gave it a leading position in the traffic of this then mighty highway. Dover at once became a center of trade and commerce. Constant streams of grain and other farm products flowed into its capacious warehouses to be shipped to the eastern market. Men of superior business ability were attracted by its advantages, and ten years after the completion of the canal, or in 1840, Dover was the first town in the county in point of population and importance. The canal trade gained for it notice abroad which far eclipsed that of the county seat.[2]

Land values increased greatly and the availability of canal transportation was of primary importance when considering the sale or purchase of land.[3] Road building was stimulated as communities away

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[1] Mansfield, op. cit., p. 388.

[2] Ibid., p. 535.

[3] The Organ (Cadiz), December 6, 1838. "A good bargain can be obtained from the subscriber, who wishes to dispose of eighty acres of

from the canal attempted to overcome the disadvantage of their situation. Trail and canal crossings became villages and then cities.

The tri-county area, particularly Tuscarawas County, benefited greatly by having this means-to-market passing through its midst. Convenience, low cost and speed were the most valuable assets of the canal. The distance farmers were required to haul their produce to market was reduced. Charges for canal transportation were only a fraction of wagon charges. This saving in cost and time often meant the difference between a profit and loss. The canal era was short as the railroads with greater speed and manueverability supplanted the canal barge as the main means of transportation; but it was a key factor in the settlement of southeastern Ohio.

The Period of Declining Rural Population, 1850-1930

Population trends.--In the first twenty years of this period the population growth pattern shows the results of the outward migration of tri-county inhabitants. Harrison and Carroll Counties lost considerable population while the growth rate in Tuscarawas County slowed perceptibly (Fig. 3). After 1870 the population trend was again upward. Tuscarawas County returned to a growth rate comparable to that prior to 1830. Harrison and Carroll Counties almost reached the peak year of 1840. In these counties the downward trend returned after 1900. In Tuscarawas County population growth slowed slightly at this time but by 1920 had resumed its "normal" growth rate.

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first rate land. It is in Tuscarawas County, on Phillips fork of Laurel, 5 miles west of Westchester and eight miles from the Ohio Canal. The land is well watered, has a handsome bottom, and an excellent site for a mill seat. The improvements are 30 acres, in good cultivation and several comfortable cabin buildings."

Figure 3, however, does not indicate the true picture of rural population patterns. In 1850 population in Tuscarawas, Harrison and Carroll Counties was still almost completely rural. Although Dover and New Philadelphia were bustling trade centers, they were still classed as villages; and no other town in the tri-county area had as many as five hundred inhabitants. After 1850 there was a decline in farm population accompanied by a slow increase in the non-farm population. Figure 6 shows this development for the hundred years from 1850 to 1950.[1] In Tuscarawas County the rural population was 27,926 in 1850. It declined to 25,944 in 1870, rose to 27,846 in 1880 and declined again to 25,139 in 1920. It has remained at approximately this point through 1950. In this same period the number of inhabitants in towns and cities has increased from 3,835 in 1850 to 44,625 in 1950. By 1910 over half the county's population was living in towns or cities. At no time has there been a decrease in the number of such residents; and as a result of this continuous growth, Tuscarawas County has never recorded a decrease in population.

Harrison and Carroll Counties present a somewhat similar growth pattern. No cities the size of New Philadelphia (12,918 in 1950) or Dover (9,852 in 1950) exist. Cadiz with 3,020 inhabitants is the largest town in Harrison County and Carrollton with 2,658 is the largest in Car-

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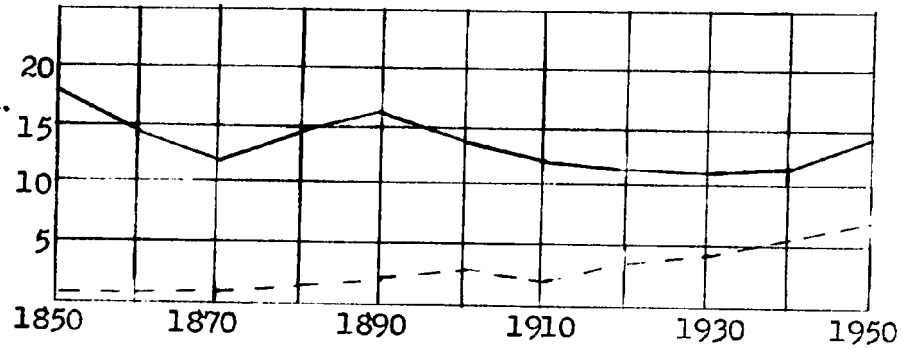
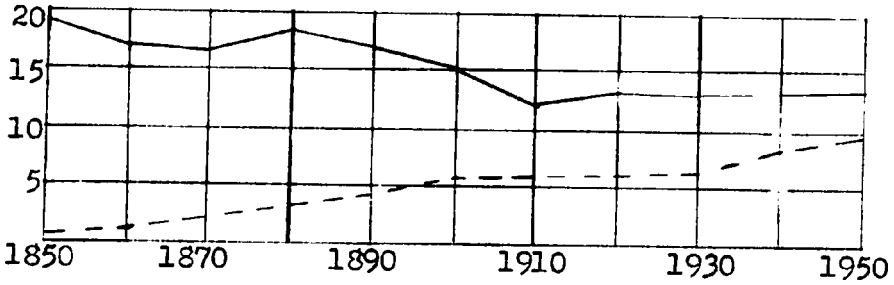
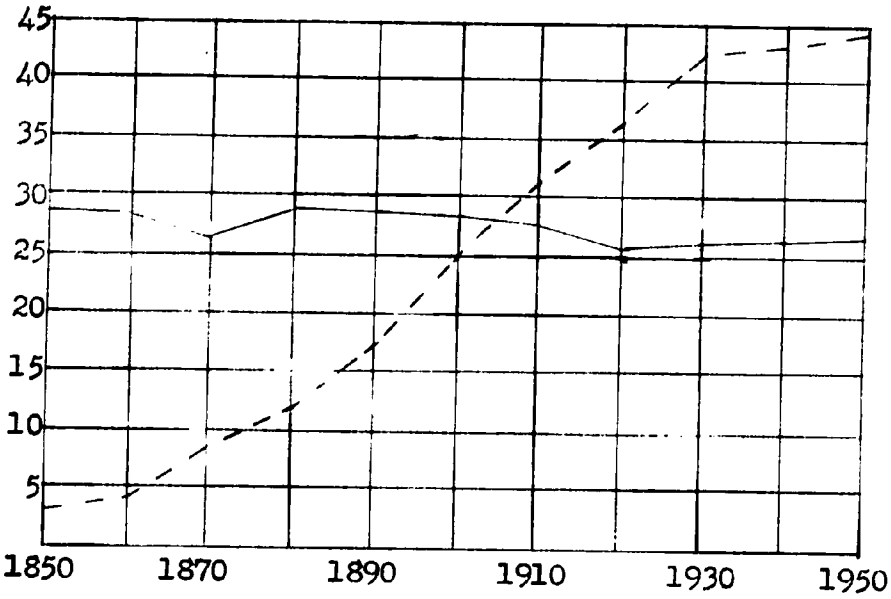
[1] Material used in developing these illustrations is from Bureau of the Census returns, but the author has used a different criteria for distinguishing between rural and urban population than that used by the Bureau of the Census. Since this is primarily a study concerned with rural people and their related land use types, the author believes that towns and villages as well as cities be considered as non-rural. Five hundred residents was arbitrarily chosen as the point of division between rural and non-rural. In the illustration all communities reporting five hundred or more inhabitants are included as non-rural.



Carroll County population in thousands.



Harrison County population in thousands.



Tuscarawas County population in thousands.

———— Rural population

– – – – – Urban population

Source: United States Bureau of the Census, 1850-1950.

Fig. 6.— Rural and urban population growth compared.

rol.[1] Growth of these towns has been slower than in Tuscarawas County, but, nevertheless, it has been steady.[2]

The settlement and growth patterns of the tri-county area differ from patterns developed by counties located in the level, more easily farmed Miami Valley. Because it was settled at about the same time and is largely agricultural, Darke County serves as an excellent area for a brief comparative study. Darke County has long been noted as one of Ohio's best agricultural areas. Its agriculture has been stable and, as a whole, its farm operators have been prosperous.

Population in Darke County increased steadily from the beginning of settlement. The sudden spurt that occurred in the tri-county area after 1830 was not duplicated in Darke County. The peak in rural settlement was not reached until about 1880, almost thirty years after it had been reached in the tri-county area. And in Darke County rural population remained at about the same level until after World War I when farm mechanization resulted in the consolidation of farm units with lower man-power requirements.

What accounts for the unstable character of tri-county settlement as compared to that of Darke County? Aside from the early influence of the Ohio Canal, the answer is primarily in the comparative productivity of the land.

Factors influencing population changes.--The primary reason why a people emigrates is the hope of bettering their economic situation. In this brief statement of fact is summed up the basic rea-

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[1]Minerva has a larger population than Carrollton but almost half the town is located in Stark County. The Carroll County part has a smaller population than Carrollton.

[2]Non-rural growth in Harrison and Carroll Counties has been continuous except in 1910 when a decline of about 150 occurred in Harrison.

sons for people leaving the rural areas of Tuscarawas, Harrison and Carrol Counties. The first settler was primarily a hunter; and when neighbors got too close and destroyed the best hunting, he packed his few possessions and moved to a new area to begin over again.[1] The second wave of settlers was composed of pioneer farmers. Often many in this group despaired of making a farm in the forested hills of the Tuscarawas Valley and soon moved on.[2] They were followed by a group lacking the true pioneer spirit but possessing money and greater agricultural know-how.[3] This group purchased farms already in the process of being cleared and, as a rule, remained in the area.

At first the newly cleared land produced well, but continual cropping of the exposed hillsides resulted in a gradual lowering of productivity.[4] As long as there remained land to be cleared, this did not seem an important matter. New land could be cleared as the old wore out. The second generation often found it more expedient to join the westward migration than to battle the forests and worn-out land.

> In 1840 Carroll County had a population of 18,108, equal to forty-five persons to every square mile of its area. The active industry of its people was that of farming and felling the huge forests and subduing the lands suitable for agricultural purposes. But the sons of such energetic sires were not contented with the slow progress they were making in trying to make a garden spot out of such a wilderness as "Little Carroll" presented at that time. They pushed farther on toward the setting sun, after first having disposed of their lands here. This caused a perceptable decrease in the population thus early in its history. In 1850 the county had a population of 17,685, in 1860 it was only 15,738; in 1870, 14,490, a decrease of 3,617 during thirty years.[5]

Technical advances in agricultural machinery made possible the plowing of the thick sod of the prairies. Reapers and other types of farm

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[1]Flint, op. cit., p. 232.

[2]Ibid., p. 233.

[3]Townshend, op. cit., p. 484.

[4]Ibid., p. 487.

[5]W. T. Perry and J. E. Eckley, History of Harrison and Carroll Counties, Ohio (Chicago: The Lewis Publishing Co., 1921), p. 18.

equipment made possible a large scale agriculture in the newly opened western plains. Land was cheap; it was more productive than most of Ohio's hill lands and more easily farmed. Railroads were built into this virgin land, making possible the shipping of produce to eastern markets. Tri-county agriculture could not compete against these inducements, and after 1850 an outward migration resulted in more people leaving than could be replaced by natural increase or inward migration.[1]

By 1900 little good land remained unclaimed, but a new attraction for tri-county inhabitants had been developing. Some industrial development had occurred prior to the Civil War, but industrial growth was greatly accelerated in the years immediately following; and by 1900 Ohio had become a major industrial state. As agricultural opportunities declined, industrial opportunities expanded; many Tuscarawas, Harrison and Carroll County residents became industrial workers.

The story of settlement, growth and change in Tuscarawas, Harrison and Carroll Counties has been that of a search for opportunity. Those who moved into the area from the east saw it as offering a better opportunity than their former homes. However, as time passed, the tri-county area became less favored than the virgin land of the west or the industry of Cleveland, Columbus, Akron and other cities. This survey indicates that the change in attitude occurred as the productivity of the land decreased. The question now to be answered is "why." The answer will be sought as the pattern of land utilization is outlined in Part II.

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[1] As late as 1910 approximately 10 per cent of Tuscarawas County inhabitants were of foreign birth--primarily German or Swiss.

PART II

LAND UTILIZATION TO 1930

Land utilization in Tuscarawas, Harrison and Carroll Counties has passed through three basic periods: the Indian era, the pioneer period and the agricultural[1] period. Although each period can easily be distinguished from the other two, each was also an age of transition. The land use of the agricultural period was based to a considerable degree on the pioneer period just as that of the pioneer period had much that was carried over from the Indian era.

The Indian era can be classed as a period of using the natural habitat. Nature provided most of the necessities of life with agriculture used to supplement the proceeds of the hunt and the forest. This period came to an end when the Indians signed over their lands and left the area.

The pioneer period was one of occupying and clearing the land. As the Indian had done before, the pioneer utilized the forest and game resources while clearing the forest for agriculture. In general this period was one of self-sufficiency. Isolated from neighbors and trading centers, the pioneer was forced to provide himself with the basic necessities of life. With these taken care of, he could begin producing for market. The pioneer period came to an end when the farmer advanced beyond the supplying of his own needs and when roads and other communications capable of carrying this surplus to market were developed.

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[1]Grazing was carried on and considerable timber was cut, but these activities were generally considered as part of the agricul-

The agricultural period can also be divided into three divisions. The first was the relatively brief period of rapid expansion encouraged by the opening of the Ohio Canal. The second was the period of decline in agricultural activity that began about 1850 and ended about 1930. The last period has been one of study and adjustment of land use patterns in order that they may more nearly meet the requirements of the ideal pattern of use as conceived by various conservation groups. Only the first two will be discussed in Part II.

The Indian Era

The Indian economy was more complex than has usually been pictured. Most emphasis has been placed on the warrior and hunting phases of Indian life. The squaw activities of cultivating the soil, picking fruits and berries, cleaning and preserving the game and preparing the food have received little notice. The men were the hunters and warriors, and a man's reputation was largely dependent on his prowess against the enemy or his skill in the chase. These more noble occupations have been enveloped with an aura of romance in most tales of Indian life while reports of the less spectacular gathering and agricultural phases have remained almost forgotten.

Forest Utilization

The forest provided generously for those living within its borders. A variety of trees and bushes yielded fruit, berries and nuts. From the maple came syrup and sugar. The bark of trees was used in the construction of canoes, homes, clothing and in an emergency could be

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ture. The grazing was usually a part of the farm operation, and the timber was cut to clear land for cultivation.

used as food. The Indians gathered plants yielding medicines and dyes. In producing these and other items, the forest provided materials that enabled the Indian to diversify his economy. Many of the forest products must be considered essential; but others can be classed as luxuries and, as such, aided in providing the Indian with more than a subsistance living standard.

The fruit of the pawpaw, peach, crab apple, grape, wild cherry and wild plum were used by the Indians. Of these the plum was most highly regarded, and the Indians were especially careful of their plum thickets.[1] Early white travelers and settlers commented on the size, color and excellent flavor of this fruit. Plants bearing strawberries, cranberries, blueberries, blackberries, gooseberries, raspberries and currants also grew in the forest. Most of the fruit and berry harvest was used as it was picked; but some fruit, like the apple, could be dried and stored for several months.

Extensive use was made of the sap of the maple tree. The sap was reduced to syrup or sugar and either used in this form or mixed with bear fat and stored in skins. As long as the supply lasted, it was used in cooking green corn and other vegetables.[2] The Indians taught the early white settlers how to make and use maple syrup and sugar. One early traveler advised settlers to preserve maple groves for their valuable products.

> The sugar-maple is a tree of immense value to the people of this state. It ought to be the first objective with every man, when he begins to cultivate his land, as much as possible, to preserve these trees. Each tree of from eighteen to twenty inches in diameter, will yield four pounds of sugar every season.[3]

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[1]Lloyd, Falconer and Thorne, op. cit., p. 19. [2]Ibid., p. 20.

[3]Charles Williams, A Topographical Description of the State of Ohio, Indian Territory, and Louisiana (Boston: Charles Williams, 1812), p. 14.

The bark of the elm and birch was made into canoes, and birch bark was frequently used in the making of clothing. Bark vessels were used for storing liquids, and many homes had bark siding. On occasions when food stores neared depletion, the tender inner bark of some trees could be used as food. The sweet and sappy bark of the poplar was considered a delicacy. Acorns, chestnuts, walnuts and hickory nuts were roasted or used in cooking. Herbs were gathered and used in preparing medicines or "cures" and for seasoning foods.

Thus, in season, the Indian was able to gather a variety of forest products that provided a constantly changing diet and other needed items. Traders, travelers and settlers came to know and use many of these same products; and until the forest gave way to open fields, gathering activities contributed greatly to the pioneer's way of life.

The Game Resources

Prior to the invasion of white settlers the tri-county area was primarily a hunting ground. The Delaware inhabitants occupied only a small part of the region, and additionally the land within fifty miles of the Ohio River was almost exclusively the province of game animals. The absence of a permanent population doubtlessly contributed to the excellence of the hunting.

The buffalo was the most important of the game animals. Buffalo followed the Muskingum Valley in their north-south migration. Savannas provided excellent grazing; and as previously noted, the nearby salt licks proved an attraction. Bear, deer and other animals followed the well-defined routes of the buffalo. Wild turkeys were plentiful[1] and the streams were well stocked with fish.

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[1]Hildreth, op. cit., p. 208.

The bountiful game supply contributed greatly to the Indian way of life, and doubtlessly contributed to the loss of the area to the white man. Furs attracted the French to the area in the Seventeenth Century and trapping became a part of the Indian economy. Later the British and French fought for control of this fur-rich region. It was of little importance to the Indian as to who the victor might be; for once in the region neither the French nor the British showed any inclination to leave.

Indian Agriculture

The Indian economy placed a greater dependency on agriculture than is usually noted. Corn fields and gardens were located near every permanent village, and the agricultural products are reported to have exceeded in variety and quality those of any other equal area in North America. Heckewalder, one of the Moravian missionaries, listed the principal Indian foods as game, fish, corn, potatoes, beans, pumpkins, cucumbers, squashes, melons, cabbages, turnips, roots of plants, fruit, nuts and berries. Beatty, a traveler in the Tuscarawas Valley in 1792, recorded in his diary, "They brought us some corn in the husk, and cucumbers, the same they themselves eat, which we thankfully received."[1] The Indians were also reported to have planted and cared for extensive orchards of apples and peaches.[2]

Corn, however, was the keynote of existence. A new corn harvest was the occasion for the most important festival of the Indians--the green corn dance. The Indians apparently differed little from present-day Americans who wait impatiently for roasting ear time. The mature

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[1]Charles Beatty, Journal of a Two Months Tour (Edinburgh: T. MacCliesh and Co., 1798), p. 20.

[2]Lloyd, Falconer and Thorne, op. cit., p. 19.

dry corn was stored and then usually ground into meal. This was cooked in a variety of ways, often being mixed with fat, berries and meat. Parched corn was carried while traveling.

Methods of cultivation were primitive. Fields were cleared in the forests, and the hills of corn were planted between the stumps or girdled trees. Often squashes, pumpkins and beans were planted in the same hills with corn. Agricultural implements were few--a sharpened stick, a bone, a flint hoe or a shell served as a digging tool. The best of these was the flint hoe. Near the end of the Indian era iron hoes were introduced by the white traders, but even then the soil was scratched rather than cultivated. Usually the same crops were raised in the same fields year after year without much use of fertilizers, manures or rest crops. When the reduction of crop yields threatened the well-being of the Indians, they located a new home, cleared new fields and established new villages.

The agriculture of the Indian, though crude and primitive, is historically important because in many ways it was the prototype of the agriculture of the pioneer. The white man, as the Indian before him, was to go through a period of experimentation and adjustment before he came to recognize the methods and crops most suitable to the area. He was to depend on the resources of the forest until his clearings became large enough to sustain himself and his family. He was to wear out and abandon many farms before recognizing the limitations of land use imposed by natural conditions. The land use of the pioneer was to differ little from that of the Indian in method and production. The changes that were to occur came later when the pressure of an increasing population and a changing technology required that a new kind of land use be adopted.

The Pioneer Period, 1800 to 1832

The Settlers

Throughout the pioneer period the character of land use was largely dependent on the character of the settler. Flint, a careful student of the pioneer and his way of life, noted three types of settlers.[1] The most primitive of these, the backwoodsmen, were primarily hunters. A second group was considered as true farm pioneers. The third group was composed of men of substantial means who preferred to purchase land on which the cutting of the forest was well under way.

The true backwoodsmen were a restless lot and seemed always on the move. Their homes were log cabins of sorts; and since they were primarily hunters, the rifle was their most valuable piece of equipment. They sometimes possessed a horse, a cow, a few hogs and some poultry. When neighbors got too close and destroyed the best hunting, they packed their few possessions and moved on.

The backwoodsman was a farmer only to the extent required to supplement the food supplied by hunting and gathering. An occasional clearing was made; but most frequently trees were killed by girdling, and the crops planted among them. A traveler passing through Harrison County in 1819 wrote in his diary "corn fields in the woods, among dead trees, and the corn very fine."[2] Livestock was permitted to run wild in the forest and frequently in the unfenced corn field as well. Cultivation was almost completely absent, and corn had to struggle to rise above the weeds and vines. It was often stated that one could stand at

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[1] Flint, op. cit., p. 232.

[2] Extract from the diary of Dr. Richard Lee Mason published by the Chicago Record in January, 1897.

one end of the field and shake every stalk of corn in it. Except for the erection of a few buildings and the possession of livestock, the economy of the backwoodsman differed little from that of the Indian.

The second group of pioneer farmers can most accurately be classified as hunting farmers. Since it was usually a matter of several years before enough land was in cultivation to supply the needs of the family, the hunting farmer was forced to rely on the resources of the forest and game. However, he was an agriculturalist by heritage and experience; and as soon as his fields would supply his needs, hunting became an avocation. This choice may have been influenced by the depletion of game that occurred as the number of settlers increased. The larger animals such as buffalo, bear, deer and wolves were plentiful at the beginning of the pioneer period but had largely disappeared by 1825.[1]

The hunting farmer greatly improved on the agriculture of the backwoodsman. Fields were enlarged and often fenced. Livestock was improved although a prime requisite was the ability to forage in the woods. After the first few years the farmer became self-sufficient, but farming the tri-county hill land was difficult; and when a new arrival appeared desiring to buy land already cleared, the hunting farmer sold out and followed the backwoodsman to the west.

The settlers in the third wave had frequently been land owners in one of the seaboard states and had sold out before moving to the Tuscarawas Valley. This was especially true of the Germans from Pennsylvania and the English from Maryland. In addition to greater wealth this new settler often possessed education and skill far above that of his predecessor.[2] Many of these went beyond the clearing of the forest;

[1]Howells, op. cit., p. 127.

[2]Townshend, op. cit., p. 484.

they removed the stumps and grubbed-out the roots as well. Larger and better homes were built. The log cabin of the former owner became an outbuilding or was torn down. Better seeds and pastures produced better crops and livestock. Those fortunate enough to locate near a good stream could erect a gristmill, sawmill or distillery. This was a rural economy, however, and most interest was in farming.

Pioneer Agriculture

Cultivated crops.--The pioneer's first objective was to provide the food necessary to feed his family. The earliest agriculture reflects the attempt to meet this need. The first crops planted were food crops that had demonstrated the ability to produce under the primitive forest-clearing type of agriculture. When food was assured, the pioneer added crops that would make him nearly self-sufficient in all things. The lack of transportation facilities precluded the possibility of exchanging his produce for materials produced under more favorable conditions elsewhere. Thus the early settlers planted cotton, rice and other crops not suited to the tri-county area.

Corn was the most important crop in the pioneer economy as it had been in that of the Indian. The Indian method of planting and cultivating was followed. Corn was planted in hills among the stumps and dead trees; and as the Indian had done before, the pioneer planted beans, pumpkins and squash in the hills with the corn.[1] In this way variety could be added to the diet with little additional labor. Equipment was usually restricted to the heavy iron hoe. With this holes were dug for planting, weeds removed and corn "hilled up."

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[1]This is still a practice in the tri-county area. Squash, pumpkins, melons and climbing beans can be seen in many corn fields.

As the amount of land under cultivation increased, wheat, oats, rye and a variety of hay crops were added.[1] The small grains were sown broadcast in the cleared fields and were "harrowed in" with a brush harrow. Although wheat was grown throughout the pioneer period, it was neither as popular a crop nor as well adapted to the new soil as was corn.[2] Wheat grown on the virgin soils was often infected by a fungus disease that affected the flour made from it. This wheat was referred to as "sick" because those eating bread made from its flour became ill. Wheat grown after several crops of corn, rye, buckwheat or tobacco was not as likely to be infected. Thus wheat was usually grown on previously cultivated land.

In time, however, wheat came to rank second only to corn in pioneer agriculture. By 1820 corn and wheat production was of such proportion that Flint was able to report:

> The landlord was a farmer. He told us that Indian corn sells for twenty-five cents (1S.1½d English) per bushel, and that he could produce twenty thousand bushels of it within three miles of his house. This appeared to be somewhat surprising, on considering that the cleared grounds form only small detached parcels, when compared with the intervening woods. Wheat sells at seventy-five cents (3S.4½d English) per bushel. This sort of crop is at present more profitable than Indian corn, as in most cases it yields more than a third part by measure; it does not require to be cleared of weeds, and is more easily carried to market.[3]

Throughout the last half of the pioneer period tobacco was raised in considerable quantities. Many farmers raised it to "tame the soil for wheat."[4] Often it proved a profitable crop, but the local market was limited; and any surplus faced a long haul either by water to New Orleans or overland to Baltimore.[5] The crop proved even more prof-

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[1] Lloyd, Falconer and Thorne, op. cit., p. 51. [2] Ibid.

[3] Flint, op. cit., p. 236. [4] Atwater, op. cit., p. 88.

[5] Mansfield, op. cit., p. 400.

itable after the completion of the Ohio Canal, but continual cropping soon depleted the soil; and after about 1840 tobacco cultivation declined rapidly.

Poor transportation facilities and the resultant high cost left tri-county settlements isolated not only from eastern markets but from each other as well. Scarcity of markets and money further contributed to the development of a self-sufficient economy. The forest and soil provided food and shelter, and with these assured only the problem of clothing remained. In the early years pelts of animals were available; but as the game supply was depleted, other clothing sources had to be found. The pioneer farmer turned to a variety of fiber crops to fill this need.

In the first years attempts were made to raise cotton. The fiber was mixed with hemp or flax and made into stockings or cloth. Those who hoped to become cotton planters were disappointed. "The early frosts of autumn destroyed much of it before the floss was formed, and taught them that this was not the proper climate for cotton."[1]

Silk production was never of major importance, for the care of silkworms required more skill and labor than was available. Additionally, silk was a luxury that few were wealthy enough to afford. Many, however, had visions of becoming wealthy and made attempts at silk culture. Silk's greatest value was as sewing thread. It was strong and pliable and helped make the job of supplying the family's clothing somewhat easier.

Of all the fiber crops flax proved of greatest value to the pioneer way of life. Almost every farmer raised a patch. The processing

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[1]Hildreth, op. cit., p. 394.

of the flax fiber occupied the family through the winter months. The men prepared the fiber and the women did the weaving. Coarse cloth woven from linen was often the only material available for clothing; and mixed with wool, it became the "linen-woolsey" used in making most of the pioneer clothing. "The quarter acre flax patch and a few sheep would, almost without noticing the expense of labor, produce the material for clothing a large family."[1] As the preparation of wool required almost as much labor as that of linen, the providing of a supply of cloth for the pioneer family was a never-ending job.

The pioneer housewife doubtlessly greeted the completion of the Ohio Canal with great joy. It meant that low cost cotton cloth could be purchased and she and her daughters were freed of the constant drudgery of keeping the family clothed. Within five years after the completion of the canal, it was noted that "flax was going out of use as people preferred the cotton cloth to their own home manufactures."[2]

Livestock.--At various periods the tri-county area has been noted for its livestock and livestock products. In the period from 1850 to 1900 it was one of the leading sheep raising areas of the United States. Later, and continuing to the present, dairying became important. The quality of this early stock was uniformly poor. Since few of the early settlers were able to produce beyond their own needs, one of the required qualities of pioneer livestock was the ability to "shift for itself." Forage was available in the forest, and only occasionally did the farmer feed grain.[3]

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[1]Howells, op. cit., p. 393.

[2]Lloyd, Falconer and Thorne, op. cit., p. 54.

[3]Howells, op. cit., p. 65.

Cattle were raised for work, milk and meat. "Oxen were so much better adapted to the clearing of the land and to pioneer conditions that they were generally used for agricultural and transportation purposes rather than horses."[1] The use of cattle for milk and meat was thus secondary to that of pulling the plow. Milk production was almost wholly for the needs of the family.

As noted above the raising of sheep was a part of almost every pioneer farm. Wool was produced for home weaving, and textile mills in Steubenville provided a market for any surplus. Sheep raising and wool production increased greatly, and the profits to be gained from wool production led to early attempts to improve the quality of stock.

Wild hogs were reported in the woods even before the settlement of the area.[2] Hogs raised by the early settlers were of little better quality than the wild ones. They were long-legged, thin, fleet-footed and slow maturing. Most roamed the woods in a semiwild condition and were fattened largely on mast.[3] Pork was the most important source of meat for the pioneers. Hogs produced beyond the needs of the local market were driven east to Philadelphia and Baltimore.

As long as the primary concern of the pioneer farmer was the clearing and planting of the land, the quality of livestock remained poor. When a surplus of grain was produced and the farmer discovered that the grain could be marketed more easily and more profitably as meat, cheese or wool, attempts were made to improve the quality of the animals.[4]

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[1]Lloyd, Falconer and Thorne, op. cit., p. 61. [2]Ibid., p. 66.

[3]Mast refers to acorns and other nuts that were present in large quantities in the forests during the pioneer period.

[4]William T. Utter, op. cit., p. 146.

The fact remained, however, that regardless of the quality of produce the market was too far removed and too difficult to reach to enable a Tuscarawas Valley farmer to compete successfully with farmers more favorably situated. When the problem of isolation was solved, the pioneer period had come to an end.

Growth and Decline of the Rural Economy

Evolution of the Rural Economy

In the pioneer period a general farming with livestock type of land use developed within the tri-county area. Changes occurred after this period, but generally they were changes in emphasis within this basic pattern. Some uses increased in importance and new ones came into being. Others declined and some were discarded completely. Most of these changes were adjustments made necessary by the physical character of the land or by changing economic or technical factors.

As observed previously the pioneers entered an area almost completely covered by a hardwood forest. The pioneers, except for the backwoodsmen, were mostly interested in agriculture and began removal of the forest. By 1832 forest clearing was well advanced but trees still covered the greater part of the land. In the following ten years, however, it was estimated that as much land was cleared as in the preceding thirty,[1] and by 1850 forest covered only about 35 per cent of the tri-county area.[2] Forest removal continued until a low point was reached about 1930 (Fig. 8).[3]

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[1]Townshend, op. cit., p. 497.

[2]Ohio State Board of Agriculture, 14th Annual Report (Columbus: State of Ohio, 1861), p. 572.

[3]Statistics on land uses for Ohio counties are available from three sources: Ohio township assessors reports, the Ohio crop reporting

After the completion of the Ohio Canal in 1832 the amount of land under cultivation increased rapidly. This upward trend probably reached a peak between 1840 and 1845 and soon thereafter began a decline that, except for temporary recovery periods, has continued to the present time (Fig. 7). Coinciding with this decrease of land under cultivation was an increase of land in pasture or hay crops (Figs. 9 and 10).

Grazing, with the emphasis on sheep, became important about 1850. Sheep raising reached its highest point between 1860 and 1890 and, except for a brief time (1900-1910), has since declined steadily. Cattle grazing did not attain the prominence in the tri-county area that it reached in other southeastern Ohio counties.[1] The decline of sheep raising was followed by increased emphasis on dairying. This change was doubtlessly influenced by the growth of relatively near urban markets. Since about 1900 the dairy industry has been the most important source of income for tri-county farmers.

At the close of this period the economy was primarily agricultural. The remaining timber was largely second growth of relatively poor quality. Some land was being removed from cultivation as the strip mining of coal began. Perhaps the most unfortunate trend in land use was the increasing amount of land classified as waste land. Waste land had been increasing since the first settlement and by 1930 nearly equaled the area classed as woodland.[2]

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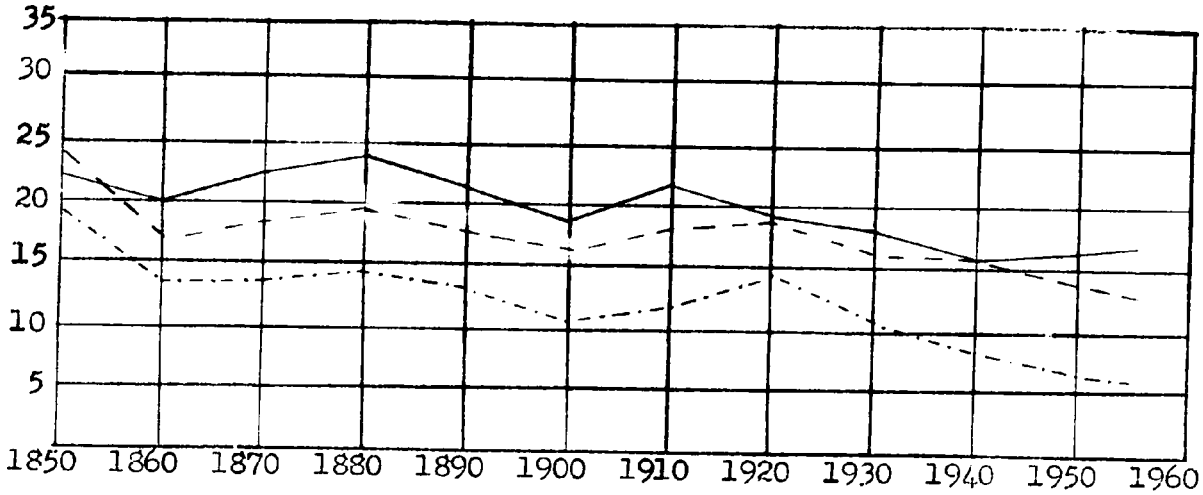
service of the Ohio Agricultural Experiment Station and the U. S. agricultural census reports. These reports rarely agree on the total area for the various types of use, but they almost invariably agree on trends in land use changes. The data used in developing land use charts for this study are primarily from the township assessors reports. These annual reports have been compared with the others, and adjustments have been made if major differences were noted.

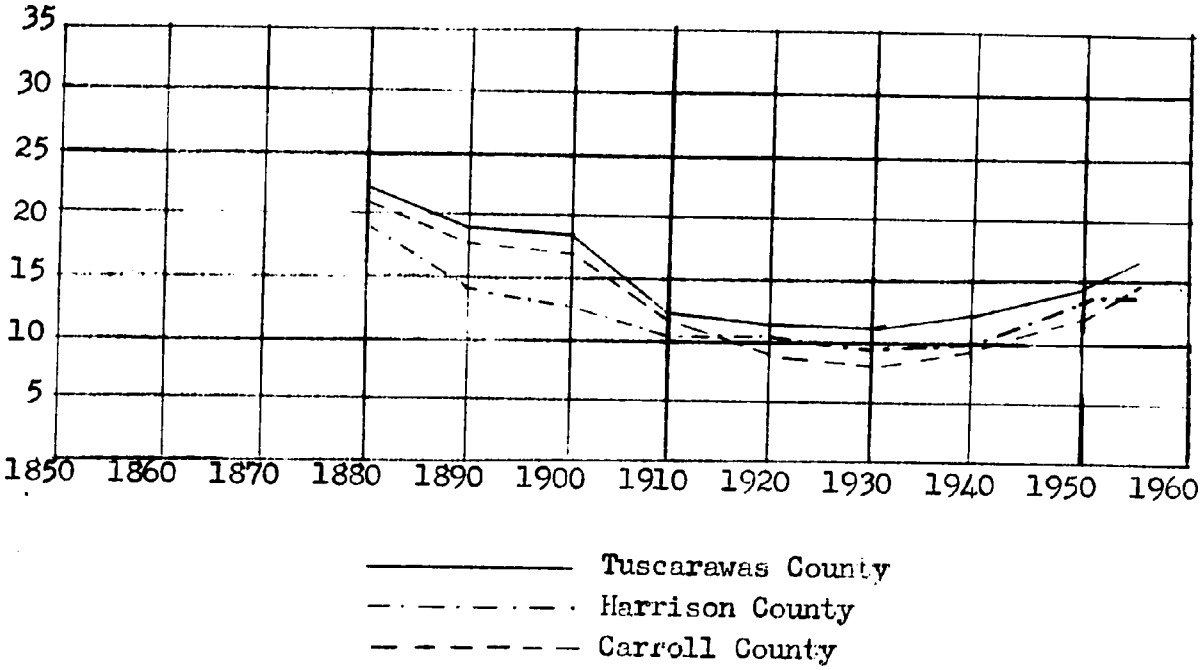
[1] Lloyd, Falconer and Thorne, op. cit., p. 217.

[2] U. S. Bureau of the Census, United States Census of Agriculture: Ohio (Washington: Government Printing Office, 1930).



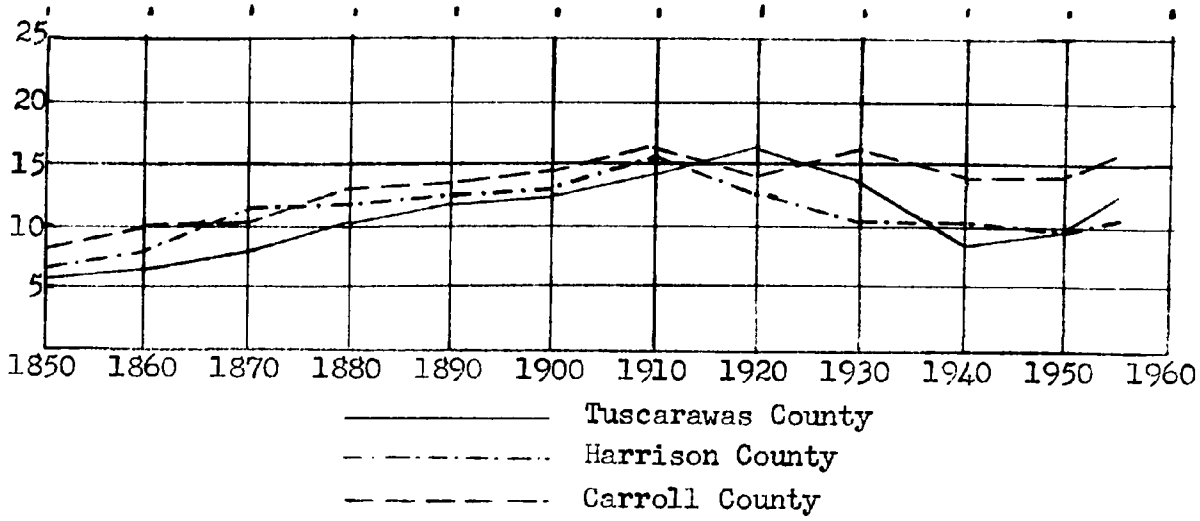
Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 7.-- Per cent of total land area in row crops and small grains.



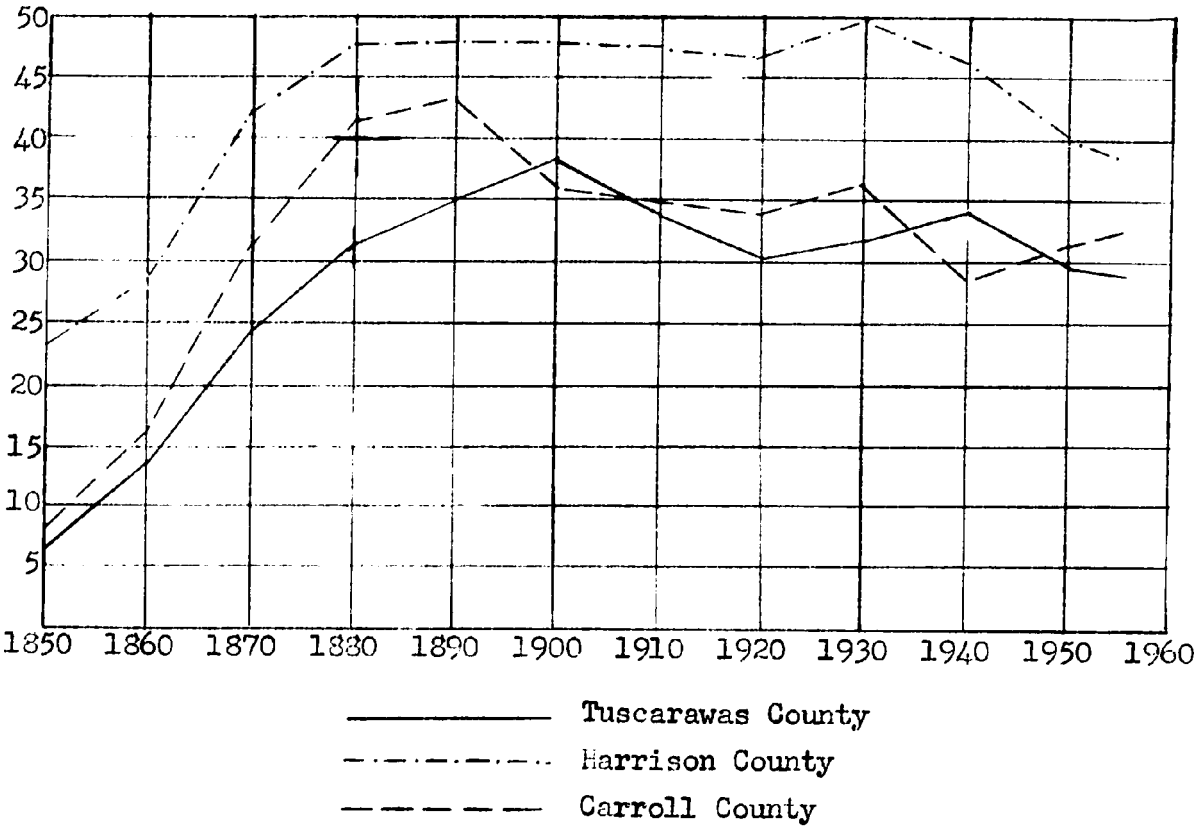
Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 8.-- Per cent of total land area in forest.



Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 9.— Per cent of total land area in hay.



Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 10.— Per cent of total land area in pasture.

Cropland agriculture.--The completion of the Ohio Canal in 1832 was followed by a rapid expansion of agriculture in Tuscarawas, Harrison and Carroll Counties. By 1845 the area in cultivation was probably greater than at any time before or since. The projecting of Figure 9 back to the 1840-1845 period would indicate a probable average of 25 per cent of the total area being planted to corn, small grains and potatoes. By this time wheat was of greater importance than corn with rye and oats also being grown. Flax acreage was decreased as ready-made cotton cloth became available and tri-county residents were no longer required to make their own clothing.

Tobacco was an important crop in the late pioneer period and through the 1830's. Atwater commented that tobacco "grows only on rather a thin soil, such as exists in our hilly region."[1] Tobacco, however, was a robber crop; and fertilizer and careful cultivation of the hilly fields were required in order that the fields continue producing. Since the early farmer was not particularly noted for conservation, soil erosion and depletion soon made the growing of tobacco unprofitable.

As livestock was improved and became a more important part of the economy, forage was also improved. A variety of hay crops were introduced, and seed production proved profitable for many. An account of one Harrison County farm operation appeared in The Cadiz Organ.

> The contrast in the farming business now, and what it was a few years ago in Ohio is astonishing. We remember, when not one farmer in a half dozen produced but little if any more, than for his own consumption; consequently, no increase ensued; now, the face of the thing has changed. A gentleman at our elbow, informs us that on a piece of ground containing eight acres, he has raised in one season about 25 bushels of cloverseed, which is worth from $11 to $12 per bushel, amounting to say $287. He bestowed on it 58 days of labor, which is worth say one dollar per day--the seed used in sowing cost $3--adding labor and seed, it amounts to $61. The hay paid the

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[1] Atwater, op. cit., p. 83.

labor and seed used in sowing; leaving the amount received for seed, 287 dollars, clear of all expenses.[1]

Prices for farm produce, even away from the Ohio Canal, were good. In the same issue of The Organ grain prices were quoted as "wheat at $1.37½ a bushel, corn at $0.75 a bushel and oats at $0.50 a bushel."[2] This led the editor to comment: "At such prices, no farmer that is a prudent man, can help realizing a fortune in a few years."[3]

There was an increasing demand for the farmer's products, especially grain. The merchants of Dover, New Philadelphia and Cadiz competed also for other available produce. The following is one of several similar advertisements appearing in The Organ on December 21, 1838.

> Wanted--1000 bushels clover seed; 500 bushels Timothy seed; 1000 bushels Flax seed; 3000 lbs. Roll Butter; 200 Kegs hog's lard; 100 bushels dried peaches; 200 bushels dried apples: for which highest market prices will be given.

After 1850 a rather abrupt change occurred. Experience had shown that the soils and topography of the tri-county area were not well suited to open-tilled crops. Soils were becoming badly eroded and depleted. As long as there was new land to clear to take the place of that being abandoned, the amount of cropland remained at the same level or increased. By 1850, however, most of the forest had been removed and that which remained was usually in the more rugged or more remote areas. From this time on more land was being removed from cultivation than was being added by forest removal, resulting in a sharp decline in the cultivated area.

As indicated in Figure 8 the decline reached a low point in the 1860's. The amount of cultivated land fluctuated somewhat from this level, but after World War I another definite downward trend developed. Most of this decline can be charged to the acreage reduction of wheat

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[1] The Organ (Cadiz), January 3, 1839. [2] Ibid. [3] Ibid.

and of rye, of which production had become insignificant by 1880. In Harrison and Carroll Counties the wheat acreage for the 1860-69 period was less than half that for the 1850-59 period; in Tuscarawas County it was one-third less (Fig. 11). Wheat production was increased about 1880 under the impetus of high prices and the development of better machinery, but shortly thereafter lowered prices and reduced yields influenced a decline that has continued.

While rye was almost disappearing and wheat declining in importance, the acreage planted in corn and oats changed but little after 1850. A probable reason for this continued planting of corn and oats was their value as livestock feed. Wheat and rye were generally cash crops; and as livestock became more important, they lost out to the feed grains.

With the end of the post-canal surge of cropland expansion a number of factors began influencing a change in emphasis in tri-county agriculture. Soil erosion and depletion caused the removal of much land from cultivation, and the cash grain farms of the hilly areas could not compete with those of the fertile, more easily farmed land of other parts of Ohio and farther west. By 1850 a trend towards consolidation of land holdings into larger units more suited to grazing was noted.[1]

Emergence of the livestock economy.--The raising of livestock now advanced from a subsidiary enterprise to become the primary base of the rural economy with sheep raising the leading phase. Nearly all pioneers had possessed a few head of sheep to supply the family clothing needs. Thus it was just a matter of increasing the flock to become an important wool producer. Secondly, a cash market for wool had developed

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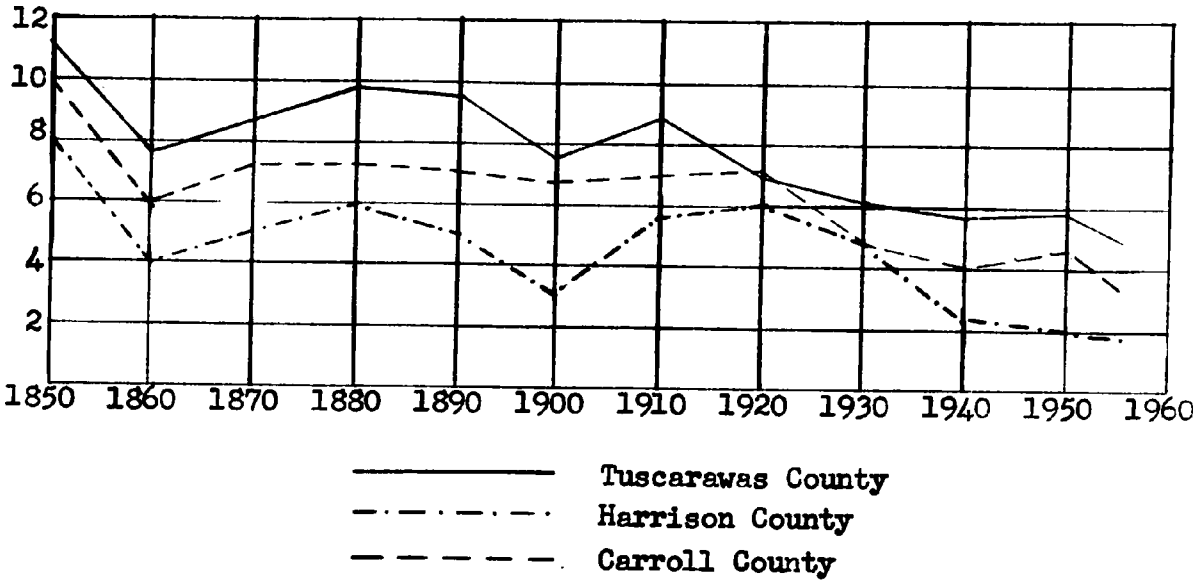
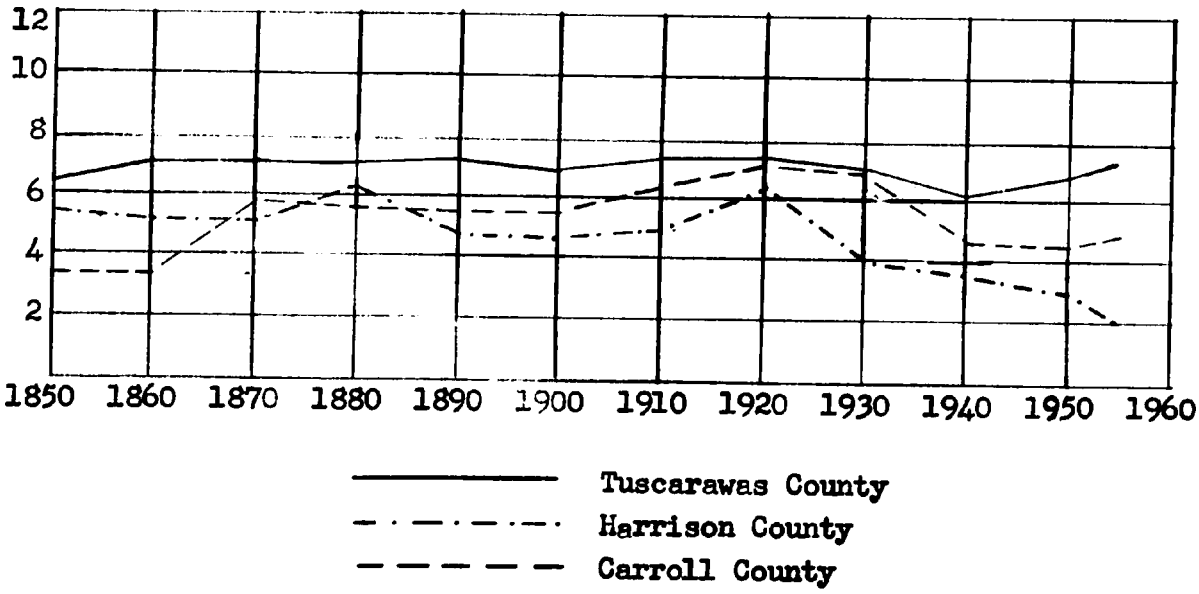
[1]Ohio State Board of Agriculture, 11th Annual Report (Columbus: State of Ohio, 1856), p. 45.



Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 11.— Per cent of total land area in wheat.



Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 12.— Per cent of total land area in corn.

in the 1840's.[1] Wool, possessing a high value per unit of weight, enabled the producer to ship considerable distances to market and still realize a profit.[2] Finally, the limestone soils underlying much of the tri-county area were considered excellent for the grazing of sheep.

The rise in the number of sheep was spectacular (Fig. 13). From 1850 through 1880 Ohio was the biggest sheep raising state in the nation with Harrison, Carroll and Tuscarawas among the leading counties. In the 1860-1880 period Harrison County was probably exceeded only by Licking County, Ohio and Venango County, Pennsylvania, in the number of sheep raised.[3] In the ten years from 1865 to 1875 an average of one sheep for each 1.8 acres of land was raised in the three counties while one report indicates that Harrison County had more sheep than acres in 1868.[4]

The quality of the sheep improved greatly in this period of expansion. Premium prices were offered for better grade wool, and this was sufficient inducement for improving the quality. The Cadiz Republican for November 13, 1897, reports that "A gold medal has been awarded Harrison County wool exhibited at the Paris Exposition. The exhibit was sent by S. S. Campbell of Cadiz."

The extremely high post-Civil War wool prices made wool production profitable. A peak of $1.10 a pound was recorded in 1868, but prices soon declined to a more realistic level.[5] Howe, writing of Cadiz in 1887, reports:

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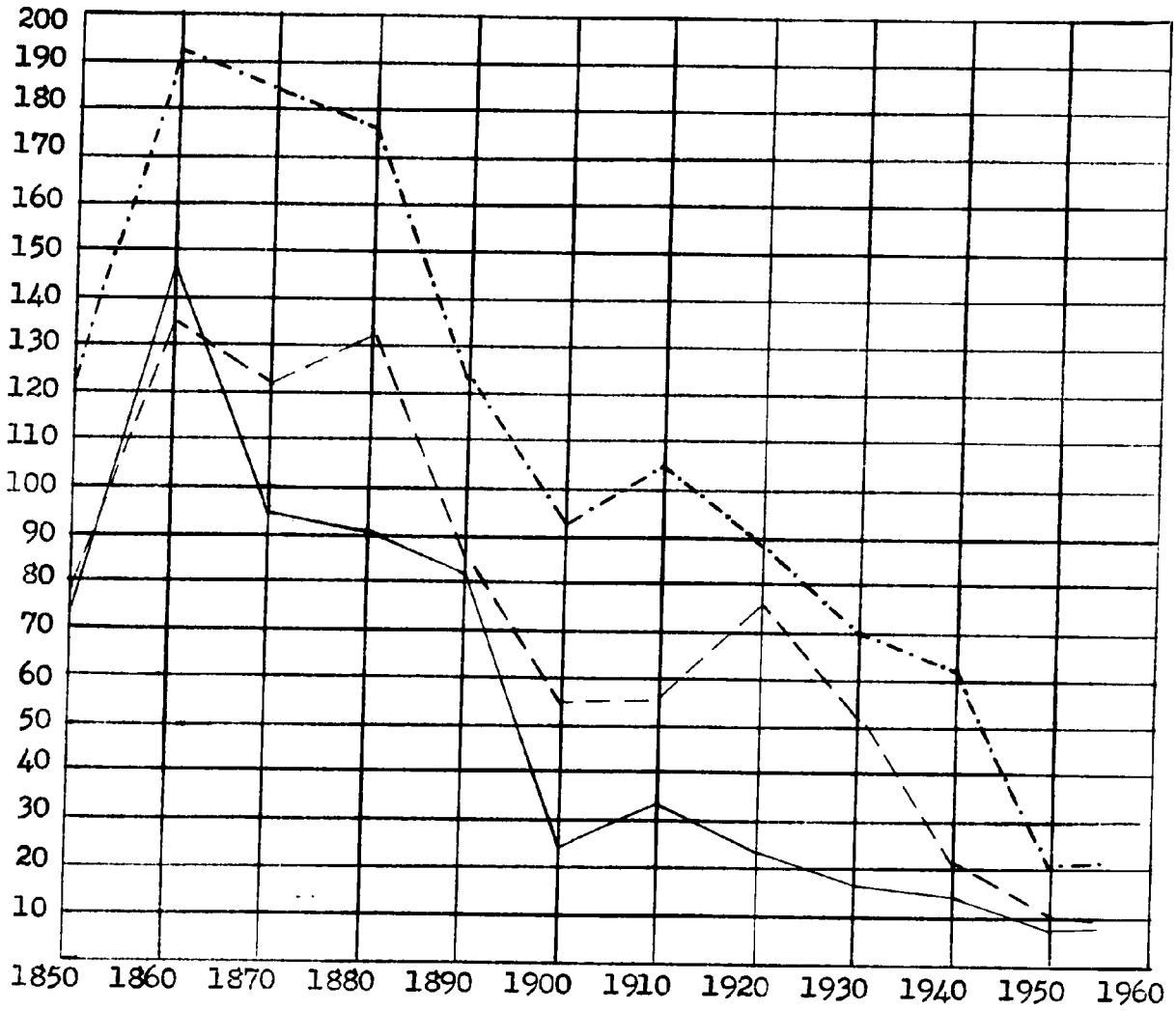
[1]Lloyd, Falconer and Thorne, op. cit., p. 107.

[2]Langdon White and Clyde E. Cooper, "Sheep Industry of Southeastern Ohio," Economic Geography, July, 1931, p. 263.

[3]Henry Howe, Historical Collections of Ohio, Vol. II (Columbus: Henry Howe and Son, 1891), p. 175.

[4]The Cadiz Republican for April 23, 1869, reported 252,111 head of sheep in Harrison County in 1868. This was the peak year in the area.

[5]Howe, op. cit., p. 176.



Source: Bulletins 326 and 526, Ohio Agricultural Experiment Station and United States Census of Agriculture.

Fig. 13.— Number of sheep raised (by thousands).

> This place it is claimed contains more wealth than any other its size in the state. The banking capital is especially large. Here reside families who have accumulated fortunes from prosperous farming, largely wool growing, and tired of the isolation of farm-life make it their permanent home.[1]

A Harrison County resident provides additional information concerning the practice and profit of raising sheep in the area.

> On a farm of a quarter section, 325 sheep can be conveniently pastured. This in 1880 is valued at about $5,000. The value of such a flock of sheep would be about $650. With proper care and feeding corn and hay, all of which one man can do, the annual clipping would be about seven pounds per sheep; total 2,275. At thirty-three and a third cents per pound present price, this gives $758.33 for the wool. Then the increase in sheep is double at the end of the year, which at $2.00, each is $650. This added to the product of the wool, gives $1,308 as the annual production of the farm. About 200 large wethers are also sold at $5.00 each, making a total of $2,308. The largest bank accounts in our town [Cadiz] come from wool growers of the county.[2]

However, by this time (1880) the sheep industry had begun a sharp decline. The number of sheep in the tri-county area in 1900 was considerably less than half the number raised during the peak years of 1860 to about 1890. After staging a slight recovery from 1910 to about 1925, wool production again declined and today is of little importance.

In contrast to the rapid growth and decline of sheep and wool production was the slow development of the dairying economy. The number of cattle raised remained at about the same level from about 1850 through 1930. In the early part of the period the triple-purpose cow of the pioneer was still of importance. However, horses were assuming the job of pulling the plow, and beef cattle were being developed in other areas to provide better meat.

The dairy industry did not develop at the same speed in all parts of the tri-county area. The 1851 report of the Carroll County Agricultural Society noted the greater emphasis being given to increasing the

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[1] Ibid., p. 170.

[2] Ibid., p. 177.

number and improving the quality of sheep while also noting that there was little increase or improvement of dairy cattle.[1] On the other hand, the Tuscarawas County Society reported in 1852 that Tuscarawas County farmers had a surplus of butter.[2] The Tuscarawas County dairy industry received help in the post-Civil War period when a large number of Swiss and Germans migrated to the county and began making Swiss cheese. They settled primarily in the area west of the Tuscarawas River with large numbers near Sugar Creek, Ragersville and Baltic. The cheese was made by individual farmers or in small factories--a practice that continued throughout the period under discussion. In 1875 there were six cheese factories in Auburn Township with a total production for the year of forty-two tons.[3] Production has increased with Sugar Creek often being called the Swiss cheese capital of the United States.

The number of dairy cattle increased slowly; but, as indicated above, the dairy industry became the most important source of income for tri-county farmers. However, as the urban market developed and different means of transportation came into use, butter and cheese gave way to fresh milk as the most important dairy product.

Although other types of livestock have been raised, they have never attained the importance of sheep or cattle. Horses were necessary in the farm operation and, because of the religious beliefs of the rather large Amish group in Tuscarawas County, have remained more important than in other parts of the state. Swine have proven more profitable in the

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[1]Ohio State Board of Agriculture, 6th Annual Report (Columbus: State of Ohio, 1851), p. 247.

[2]Ohio State Board of Agriculture, 7th Annual Report (Columbus: State of Ohio, 1852), p. 363.

[3]Rhodes, op. cit., p. 63.

Corn Belt section of the state and have never been grown in the same proportion in the tri-county area.

The Changing Character of Agriculture

To a large degree the 1832-1930 period was one of trial and error in an attempt to develop a type of agriculture best suited to the rolling character of the land. The agricultural patterns changed from one of corn and small grains with livestock to sheep and wool production with declining agriculture and then to dairying-general farming. As the patterns developed and changed, they were subjected to pressures of technical and scientific advances. These advances were primarily in the form of improved seeds and livestock and the development of machinery. The development of machinery probably had the greatest influence on tri-county agriculture.

Falconer, writing in The Agriculture of Ohio, summarizes the early development of machinery.

> There had been considerable improvement in farm machinery previous to 1840. An Ohio farm at that date could be worked with half the expense of labor that was required to work it 40 years before, and better worked withall. There had been much improvement, but compared with that which was to come during the next 40 years it was, indeed, small. Charles Newbold and Jethro Wood, improvers of the plow, had been prominent in the development of agricultural machinery from 1820 to 1840. From 1840 to 1860 Hussey, McCormick, Whitely and Ketchum, improvers of the reaper and mower, were foremost. Now that the farmer had something better than his old "bull" plow, attention was turned to labor saving in other lines of work, and the reaper, the threshing machine, the mower, and other implements were developed and adopted. By 1860 grain was commonly cut with the reaper, but still bound by hand. The combined thresher and separator had come into use. Steam threshing outfits had been tried. Mowing machines were widely used. The wheeled horse-rake had begun to supplant the wooden revolving horse-rake. The steel plow had replaced the cast iron plow. The single shovel plow had given way to the double shovel plow. After 1870 the two-row corn planter and the two-horse cultivator was developed.[1]

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[1] Lloyd, Falconer and Thorne, op. cit., p. 224.

Between 1880 and World War I changes in farm machinery were more refinements rather than the development of new types. The farm tractor became important following World War I and was accompanied by the development of tractor-powered equipment. These developments have revolutionized farming methods.

Machine agriculture influenced changes in land use and settlement in the tri-county area. It required a smaller number of people to farm the same area; and, as a result, many farmer's sons were, in effect, forced to move from the "home place." On the other hand, the manufacturing of farm machinery created jobs, often more attractive than those on the farm, for the young people who were being replaced by the use of machinery. The use of machinery has also been largely responsible for the consolidation of farm holdings into larger units with a consequent loss of farm population. It encouraged the large-scale agriculture of the interior lowlands and Great Plains that could produce grains at a lower cost than on the relatively small farms of the tri-county region.

When tractors replaced horses and mules, the pasture needed for the six to eight horses or mules used on each quarter section was now available for other stock or for cultivation. The influence of each factor may have been small; but when all are considered together, they indicate a considerable influence in the development of the livestock character of tri-county agriculture.

Improvement of seeds and livestock kept pace with the development of machinery. Even in the pioneer period there were individuals with more than a cursory interest in improving yields of grain and the quality of the livestock. This interest expanded and in the 1840's was strong enough to influence the creation of state and county agricultural soci-

eties for the purpose of improving agriculture in general. Commercial fertilizers came into use in the latter part of the period. However, for the tri-county area and for most of southeastern Ohio, improved seeds and livestock and the increasingly heavy use of fertilizers and manure did not result in higher yields and better profits.[1] Yields remained at about the same level and in some instances even declined. This declining productivity was reflected in the slow deterioration of the rural economy that began about 1850. Rural population declined; farm income was reduced; land was abandoned. To understand why these things occurred requires an examination of the factors that caused them.

Factors Influencing the Deterioration of the Rural Economy

The limitations of the natural environment and the type and method of land use were the primary contributive factors in the declining economic standards of rural Tuscarawas, Harrison and Carroll Counties. The natural factors were not direct causes; but when poor land management practices were used, they contributed to the more rapid development of land use problems. Soil deterioration thus begun made it difficult for tri-county agriculture to compete successfully with that of other agricultural areas.

The Natural Environment and the Declining Economy

Soil erosion and soil depletion were the most important causes of soil deterioration. The natural factors were more directly associated with the development of erosion. For this reason the discussion that follows will be primarily concerned with the extent and severity of erosion within the tri-county area and the environmental characteristics.

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[1] G. W. Conrey, J. S. Cutler and A. H. Paschall, Soil Erosion in Ohio, Bul. 589 (Wooster: Ohio Agricultural Experiment Station, 1937), p. 3.

An erosion survey of Ohio completed in 1934 indicated erosion problems in almost all parts of the tri-county area (Fig. 14). A later survey covering the occurrence of erosion in the Muskingum Watershed substantially supported the findings of the first report.[1] The reports showed the most severely eroded section to be in southern Tuscarawas County and west-central Harrison County (Area V in Fig. 14). Area IV (an estimated 50 per cent of the total area) differed only from Area V in having a lesser amount of gullying. Only Area I, the bottom land along the Tuscarawas River and larger tributaries, showed little or no erosion. In Areas II and III erosion has occurred but is not severe. The areas of greatest erosion (IV and V), however, cover an estimated 70 per cent of all land in the three counties.

Erosion development coincided with the introduction of agriculture. The original forest cover protected the land, and the first settlers found a relatively productive soil awaiting them. With forest removal, however, erosive characteristics of the natural environment became operative. Continual agriculture without appreciable effort to control erosion and depletion soon resulted in declining soil productivity. This decline was noted as early as 1830 when one writer commented, "The farms are mostly new, and the soils are very productive. But it will be observed, that those which have been used for several years, begin to show evidence of degeneration."[2]

Economic expediency rather than lack of knowledge of better farming methods generally dictated the policy of poor land management. Criticism of this policy by English and eastern farmers is acknowledged in

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[1] H. Howe Morse, Erosion and Related Land Use Conditions of the Muskingum River Watershed (Washington: U. S. Dept. of Agriculture, 1939).

[2] Ohio State Board of Agriculture, 14th Annual Report, op. cit., p. 392.

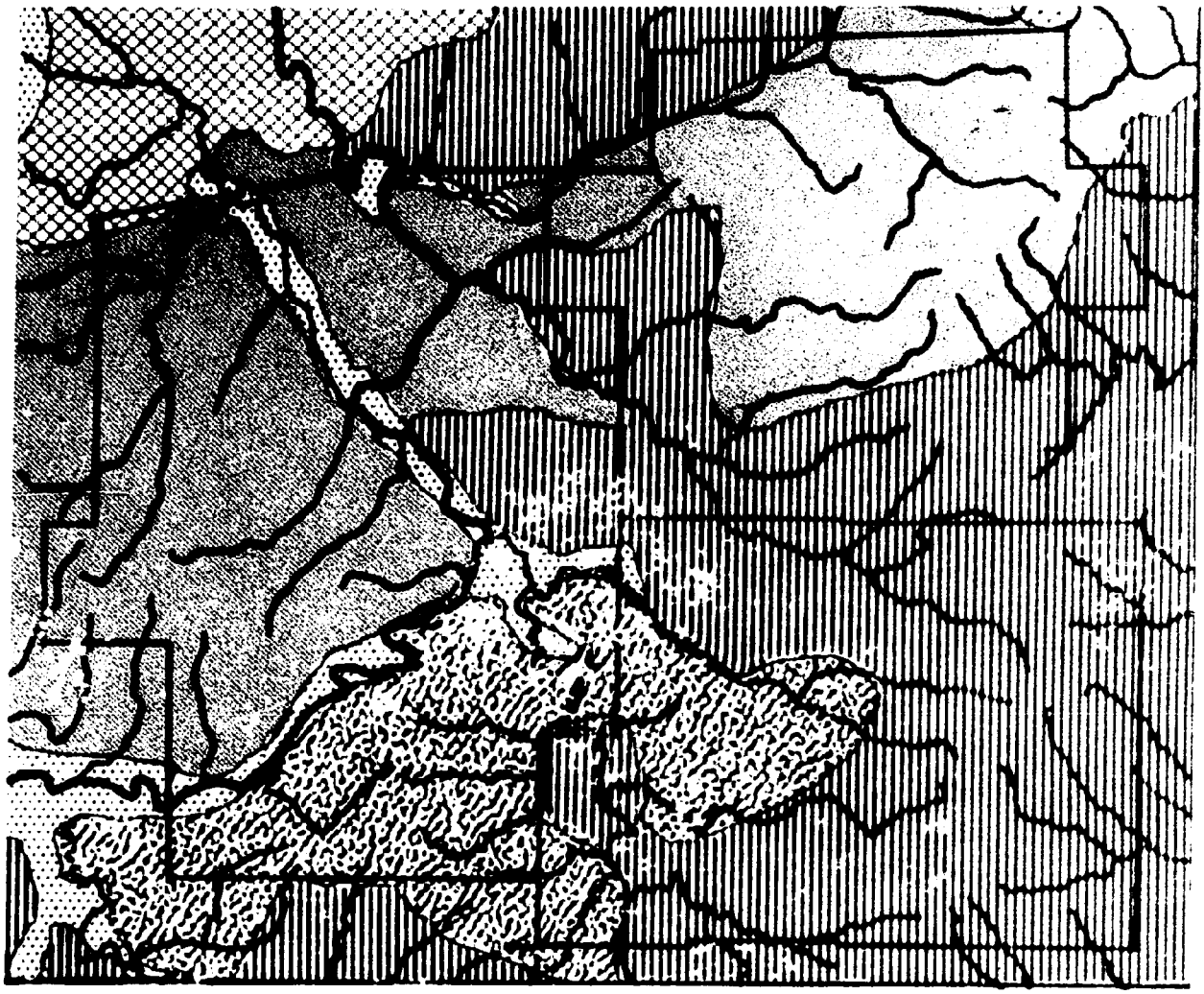

Fig. 14.-- Severity of Erosion in Tri-County Area.

the preface to the 1860 agricultural census.[1] "All that we ask is, that those who censure our farmers for not cultivating and enriching their land more thoroughly should take into consideration the circumstances which surround us. High farming involves high prices."[2] The land use methods were defended as being necessary because "Where land is cheap and rich, it will not pay to expend much labor and money in making or in purchasing manure."[3] The writer notes further:

> But it may be asked, "Will not the practice of raising crops without manure impoverish the land?" Certainly it will; but our hardy pioneers, having enjoyed the cream of the soil as a reward for their enterprise, go into a yet newer country, cut down the original forests, plow up the land, and raise all the grain they can. Admitting that after all this is effected, the land is not so rich as when first cleared, and that much labor has to be expended in its cultivation, nevertheless much good has been accomplished.[4]

This philosophy of land use in pioneer areas seems to be universal and changes only when a frontier no longer exists.[5] "We shall farm better as soon as such improvement is perceived to be profitable and necessary."[6] For the tri-county area this became necessary when good virgin soils no longer could be had by simply moving westward.

Characteristics of slope, soils and climate were the main contributors to the development of erosion problems. Where land is sufficiently level for cultivation, conditions of soils and climate do not become major erosive influences. Characteristics of soils and climates do, however, help make soil erosion control more difficult in areas of

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[1] U. S. Bureau of the Census, United States Census of Agriculture: 1860 (Washington: Government Printing Office, 1862), p. viii.

[2] Ibid. [3] Ibid. [4] Ibid.

[5] John P. Augelli, "Cultural and Economic Changes of Bastos, A Japanese Colony on Brazil's Paulist Frontier," Annals of the Association of American Geographers, Forty-Eight (March, 1958), p. 18.

[6] U. S. Bureau of the Census, United States Census of Agriculture: 1860, op. cit., p. ix.

steep slopes. If all other factors are equal, the greater the slope the greater is the amount of erosion.[1]

Slope.--Figure 15 shows the areas of steepest slopes to be the triangular region south of the junction of Stillwater Creek with the Tuscarawas River; the divide between Conotten Creek on the northeast and Little Stillwater Creek on the southwest and the headwaters area of Yellow Creek in Carroll County. A relatively wide flood plain exists along Conotten Creek (Figs. 16 and 17) and Big and Little Stillwater Creeks; but elsewhere valleys are V-shaped with narrow, intervening ridges. Slopes of over 20 per cent are numerous. In other areas, such as along the divide between the Tuscarawas and Ohio drainage areas and in central and northern Carroll County, ridge tops are frequently a half-mile or more in width with relatively narrow, intervening valleys (Figs. 18 and 19) and steep, lower slopes. A more gently rolling landscape is present in the northwestern part of Tuscarawas County. It has been estimated that approximately 70 per cent of the unglaciated portion of the Muskingum Watershed has slopes of greater than 12 per cent.[2] The tri-county area doubtlessly approches this figure. Land use surveys made in the late 1930's recognized the limitations of such land and suggested that most of the area not be cultivated (Fig. 30).

Land suited for cultivation is limited largely to the bottom land, terraces[3] and the wider ridge tops. Slopes between 12 and 20 per cent should be cultivated only with the best of conservation practices. Any slope greater than 20 per cent should be placed in either pasture or

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[1] Conrey, Cutler and Paschall, op. cit., p. 8.

[2] Morse, op. cit., p. 5.

[3] During the post-glacial period ponding occurred in the Tuscarawas and large tributary valleys. As the water level dropped, a series of broad terraces and high bottoms and flood plains developed.

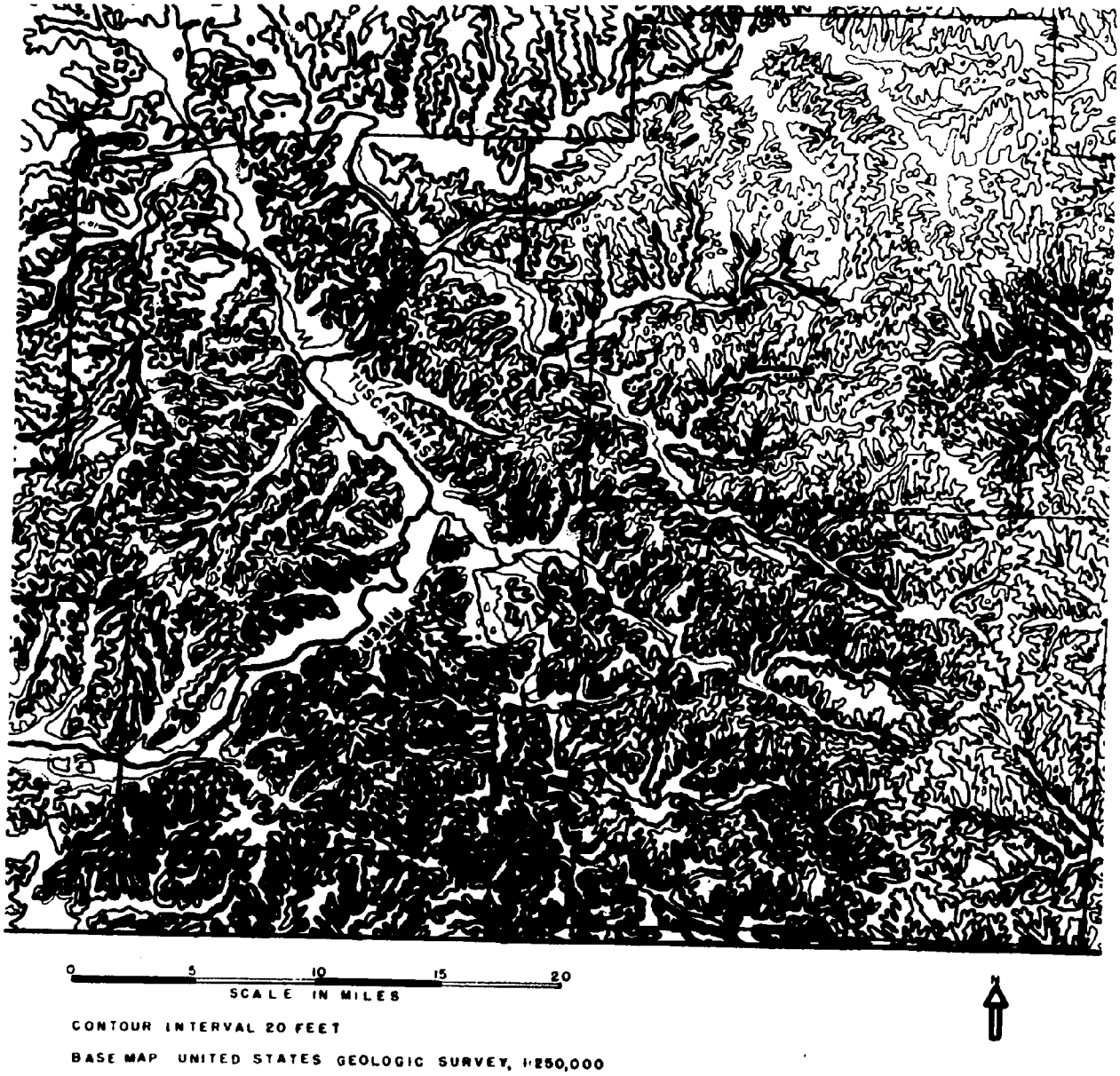

Fig. 15.-- Topographic Map of Tuscarawas, Harrison and Carroll Counties.



Fig. 16. Conotton bottom land and first terrace, North Township, Harrison County.



Fig. 17. The Conotton Valley, Orange Township, Carroll County.



Fig. 18. Baxter Ridge from County road 20 northeast of Dellroy.



Fig. 19. Looking towards Messer Run, the valley joining Baxter Ridge on the west.

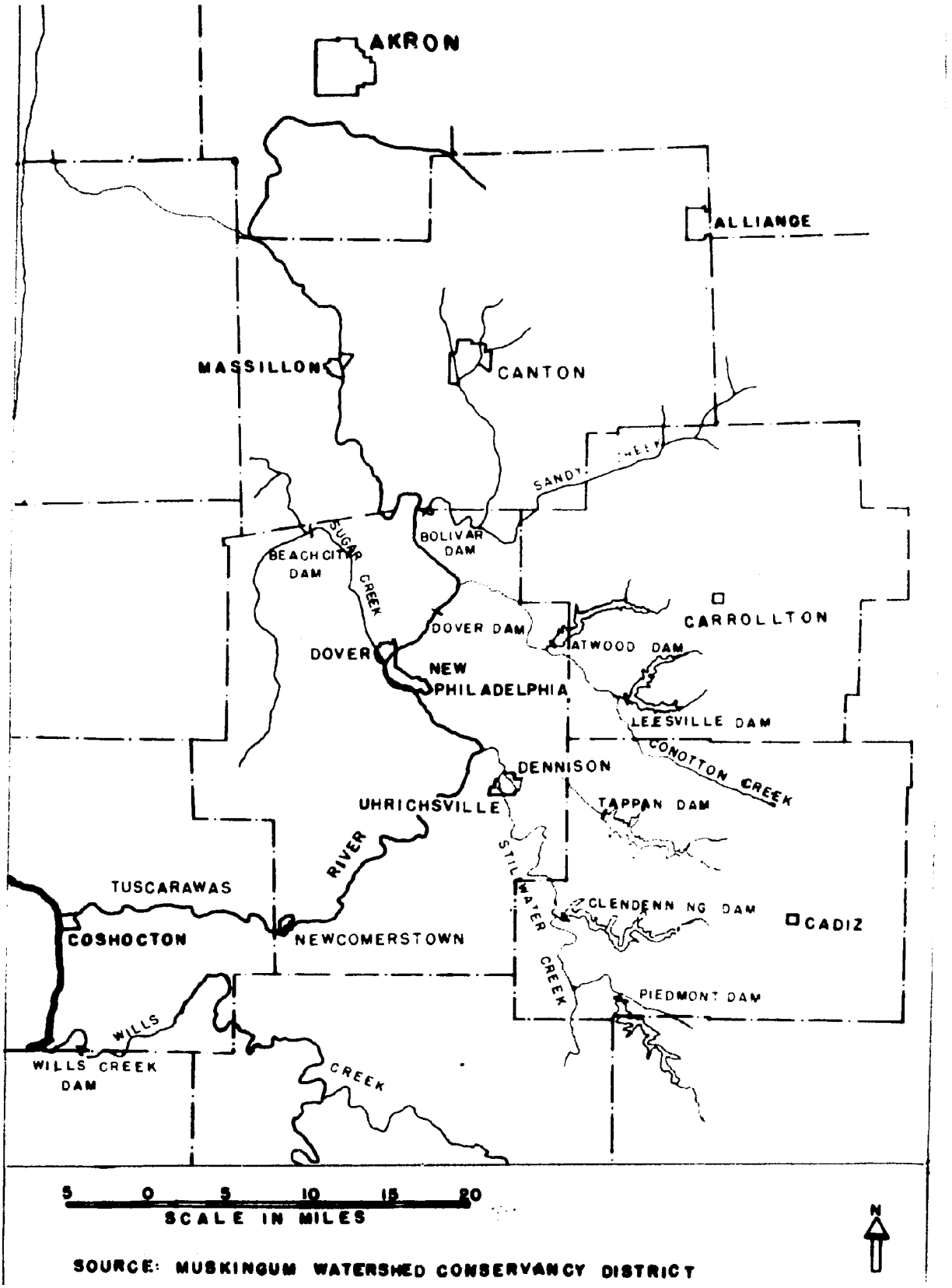

Fig. 20.— Lakes of the Tuscarawas Drainage Area

woods.[1] Following these recommendations then means that approximately 50 per cent of the tri-county area is unsuited for cultivation and another 20 per cent should be cultivated only with the best of conservation measures in use. These limitations have not been observed in the past, and severe erosion has been the result.

Soils.--Three major soils groups (Fig. 22) are found in the tri-county area: Muskingum silt loams formed from sandstones and shales, Belmont and Westmoreland silty clay loams formed from limestone, soils formed from the glacial outwash along the Tuscarawas River and major tributary streams. The natural fertility of the soils is not noticably lower than that of soils in the unglaciated parts of the state. Average corn yields in Carroll, Harrison and Tuscarawas Counties approximate those of Montgomery and Hardin Counties, two counties in the Corn Belt region of western Ohio.[2] However, in order to reach and maintain those high yields, more care and greater effort is required in southeastern Ohio. The farmer in this area must use modern methods of strip-farming and terracing and a greater amount of labor to achieve the same results as farmers in the western part of the state.

The Muskingum silt loam occupies the largest area within the three counties. The A horizon of the Muskingum series is only from six to eight inches deep. The B horizon is almost completely lacking.[3] The parent base of sandstones and shales occurs two to four feet below the surface, and severe erosion can easily expose it. The C horizon is relatively unproductive, and to restore some fertility and a satisfac-

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[1]Morse, op. cit., p. 13.

[2]U. S. Bureau of the Census, United States Census of Agriculture: Ohio (Washington: Government Printing Office, 1950).

[3]Morse, op. cit., p. 20.

tory grass cover requires intensive fertilization and liming.[1] The rapidity with which the C horizon dries out in the summer months adds to the problem of soil restoration. On severely eroded land trees are established with considerable difficulty. It is recommended that the steeper slopes with the Muskingum series be retained in forest rather than grass.[2]

The limestone based soils occur primarily in the eastern parts of Harrison and Carroll Counties where thin layers of limestone are situated near the surface.[3] The limestone outcrops frequently occur between layers of sandstone and shale with erosion causing a mixture of the two soils on the lower slopes. Soils of the Belmont and Westmoreland series have a high clay content, which retains moisture quite well and becomes very unstable when saturated with water.[4] These soils usually occupy the steepest slopes of an area and, as a consequence, have a tendency to slip down the hillsides in the spring months. Gullying is frequently severe. Slips may cover several acres and are especially noticable in grasslands. For some undetermined reason slips seldom occur in cultivated regions.[5] Gullying, however, is more severe on cultivated land. The limestone based soils have a slightly higher natural fertility than average soils in the state.[6] This has frequently resulted in a more intensive use followed by exaggerated erosion problems. The fact that subsoils may continue to produce fair yields after the top soil has been removed sometimes blinds farmers to the need for erosion control.

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[1] Ibid.

[2] Ibid.

[3] Conrey, Paschall and Burrage, A Key to the Soils of Ohio (Wooster: Ohio Agricultural Experiment Station, 1938), p. 23.

[4] Morse, op. cit., p. 17.

[5] Ibid.

[6] Ibid., p. 20.

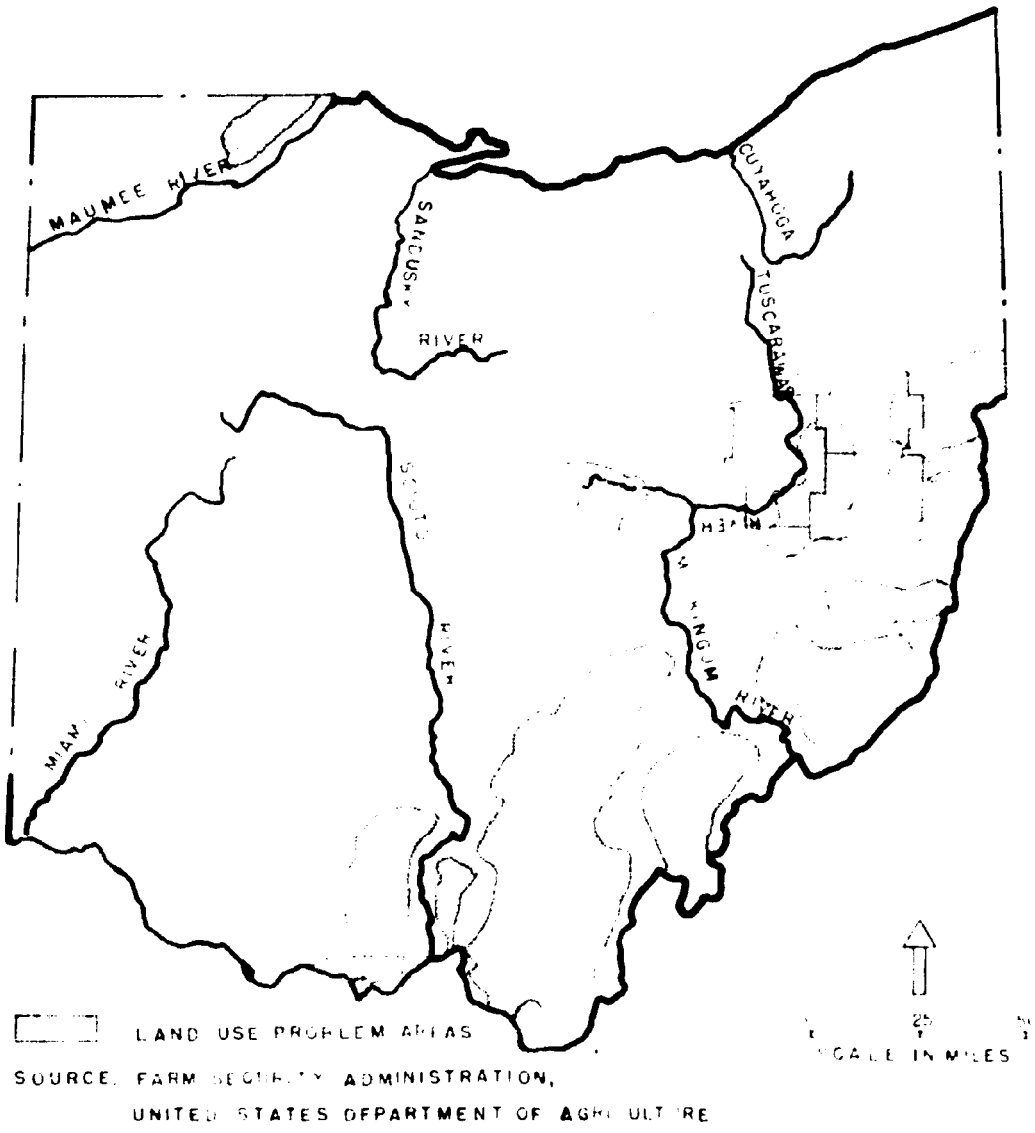

Fig. 21.-- Land Use Problem Areas of Ohio.

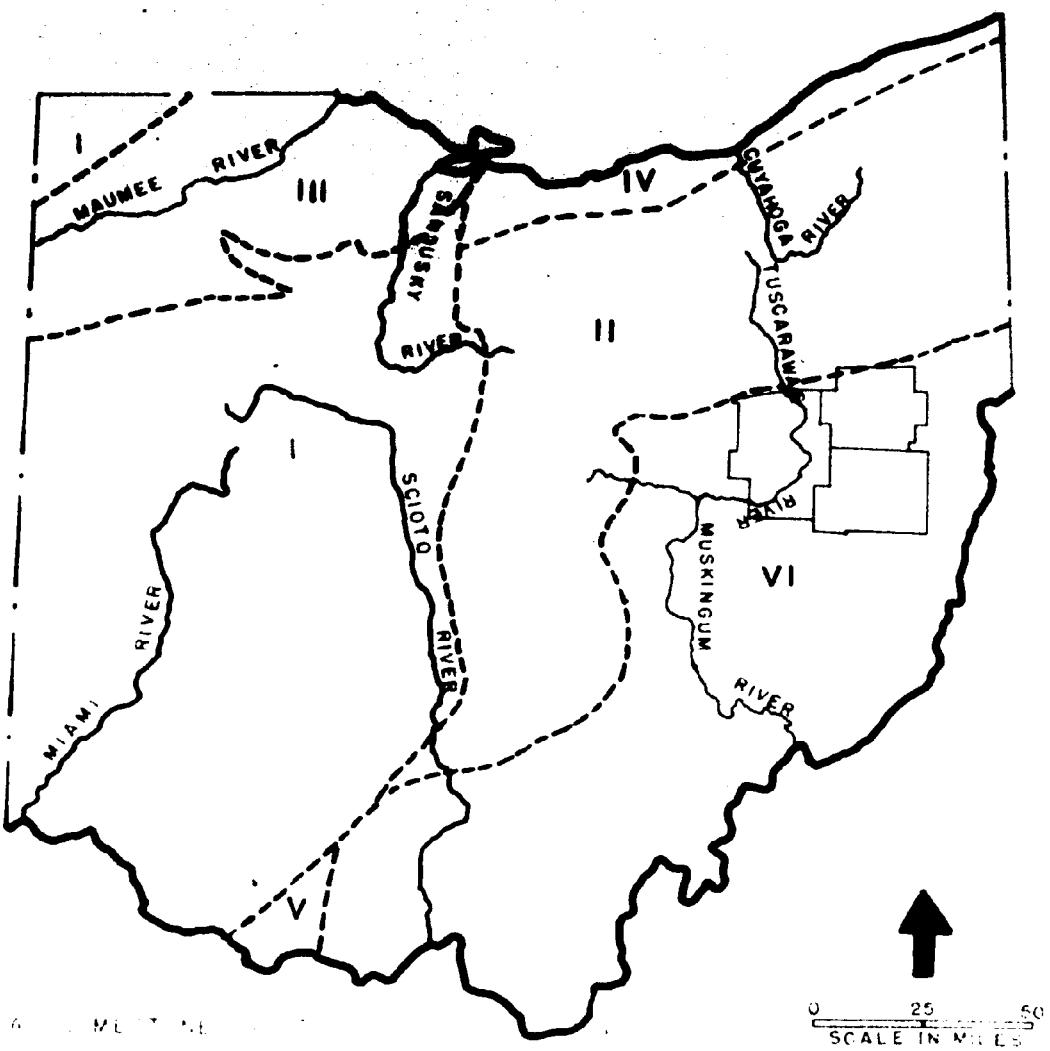

Fig. 22.--- Generalized Soils Map of Ohio with Subsections of Soils of Southeastern Ohio.

In the first bottoms there is a considerable diversity of parent material because of the sorting action of the water carrying material away from the glacier. Marshlands and muck are interspersed with more extensive areas of sandy loams, silt loams and silty clay loans. In general, these soils are fairly productive. Drainage is a problem in some areas; locally erosional debris from the surrounding hillsides (coarse material or unproductive subsoil) has covered bottom lands.

In general, soils of the tri-county area have a relatively high productive potential; but limitations of use occur because of the steepness of many slopes. The soils have a tendency to erode easily. Hence, constant care is necessary to retain the top soil. While it is true that some erosion occurs with spectacular suddenness, in most instances the soil removal has been slow and unimpressive. For this reason the farmer often is not aware of the seriousness of the erosion. Thus it is sometimes difficult to alert farmers to the possibility of complete destruction of their land.

Climate.--The climatic characteristic contributing the most to soil erosion is the tendency of precipitation to occur in heavy rainstorms.[1] An additional factor is the occurrance of these rains in the months of June, July and August when the land is being cultivated or closely grazed and thus least protected from the possibility of erosion. The climate also contributes to erosional tendencies during the spring thaw when the soil is in a very unstable condition. A heavy spring rainstorm can cause considerable damage as the slippage of soils, noted above, is most likely to occur.

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[1]There are numerous instances of three or more inches of precipitation in a twenty-four hour period. Three and six-tenths inches of rainfall were recorded at Dover Dam in Tuscarawas County on July 11, 1958.

If the severe storms and unstable soil conditions occurred in relatively level lands, they would not be likely to cause extreme damage; but when they occur in an area with easily eroded soils and steep slopes, considerable top soil can be lost. It has been shown, however, that two farms with almost identical conditions of slope, soil and climate can differ considerably in the degree of soil deterioration.[1] Essentially then, the quality of land management[2] and the character of land utilization are the factors that determine continued soil productivity.

Land Management and Land Use in a Declining Economy

It has been observed previously that the pioneer's first objective was to provide for his family.[3] Since these first settlers were farmers by training and background, this objective was met by clearing the forest and cultivating the soil. Their choice of crops and methods was not conducive to the maintenance of a high level of land productivity. This sometimes occurred because the new farm presented conditions far different from those of their former home. Often, however, the farmer had worn out a farm back east; thus, in a sense, his move was a necessity. On the new land he grew the same crops with the same methods. The results also were the same--a worn-out farm.[4]

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[1]E. H. Reed and J. I. Falconer, The Effect of Land Use and Management on Erosion, Bul. 585 (Wooster: Ohio Agricultural Experiment Station, 1937), p. 18.

[2]Land management is basically that part of land use that requires the making of a decision.

[3]The pioneer has often been criticized for destroying the forest. Most of this criticism comes from those with the advantage of having observed the results of this destruction. To the pioneer the forest was a barrier to his establishment of a new home and it had to be removed.

[4]Ohio State Board of Agriculture, 14th Annual Report, op. cit., p. 488.

Because the amount of level land in the tri-county area is limited, most settlers purchased and cleared slopes and ridge tops.[1] The first crops were corn, tobacco, wheat, flax and a variety of vegetables. Corn and tobacco are open-tilled crops, and their cultivation left the sloping land exposed to the heavy rains and subsequent runoff. Wheat and flax, while not open-tilled, also left the soils exposed but to a lesser degree. The result of this type of use was considerable loss of soil by erosion. Joseph Harrison, writing of his pioneer grandfather,[2] notes that

> The after-effects of preparing the land for cultivation are also to be seen, for in addition to conserving the rainfall, which the original forest did, the removal of the roots of the trees and bushes allowed the ground to wash away much of the vegetable mould and soil.[3]

In this pioneer economy pasture and cover crops were little needed or used. What livestock the pioneer possessed was pastured in the woods. As the economy matured, however, a greater emphasis was placed on sheep raising and dairy farming. Eroded and worn-out land was abandoned or placed in permanent pasture. This was a more satisfactory use, but unfortunately overgrazing by sheep proved nearly as destructive as the former cultivation practices. The dairying economy, especially as carried on by the Swiss and German settlers in Tuscarawas County,[4] proved a most suitable type of land use.

Soil depletion also developed as a result of these land use practices. The raising of a single crop on the same land year after

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[1]The pioneers often preferred these areas because the forest growth was frequently thinner than in the bottom lands.

[2]John Harrison, who settled on Dining Fork Creek in 1819.

[3]Joseph T. Harrison, The Story of the Dining Fork (Cincinnati: C. J. Krehbiel Co., 1927), p. 51.

[4]The greatest concentration of these settlers is in Sugar Creek, Dover and Auburn Townships.

year without manure or fertilizer being applied slowly destroyed the soil fertility. Tobacco, a "robber" crop, was widely grown during the pioneer period to "tame" the soil for wheat. Where such practices were used, the soils were soon depleted. Corn, wheat and other crops, while not as destructive as tobacco, also depleted the soil; it was simply a matter of more time.

As overgrazing helped expose the soil for erosion, grazing without proper management practices also results in soil depletion. Every sheep and every pound of wool that left Harrison, Carroll or Tuscarawas Counties removed some of the plant nutrients. The number of sheep being grazed in the tri-county area decreased sharply after 1880 although the pasture area increased or remained at about the same level. A reduced carrying capacity of the land is partially responsible for the decreasing flocks.

Although the type of land use contributed greatly to soil erosion and soil depletion, the effect could certainly have been reduced by better land management practices.[1] Better use of cover crops, more attention to slope limitations, application of manure and later commercial fertilizer, and improved erosion control measures could have helped maintain a higher level of land productivity.

In summarizing their study of the relationship between land management and erosion, Reed and Falconer record the following observations:

> Erosion reduces crop yields. Yields of corn on the less severely eroded farms were 25 per cent above those of the more severely eroded farms. Furthermore, the less severely eroded farms had maintained crop yields; whereas yields per acre had declined on the more severely eroded farms.

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[1] Reed and Falconer, op. cit., p. 19.

> Incomes were 65 per cent larger in the less eroded farms than on the more severely eroded farms. Low incomes may be a result of erosion. They may also be a contributing cause through preventing the establishment of erosion-control measures.
>
> Erosion effects buildings and living conditions. The majority of the buildings on the less eroded farms were maintained in good condition; whereas the majority of the buildings on the more severely eroded farms were in poor or fair condition.[1]

Doubtlessly somewhat similar results could have been obtained from a study of soil depletion.

Essentially then the deteriorating economy was largely the result of continually worsening conditions of soil erosion and depletion. As the economy weakened, the ability of tri-county agriculture to hold its own with that of better agricultural areas declined.

Foreign Influences and the Declining Economy

Foreign influences worked in two ways to affect the tri-county rural economy. The first and probably most noticable way was the movement of people out of the region. The second way was the result of newly settled areas sending produce to market where it came into direct competition with local produce.

Most of those leaving Tuscarawas, Harrison and Carroll Counties moved either to virgin lands to the west or to newly created jobs in Ohio industry. The westward movement continued as long as the frontier existed. The western lands had many advantages over the hill farms of the tri-county area. The land was cheap, generally more fertile, level and free of forests. The tough sod created a problem, but this was overcome with the development of the steel plow. The plains area proved exceptionally well suited for the large-scale machine agriculture that developed after 1850. While much of the land was unsuited for agriculture, it could be used for grazing. This land was often free or low-cost.

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[1] Ibid.

Beef and wool could be produced here for a much lower cost than in southeastern Ohio. All these factors combined to enable the western farmer to produce many things at a very low cost.

Railroads moved westward with the people and provided the means to carry the wheat, corn, beef and wool to eastern markets. Thus, not only did many tri-county inhabitants move into the western lands but they could now ship the produce of their new lands to markets where it could possibly compete with that of former neighbors. In most instances the tri-county farmer was unable to compete successfully. In this manner western agriculture and grazing influenced basic changes in the rural economy of the tri-county area, which were primarily noted in reduced grain and wool production.

In the period immediately following the Civil War industrialization expanded rapidly in Ohio. This expansion required labor; and as economic opportunity declined on the farm, many moved to these newly opened jobs. Most of those leaving Tuscarawas, Harrison and Carroll counties were young. United States census reports for the period between 1870 and 1950 show the rural population of these counties to be approximately five years older than the rural population of corn belt counties in western Ohio. The loss of the young people and of those who were doubtlessly the most energetic left a depressed population as well as a depressed economy.

Throughout the period from 1832 to 1930 the tri-county economy had been dependent on the productivity of the land. When the soil wore out, the people had little choice but to move. The frontier with its low-cost virgin land eventually closed. The beginning of the great Depression of the 1930's resulted in a temporary closing of the industrial frontier. No longer was it possible to use the land and, when it was

worn out, move on to a new beginning. In this respect then the closing of the frontiers--or the loss of alternate economic opportunities, as it were--was largely responsible for the developments that were to occur in the period after 1930. Governmental agencies were created to help relieve the severity of the economic recession. In some instances these agencies stimulated local rehabilitation programs, whereas in others local initiative began the work necessary to restore the sagging economy. For the tri-county area a combination of the two--governmental action and local initiative--began the slow process of restoring the area to a higher level of economic stability. This program, still under way, is examined in the next part.

PART III

LAND USE AND SETTLEMENT SINCE 1930

The tri-county area of 1958 is a region of lakes in winding valleys, young pine trees partly hiding eroded hillsides, white-faced cattle grazing on reseeded spoils banks and a crazy-quilt pattern of contour farmed fields. It is a beach crowded with week-end bathers from as far away as Canton, Akron and even Cleveland. It is a region where deer graze in a growing forest and where "fisherman's luck" will yield a limit of bass or bluegills. Things are happening here. New homes, new factories and new opportunities are appearing with amazing rapidity. It is especially amazing for a region that twenty-five years ago was so depressed economically that it was frequently used as an example of extreme economic blight. Not all problems have been solved, but such strides towards their solution have been made that a brighter future seems in the offing.

In 1930 the area's future seemed bleak. Its resources were almost completely depleted or, as was true of coal, not being used to best advantage. Soil fertility was so low that difficulty was experienced in returning some areas to forest. The increased acreage of abandoned land was reflected in a shrinking tax base. The declining rural economy previously noted had about reached its lowest point. Rebuilding was necessary if the tri-county area, along with other southeastern Ohio counties of similar character, was not to become economically dependent on the more productive parts of the state.

The rehabilitation[1] of the three counties required consideration of two separate but interdependent elements--the natural and human resources. The gradual depletion of the natural resources had been accompanied by a depletion of the human resources. A renewing of the human resources was basic to the success of any redevelopment of the natural resources. The recognition of this factor was doubtlessly of major importance to the successful application of the rehabilitation program.

The Human Resource

The Problem

The depletion of the human resource was owing primarily to two factors: the continuing outward migration of the young men and women and the depressed, hopeless attitude of many of those who remained in the area.[2] To retard the migration of the youth greater opportunities within the area were necessary, but the development of these opportunities was dependent on the stimulation of the older segment of the population.

The more ambitious and more adventurous of the youthful element had been leaving the region for almost one hundred years. In the 1840's and 1850's it had been attracted by the more productive and more easily farmed lands of the west. In the latter part of this period California gold was the magnet. In later years job opportunities in the rapidly expanding industrial economy lured many others from home. By 1930 the

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[1]The term "rehabilitation" as used in this section is meant to convey the idea of an overall program of resource renewal.

[2]In the period from 1933 through 1936 the author made numerous visits to the region to truck coal from Belmont and surrounding counties to Piqua and Covington in Miami County, Ohio. These visits thus give the opportunity to compare conditions and attitudes of this early period with those noted during the 1951-57 period.

average age of inhabitants of Carroll County was 52.7; of Harrison County, 52.6; and of Tuscarawas County, 51.7.[1] This was an average of aproximately five years higher than in rural counties of western Ohio, where the economic opportunites were much better. The older age group was more likely to be conservative and opposed to change and less likely to be able to rebound after a disaster. One Tuscarawas County resident, in looking back to this period, commented that "Probably the biggest thing wrong with this region in 1930 was that everyone seemed to have lost faith in the future."[2] A view of the economic situation in 1930 would seem to justify this loss of faith. The economic standard had again been sharply lowered by the 1929 stock market crash. A drought the following year left many Muskingum Valley residents in a very precarious economic position. In these first years of the 1930's there seemed to be little prospect for a better future. Many residents were too old to make a new start elsewhere, and many others lacked the ambition and energy to move even if a better opportunity could be found.

Beginning of Resource Renewal

The idea that was largely responsible for restoring vitality to much of southeastern Ohio had its beginning in 1928 when a group of Zanesville citizens[3] financed, with some state aid,[4] a survey to determine the best method of controlling the floods that hit Zanesville periodi-

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[1] U. S. Bureau of the Census, United States Census of Agriculture: Ohio, 1929, op. cit.

[2] This statement was made by a wholesale grocery salesman who had covered the upper Muskingum territory since 1926.

[3] Bryce Browning, the present secretary-treasurer of the Muskingum Watershed Conservancy District, was a leader in this group.

[4] The amount raised was $40,000 with the state contributing $10,000.

cally. The survey was directed by Arthur Morgan,[1] an engineer who earlier had helped plan the Miami (Ohio) Conservancy District flood control project. The Morgan recommendations suggested a three-point program: (1) since Zanesville's flood problem was not a local one, the project should be worked out to cover the entire Muskingum drainage area; (2) in addition to flood control any plan adopted should encompass water and soil conservation, recreation and any other feature that seemed economically feasible; (3) because of the scope of the project state and federal aid assistance would be necessary and merited. This was a rather new concept of flood control that many found difficult to accept. However, the Zanesville group gave the plan its backing and organized support to implement it.

The first objective in the rehabilitation program was to inform and stimulate valley residents. The Zanesville group began the job of "selling the people on themselves" by inaugurating an intensive educational program. Its primary purpose was to convince Muskingum Valley residents that "deforestation and soil erosion contributed to droughts and floods, that poor, eroded lands made poor people and sick industries."[2] Progress was more rapid than they had reason to expect, and in 1930 the Muskingum-Tuscarawas Valley Improvement Association was formed. Three years later the Muskingum Watershed Conservancy District,[3] the public corporation established to coordinate the plan, was organized. The success of the educational plan is shown by the fact that only one

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[1]Mr. Morgan was later a member of the first board of the Tennesse Valley Authority.

[2]The American Forestry Association, The Muskingum Story (Washington: American Forestry Association, 1951), p. 2.

[3]In future references to the Muskingum Watershed Conservancy District the shortened MWCD or District will be used more frequently.

hundred and fifty of the sixty-eight hundred separate land-holdings purchased for the District required court action.[1] All of these issues were resolved satisfactorily.

In 1933 when the Public Works Agency was created to help relieve the nation-wide unemployment, the people of the Muskingum Valley were ready. Shortly after its creation was announced by President Franklin D. Roosevelt, representatives of the MWCD outlined their plans to Public Works Agency officials. The basic plans were approved, and federal funds were made available. The job of rehabilitating the watershed was now beyond the talking stage.

Natural Resource Rehabilitation

The three-point program outlined in the Morgan report indicated the extent of rehabilitation needs. Although the immediate objective was flood control, the report noted the advantage of combining this with other conservation measures. The idea that flood control is not limited to a stream channel or to a flood plain but is extended to all parts of the watershed recognizes the value of soil and water conservation, reforestation and other conservation measures. This philosophy has since been utilized in the development of large watersheds such as the Tennessee Valley and small watersheds such as Sandstone Creek in Oklahoma. Although the program as eventually developed did not use all recommendations of the Morgan reports, the basic concepts were retained.

Within the tri-county area six interrelated factors have been considered as needing study and rehabilitation: flood control, water conservation, soil erosion control, strip mine reclamation, reforesta-

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[1]Letter from Bryce Browning, February 5, 1958.

tion and recreation. Many individuals, corporations and government agencies cooperated in the different phases of the work. The MWCD coordinated the work of twenty different state and federal organizations on lands under its control. On other land there was considerable division of responsibility for the various phases of work. The Corps of Engineers was primarily concerned with flood control; the Soil Conservation Service with soil and water conservation. Spoils bank reclamation, under state law, became the responsibility of the mining companies. The reforestation and recreation phases generally developed as integrated parts of the other programs with support from many different groups.

Flood Control

Flood control involves two basic phases of control of water movement: slowing the runoff and controlling the water after it enters the various streams of a watershed. In the tri-county area control problems are aggravated by the occurrence of relatively heavy rainfall over brief periods of time--usually in March, April and May. If these heavy rainfall periods coincide with a rapid melting of a heavy snow cover, the flood potential is further increased. High level floods have been frequent. This has been noted previously as a possible factor in influencing the location of Indian villages near the headwaters of Ohio River tributaries. The most destructive flood during the era of white settlement occurred in 1913. The extensive flood plains of the Tuscarawas River and Big Sandy, Conotton, Sugar Creeks, and Big and Little Stillwater Creeks seem to invite disaster from flooding and have been subjected to almost annual flooding in the spring months.

To protect these lowlands a series of fourteen dams was constructed (Fig. 20). Ten impound water in permanent lakes, whereas the

reservoir areas of the other four remain dry except in times of exceptionally heavy water movement. All or parts of eight reservoirs are in the tri-county area. All of these except Dover are on small tributary streams.

The slowing of the runoff required improved land use. Terracing and contour farming helped keep water on the land until it could seep into the earth. Trees and grasses were planted; and as they grew, they helped loosen the soil in order that water could penetrate more easily. Another benefit resulting from these activities was the slowing of siltation of the MWCD reservoirs, an essential to the long life of the reservoir system.

The development of these flood control measures has resulted in protection of the cities and valuable farm land in the flood plains. The efficiency of the system was proved in 1947 when the quantity of water moving into the Muskingum drainage system was comparable to that of the 1913 flood. In 1947, however, the damage was so slight that it was not computed.

Flood control has done more than protect the valley lands. Factories have been located in cities bordering the Muskingum and Tuscarawas Rivers in areas that would not have been considered as factory sites prior to the MWCD program. "With the danger of floods which existed in the Muskingum Valley prior to the control dams built by the Conservancy District, it would have been impossible for General Electric to consider Coshocton as a site for a plant."[1] This too has helped restore the economy's health.

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[1] The Daily Reporter, Dover, May 28, 1954. Quoting W. L. Rodich, general manager of the Laminated and Insulating Products Department of General Electric Company.

Water Conservation

While flooding is a constant threat in spring months, drought is almost as frequent a threat in late summer. This necessitates ways and means of retaining water on the land rather than letting it run off into the streams. The two factors of flood control are also the primary factors of water conservation. More water stored under ground means a higher water table, a more constant stream flow and a more reliable water supply. Reforestation, terracing, and contour and strip farming help hold the water on the land until it can seep into the underground supply.

The more stable stream flow plus the water stored in the MWCD reservoirs assure a more reliable late summer water supply for many purposes. Domestic and industrial usage is aided. In recent years irrigation has been introduced in the tri-county area. The 1954 Census of Agriculture reported irrigation of 381 acres on eleven farms in Tuscarawas County. This is not a large acreage, but it represents an increase over past years and shows that more farmers are interested in this type of drought insurance.[1] Most of the irrigation is by the overhead method and is pumped from nearby streams.

Through flood control and water conservation practices water has become one of the area's most important resources rather than a destructive force. The water supply has improved enough to be considered as one of the leading attractions and should be used as an important economic base to improve the recreational and industrial facilities.[2]

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[1]Several farmers who were interviewed in August, 1957, were irrigating in that year for the first time.

[2]T. D. Best, R. E. Holms and D. D. Moore, Summary Report on an Economic Appraisal of Tuscarawas County (Columbus: Battelle Memorial Institute, 1955), p. 5.

Soil Erosion and Depletion

In the early 1930's a series of surveys showed the need of land rehabilitation in the tri-county area. Figure 21 shows the extent of problem areas in Ohio during this period. Area III includes all of nine townships and parts of twenty-four others[1] from Carroll, Harrison and Tuscarawas Counties. This includes approximately 160,000 acres. A considerable acreage with land use problems is outside the boundaries of Area III. These sections generally constitute smaller portions of their total area and, hence, were not considered large enough to be denoted as problem areas.

During the 1930's county and township committees, with state and federal agencies cooperating, completed county land use surveys. These inventories were the necessary first steps in land use planning. They provided information on types and practices of land use and on land capabilities. Further, the survey teams made definite recommendations for a more adaptable land use pattern. In general, the surveys noted the declining land productivity because of soil erosion, soil depletion and the growing of crops not suited to the natural conditions. They also noted the increasing amount of idle or waste land.

The surveyors suggested programs of erosion control and soil rebuilding. They also suggested that land unsuited to agriculture be placed in forest or permanent pasture. The reforestation program was usually recommended for land with steep slopes, severe erosion or badly depleted soils. Wherever possible, idle land should be made productive.

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[1]This is a total of thirty-three of the fifty-four townships.

The low standards of tri-county agriculture created problems in implementing the rehabilitation program. Few farmers were wealthy enough to permit the removal of land, no matter how poor, from cultivation in order that it could be reforested. The expense of erosion control was often too great for most individual farmers. Although many recognized the need for long-range rehabilitation planning, they were faced with the needs of the immediate future and were thus unable to carry out needed reclamation.

The solution was found in government aid and cooperative effort. The Agricultural Adjustment Act of 1938 provided payments to farmers who reduced their planting of soil depleting crops such as harvested row crops and small grains and increased their plantings of grasses, legumes and cover or green manure crops. The Soil Conservation Service was authorized to develop demonstration projects and to carry out erosion prevention measures. In the demonstration projects the soil service worked directly with the farmers in the planning of the soil improvement programs.

Soil conservation districts were established. In these farmers joined to work towards the solving of areal problems. Without neighborhood cooperation individual conservation efforts could be nullified. In addition, a group could purchase expensive equipment that was beyond the means of an individual farmer.

Progress has doubtlessly been slower than conservationists wished, but much has been accomplished. In 1958 52 per cent of Carroll County farms are enrolled in the Soil Conservation Service program. Approximately 60 per cent of these have their conservation plans and practices completed.[1] This progress is reflected in the 1954 Census of

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[1]Report of Paul Rinkes, Carroll County soil conservationist.

Agriculture report. Carroll County had 15,137 acres, almost one-fourth of its total crop land, being contoured farmed.

Progress has been somewhat slower in Tuscarawas County where only about 30 per cent of the farmers are in the conservation program and in Harrison County were the number of cooperators is about 35 per cent.[1] A new conservation needs inventory was completed in 1957 for Tuscarawas County and one is now underway in Carroll County. The Carroll County survey is to be completed in 1959. These recent studies emphasize the importance of constantly reviewing and revising conservation plans. Changes that have created the need for these new surveys will be discussed later.

Strip Mine Reclamation

A land use problem that has developed largely since 1930 is that of utilization of land changed by strip mining. Strip mining occurs in only scattered sections of southeastern Ohio, but it has created a widely discussed reclamation problem. This has developed largely as a result of the unsightly appearance of the spoils banks--the overturned earth that remains after the removal of the coal. Within a period of a few months one of the huge power shovels used in strip mining can change a field or a pasture into an area of barren ridges, high walls and dusty access roads.

Coal of commercial quality is found in twenty-nine Ohio counties. Most of these are located in the unglaciated hill lands with Harrison, Jefferson and Belmont as the primary coal producing counties.[2]

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[1]Material on Soil Conservation Service program has been supplied by Conservationists Paul Rinkes of Carroll County, Stephen Turner of Tuscarawas County and Earl Nelson of Harrison County.

[2]All coal production data has been supplied by Ohio Department of Industrial Relations.

Although coal has been known to exist in Ohio since the earliest white settlements,[1] it did not become important until the industrial development of the late Nineteenth Century. Production reached a peak in 1948 and has since maintained approximately the same level. Mining has been from both underground and surface mines, but an increasingly greater part is being mined by the stripping method.

The nature of strip mining.--As noted above, coal deposits suitable for strip mining do not occupy large areas. Harrison County has the largest potential strip mine area in Ohio, and it has only an estimated twenty thousand acres (less than 1 per cent of total land area) either stripped or available for stripping.[2] This is nearly double that of Jefferson, the next leading county. At the present time strip mine activity in Carroll and Tuscarawas Counties is of relatively little importance, but in Harrison County it is probably at its peak.[3] Almost all present Harrison County mining is in the eastern two tiers of townships with Cadiz, Athens, Short Creek and Green Townships having the greatest production (Fig. 23).

Stripping rights are acquired by one of two methods: by purchase of the land or by a lease-royalty agreement with the land owner. In areas of good deposits most companies prefer to purchase the land; but if the coal seams are indefinite or if the area to be mined is small, a lease-royalty agreement is preferred. Nearly all coal mined in Harrison

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[1]Hutchins, op. cit., p. 21.

[2]Ohio Coal Association, Strip Mining Digest (Cleveland: Ohio Coal Association, 1946), p. 1

[3]Through 1957 Carroll County has had approximately 450 acres strip mined; Tuscarawas County, 3,050 acres; and Harrison County, 11,000 acres. This represents over half of Harrison County's potential. Data from Charles Breeding, Field Director, Ohio Reclamation Association, October 3, 1958.

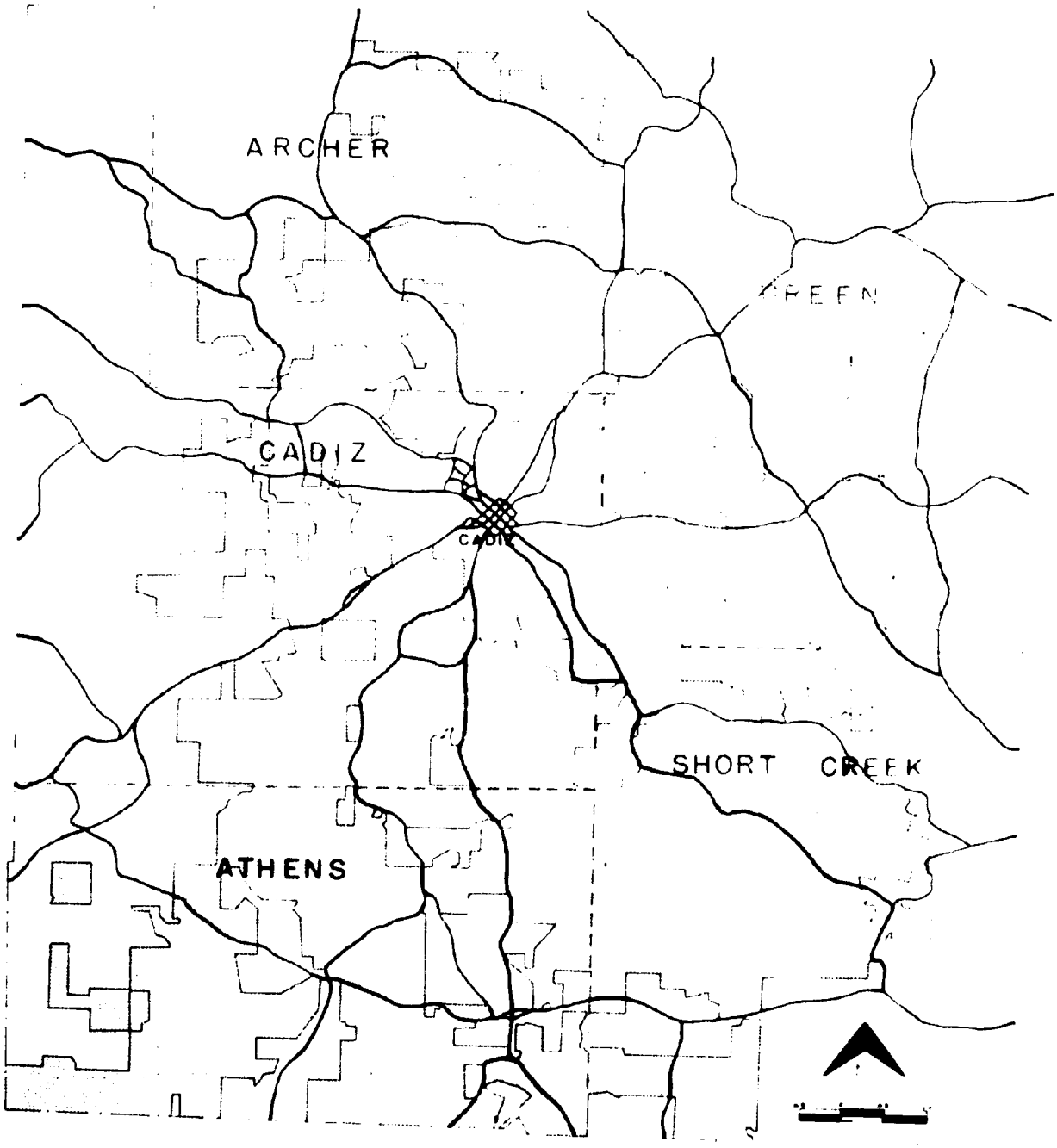

Fig. 23.-- Land Owned by Coal Companies in Harrison County. The extent of coal lands is indicated by the shaded area.

County is from company owned lands, and over one-third of the land in Green, Short Creek, Cadiz and Athens Townships is owned by mining companies.[1]

Strip mining can be profitable for both the land owner and the mining operator. An acre of land will average approximately 5,500 tons of coal.[2] Farmers can receive royalties of from twelve to fifteen hundred dollars an acre from a coal lease. In many instances this will be one hundred times the annual return from farming or grazing activities. It is small wonder then that farmers sell or lease their land for stripping.

The mining of coal by the stripping method is carried on where underground mining cannot be done because of a too shallow roof and where the overburden (rock and earth overlaying the coal seams) is thin enough to permit its removal economically. The amount of overburden that can be profitably moved is dependent on the character of the rock structure and the thickness and quality of the coal seams. If the overlaying rocks must be shattered by blasting, the cost becomes greater; and the amount of overburden that can be removed to mine a foot of coal profitably will be reduced proportionately. As a general rule, approximately fifteen feet of overburden can be moved to mine a foot thick seam of coal.

Stripping operations usually occur where coal outcrops along the side of a hill. The contour of the outcrop is followed along the hillside until the overburden becomes too thick. The overburden is removed

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[1]Information from Harrison County map for 1956.

[2]Alan R. Davidson, "The Economic Value of Lands to be Strip Mined Considered in the Light of Other Possible Uses," Strip Mining Digest, op. cit., p. 15.

by large power shovels (Fig. 24) and deposited in ridges paralleling the coal outcrop. The coal layer is then swept clean. Smaller shovels load specially-built trucks for hauling the coal to the preparation plant. The largest shovel can remove the overburden from a one hundred foot cut. On relatively steep hills only two or three cuts can be made before the overburden layer becomes too thick. On more gently sloping hills the entire deposit may be mined. Generally, however, the cut will wind in and out of valleys or, in some instances, completely encircle a hill (Fig. 26). In either situation the tops of hills will be left undisturbed.

Strip mining is the preferred method of mining when conditions of coal deposition make it possible. Mining costs are generally lower than in deep mines; and 90 per cent of the coal can be recovered as compared to approximately 60 per cent from underground mines. In addition, strip mining can be carried on where underground operations would be unsafe. However, in order that the greatest percentage of coal can be recovered, it is advisable that both methods be used. In some areas strip mining has occurred around the edges of old underground mines; and in other areas where stripping has been completed, the coal companies have retained property rights in order that the remaining coal may be recovered later by either shaft or drift mining.

The results of strip mining.--The nature of strip mining virtually destroys any immediate productive potential for the mined area. Because the overburden from the first cut is placed on adjoining land, the area removed from other types of production is greater than the area mined. In addition, the high wall (Fig. 25) is potentially dangerous; and safety requires that land back from the wall must be restricted in



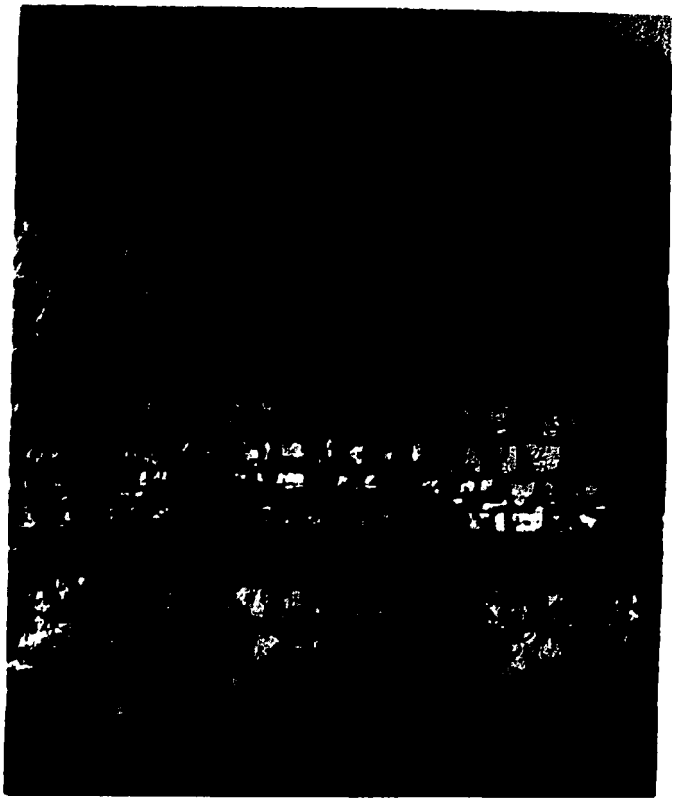

Fig. 24.-- Removing the overburden in strip mining. The Green Hornet is 130 feet high, has a dipper capacity of 50 cubic yards. It removes overburden averaging 80 feet. (Hanna Coal Company photo)

Fig. 25.-- The "highwall" left after stripping of coal.



Fig. 26.-- Air View of Recently Stripped Area South of Cadiz.

use.[1] In some instances mining will completely isolate parts of a land holding. For every three acres mined approximately one additional acre is affected by the mining operation.

Stripping has different effects on different land holdings. Owing to the distribution of coal suitable for stripping, some land holdings will be almost completely mined; whereas others may have only a few acres disturbed. On the latter farms the regular agricultural activities are only slightly disrupted. Generally, however, stripping means the virtual ending of agriculture on most farms. This would doubtlessly have meant a serious decline in the agricultural and livestock production of Harrison County except for the fact that agricultural lands had been declining for many years prior to the beginning of strip mining. As a result, little productive land remained. Much of the area mined was either too rugged for agriculture or had had its productive capacity destroyed or greatly reduced through soil erosion and depletion. Figure 9 illustrates the slow decline in Harrison County's cultivated area since 1840. No increase in the rate of decline is noted after the beginning of strip mining in 1916. It can be inferred then that strip mining has removed relatively little land from cultivation.

Three problems emerge as the aftermath of strip mining: (1) restoring a productive potential to the land, (2) removing the scenic blight and (3) economic and cultural realignment. The first two are of major importance wherever strip mining occurs, but the last is of major importance only where a relatively large amount of stripping is likely

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[1]Auger mining adds to the potential danger. By the use of augers it is possible to remove coal remaining after the last strip mine cut has been made. The augers can bore up to two hundred feet into the coal seam and remove a four foot layer of coal. This increases the possibility of the high wall collapsing.

to occur. In the tri-county area only Harrison County is likely to have many people displaced by mining activity.

Unreclaimed spoils banks have little positive value. The subsoil and rocks are thoroughly mixed, and the presence of rocks at or near the surface precludes any possible agricultural use of the land (Figs. 26 and 27). Spoils banks are usually in parallel ridges with many slopes of 60 per cent or greater. In addition, toxic minerals, such as sulphur, can be brought to the surface. In such instances soils may become so toxic that plants have difficulty in getting established.

Areas other than the spoils banks are also affected. The last cut frequently becomes a stagnant pool, and the seepage from the surrounding area can make it too toxic for plant or animal growth. Water from such strip mine pools that flows into adjacent streams contaminates their water and makes it unsuitable for domestic use or as a habitat for fish. Generally, then, without a definite reclamation program strip mine lands are waste lands; and if the present condition of unreclaimed spoils banks is an accurate criterion, they will doubtlessly remain so for many generations.

Figure 27 shows a spoils bank approximately twenty years after the mining occurred. The unsightly appearance of this and other unreclaimed spoils banks was largely responsible for the agitation that resulted in the passage of Ohio's present strip mine law. The barren character of old spoils banks indicates that reclamation is a necessity.

In those areas where strip mining is occurring on a large scale, changes in the economic and cultural base are noted. The purchase of large tracts by the mining companies usually means the removal of the land from agriculture and grazing. Where this approximates one-third of the total land area as in Harrison County, large numbers of farmers are

being displaced.[1] It has meant the scattering of neighbors of long-standing. Many of the older county residents are finding this adjustment difficult, and considerable bitterness has developed against the mining companies.

Farm families are being replaced by miners, factory workers and others who live in but are not a part of the Harrison County community. This change is distrubing to merchants and service people, as many who work outside the county also shop outside the county.[2] The former farm families had deep community roots and were more concerned with county affairs than this newer group who have, in a sense, made Harrison County a dormitory area. Many, such as the miners, will be temporary residents. When the mining has been completed, these people are likely to move on to other mining areas. It would appear that Harrison County's population is to become more unstable than it has been in the past.

Cadiz especially will be affected by this change. In past years Cadiz, as the shopping and shipping center for a large rural area, was a city of greater importance than its size would appear to warrant. The city is now the center of strip mine activity, but what will happen when mining ends in another fifteen or twenty years?[3] This is the question that must concern Cadiz and Harrison County residents. The future development of the area should be planned now--not when the mining activity comes to an end.

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[1]Most older residents seem more concerned with the loss of long-time friends and neighbors than with any great economic change.

[2]Milton Ronsheim, long-time editor of The Cadiz Republican and one of Ohio's leading conservationists, dislikes seeing the county torn apart by power shovels; but his greatest fear is for the economic and cultural future of the Cadiz community.

[3]This is a rough approximation based on the present rate of mining and the total acreage estimated to be suitable for strip mining. Probably some of this land will not be mined. It is possible then that the time will be much shorter.



Fig. 27. Twenty year old spoils banks without reclamation.



Fig. 28. A field of young pine trees, Rose Township, Carroll County.

Development of reclamation.--Underground mining was indirectly responsible for the beginning of strip mine reclamation. Considerable lumber is needed for shoring in mines, and this led to the cutting of almost all timber in the vicinity of the mines. Operators were thus forced to import lumber from considerable distances. The increasing cost of acquiring this lumber led to the first attempts in 1937 to reforest land owned by the mining companies.[1] In 1945 the mining operators formed the Ohio Reclamation Association for the purpose of (1) growing timber for underground mines and (2) producing something of value on non-productive, but taxable, land.

From the standpoint of the mining companies the planting of trees was the most important aspect of these early reclamation attempts. It was discovered, however, that many spoils banks were not suited for tree growth. The Association could have adopted the policy of planting only those areas that would produce marketable timber, but instead it followed the precept of putting the land to the use for which it was best suited.

Some operators, however, had no intention of reclaiming their lands. By careless operation they frequently destroyed more land than was necessary for the completion of a project. Some failed to honor lease-royalty agreements. By their irresponsible actions these operators helped create a demand for a law to control strip mining. The Strip Coal Mining Act was passed in 1947. This law proved weak and ineffective; and the next General Assembly passed a revised law, the Coal Strip Mine Land Reclamation Act. This law, effective since 1949, established a Division of Reclamation as the agency responsible for the enforcement of the strip

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[1] William Burt of the Jefferson Coal Company planted the first trees, which grew so well on the spoils banks that other companies became interested in the project. Foresters were hired to implement the plan, but World War II interferred; the project was not again pushed until the end of the war.

mine code. Basically, the law requires a license before strip mine operations can begin in an area and the posting of a bond to insure reclamation. If the reclamation is not satisfactorily completed, the bond can be declared forfeited. The bond is high enough to make it profitable in most situations to meet the requirements of grading and planting.

As noted above, many mining operators had begun reclaiming spoils banks before the passage of the strip mine law; and only refinements of grading were necessary for them to be in compliance with the law. Others, however, were not as eager to comply; and court action was necessary to force these operators to meet the law's requirements.[1] Through court action and the refusal to issue them mining permits, most unscrupulous operators have been forced out of business.[2] The more responsible mining companies have frequently gone beyond the legal requirements to make the reclamation more desirable and acceptable.[3]

Meeting the requirements of the strip mine law and the Ohio Reclamation Association required considerable experimentation, and aid was sought from several state and federal agencies. The Central States Forest Experiment Station of the United States Forest Service and the Ohio Agricultural Experiment Station cooperated in almost all phases of the work.[4] A reconnaissance survey made in 1946 and 1947 by the Ohio Reclamation Association disclosed that approximately 90 per cent of the strip mined lands could be put to some productive use within a few years

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[1]Division of Reclamation, Official Report for the Period July 1, 1952 to June 30, 1954 (Columbus: F. J. Heer Printing Co., 1954), p. 12.

[2]Ibid., p. 31.

[3]Ibid., p. 32.

[4]Other cooperating agencies were the Federal Soil Conservation Service and the Production and Marketing Administration. State agencies were the Geological Survey and the Bureau of Mines.

after reclamation was begun.[1] A part of the remaining 10 per cent could possibly be made productive in the future.

Soils were tested and experimental plantings of trees and grasses were made. These early tests showed that "the diversity of site conditions is so great that almost every strip-mined area presents a combination of factors that require special consideration."[2] The tests also showed that spoil texture and acidity, the proportion of soil to stone, the spoil bank stability and topography are the most important site conditions affecting plant growth. Site conditions vary widely, chiefly because of differences in the character of the coal seams mined, locality, composition and thickness of the overburden and mining methods.[3] Since eighteen coal seams have been mined in Ohio, the number of combinations of factors is almost limitless.

Within the tri-county area the type of vegetation cover to be planted in a reclamation project is usually determined by whether the spoils are toxic, acidic or calcareous. The extent of the toxic spoils is limited, and in only a few scattered spots is vegetation difficult to establish. The acidic spoils are most often associated with sandstones and shales; and the calcareous spoils, with limestone and clays.[4] The calcareous spoils are located almost exclusively in the eastern two-thirds of Harrison County, whereas spoils in other parts of the tri-

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[1] G. A. Limstrom and R. W. Merz, Rehabilitation of Lands Stripped for Coal in Ohio (Cleveland: Ohio Reclamation Association, 1949), p. 1.

[2] Ibid., p. 3.

[3] Ibid.

[4] Limstrom and Merz, Overburden Analysis and Strip-Mine Conditions, Technical Paper No. 124 (Columbus: Central States Forest Experiment Station, 1951), p. 2.

county area are generally sandstones and shales.[1] Foresters of the Central States Forest Experiment Station suggest that trees be planted in those areas with acidic soils; and grasses and legumes, in the calcareous spoils.

A recent estimate indicates that approximately 90 per cent of all strip mined land has been reclaimed. The remaining 10 per cent includes current operations and pre-strip mine law banks that have not revegetated naturally.[2] This would seem to indicate that only a very small portion of strip mined land cannot be reclaimed.

Reforestation

Reforestation has usually been carried on as a part of other phases of the restoration program. Reference has been made to reforestation as a part of the water and soil conservation programs and as a minor factor in flood control. It has become the most important part of the spoils bank reclamation program. Every survey of the tri-county land use problem recommends that much of the land should be in forest. Forest removal has been blamed for a large part of the soil erosion that has occurred on steeper slopes.

The most concentrated reforestation program has been that of the Muskingum Watershed Conservancy District. Protective plantings of trees have been made around all Muskingum lakes (Fig. 44). Eventually the trees will serve a number of purposes: to help slow erosion and silting of the lakes, to cover land unsuited for other uses, to provide cover for game and to provide a natural setting for the lakes.

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[1] Ibid., pp. 2-8.

[2] Report from Charles Breeding, Field Director, Ohio Reclamation Association. This includes reclamation through 1957.

Much of this has already been accomplished. The District has planted 6,689 acres of trees through 1957 and has planned extensive plantings through the next several years.[1] The forester in charge of District forest activities has developed a machine to speed planting on land with steep slopes.[2] The machine also terraces the land at the same time. Erosion and water control is thus effective immediately. In many severely eroded areas pine plantings have been made to provide shade for hardwood seedlings. Eventually the hardwoods will become dominant and cover much of southeastern Ohio with a forest resembling that of its original cover.

Many farmers have planted trees as a part of their soil conservation plans. Most of these are hardwoods, but some conifers are planted with the expectation that these will provide a more rapidly growing timber crop than the hardwoods. As a rule, plantings on farms are small; most are made to protect steep slopes or badly eroded land. More and more farmers are planning their woodlot plantings with the idea of making timber an annual crop through proper timber management.

Tree plantings on spoils banks provide another extensive addition to the reforestation program. There are approximately thirteen thousand acres of spoils banks in the tri-county area. Additional strip mining will add more land to this total. However, as noted previously, not all spoils banks will be planted with trees. Most of the land and much nearby land affected by the mining operations will be forested.

Besides the planned reforestation a large area of idle or abandoned land is returning to woods by natural revegetation. This is a

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[1] Letter from Bryce Browning, February 4, 1958.

[2] The machine has been developed by H. P. Garritt, who has been in charge of MWCD forest activities since 1941.

slow process and, unfortunately, many of these plants are either undesirable or of such poor quality as to make them almost useless as a future economic resource. The 1957 Tuscarawas County conservation needs inventory listed 48,276 acres of idle land in that county.[1] The 1954 Census of Agriculture reports Carroll County with approximately eighteen thousand acres and Harrison County with almost sixteen thousand acres in the same category.[2] For much of this land the most suitable use is for woodland.

Recreation

The machine age has been largely responsible for the increasing importance of recreation as a basic land use type. The use of machinery in factories aided in the establishment of the forty-hour work week, thus giving the worker additional leisure time. The automobile gave the worker mobility. With the time and the facility more and more Americans began to "discover" America. By 1930 highways had improved to the point that almost every part of the United States was accessible by automobile. Industries began giving a week or more of paid vacation time each year. Many Americans built summer or week-end cottages in the woods or at the lake. Many of these, if built near enough to the place of work, became permanent homes with the worker commuting to the city. Areas with scenic or recreational attractions were sought by the tourist or vacationer. In providing services for these people many communities discovered an important new source of income, and in many of these areas the recreation industry has become the first or second most important income source.

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[1]Letter from Stephen Turner, Tuscarawas County Soil Conservationist, September 11, 1958.

[2]The census lists this under the heading of "all other land." Most of this land is not being used and is thus classed as idle.

Ohio has been slow to recognize the value of recreational facilities. Each summer thousands of Ohio license plates are seen in states featuring recreational activities, but few out-of-state plates have been seen in Ohio. Many Ohio communities are now trying to change this situation.

Prior to 1930 recreational facilities in the tri-county area were almost non-existent. Some hunting and fishing was possible but this was poor. Doctor Charles Dambach,[1] writing of wildlife conditions in the 1930's observes:

> There was little in the valley[2] then to hold the interest of the fisherman, the hunter or any but the most persistent among the naturalists. Ruffed grouse, the "wood pheasant" of the old timers, were at a record low and considered by some to be forever lost; pheasants, despite repeated stocking year after year, had not taken hold; squirrels were still few in numbers and had only recently been returned to the game list; Bob-white quail suffered near disaster in the severe winter of 1935-36, and coon hunters grumbled that there weren't enough coon in a whole county to get up a good chase.
>
> Cottontail rabbits still were present, particularly around abandoned home sites where undisturbed soil nourished plants they fed upon. Reports of deer were so rare that they made headline news, and beaver were practically unknown.
>
> Virtually the only fishing available was to be found in the creeks and "the river." Elsewhere silt from eroding farm lands and acids from abandoned coal mines made life untenable except for the hardiest of fishes. A few streams like Wills Creek and deep pools in the Tuscarawas and Muskingum yielded an occasional muskellunge and big cats turned up every now and then.[3]

Ohio's large urban population was almost without water recreation of any sort. Lake Erie along the northern border and a few small lakes and reservoirs in the interior provided swimming and fishing for a small number. Thus the development of the Muskingum lakes proved a boon for southeastern Ohio residents living too far from these limited

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[1] Chief of the Ohio Division of Wildlife.

[2] Doctor Dambach is referring to the Muskingum.

[3] Daily Reporter (Dover), May 28, 1954.

facilities to use them. Swimming, boating, fishing, hunting and water skiing were either improved or inaugurated as water sports.

The reforestation program provided food and cover for game. Doctor Dambach, in comparing the wildlife situation of 1954 with that of the 1930's, writes:

> Gradually there emerged a new pattern that was beneficial to the land, to the owner and to wildlife. Raw gullies were clothed with the protective covering of black locust and pines. Bordering the pines and locusts were good and cover-producing trees and shrubs such as hazelnut, dogwood, black haws, mulberries, roses and bush lespedezas. Fences were built to exclude cattle, sheep and horses from woodlots.
>
> Nature responded with vigorous growth of seedling trees and shrubs. Thin soils which supported only weak stands of poverty grass and broom sedge gained new vigor from applications of lime and fertilizer--then clovers and nutritious grasses moved in. Altogether these practices added up to more and better distribution of the essential living needs of wildlife and wildlife was quick to respond.[1]

The stocking of the Muskingum lakes with fish added still greater enjoyment for the outdoorsman. Additionally, many strip mine lakes were stocked. With these beginnings the tri-county area has started a program that has provided a boost to its economy.

Land Use Trends, 1930 to the Present

It is perhaps somewhat early to make definite evaluations of the rehabilitation program that had its beginning in the 1930's. However, Figures 7 and 8 seem to indicate a changing character in the land use pattern that reflects the results of constantly increasing application of conservation measures.

A definite upturn in forest acreage in all three counties since 1930 is shown in Figure 7. Since 1954, however, substantial acreage has been added through the combined efforts of the Soil Conservation Service,

[1] Ibid.

MWCD foresters, Ohio Reclamation Association, individual coal companies[1] and farmers. The Tuscarawas County conservation needs inventory indicates that a substantially greater area was in woodlots in 1957 than has been shown by other sources. Based on the United States Census of Agriculture reports, the forest area has increased by approximately 5 per cent between 1930 and 1954. The rate of increase can be expected to continue.

Figure 29 shows the extent of 20 per cent or greater slopes in southern Tuscarawas and southwest Harrison Counties. Most of this rough area should remain in permanent forest. At present much of the land is idle with second growth timber covering a considerable portion of the land. As a rule, this timber is of very low quality and shows little possibility of ever becoming marketable lumber. Much of the land could be planted to better quality trees in order that it could produce something of value in future years. Many other sections of the tri-county area are in similar condition, and these offer a challenge to conservation-minded people to get the land back into production. The Soil Conservation Service plans to return 10,458 acres in Carroll County to forest over the next several years.[2]

The area under cultivation continues to decline with the rate of decline differing within the three counties. Harrison County has only about 6 per cent of its land being cultivated; and it would appear that the county has about reached bottom in this respect. Some formerly

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[1]The Hanna Coal Company, the largest mining company operating in the tri-county area, does most of its own reclamation.

[2]The considerable influx of "urban" population in the last three or four years has influenced this. A large part of the land being purchased by these people is being planned for either forestry or recreation.

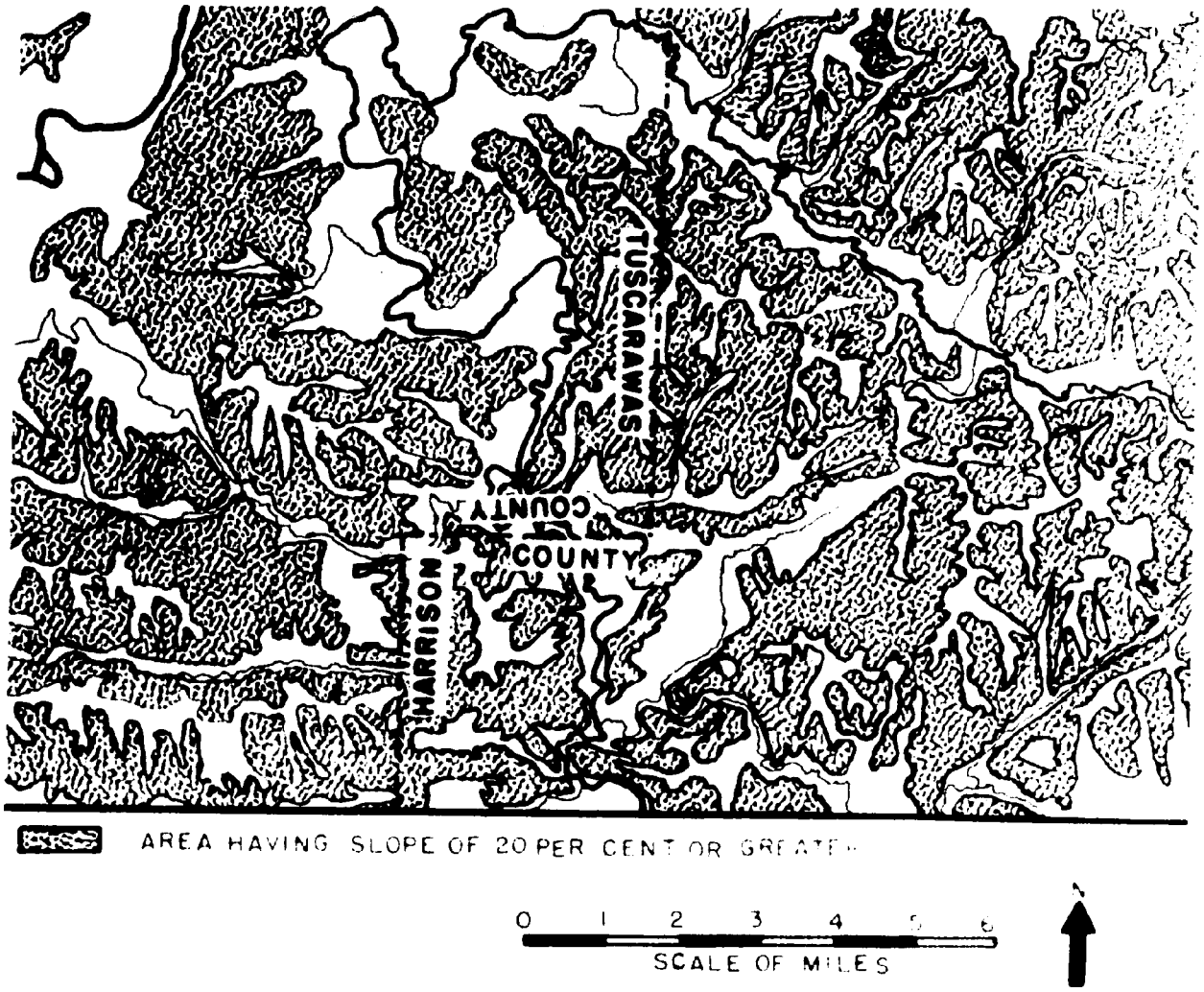

Fig. 29.-- Area of Over 20 Per Cent Slope.

cultivated land has been returned to forest or pasture; some has been strip mined, and other land has simply been abandoned.

The decline in cultivated land in Carroll County has not been as precipitous as in Harrison. However, the decline is more likely to continue. Because of its location in relation to Canton and other industrial centers, the area has been selected as the permanent home of many employed in those communities. In addition, the presence of Atwood and Leesville Lakes has helped make the county a most attractive residential location. The rural character is changing and will likely continue to change to meet the needs and desires of these new residents.

The cultivated area in Tuscarawas County has fluctuated considerably. It declined during the 1930's and then, under the influence of the high war-time and post-war prices, increased from 1940 through 1954. Since 1954 the decline is again under way.[1] The urbanization trend noted in Carroll County is also present in Tuscarawas. The New Philadelphia--Dover and Uhrichsville--Dennison areas are becoming increasingly industrialized. Factories, homes and recreation areas are taking over former farm lands, and it can be expected that this trend will continue.

Strip mine activity has expanded rapidly since 1930 and, as noted previously, has probably reached its peak. Owing largely to its being a temporary phase of land use, strip mining has exerted considerable influence on other types of land use. It has replaced agriculture, grazing and woodlots; and where the coal has been removed, reclamation of the spoils banks restores the area to forest or pasture and largely elim-

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[1]During World War II and the period immediately following, high prices tempted many to return to cultivation much land that was unsuitable for cultivation. When farm profits declined, the land was again abandoned. Letter from Lester Cronin, Tuscarawas County Agricultural Agent, October 11, 1958.

inates the cultivation of crops. In this way strip mining has greatly changed the surface of eastern Harrison County.

While these changes have occurred, the basic agricultural type has remained. Livestock farming, especially dairying, has continued to increase in importance. Growing cities and improved trucks and highways have combined to enlarge the market for livestock products. Accompanying the livestock expansion has been the planting of a larger acreage in forage crops.

In general, the trend has been away from land uses that require the cultivation of the soil and toward the more permanent type of cover crops. The result is a greater amount of land in forest, pasture and hay crops.

Land Use, 1957

Present land uses can be grouped under four general headings: (1) agriculture (including grazing), (2) woodlots, (3) strip mine spoils banks and (4) recreation. There is considerable duplication of use within these groupings. Many woodlots are pastured and can also be considered as grazing land. Most of the reclaimed spoils banks have been planted to either trees or grass and can thus be considered as woodlot or grazing land. Most recreational developments have been as secondary functions of the first three groups. Each phase, however, differs in character to such an extent that it needs separate consideration.

Agriculture

The agricultural base is primarily livestock farming. Income from the sale of livestock or livestock products ranges from 89 per cent of the total farm sales in Harrison County to 87 per cent in Carroll

County and 77 per cent in Tuscarawas County.[1] The sale of dairy products provide tri-county farmers with over 40 per cent of their total incomes. Approximately 38 per cent of Carroll County farmers, 35 per cent of Tuscarawas County farmers and 30 per cent of Harrison County farmers consider themselves to be dairy farmers.[2]

Income from all other types of livestock is about equal to that from dairying. Beef, swine and sheep raising has fluctuated considerably in the past fifty years. Sheep raising has declined greatly from its peak in the last half of the Nineteenth Century and is only of slight significance at the present time. Swine production has never attained the prominence that is found in the Corn Belt counties of western Ohio. Beef production has also been on a lower level than in the Corn Belt counties. A slight increase has been noted in recent years as improved pastures have been developed.

Agricultural practices differ widely within this framework of livestock farming. Two factors seem largely responsible for the major differences: the cultural development and the character of the landscape.

The cultural factor.--People migrating from one area to another are likely to carry with them their occupational habits gained over long periods of time. This has been true of those who settled the tri-county area. Settlers who had been careful farmers in their former homes were likely to be careful farmers in their new ones; and, unfortunately, those who had been poor farmers in their old homes did little better with the new farm. The results of their methods frequently determined the productive character of the land for several generations.

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[1] U. S. Bureau of the Census, United States Census of Agriculture: Ohio, 1954, op. cit.

[2] Ibid.

Many of those entering the area were from the hills of Virginia and often had little interest in farming. They farmed only because it was sometimes necessary to do so to provide food for the family. When their land wore out, they could always move on. Many parts of the tri-county area show the results of this type of farm management--a subsistence type of agriculture. Corn and a few vegetables are grown on eroded and depleted land. A few head of poor quality livestock are raised. The food supply is supplemented by hunting and fishing and often by a welfare check.[1] Most farm buildings in such areas appear in danger of collapsing. Such a run-down type of agricultural economy acts as a drain of the healthier phases.

On the other hand, there are many areas of prosperous agriculture. The sections settled by the thrifty and hard working New Englanders and Pennsylvania Dutch are generally the most prosperous looking. These settlers were farmers rather than hunters and were accustomed to expending a little more energy than was required to "just get by." They have passed down to their children farms that they hoped were as good or better than when they first began farming them. Many of these people introduced the livestock-general farming type of agriculture that is dominant today.

The Germans and Swiss who migrated into western Tuscarawas County in the last half of the Nineteenth Century emphasized dairying to a greater degree than did other tri-county farmers. Even while other farmers were primarily interested in sheep, the Germans and Swiss processed their milk into butter and cheese. Small cheese factories were in operation in Auburn Township in the 1870's. Swiss cheese became a specialty;

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[1]Most markets in southern Tuscarawas County and in Harrison County post signs informing one and all that they will fill welfare orders.

and today this region, with parts of adjoining Holmes and Coshocton Counties, forms one of the more important Swiss cheese manufacturing centers of the United States.

Much of the milk used in the cheese processing is produced on farms owned and operated by members of the Amish sect. They have not desired to install the modern milk handling equipment that is often required for those supplying major metropolitan areas. In the production of milk, as in other phases of their agriculture, the Amish have retained many ties with the past and farm much the same as did their ancestors. Although some are accepting and using more modern equipment and methods, horses and horse-drawn equipment are still much in evidence. The careful agricultural practices of the Amish have been largely responsible for the continuing high yields from their lands. Their emphasis on livestock has required the retaining of much land in pasture and in hay crops. Most of the hay and grain is fed to the livestock, and in this way the plant nutrients are returned to the soil in the form of manure.

The stability of Amish agriculture is another of its outstanding characteristics. On November 1, 1934, in the midst of the "Great Depression" of the 1930's, only one township of those with large Amish settlements had any rural residents drawing welfare payments.[1] That one township, Sugar Creek, had under 2 per cent of its population on relief roles.[2]

The Amish are not the only careful farmers in the tri-county area; but because they are concentrated, they have been able to show a

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[1] J. H. Sitterly and J. I. Falconer, Better Land Utilization for Ohio (Columbus: Ohio State University, 1938), p. 76.

[2] These were probably not Amish. The Amish religion teaches that the group as a whole is responsible for the welfare of any member.

greater affect on a community. In other sections individual farmers or small groups are farming as well or better. This is true in sections of productive river bottoms or other relatively level lands where agriculture can be carried on without extreme conservation practices being necessary. Even in the more rugged sections through the utilization of good land management practices, some farmers have been able to farm on a high sustained yield basis.

The contrast between these farms and those of farmers without the desire or know-how to farm better is great. Many occupy land that is extremely difficult to farm because of the steepness of slope or character of soils. Operators of run-down farms live next to productive, well-kept farms with little apparent differences in slope or soil characteristics. In general, however, most of the low-producing farms are in areas where agriculture should be attempted only with the best of land management practices.

Landscape type and agricultural development.--Four general types of landscapes can be observed in the tri-county area: (1) level bottom lands and low terraces; (2) gently rolling hills with slopes usually under 20 per cent; (3) wide, relatively level ridge tops with steeply sloped, V-shaped, intervening valleys; and (4) narrow ridge tops with steeply sloped, V-shaped, intervening valleys. Some areas do not fit into any of these types but are isolated pockets within one of the major regions and will be considered with that region.

Bottom lands.--The greatest expanse of bottom land is along the Tuscarawas River. In some parts the bottoms are more than a mile in width, and only in the stretch between the mouth of the Big Sandy and the mouth of Sugar Creek does the flood plain become narrow and insignificant. The major tributary streams also have extensive areas of bottoms

and terraces. The lower valleys of Sugar Creek, Big Sandy Creek, Conotton Creek and Big and Little Stillwater Creeks have been filled by postglacial ponding and thus have wider flood plains than their size would seem to warrant.

Some sections of the bottom lands are swampy and of little value for agriculture, but the greater part is suitable for some type of agriculture (Fig. 30). Much of the land is farmed intensively with almost every field planted in some crop. A much higher percentage of grains is found here than in other sections of the three counties. Corn in particular grows well here. Potatoes and vegetables are grown near the larger towns with a recent development of irrigation near the streams. Water is pumped from the streams and the irrigation is by the overhead method.

Farm and field patterns differ considerably from those of the surrounding hills. Figure 32 shows a portion of the Tuscarawas Valley southwest of Port Washington. The rectangular field patterns contrast greatly with the odd-shaped fields outside the flood plain. A narrow ribbon of trees lines the river; a wider belt marks the edge of the flood plain. The contrast is further accentuated by the almost complete absence of trees within the flood plain, where almost all the land is planted in field crops. The area beyond the flood plain has some of the steepest slopes to be found in the tri-county area, and an almost complete absence of land being cultivated is noted. The bottom lands are the most intensively farmed lands in the three counties.

Gently rolling land.--In the areas of rolling lands, slopes range generally from 5 to 20 per cent with considerable variation within relatively small areas. Small sections of relatively level creek bottoms may be surrounded by gently sloping hills with the slope near, or even below, 5 per cent. Nearby areas may approach the other extreme--valleys more narrow, slopes steeper and ridge tops sharper.

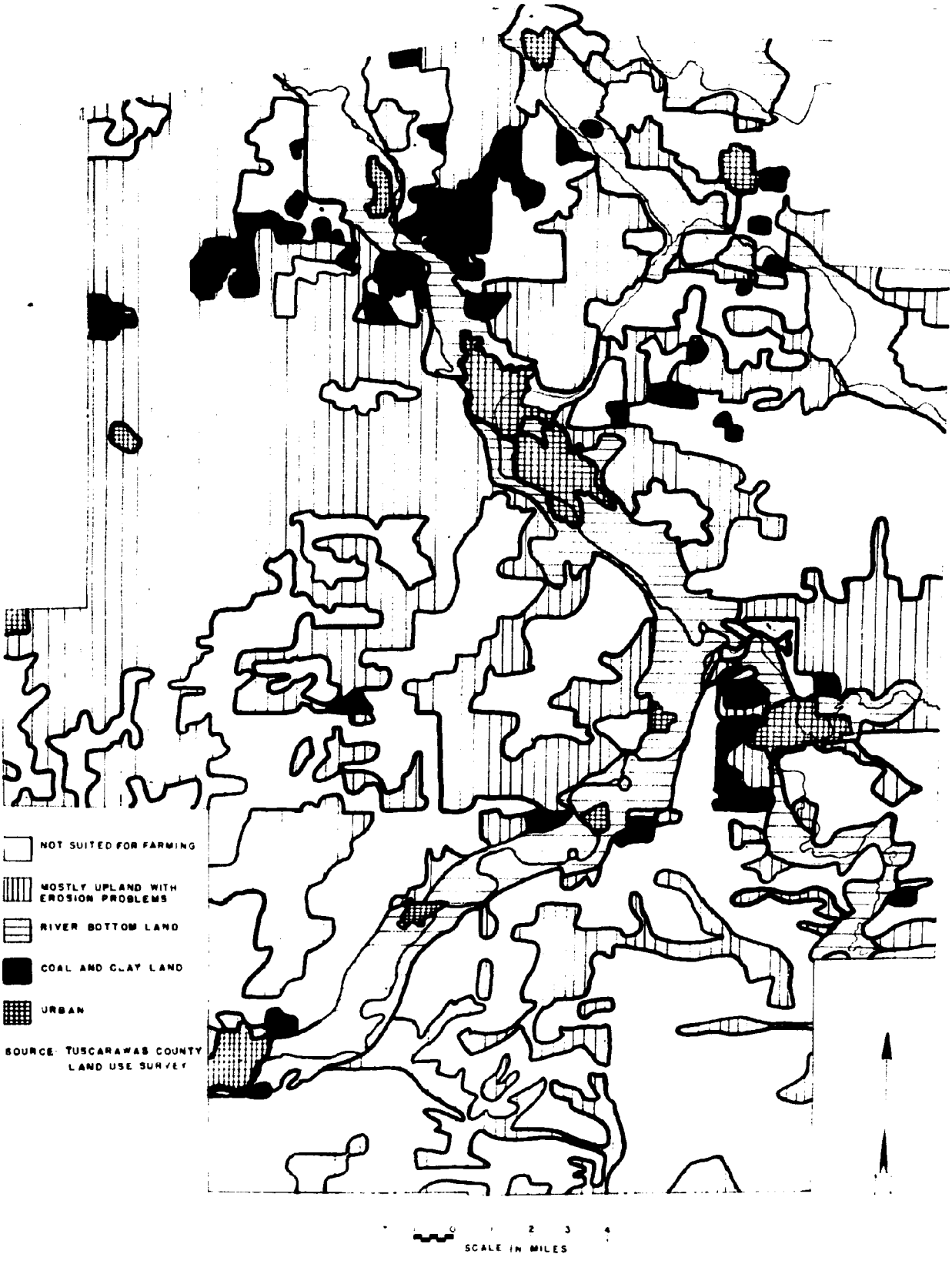

Fig. 30.-- Land Use Survey Map of Tuscarawas County.



Fig. 31.-- Air View of Tuscarawas Valley Near Port Washington.

Rolling areas are scattered throughout almost all parts of the three counties. The greatest concentration in Tuscarawas County is northwest of a line extending from Mineral City through New Philadelphia and Stone Creek; in Carroll County, in the northeast corner (East and Fox Townships). Both sections are near the unglaciated area with approximately two square miles in the extreme northwest corner of Tuscarawas County the only part that has been glaciated. Even within some of the more rugged hill lands, pockets of gently rolling land are found.

The intensity of agriculture varies considerably within this landscape type. Especially when slopes approach the 20 per cent limit, the possibility of erosion is present. Land capability classifications suggest that slopes from 12 to 20 per cent be cultivated only with the most intensive erosion control measures in use.[1] In most instances some erosion control measures are being used, and many farmers follow the complete program outlined by soil conservationists. The resulting land use type is not always as suspected. Some quite level lands are used as permanent pasture (Fig. 33), while other land with steep slopes is planted to open-tilled crops--primarily corn. In general, however, the most intensively cultivated land is that with the least slope. Figure 34 shows an area along the South Fork of Sugar Creek north of the village of Sugar Creek. The field in the foreground has alfalfa coming into a field after wheat had been cut from it. More distant fields show corn, wheat stubble and pasture. Much of the land along the creek is in permanent pasture. Contrasting greatly with this area is that illustrated in Figures 35 and 36. The land shown here, approximately two miles north of the Sugar Creek bottom land, has been cultivated in the past

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[1] Morse, op. cit. p. 13.

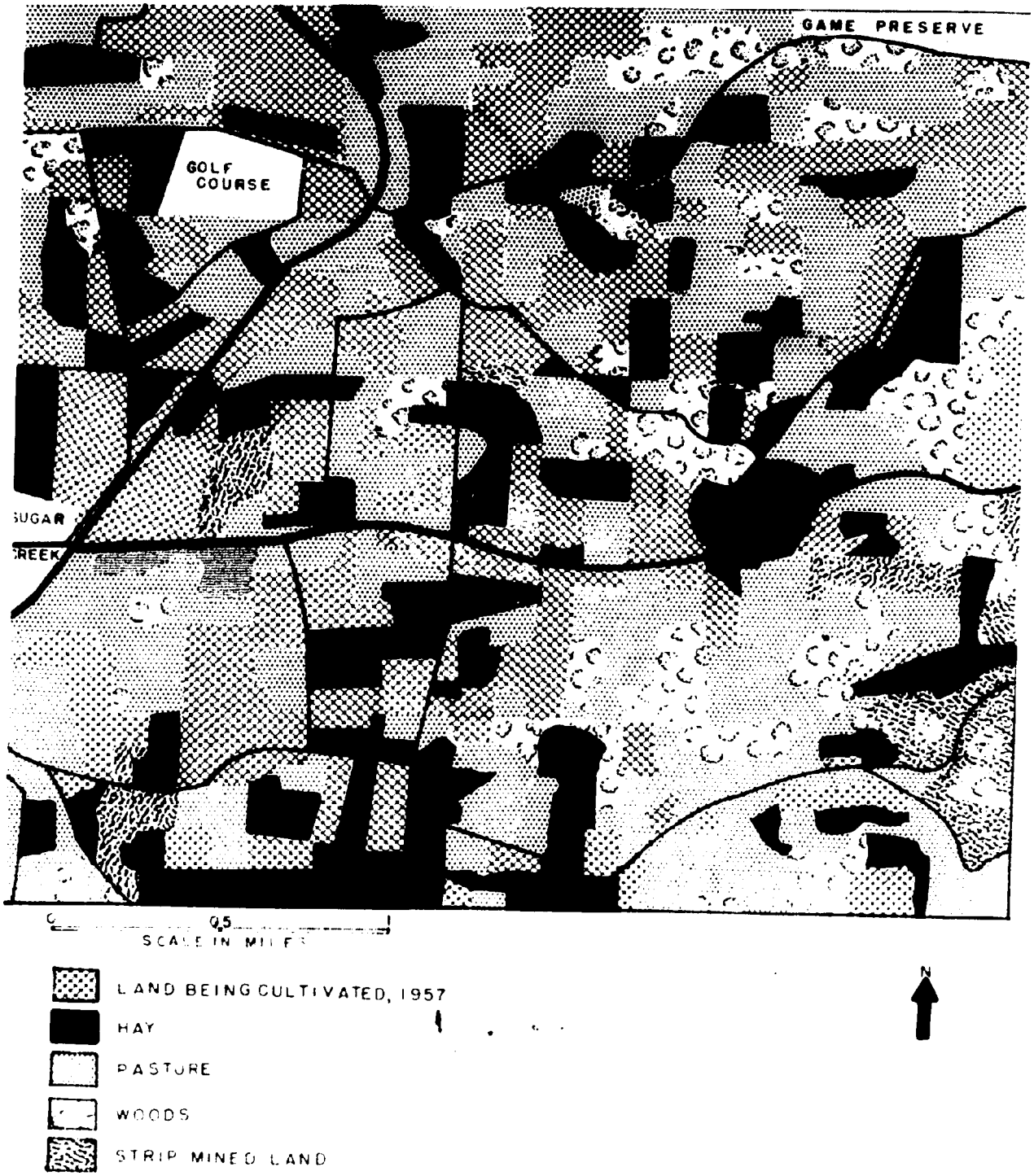

Fig. 32.-- Land Use in the Sugar Creek Dairy Region.

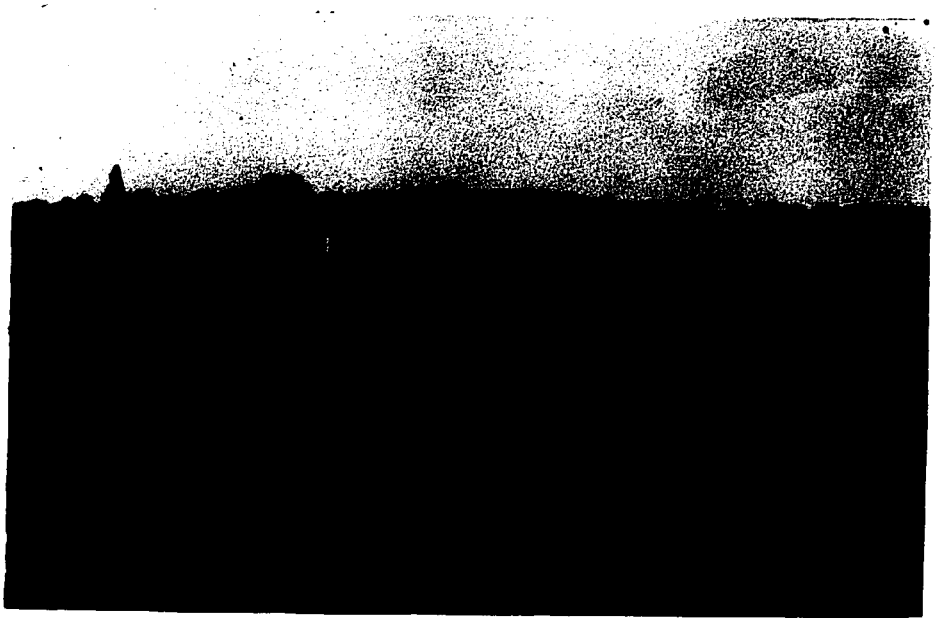

Fig. 33. Dairy farm near Sugar Creek. The stream is the South Fork of Sugar Creek. Bottom land is in permanent pasture.

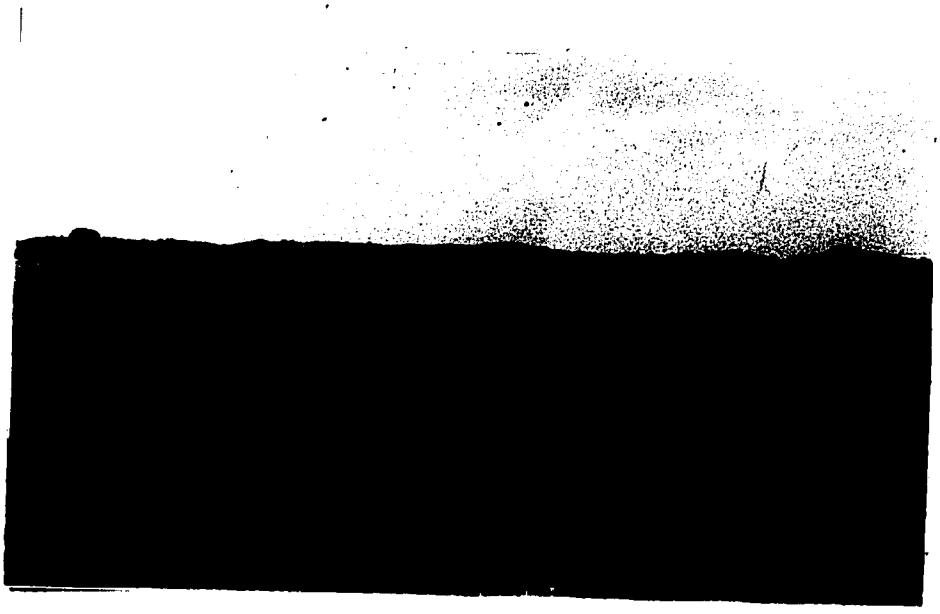

Fig. 34. Gently rolling land northwest of Sugar Creek.

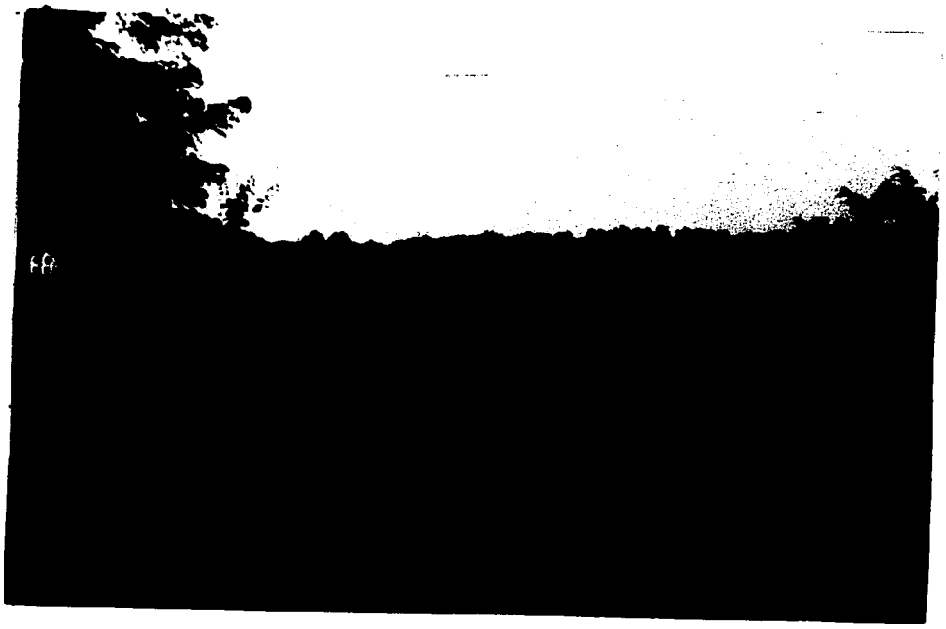

Fig. 35. Trees and bushes growing onto abandoned farm land. Area is now a game preserve. House belongs to a beagle club.



Fig. 36. Woodlot on rough land in Sugar Creek Township.

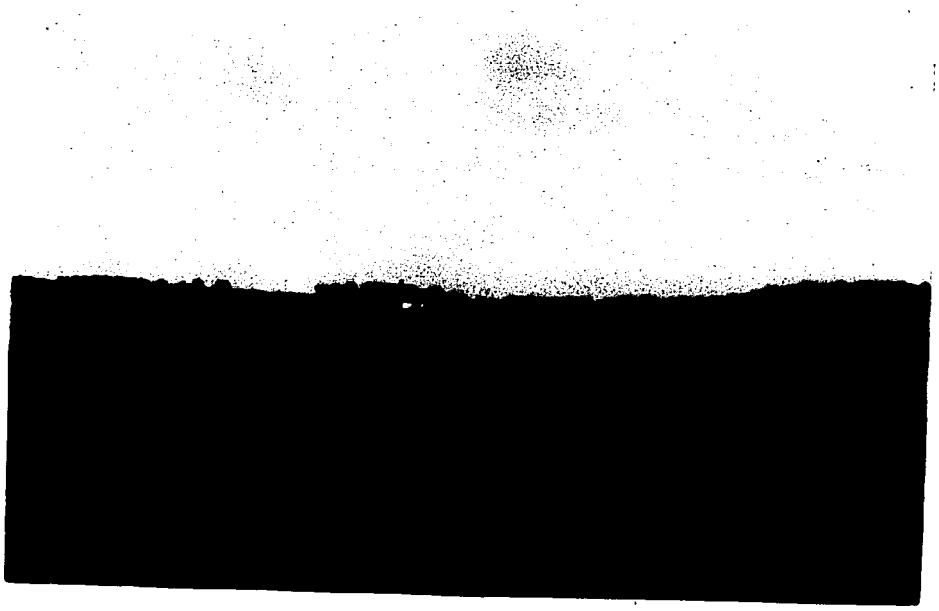

Fig. 37. Strip-cropped land on Baxter Ridge, Harrison Township, Carroll County.



Fig. 38. A ridge top farm near Germano, Harrison County.

but is now growing back without supervision into scrub woodlots. This is perhaps unfortunate, but the land is too steep for safe cultivation under most conditions; and the scrub growth does provide a protective cover to aid in controlling erosion.

Land use patterns in most rolling areas follow rather closely that shown in Figure 34. Corn and wheat are the most important grains and are usually grown in rotation with hay or pasture. On the slopes, alternating strips of corn, wheat and a cover crop will be grown in rotation. This landscape type also has the greatest concentration of dairy farms with much of the land in permanent pasture (Fig. 31). The pasture with a variety of hay crops usually occupies the greatest acreage. The emphasis is on a general farming-livestock type of land use; and except for the islands of rougher land as exemplified by Figures 35 and 36, relatively little land is in forests. Except for the bottom lands this region has the greatest per cent of its area being farmed.

Wide ridge tops and narrow valleys.--The most extensive areas of the wide-ridge-top, V-shaped-valley landscape type are along the divide between the Tuscarawas drainage system and those streams flowing eastward to the Ohio and in central and northern Carroll County. Here the numerous creeks have not yet dissected the former plateau as thoroughly as in other areas. Whereas other areas may have a number of relatively flat knobs, here ridge tops approach a mile in width and often exceed five miles in length. Small streams flow along the intervening valleys that are barely wide enough for the stream and a narrow country road. Slopes are steep (usually over 20 per cent) near the bottom and become more rounded near the top.

On the ridge tops the slopes vary from about 5 to 12 per cent. This permits safe agriculture although precautions against erosion must

be observed. Most ridge tops are intensively farmed in corn, wheat and hay. Most fields, regardless of the degree of slope, are strip farmed. Figure 37 shows a farm on Baxter Ridge north of Dellroy. The three strips illustrated here are corn, alfalfa and newly plowed wheat stubble. This is the crop grouping most frequently used although other hay crops are frequently substituted for the alfalfa. Crops are generally above average in yields. The productive character is reflected in the appearance of the farm buildings; most of those found on the ridge tops are large and well-kept. This is in great contrast to the appearance of buildings in the intervening valleys (Fig. 19). Pasture and woodlots usually occupy rougher land near the edges of the ridge tops.

The valleys and steeper slopes are generally covered with trees. Here and there the valleys widen to permit the growing of a few acres of corn, hay or vegetables. The fields, occupying strips along the creeks, rarely exceed fifty feet in width and may extend several hundred yards in length with the rows of corn and potatoes following the turns of the creeks. Buildings are usually old and unpainted and have the appearance of being ready to collapse if they were not pressed against the steep, supporting slope.

The north and central parts of Carroll County are in the Canton milkshed, and farmers are advantageously located for a dairying economy. This has doubtlessly influenced the development of the livestock-general farming type of land use on the ridge tops. The agricultural pattern and the buildings have been planned with the sale of fresh milk as the primary objective.

Ridge top agriculture is not of comparable importance in Harrison County, where the ridge tops are less extensive and more rolling (Fig. 38). A greater portion is in permanent pasture; much of this area

was the heart of the sheep raising of the 1860-1890 period. Erosion and depletion seem to have taken a greater toll, and now much of the land is covered by a growth of scrub trees. Here too strip mining has replaced some former farm land and left isololated islands of cultivated fields. The air of prosperity noted in the ridges of Carroll County is generally missing; and while individual farms appear prosperous, there is little continuity of such holdings.

The intervening valleys are not as sharply defined as in Carroll County. Slopes are less precipitous and have wider areas of level land in the valley floors. Most are similar in that they are usually heavily wooded with little agricultural use.

Settlement and land use patterns of the ridge tops appear unusual when first observed. Trees have been removed from almost all parts of the higher elevations, and their presence in the surrounding valleys provide a low bordering fringe to the cultivated areas. The more important county roads are near the center of the ridges. Most farm buildings are usually some distance from the roads and are half-hidden in valleys or in clusters of trees. Additionally, there is the great contrast in land use between ridge tops and valleys that is not apparent in the other landscape types.

Steep slopes and narrow valleys.--The greatest concentration of above 20 per cent slopes is in the southern third of Tuscarawas County and the western half of Harrison County.[1] Smaller areas of similar character are scattered throughout other parts of the three counties. Erosion has reduced the divides to sharp ridges in many sections. Roads

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[1]The wider flood plains of the Tuscarawas River and Big and Little Stillwater Creeks are not included in this landscape type although they are surrounded by this rougher land.

wind about on these ridges, frequently dipping sharply where streams have cut into the divide. Scattered knobs are level enough to permit cultivated fields of considerable size, while in other parts fields suitable for cultivation are limited to narrow strips paralleling the roads. From these ridges the slopes dip abruptly to the valley below. The valleys are narrow with slopes frequently rising directly from a stream's edge.

The results of erosion are seen throughout the steeply sloped area. Rocks are strewn about in open fields with an occasional outcrop of bedrock. Where forest has protected the earth, a layer of top soil remains with rocks protruding only on the more precipitous slopes.

Agricultural practices vary greatly from place to place. Corn, small grains and hay crops are most frequently grown. Most of these crops are produced on the knobs; corn and vegetables are grown in creek bottoms where space permits. Many slopes have been cultivated in past years but are now being permitted to revegetate naturally. The present cover is usually a mixture of grasses and scrub woods. A large part of this land is idle and can best be classified as waste land.

Perry Township in the southeast corner of Tuscarawas County is typical of this region. The Tuscarawas County Land Use Survey (Fig. 30) listed 69 per cent of Perry Township's farms as being suitable only for subsistence farming. About 30 per cent of the farms were considered able to support full-time farmers. Approximately 20 per cent of the land was reported as being in woodland in comparison with the suggested 85 per cent. Figure 30 indicates that only small portions of Perry Township are suited for farming and these only when good land management practices are used.

This landscape type has an air of poverty: farm buildings are old and in need of repair; many homes seem unsatisfactory for occupancy; livestock is scrawny; and roads frequently are little more than trails. The animals that are kept are primarily to supply the needs of the family. Except for isolated farms this section could serve as an object lesson of where and how not to farm.

Woodlands

Determining the extent of tri-county woodlands depends on the criteria used in defining a woodland. Many formerly cultivated areas, now abandoned, have a cover of scrub trees and brush (Fig. 36). More recently abandoned lands are just now beginning to grow back in to a similar type of vegetation (Fig. 39). Have such areas been reported as woodland in past surveys? No definite division seems to have been made, but for the following discussion any area with a dominant cover of trees or brush is classified as woodland.

The character of tri-county woods growth makes any survey difficult and obsolete almost as soon as it is completed. Some woods cover several hundred acres, while others may occupy narrow strips in valleys, a little land along old fence-rows or a few acres near farm buildings. The woodlots include many mature oak, maple, walnut and other hardwoods. Second growth timber of good commercial potential is dominant in some woodlots. Planned plantings are being made of the native hardwoods with scattered plantings of conifers in areas where the hardwoods are difficult to get established or where a rapidly growing tree is wanted. A great part of the abandoned land is left to "shift-for-itself"; and if trees or bushes do get established, they are often undesirable species. Although this type of woods growth has little commercial value, it is valuable in that it provides cover to slow erosion.

Reforestation is proceeding at a rapid rate. Most planned plantings have been made in the past twenty-five years with the farmers, the Soil Conservation Service, the Muskingum Watershed Conservancy District, the Ohio Reclamation Association and the mining companies all sharing in the work. The Soil Conservation Service does not own land but cooperates with the other groups in planning reforestation programs.

Tree plantings in the soil conservation districts are made as a part of the over-all conservation program; and, as a result, the total area planted appears small. The Harrison County District planted two hundred acres in 1957 with a total of 1,307 acres planted since the conservation program was started. The Carroll County District has an even more impressive record. One hundred fifty-six acres were planted in 1957 with 3,195 acres planted since the beginning of its program. Plantings have been planned for an addition 10,458 acres in future years.

Reforestation has been an important part of the Muskingum Watershed Conservancy District program since its inception. Present plans call for approximately two-thirds of all District lands to be placed in woods and all lakes to be almost completely surrounded by trees. Although the District sells timber as a part of its forest management program, the primary purposes of the District forest program are to aid in erosion and siltation control and to provide a scenic attraction. At the present time over six thousand acres have been planted with trees. The District forest management program has been of inestimable value to southeastern Ohio landowners through the example of its work.[1] By returning a profit

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[1]Lester Cronin, Tuscarawas County Agricultural Extension Agent, observes that the District "has provided leadership to all county and area farmers in reforestation and timber management by example through their tree planting program and selective cutting and harvesting of their wooded areas. Not only farmers but business and professional people as well bought and planted more trees because they saw first hand

the program has demonstrated that conservation and profit-making are not incompatible.

Another concentrated reforestation program is that on strip mine land. Because state law requires the rehabilitation of all strip mined land and the need of timber for use in underground operations mining companies have, of necessity, become interested in a tree planting program. The planting program is closely integrated with the over all spoils bank reclamation and will be discussed later.

Woodland, both old and new, is widely scattered throughout the three counties. The greatest concentration is in the areas with steepest slopes: southern Tuscarawas County and western Harrison County. A smaller section of similar character is near the headwaters of Yellow Creek in eastern Carroll County. Some type of woods growth covers most of this rougher land. Much of the woodland is pastured and might better be classed as permanent pasture.

Contrasting with the woods cover of the rougher areas is that of the sections with wide ridge tops and narrow valleys. In such areas trees grow in the valleys and lower slopes. In the more intensively farmed sections woodlots are generally small and occupy isolated plots on lands too rough to farm. Woodlands cover approximately 20 per cent of the total tri-county area at present, but with the completion of plantings already planned the total area in woods will probably approach 25 per cent.

The sale of forest products does not provide an important source of income, but with improved forest management this could be changed.

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how they grew and contributed to erosion control on district owned land." Letter, October 13, 1958.

Commercial production is a part of the MWCD and spoils bank reclamation forest management programs. The MWCD sells timber from thinning operations. The timber stand is improved and, at the same time, money is provided for District operations. Mine timbers, fence posts and other forest products are being harvested from the plantings made on the reclaimed spoils banks. These operations are small, to be sure; but they offer proof of commercial timber possibilities for future years.

Spoils Bank Utilization

Land utilization of spoils banks is generally limited to forestry, grazing and recreation. A number of use limitations were noted in the discussion of spoils banks reclamation. The rock-strewn surface virtually rules out any type of use where plowing or cultivation is necessary. Toxic soil conditions make it difficult to establish most plants. The last cut leaves a high wall and a steep slope where the spoils from this cut were deposited.

The most suitable use of spoils banks appears to be forests.[1] Acidic soils and steep slopes influence this choice. Hardwoods such as oak, walnut, ash, maple and elm are planted wherever possible. In some soils these trees are difficult to establish; and black locust, pine or other conifers may be planted instead. The latter may be planted for eventual commercial use or as nurse crops for slower growing hardwoods.

Spoils bank reclamation is still in the experimental stage with constant efforts being made to improve the plantings. Some have proven surprisingly successful, whereas others have been complete failures. One experimental plot on Hanna Coal Company land was observed in 1957. The planting consists of 20 per cent ash, 20 per cent maple, 20 per cent

[1]Approximately 60 per cent of plantings made through 1957 have been trees.

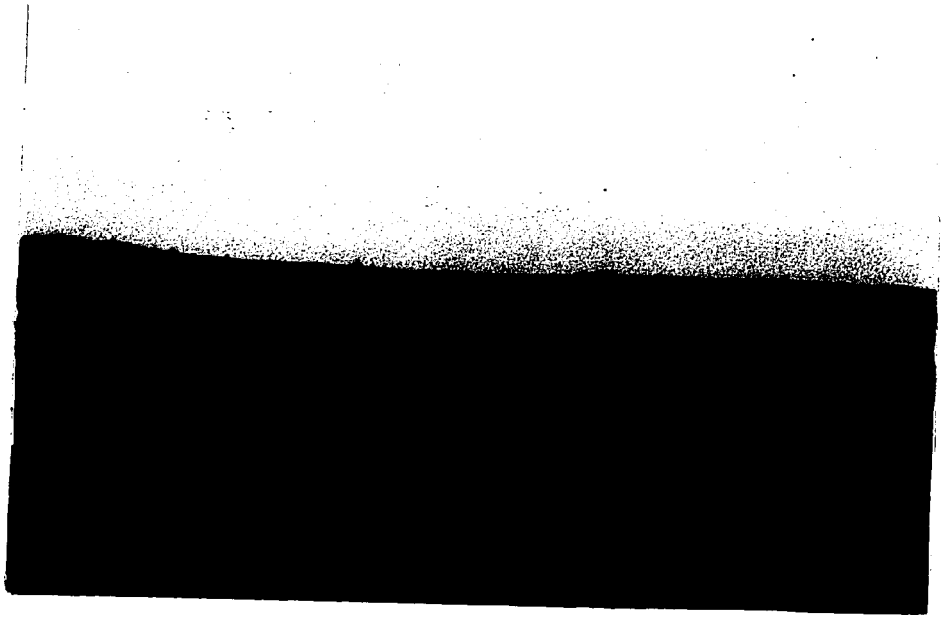

Fig. 39. Recently abandoned land near Leesville Lake. Scattered trees and bushes are growing back.

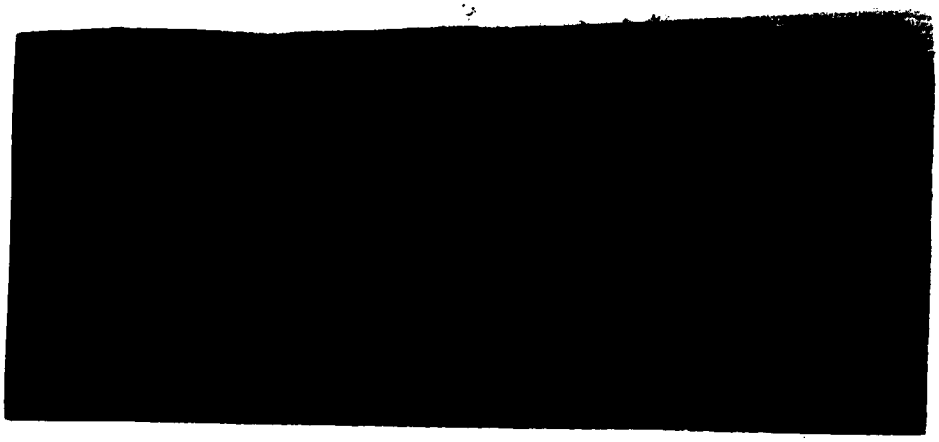

Fig. 40. A part of the Bar-B ranch. Hill in background is a reclaimed spoils bank.



Fig. 41.-- A seven year old planting of trees on Hanna Coal Company land. The spoils bank is well covered. (Hanna Coal Company photo)



Fig. 42.-- Cattle grazing on seeded spoils banks, Short Creek Township, Harrison County. (Hanna Coal Company photo)

sycamore and 40 per cent black locust.[1] The planting was made in 1947. The black locust grow rapidly, and about 30 per cent of those planted in this plot have already been cut for mine props and fence posts.[2] Plantings that are ten to fifteen years old have a surprisingly mature appearance (Fig. 41).

The oldest plantings are only twenty years old, but they give a good indication of future results. Timber is already being harvested with a greater supply soon available. Erosion and floods are being slowed. Litter is accumulating under the trees and a new layer of top soil is slowly forming. Furthermore, the spoils banks have been covered by trees, making them more attractive.

In many ways strip mining is aiding in the revival of grazing in Harrison County. Instead of sheep, however, it is beef cattle that are now being grazed. The calcareous soils of eastern Harrison County are excellent for growing many different grasses and legumes. Because of the great diversity of spoils bank soil conditions it is necessary for each area to be thoroughly tested to determine the best combination of grasses and legumes. One seeding may be a mixture of alfalfa, sweet-clover, birdsfoot trefoil, brome grass and orchard grass (Fig. 42). Another seeding may include blue grass and clover with the above mixture. The number of possible mixtures is as great as the variety of soil types.

Most seedings are broadcast although in larger areas airplanes and heliocopters have been used. A successful seeding is ready for grazing when two or three years old. Cattle grazed on newly seeded spoils banks and adjoining undisturbed grasses almost always prefer the

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[1]The planting is just off U. S. Route 250, south of Cadiz and along the company road leading to the Georgetown processing plant.

[2]The age of the trees at planting time is not known.

newly seeded area. The cattle also appear to gain weight more rapidly on the reclaimed spoils banks.[1]

Coal companies often own large tracts of land that they plan to mine, are mining or have mined. Reasons for retaining possession of the first two holdings are self-explanatory; but why does a company retain ownership of the land already mined? In a sense, because they need it for access roads or for utility right-of-ways. It is better to own these rights than to lease them. Additionally, coal to be removed by underground mining may remain. The companies are required to pay taxes on these lands--frequently at the same rate as before the land was mined. In order that they will not become a financial burden, some productive use must be found for them. Mining companies can be expected to grow trees to supply needed timber, but what use is to be made of land not in forest? The Hanna Coal Company has found it expedient to raise cattle on company land seeded in grass. The operation is not large by western range standards, but with several hundred head of white-faced cattle it does indicate that the grazing of cattle has a future in the tri-county area. Success in this venture may interest others in a similar program.

One such operation, the Bar-B Ranch, has been under way for about five years. Judson Rosebush has purchased approximately forty-one hundred acres of land affected by strip mining in German and Rumley Townships, Harrison County.[2] The mining operation had occurred before the

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[1]Edwin Mills, farm manager for the Hanna Company, notes that this appears to be true although no carefully supervised tests have been made.

[2]The Hanna Company grazing operation had little influence in establishing the Bar-B Ranch. Mr. Rosebush formerly taught political science at Wooster College. A long-time interest in conservation caused him to give up teaching in favor of ranching on old spoils banks. The

enactment of the strip mine law, and only a small part of the land had been reclaimed at the time of purchase. Since then considerable additional acreage has been seeded for pasture. Because of limited financial resources, however, reclamation has been relatively slow. The number of cattle is being increased as more land is seeded and other pasture[1] is improved.

Seeding on the Bar-B Ranch, like that on the Hanna Company land, is done only after considerable testing to determine the best seed mixture. However, grading and seeding of these spoils banks are not under state supervision; and, as a result, there are no restrictions on the experimenting that can be done. The primary objective is to produce the best possible pasture with the lowest cost. If grading and seeding can be done economically on low-cost land, it is possible that other areas of old unreclaimed spoils banks will be changed from waste land to income-producing pasture. For this reason activities on the Bar-B are being watched with considerable interest.

The recreational use of strip mined land is largely incidental to the over-all reclamation program. Hunting and fishing have benefited most from the planting of trees and seeding of grasses and the construction of ponds and lakes. Other recreational uses are generally associated with hunting and fishing. Trees, grasses and other plantings--such as multiflora rose fences--provide both protection and food for game; and the result has been better hunting.

More planning for recreation has gone into the fishing phase. Many ponds and small lakes have been created because of the need for

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Harrison County location was selected because of the presence of an extensive area of low-cost, unreclaimed strip mined land.

[1]Much of the land not disturbed by strip mining was in pasture. Because of over grazing, soil depletion and erosion the pasture was unsuitable for grazing.

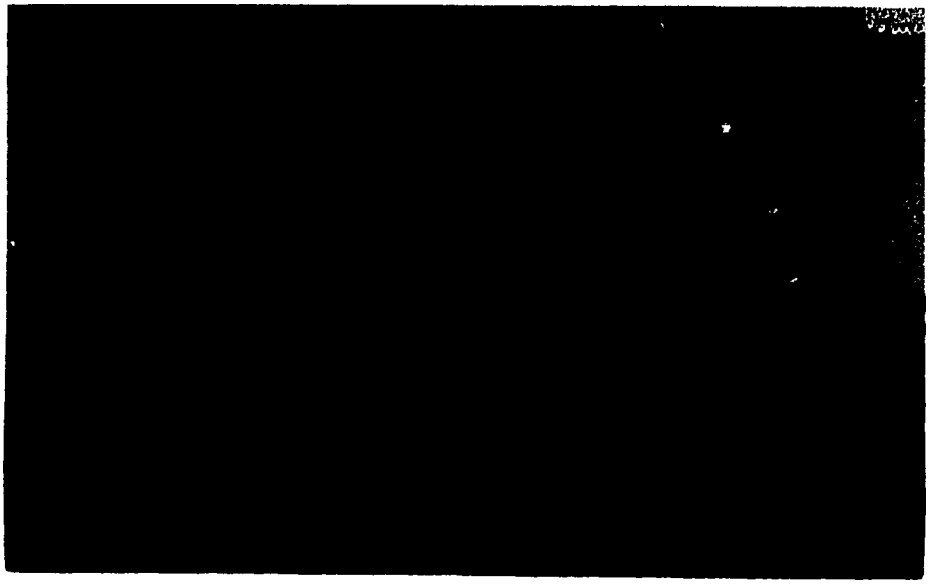

Fig. 43.— Strip mine lake along Route 250 south of Cadiz. Black locust and florabunda roses on spoils bank and pine on top of high-wall. Lake is stocked with fish.



Fig. 44.— Leesville Lake.

covering the coal seam left exposed by the last cut. Water covering this cut helps reduce contamination of the drainage area. The ponds and lakes vary greatly in size; the average is less than an acre.[1] Most of them are on the holdings of the coal companies.

There are about two thousand strip-mine lakes and ponds within the tri-county area[2] with three-fourths of these in Harrison County. At least 360 lakes have been stocked with fish. Most lakes are within private property limits and are, in a sense, private fishing preserves. Stocked ponds on coal company land are usually reserved for company employees. Where they abut public highways, no organized plan to prohibit fishing by the general public exists (Fig. 43). However, the companies discourage fishing where access must be gained by using company roads. Heavy truck traffic, blasting and other mining activities make the use of such roads dangerous.

Some strip mined land has been purchased or leased by sportsman's groups for use by members. Such land is primarily used for hunting, fishing, boating and wildlife conservation. Four areas, two in Harrison County and two in Tuscarawas County, are being used in this manner. The limited number of groups using reclaimed strip mined lands indicates the scope of recreational activities at present, but increased use will occur as the existence of such facilities becomes better known.

Recreation

Recreational development has lagged in the tri-county area because top priority in the rehabilitation program has been given to such

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[1]This is an approximation based on information gathered by Dr. Charles Riley, Professor of Biology, Kent State University. Dr Riley plans to publish a report on the use of strip-mined ponds and lakes at a later date.

[2]Since new lakes are being created as mining progresses, this 1956 figure has probably been exceeded.

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defective typing

things as flood control, soil and water conservation, spoils bank reclamation and reforestation. This may prove to be most fortunate. In the desire to do "first things first" a firm natural base is being established for recreational activities. The flood control and water conservation programs, by the building of reservoirs and stabilizing of stream flow, have provided a base for water recreation. The planting of trees and grasses has greatly improved the wildlife habitat. Improvements are being made in the beautification of the landscape by covering spoils banks and badly eroded areas with trees and grass.

Largely as a result of these projects the tri-county area is in position to provide limited recreational opportunities to both those interested in the more active pursuits such as hunting, fishing and swimming, and to those interested in scenic attractions. The slow development of these facilities points up the lack of a comprehensive plan to improve the area and advertise to attract tourists and vacationers. The only effective program to develop recreational facilities is that of the Muskingum Watershed Conservancy District. Although limited in its areal coverage, the MWCD has made considerable progress towards making recreation an important new economic base in the tri-county area.

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MWCD program.--MWCD recreation plans center on the District lakes. Six of the permanent lakes are either completely or partially within the tri-county area (Fig. 20). These include Bench City in Muskingum County, Leesville on the Muskingum and Carroll County border, Tappan and Clendenning in Harrison County, and Piedmont on the Harrison and Belmont County border.

Some phases of the program are directly controlled by the MWCD, whereas other phases, although coordinated by the MWCD, have been activated and supervised by other groups. The Ohio Wildlife Division is



Fig. 45. Beach at Atwood Lake.



Fig. 46. Park and Picnic area at Atwood Lake. Lake and beach is beyond the grove of trees.

primarily responsible for hunting and fishing. The Division releases game and stocks the lakes with fish, such as bluegill, bass, perch and pike. It controls the hunting and fishing through the issuing of permits and the establishment of governing regulations. It also carries on research to improve wildlife and the wildlife habitat.

The Wildlife Division leases the MWCD water facilities and pays an annual fee based on an evaluation of the role of these facilities in increasing the sale of hunting and fishing permits. The lakes have only a remote connection with hunting, although they have been largely responsible for the addition of duck hunting. The hunting of deer, grouse, rabbits and pheasants is more closely associated with wildlife cover and food improvements made in the area surrounding the lakes.

Fishing is the most widely dispersed lake use. It is permitted on every lake, while other activities are restricted to certain lakes. Fishing has had a greater economic impact than the other recreation types.[1] It is impossible to determine the amount of money spent on fishing gear; but almost every merchant in the vicinity of a lake sells some type of fishing equipment or supplies, such as rods, bait, boats, motors and clothing. Motels, service stations and restaurants near the better fishing areas have had an appreciable increase in business. New business communities, such as the one along United States Route 250 on the north shore of Tappan Lake, have come into being since 1950. Leesville and other older communities have taken on a more prosperous look. Boat and dock concessions are leased by the District and thus provide income for the expansion of recreation facilities.

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[1]The significance of fishing is illustrated by the sale of fishing permits. Harrison County, in leading all other counties, sold 2,376 annual and 2,517 temporary, non-resident fishing licenses in 1955. Report from Division of Wildlife, Department of Natural Resources.

Boating has become important as an activity separate from fishing. Occupants of cottages on leased District lands have beach privileges and many own boats. Some are large, although the horsepower of motors is limited when used on lakes in the tri-county area.[1] Sailboats appear on Atwood and Tappan, where occasional sailing regattas are held.

Atwood Lake has the most complete facilities of tri-county lakes. In addition to the usual fishing and boating opportunities, there is a swimming area with a park and picnic facility nearby (Figs. 45 and 46). Vacation (Fig. 47) and fishing cabins[2] are also available. The vacation cabins are popular and are frequently leased well in advance of the summer season. Group camping facilities are also located along the lake shore, and it is the hope of some Tuscarawas County residents that these facilities will be expanded to make the area a summer music center. There is already a small colony of artists and musicians near the lake. All these activities attract great numbers of participants. The swimming and picnic areas alone will have over six thousand visitors on an average summer week end.

The boat concessions are the only commercial development permitted at the water's edge. To assure use by the greatest number the District has dedicated a one hundred foot strip around every lake for public use. Only 20 per cent of the adjoining District owned land can be utilized for parks, group meeting facilities,[3] cottage sites or other semi-commercial purposes.

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[1]Boats with motors with unlimited horsepower are permitted on Pleasant Hill Lake only.

[2]The fishing cabins, crude facilities near boat concessions, can be rented by the day or week. Most are unsuitable for family occupancy.

[3]The District encourages construction of such facilities--especially for use by groups such as The Future Farmers of America, 4-H clubs and others interested in conservation.

In addition to the "action" type of facilities, the District plans to provide for those who prefer to "commune with nature" by observing and enjoying the natural beauty of southeastern Ohio's hill lands. All lakes are to have a large part of their shore lines in forest. Building construction is being limited, and those buildings being erected must conform to District restrictions in regards to size and appearance. One lake, Clendenning, is to be permitted to grow back into a wild state. Timber thinning operations will be limited. There will be one access road with a boat livery being the only construction permitted in the lake area. Here, within a two or three hour drive from Cleveland or Columbus, a family will some day be able to view a scene comparable to one of one hundred and fifty years ago. However, the limit on road building will require the visitor to leave his automobile for a view of the natural Tuscarawas Valley. This "wilderness" will be for those who may wish to fish, hike or just look without the noise and bustle associated with other types of recreation.

The MWCD recreation program has proved highly successful. Samplings taken during the 1957 summer season indicate that the number of lake visitors exceeded three million persons.[1] This is doubtlessly a conservative estimate; for the many types of possible activities, some without means of recording an exact count of the number of participants, make an accurate report impossible. On many week ends the facilities are severely taxed to care properly for all visitors. The MWCD has taken note of this and is contemplating a million dollar recreation expansion program to be carried out over the next four or five years.

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[1] This figure is for all MWCD lakes.

The lakes have provided badly needed water recreation for the tri-county area. Local inhabitants have had greater economic opportunities provided through increased retail sales and improved employment conditions. The recreation program has been considered as an added feature in MWCD planning, but even without an organized publicity campaign it has become one of the very important phases of District operations. With expanded facilities the District can play a greater role in making Tuscarawas, Harrison and Carroll Counties the center of an Ohio vacationland.

Other recreational facilities.--Recreational facilities other than those provided by the MWCD are limited. Those associated with strip mine reclamation make up a large part of the available opportunities; and although not well developed or organized, the opportunities for fishing, hunting and boating provided by the strip mine lakes and ponds and the surrounding lands rank second only to those offered by the MWCD facilities.

A small number of sportsmen's clubs sponsor programs designed to provide outdoor activities for their members (Fig. 35). These are primarily planned to improve hunting and fishing through the release of game, the stocking of ponds with fish, the improvement of the wildlife habitat, and the backing of programs of research and education in wildlife conservation. The Soil Conservation Service helps plan similar programs for members of conservation districts. Wildlife areas are improved, and fish ponds are constructed and stocked. Within recent years a number of farms have been purchased by outsiders,[1] and many of these are being developed as private hunting preserves.

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[1] A large number of the outsiders are from Cleveland, Akron and Canton. Many are wealthy and are building substantial homes that will probably be used for week end visits or as hunting lodges.



Fig. 47. Vacation cabins at Atwood Lake.

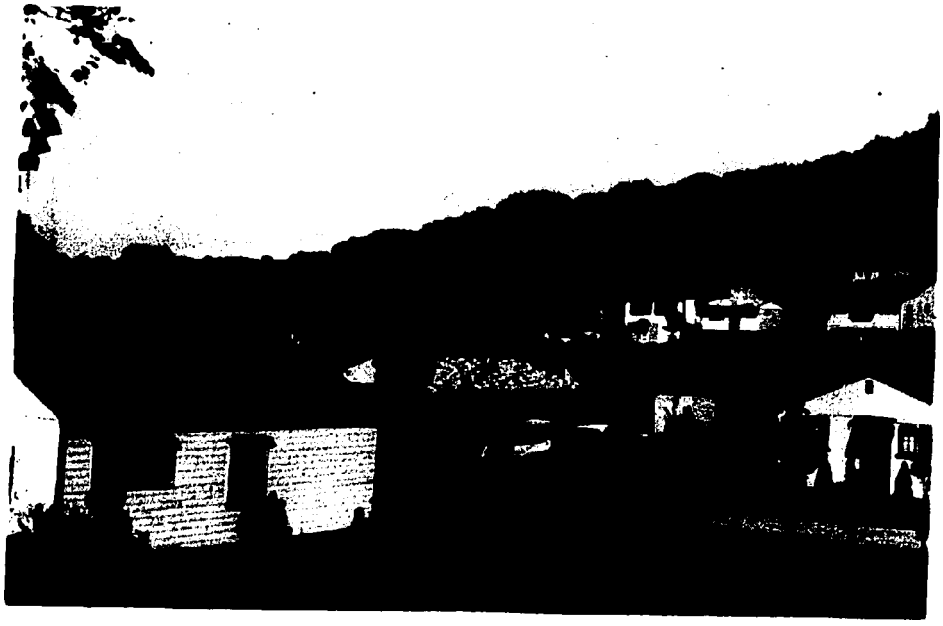

Fig. 48. New homes on the south shore of the north arm of Leesville Lake.



Fig. 49.-- Air View of North Arm of Leesville Lake. Arrow points to location of lake cottages shown in Fig. 48.

Roadside parks have been developed by the state highway department in some of the more attractive areas.[1] They are planned for tourists, but the scenic location and picnic facilities attract large numbers of local people.[2] The more popular of the parks are crowded, especially in the evenings and on the week ends. Their intensive use, particularly by local residents, seems to indicate the need for more such facilities and a better distribution within the area.

Settlement, 1930 to the Present

Population trends and settlement patterns have followed somewhat contradictory paths since 1930. Population trends noted for the years prior to 1930 have been maintained. Rural population has continued its decline, while urban growth has maintained a steady upward pace. However, within this pattern of decline and growth, changes of distribution have been occurring. Some areas show a sharp population drop, whereas the opposite is true in others. Strip mining, the Muskingum Lakes and urban expansion have been primarily responsible for the changes.

Wherever large tracts of land have been strip mined or have been taken over by the mining companies, some people have been displaced. This has happened most often in eastern Harrison County, where coal company holdings are most extensive. The economic change brought about by the strip mining has resulted in continuing turmoil. Crop and pasture land becomes a mining area; and then after the coal is removed, a third

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[1] Such parks overlook Beach City Lake, Tappan Lake, Piedmont Lake and Dover Dam. Others are placed along the more heavily traveled highways.

[2] Registration lists placed at each park indicate a greater use of some parks by local residents than by more distant travelers. The parks at Tappan and Piedmont Lakes are exceptions. Many visitors return frequently. One Dover women's group meets monthly during the summer at Tappan for a family picnic.

type of use develops. This is repeated as the giant shovels keep constantly on the move. The new type of land use may differ considerably from that of the pre-mining period. If the company retains control of the land after mining is completed, the population is permanently displaced. On the other hand, land reclaimed through reforestation or seeding with grass may be returned to individual ownership, but the type of use will be such that fewer people will be needed in the new operation.[1] Either situation will most likely result in a population loss for the mined area. A more stable population and settlement pattern must await the end of strip mining as a major land use type.

Urban expansion has been accompanied by industrial expansion. Many of the new industrial employees have elected to build their homes outside the urban areas. As a result rural population is increasing rapidly in preferred areas. This is especially noticable in northern Tuscarawas County and in Carroll County, where the Massillon and Canton influence is felt.

The presence of the Muskingum Lakes has influenced this movement to a considerable degree. Many new homes are being built near Tappan, Atwood and Leesville Lakes. Some are summer or week-end cottages, but the greatest number are planned as year-round homes. In the Tappan Lake area homes are scattered, whereas clusters of houses have begun to appear along the shores of Leesville Lake.

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[1] The Bar-B Ranch is primarily a family operation. However, several houses and barns, remnants of the former agricultural operation, still remain. The houses are rented, and the barns are used for the storage of hay and equipment. Thus the development of this ranch has not caused the loss of all former home sites. This is also true of land retained by the mining companies. Home sites on unmined land are sometimes occupied by the former owners and, with the completion of the mining and reclamation, returned to them. Other houses are rented to company employees. In this way the strip mine lands are not completely depopulated.

Homes built at Leesville Lake are in almost inaccessible locations. The homes shown in Figure 48 have been built on the south shore of the north fork of Leesville Lake. The access road is rough, without sufficient width for cars to pass and extremely steep in places. Another cluster of homes along the same side of the lake can only be approached along a road that is little more than a trail. The character of these roads indicate the newness of the communities. The residents are rewarded by a view of the lake and the forest covered hills beyond that compensates for the difficulties of reaching the settlement.

Most of the residents work in Tuscarawas County. Of those interviewed, three worked in Canton, one in Massillon and two were sales representatives working out of Cleveland offices. The greater number were employed in managerial positions.

As yet those settlements have had only a slight effect on the local economy; but in the Leesville area, where a greater concentration of homes is found, several small stores have been opened recently. Located close to the lake, Palermo and Petersburg have not felt the effects of this building activity. No new business or home building activity has been noted in these towns. On the other hand, old stores have taken on a brighter look and new ones have opened in Leesville near Leesville Dam and in Dellroy near Atwood Lake.[1]

These changes are indicative of the future. Largely because of building activity near the lakes the rural population of Carroll County has reached a higher level than at any time since 1900, although the farm

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[1]The author has made annual visits to the study area since 1951. Each year something new has been observed: dirt roads have become hard-surfaced highways; villages have gradually spruced up; stores are doing a thriving business in bait, boats, fishing rods, clothing, gasoline, food, etc.

population has continued to decline. This is likely to continue, as the water location attracts still greater numbers.

Harrison County, more distant from the northern urban centers, has not had an equal growth of rural non-farm population. Nor has it had an urban growth to compare with that of Tuscarawas County. Additionally, because of the disturbing effects of strip mining and unproductive farm lands, the county population is unstable.

Tuscarawas County is undergoing rapid urban and industrial expansion. New industry added to expanded older industries has given Tuscarawas Valley residents greater economic opportunity. The rural areas are holding steady, although the farm population has declined slightly.

The greatest population changes for the 1930-1957 period have been in the vicinity of the Muskingum lakes and in eastern Harrison County. Where lake and strip mine influence is negligible, lesser changes have occurred. Some consolidation of land holdings and abandonment of land have resulted in a loss of rural population. On the other hand, the character of Amish agriculture tends to react against either consolidation or abandonment and thus creates an exceptionally stable element in a generally unstable population pattern.

SUMMARY AND CONCLUSIONS

White occupancy of Tuscarawas, Harrison and Carroll Counties has covered a period of nearly one hundred and ninety years. When the first permanent settlement was established in 1769, the area was almost completely covered by forests. Its Indian inhabitants and the first white settlers were dependent on nature for most of their needs. Game, fish, nuts and fruit could be obtained from forest and stream. These foods were supplemented by the raising of corn and vegetables in small forest clearings.

As long as the settlements remained isolated from the markets of the Atlantic Seaboard, agricultural expansion was limited. With the completion of the Ohio Canal in 1832 the transportation barrier was broken. As settlements grew, the forest was removed from the rolling hills. Early settlements were on slopes and ridge tops, and soil erosion and depletion problems soon appeared. By 1840 Carroll, Harrison and Tuscarawas Counties had attained their maximum rural growth.

By 1850 railroads were being constructed in Ohio, and within a few years the canals had become unprofitable. The westward extension of the railroads brought the more productive prairies into competition for eastern markets. The introduction of farm machinery made the large-scale farm operations of the prairies possible, but this same machinery was relatively inefficient on the small hill farms of southeastern Ohio.

The grazing of sheep developed in the early period to provide the fibers needed for clothing. As the self-sufficient economy changed to a

commercial one, wool production became a major industry. Wool from sheep grazed on the free or low-cost semiarid lands of the western range was able to undersell Ohio-produced wool, and by 1880 wool production had declined seriously.

The decline of sheep grazing signaled the beginning of an economic recession for most of southeastern Ohio. The limited economic opportunity was the motivating force behind the migration of many to the west or to nearby industrial centers. While the national economy was expanding, that of Ohio's hill section remained static or declined.

In 1930 the tri-county area was without visible opportunity or hope. A few years later a completely different picture was presented. Efforts were being made to revitalize the economy and the people. Productivity of the land was being restored; trees were being planted; mineral resources were being utilized; and floods were being prevented. Twenty-eight years later many of these projects are approaching completion. The defeatist attitude of the people has turned to one of "it can be done."

In a sense, a cycle of land use is being completed. The natural Ohio had been destroyed almost completely. The rehabilitation of the present period seeks to restore much of the area to a state closely resembling that of the pioneer period. It is the hope of many that in future years the hills of southeastern Ohio will again be an area of extensive forests.

The rehabilitation program is at the mid-point. Some projects, such as flood control, are nearly completed. Others, such as soil conservation and reforestation, are continuous and will require constant vigilance. The people are now aware of the consequences of neglecting the natural resources. Of greater importance is the fact that they are

moving to restore the resources and to use them more wisely than has been done in past years.

Future land use patterns seem to be well defined by present trends. It should be kept in mind, however that as in past years changing technologies may result in changing land use patterns. The pressure of a rapidly increasing population may force the return of much formerly cultivated land to agriculture. It would appear, however, that with the present concern with resource conservation any land so returned would be cultivated more carefully than it had been in the past.

It is most probable that the future rural economy will be more diversified than formerly. Agriculture should not decrease much below its present level. Forest industries should increase in importance as the trees now being planted reach maturity. The grazing of beef cattle is likely to get increasing attention, and dairying may become even more prominent than it now is.

The surface mining of coal is most certain to decline as the better deposits are mined, and the area faces a future problem of finding employment for those without jobs as a result of coal depletion. The most logical solution to this problem is industrial expansion. The attraction of industry is a highly competitive activity as other communities also attempt to attract industry. Flood control and an improved water supply have greatly improved the industrial outlook, but thus far most expansion has been in the Tuscarawas lowland. Harrison and Carroll Counties have not benefited from direct expansion--only from county residents being employed in outside industrial centers.

It is the writer's opinion that the area is not exploiting some resources that would (1) aid in attracting industry and (2) provide ex-

panded opportunities in fields other than industrial . What are these resources and how can they be best utilized?

The tri-county area has two outstanding features for attracting industry: its scenic beauty and its recreational opportunities. The rolling character of the landscape, the extensive areas of woods, the green pasture lands, the numerous lakes and streams combine to provide a setting for pleasant living. The Muskingum lakes and other water bodies are recognized recreation attractions--and no part of the tri-county area is more than an hour's drive from water recreation of some kind. In this day of employee-relations-conscious-industry, the well-being of employees can be the factor determining the final location of a new plant or the expansion of an old one.[1] The tri-county area has an exceptionally high rating as a preferred place in which to live.

The writer believes that the best opportunity for expanding the economic base is in the development of the area as a vacationland. The area is aesthetically attractive; it has important historical features; it has much land that could be better utilized for vacation activities; and it is accessible to millions within less than a half-day's drive. The scenic character has been discussed previously--the others will be noted briefly.

The tri-county area, especially Tuscarawas County, has many important historical features. The first white settlements in Ohio were in the Tuscarawas Valley. A restored village of the Christian Indians is at Gnadenhutten and a cemetery containing the bodies of those massa-

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[1]When the number of possible sites for a new plant location has been narrowed to five or six, the final decision is often made on the basis of "In which of these places would our key personnel (those moved to the new plant site to supervise the plant operation) prefer to live?"

cred in 1782.[1] Facilities of the communal society of Zoar and features of the old Ohio Canal are also present in Tuscarawas County. Harrison County has the birthplace of General George Custer at New Rumley,[2] and Carroll County has the "Fighting" McCooks of Civil War fame. Few of these features are well known within the area, and almost none are noted beyond the limits of the three counties.

The potential for water and other types of recreation has not been fully developed. There are many deep, narrow valleys ideally situated for reservoir sites. Little good land would be destroyed, and serving visitors would most certainly provide a larger income than is now obtained from the farmed land. A considerable portion of the less suitable woodland could be placed in county or state forests and provide additional camping and picnicing facilities. An over-all plan for the acquisition and development of such a program is necessary. Hills, woods, water and vacationers go hand in hand. The tri-county area has the potential for the first three, but from where will the visitors come?

Tuscarawas, Harrison and Carroll Counties are away from the congestion of major industrial centers and yet near enough to be easily reached by millions. Cleveland, Pittsburgh, Wheeling, Akron, Canton and Columbus are within one hundred miles. The Ohio Valley, not far from Harrison County, is booming; and many potential visitors will be living there soon. All these people are potential vacationers or "week-end tourists." No other Ohio area is better located with regards to these

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[1]The author, while doing field work in Tuscarawas County, "discovered" this site. The tourist season was at its peak, but few visitors were present. Busy U. S. Route 250 passes only a short distance away, and yet few travelers know that an important historical site is nearby.

[2]Many prominent state and national figures have been born in Cadiz, "the biggest little town in the world." Cadiz can also claim movie star Clark Gable.

population centers. Access highways are adequate but should be improved. This is especially true of the routes from Akron and Cleveland.

The tri-county area has the hills; the woods are being added; the water potential is present; and the users are nearby. Planning and development are needed. Then Ohioans must be "sold" on the idea that Ohio too is a vacation spot. An area that was almost destroyed is on its way back. Mansfield's "Delaware paradise" can become an Ohio "paradise," but that time has not yet come. There is still much work to be done.

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