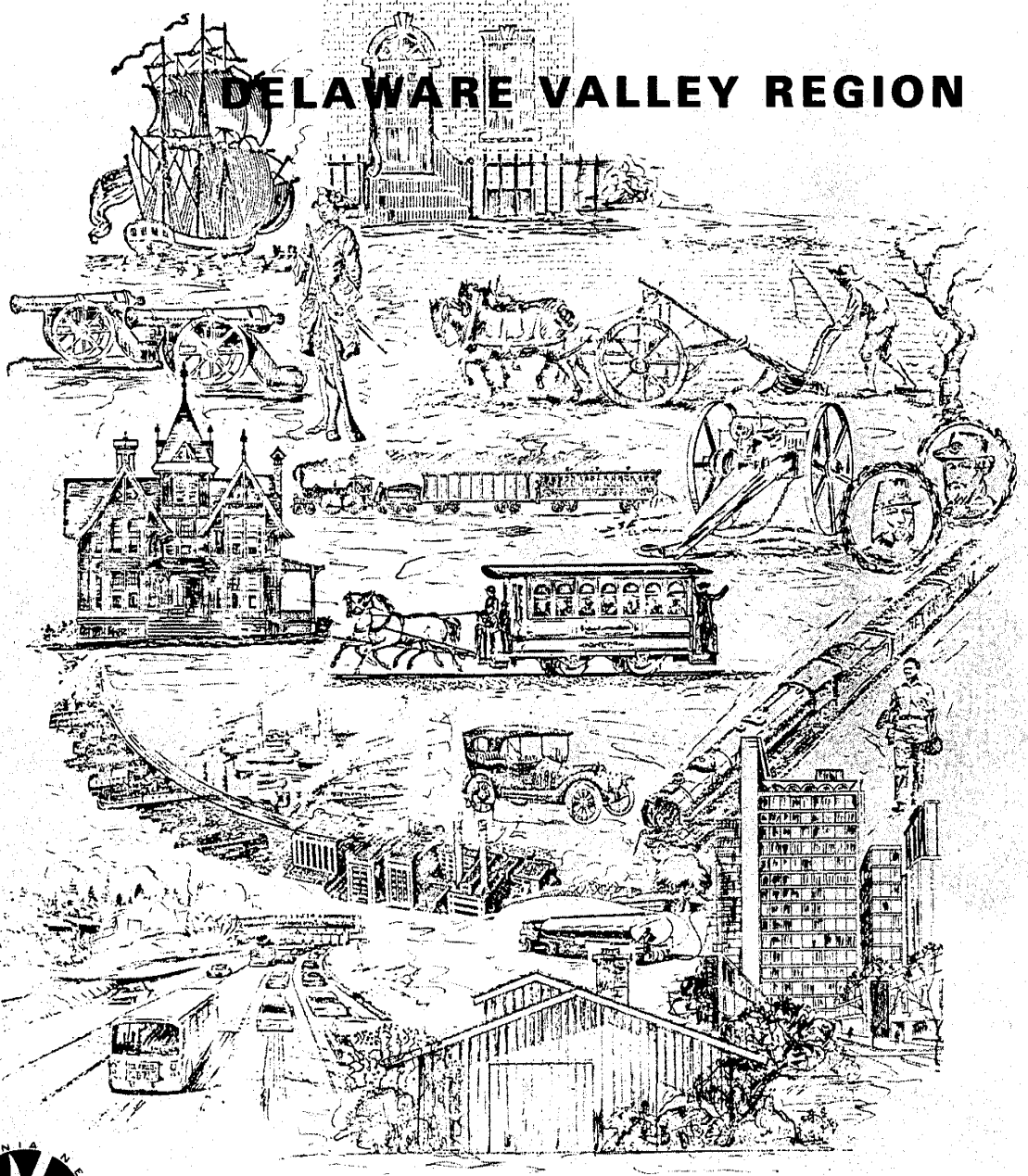
YEAR 2000 REPORT

HISTORY of DEVELOPMENT in the DELAWARE VALLEY REGION



Delaware Valley Regional Planning Commission
YEAR 2000 REPORT NO. 1

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HISTORY of DEVELOPMENT in the DELAWARE VALLEY REGION

Joseph Oberman and Stephen Kozakowski

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This study traces factors which shaped development patterns in the region over the years from the beginning of European settlement to 1975. This span of time is segmented into six significant periods: prior to 1700, 1700 to 1800, 1800 to 1860, 1860 to 1900, 1900 to 1930, and 1930 to 1975. While emphasis is placed on the impact of technological innovations, especially transportation, other shaping forces such as social values and government policy are not overlooked. The final chapter presents an analysis of the future based on insight gained from the study of the forces which lead to the present state of the region. This report includes a series of seven maps illustrating the evolution of the region's development pattern. Also included are numerous tables presenting statistical support to the text.

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PREFACE

This history of development of the Delaware Valley region was prepared as one of the initial elements of the DVRPC's Year 2000 planning programs. It traces the social and economic trends which shaped development patterns in the region over the years. It especially notes the impacts that the automobile has had on life in the region over the last fifty years. It suggests that the future is almost certain to be very different from the recent past.

This is largely an institutional analysis of the past and suggestions concerning our prospects for the future. More definitive statements of the future we will be planning for will come from (1) policy decisions by the region's citizens and policy makers as to the characteristics of the future region we will collectively plan for and (2) analysis of data with the use of computer models to examine the implications of pursuing alternative policies or goals for regional development in the Delaware Valley.

ACKNOWLEDGEMENTS

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CHAPTER I

FROM THE BEGINNING TO 1700

Early Colonization

The first European incursions into the Delaware Bay area were occasioned by an economic incentive--a rich beaver pelt trade with the Indians. Henry Hudson, an Englishman in the employ of the Dutch East India Company, first visited the Bay in 1609. The next year, the Delaware River was named by Captain Samuel Argall in honor of Lord de la Warr, then governor of Virginia. The Schuylkill River was discovered by a Dutchman, Captain Cornelius Hendricksen, on the ship Onrust, in 1616. By 1634, an English captain, Thomas Yong, sailed to the head of navigability on the Delaware, to what is now known as the Falls at Trenton. This confirmed that the River was a major water route penetrating inland, open to ships for 135 miles from the sea.

The 30-fold profit to be made by those acting as middlemen between the Indians and European consumers was why the first European settlements were established essentially as trading posts.

The Dutch were the first to attempt colonization, in 1623 and again in 1631, but these met with failure. Shortly after, in 1638, the Swedes, under Peter Minuit, built the first permanent colony in the Delaware Valley area, Fort Christian, at present-day Wilmington.

Dutch, Swedish, and English interests in the Delaware were based on the twin pursuits of trade with the Indians and the colonization of an area of vast natural resources.

The English established a trading post near the present town of Salem, New Jersey in 1641, but were quickly absorbed by the Swedes. A second English Colony at the mouth of the Schuylkill River was expelled in 1642, by the Swedes and Dutch. The governor of the Swedish colony on the Delaware, John Printz, erected Fort New Gothenburg on Tinicum Island and took advantage of nearby Cobbs Creek to build a grist mill. A second fort was established across the river from Tinicum Island, thereby closing the river to the Dutch. The success of trading ventures was indicated by Printz's report for 1644, which noted the shipment of 2,000 pieces of beaver skins and 20,000 pounds of tobacco. The new fashion of Europe, which soon equated the word "beaver" with a hat made from the creature's fur, insured a steady demand for pelts.

The Delaware River became the main avenue for intercourse between settlements and with the Old World. Rather than move inland and clear forests for farming, the Swedes extensively diked and drained marshes along the River. Relative calm prevailed in the region until 1653, when Joh Risingh, successor to John Printz, seized the two-year old Dutch settlement of Fort Casimir, at what is now New Castle, Delaware. Seizure of the Dutch post was executed in spite of orders to maintain friendly relations. In 1655, Peter Stuyvesant, Dutch governor, sailed from New Amsterdam with seven ships and 600 men and swept the Swedes from control in the Delaware Valley. This new control by the Dutch was to be short-lived.

The Arrival of the English

Charles II of England granted his brother James, Duke of York, rights to all of present-day New York and New Jersey. In 1664, Sir Richard Nicolls enforced this claim for the Duke of York by taking New Amsterdam with four men-of-war and 400 men. From this newly Anglicized settlement ships and men were dispatched south to the Delaware River where Dutch forces capitulated without bloodshed. Thus, the Dutch who expelled the Swedes in 1655 were expelled by the English in 1664.

The English increased their hold on the region through the colonization of the valley. After a brief return of the Dutch in 1673, the English established sizeable settlements at Salem, Stacey's Mills (Trenton) and Burlington. Burlington, for example, was established by Quakers arriving on the ship Kent in 1677 and quickly became a shipping and commercial center of West Jersey. In the establishment of these and other settlements in the Region the English sought three immediate goals:

1) The consolidation of power by numerically increasing the English presence. (The colonies under their control were mostly Dutch and Swedish.)

2) The removal of religious dissenters from England.

3) The opening up of a resource-rich land to furnish England with raw materials and a market for products.

By 1681, after 17 years of English control, estimates from rare records show the population of the region numbered about 500 people--mostly Swedes, Hollanders, Finns, and English. The year 1681 marks the beginning of a dramatic change.

William Penn

That year William Penn received from Charles II the province of Pennsylvania, named at the insistence of the king to honor Penn's

father. It was granted in consideration for a debt of £16,000 owed Penn's father by the king which was contracted when the former was admiral of the royal navy. Bounded on the east by the Delaware River, on the north by the forty-third parallel, on the west by a line five degrees longitude west of the Delaware and on the south by the fortieth parallel, it was the largest most valuable estate in America ever granted to a single individual by the crown. In the same year, Captain William Markham, acting as the Quaker William Penn's agent, selected the site for Penn's great adventure in religious freedom--Philadelphia. Penn arrived in 1682, to observe and direct his experiment. Within a year 30 ships brought thousands of English and Welsh Quakers to the new city.

The site for Philadelphia was selected for its high ground and deep river conditions, the latter eliminating the need for lighterage between ship and shore. Located between two rivers, the city was laid out in a grid, with the land here and in the surrounding counties being sold to settlers rather than speculators.

Penn advanced his personal funds with the object of establishing a nucleus of settlements that would attract future colonists and thus increase the value of lands offered for general sale. All lands sold or given away were subject to a quit-rent or yearly payment which provided him with a permanent income. He also retained for himself a tenth of all his surveyed lands as personal estate to be worked for profit by servants and tenants.

He said about 1698 that he had invested £30,000 in Pennsylvania, in over twelve years to create viable settlements that would attract others. He complained that he had not received a sixpense profit out of the entire effort. His expenditures strained his credit with the consequence of being thrown into debtor's prison and eventually forced to mortgage the province and assign to his creditors the revenues he derived from quit-rents, land sales, and other Pennsylvania sources.

Much later Penn attributed the ultimate success and stability of his province to the fact that it was begun by men of estates who followed his lead. He had enlisted many wealthy Quaker associates, each of whom bought for £100, a tract of 5000 acres which included a lot of 100 acres in Philadelphia. Nearly half the land sold by Penn in 1682 was purchased by about 40 of these wealthy associates who expected to people their estates with tenants. Aside from this approach, Penn also sold or gave away other lands outright. He sold land to a company of German immigrants headed by Daniel Pastorius at £300 for 15,000 acres. A list of original purchasers shows 307 families procured tracts ranging from 250 to 1,000 acres.

Also of major importance to the strength of the society was the coming of individuals and groups of colonists from Rhode Island, Massachusetts Bay, New York, the Chesapeake colonies, and the West

Indies--Barbados, Antiqua, and Jamaica. These colonists, most of them Quakers, provided Pennsylvania and West New Jersey with a select personnel possessed of wide colonial experience, considerable wealth, useful intercolonial connections, and political insight that enabled them to figure prominently in the creating of an early wealthy class.

Land in small or large parcels was sought by the newcomers, who soon located themselves up and down the Delaware, Schuylkill, Appoquinimink, Christian, Rancocas, and other streams of the six counties of Sussex, Kent, New Castle, Chester, Philadelphia, and Bucks, and in West New Jersey up to the falls. Farms appeared as much as fifteen to twenty miles inland from the west bank of the Delaware, to Plymouth Meeting for example.

Throughout the early history of the Valley, locations of towns and farms were to be determined by the natural opportunities offered by high ground, good soil, waterways, and Indian trails.

The Delaware Valley in 1700

By 1700, just 18 years after Penn's arrival, Philadelphia's population was approaching 10,000 people and the surrounding counties held an additional 10,000. Thus it was that within 90 years from the date of its naming the Delaware River saw local Indian canoes and the occasional European ship give way to a torrent of shipping activity. On its banks, subsistence-level trading posts suddenly became centers of trade and supply for farmers pushing into the hinterland. The city of Philadelphia sprang up nearly overnight to become the hub of commerce, social life, and government for the region. Colonists came to establish homes, not simply to trade for furs. The commercial needs of a rapidly growing region demanded skilled craftsmen, coopers, wainwrights, blacksmights, shipwrights, carpenters, millers, and markets for the sale or exchange of goods. By 1693, the first postal system (private) was established to connect the several settlements along this river highway of commerce and communication. Ten years before, the first sea-going vessel built in Pennsylvania, the Amity, was constructed in Philadelphia for the Free Society of Traders. Within this decade, glass works, papermills, and saw mills were established. And in 1692, 40 pounds of iron were produced on an experimental basis.

As can be seen in Figure 1, a map of Development and Transportation Patterns in 1700, by the turn of the century Philadelphia was the hub of the region's developing communication and settlement network. The rivers were the main avenues in Eastern Pennsylvania and West Jersey. Communications by water were improved as small wharves were built at suitable landing places up the many creeks where sloops and wood boats, and a variety of other small craft could take in cargoes of country produce and firewood destined for Philadelphia. To accommodate the rivermen engaged in this essential activity, boat and shipbuilding yards

FIGURE 1

DEVELOPMENT AND TRANSPORTATION PATTERNS 1700

INFORMATION DATE: 1698 - 1720

LEGEND

- Specific extent of Development, Philadelphia
- General Location of Settlements
- Roads

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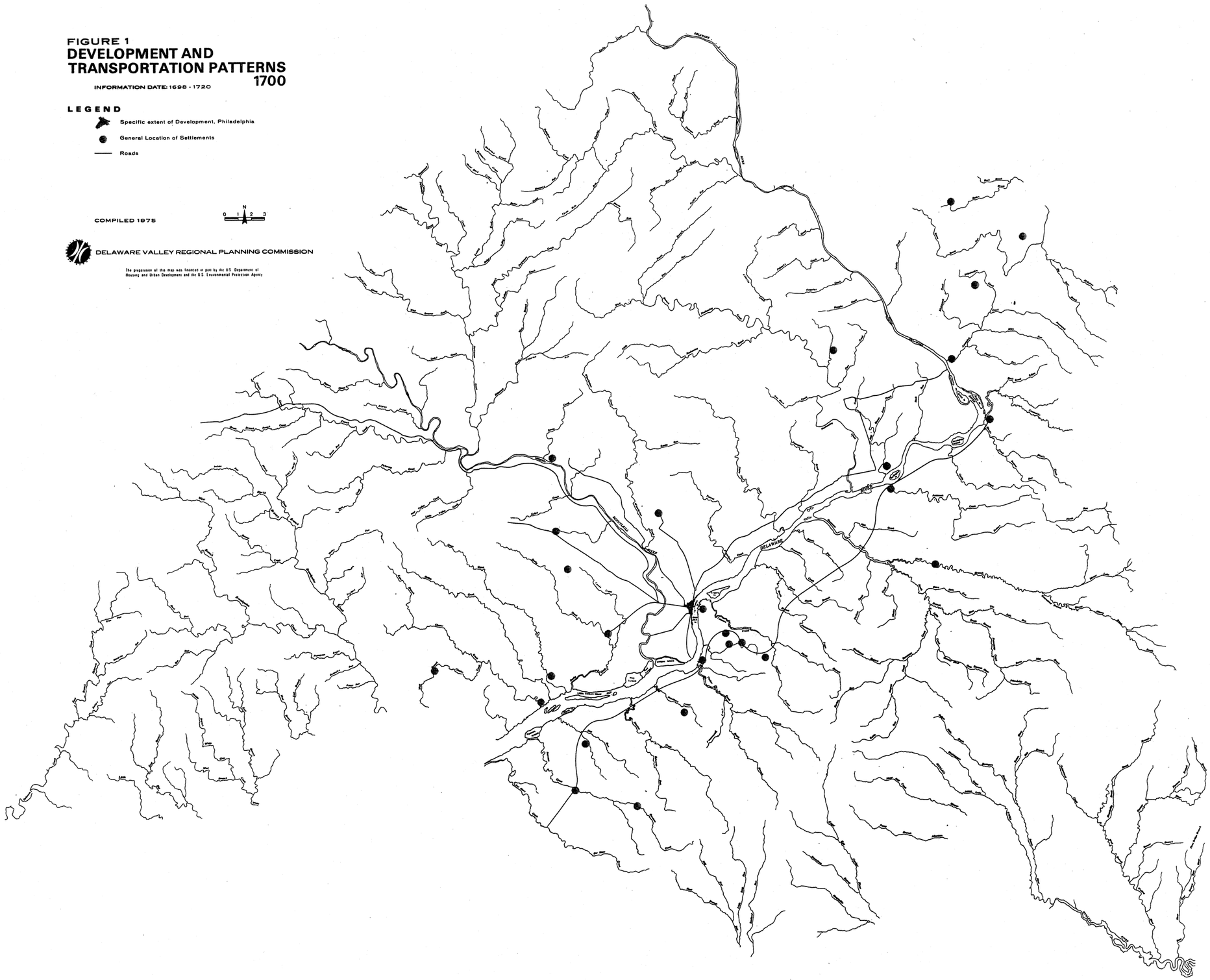
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency



turned out a mounting number of wherries, shallops, sloops, and large ships fabricated chiefly from oak and other trees growing nearby.

Ferry links were established with Philadelphia across the Delaware and Schuylkill Rivers so that "traveling for man and beast may be more easy, safe, and certain." They were also instituted to eliminate the difficulties of crossing such wide streams as the Christina, Rancocas, and Neshaminy, as well as the Delaware and Schuylkill Rivers.

As people moved inland away from navigable streams and farms appeared throughout the valley, internal improvements were promptly made. To enable the farmers to carry their produce and drive stock to Burlington, Philadelphia, or New Castle, or to the mills and wharves nearby, cart roads fanned out from such centers. Roads to Trenton and Germantown were established. "Overseers of the Highways," set up by the county courts, or the justices acting themselves, became responsible for their upkeep and improvement. "London Bridge" and the "Yorkshire Briade" at Burlington were a part of this program, as was the structure spanning Crum or Poquessing Creek for the "King's Road," which ultimately ran up the west bank from New Castle to the falls of the Delaware. This road connected the settlements on the east side of the Delaware and linked them with Philadelphia via ferryboat at Cooper's Ferry (Camden.)

By 1700 established Delaware Valley farmers were exporting the produce from their fields, pastures, and orchards to the West Indies, New England, New York, and the Chesapeake colonies. It was announced that very year, the region had become "the Grainary of America."

The rapid commercial development was in part the result of security arising from peaceful relations with the Iroquois Confederacy, the British fleet to protect the coast, and the English colony of New York to separate the region from New France. Combined with the liberal frame of laws set up by Penn, prosperity was a consequence.

CHAPTER II

FROM 1700 TO 1800 : THE SEED OF A NATION

Philadelphia's Ascendency

During the 18th century, America came of economic and political age in the world. The countryside had been rapidly turned to civilization's uses, and new arrivals to the colonies were pushing deeper into the continent. Agriculture, trade, and commerce, vital elements of the economy, were generating an ever improving and expanding communication network for moving goods and materials to and from the hinterlands. In turn this network was used to extend the line of habitation farther and farther west.

The economic success of the colonies eventually came into conflict with the economic and political controls imposed by England. The restrictions on colonial trade and commerce, and on the development of manufactures were relieved by the Revolution, freeing Americans to determine their own political and economic destiny.

Between 1681 and 1760, settlers had occupied most of southeastern Pennsylvania and western New Jersey, especially along the Delaware River. As the premiere city of the region, the settlement pattern of Philadelphia combined two opposing social tendencies. The clustering of marine trades and merchants next to the Delaware suggested the beginnings of the specialized industrial quarters then characteristic of European cities. On the other hand, the rummage of classes and occupations found in many Philadelphia blocks continued the old tradition of mixed work and residence characteristic of English country towns.

Philadelphia was the center for social, civil and economic activities. It was by far the most important entry point for the mid-Atlantic region, serving throughout the colonial period as the starting point for many of the immigrants and supply trains moving to the interior. The movement to the interior took advantage of the transportation and settlement patterns which had been developed to extract and bring out agricultural products and other exportable resources. Philadelphia's role of merging foreign commerce with internal trade hastened the development of the excellent agricultural soils in the valleys to the west, in present day Delaware and West Jersey.

Because of its early development and rapid growth, Philadelphia

was able to capture the exchange and supply functions of the entire region. This capability was overwhelming in many respects and thus inhibited the development of other centers within a radius of approximately 30 miles--or about a day's ride. A few towns were planned and developed, but for most of the century, for reasons given below, their growth was slow. Beyond the Delaware Valley, other major centers were established at Lancaster and elsewhere to serve their respective regions. These centers did grow because they were sufficiently distant from Philadelphia, but even they could not rival the city.

Settlement Patterns in the Region

When planning his American experiment, Penn had intended that the townships around Philadelphia be developed in an orderly fashion, with the nearby lands being developed first. Part of Penn's scheme included the development of agricultural hamlets in each township where everyone was to enjoy the fruits of urban living. Farmlands were to surround the hamlets and the farmers were to commute out to them. This intent was realized in the early stages of settlement.

But the Quakers themselves soon established another pattern for the region which was to be followed by nearly all subsequent rural settlers. Rugged individualism was expressed from the start through the establishment of farmsteads with homes located in the midst of the fields. The hamlets were never developed as envisioned.

Further, as other ethnic immigrant groups arrived, they sought out lands peculiarly suited to their needs which were also cheaper and more easily acquired. These deviations led to breakdown in the orderly development Penn has envisioned . The result was that the agricultural lands farther into the surrounding counties were settled first. This tendency combined with the reluctance of people seeking a rural way of life to submit themselves to the constraints of communal living, with some exceptions, hampered small town development.

The patterns which developed, as shown on the map of development in 1800, were generally dictated by terrain and natural resources. Settlements were generally established in response to circumstance rather than preconceived surveyed patterns. Farmsteads were established in relation to location of roads, water supply, topography, and the quality of the soil.

To be sure, there were "successful towns" in locations with optimal accessibility for buyers and sellers such as Chester, Burlington and Germantown. Success bred further success; towns which could provide more and more activities to serve the regional population were more likely to grow, thereby reinforcing themselves.

The size of places during this pre-industrial era was proportional

to their economic activity. Larger, central places were on major roads or navigable streams and were able to serve a larger area than were small places which lacked a particular locational asset. Smaller places were storage, transhipment, or minor distribution points. There were a number of hamlets comprised of a few homes around a single activity such as a tavern or mill.

Towns were centers for trade and commerce but not for manufacturing. Mills, iron works, and glass works required nearby farms, forests, or sand to supply raw materials. As a consequence, towns were centers of crafts and trade. On a micro-scale, the relationship of Philadelphia to the region was somewhat similar to that of England to the colonies. Philadelphia businessmen controlled the movement of goods in and out of the region and benefited from the productivity of the region. In turn, Philadelphia found a market for its special services in the hinterland.

Development Was Erratic Throughout The Century

The nature of Philadelphia's trade with England and elsewhere nurtured it as a strong central place. By contrast, in Virginia, the reliance on trade management from London or Glasgow, and the lack of variety in exports delayed development of any major port. Tobacco and other southern commodities were simply moved directly to ships in various harbors. In the Delaware Valley, intermediate handling was required to collect milled wheat, lumber, horses, and other diverse exports. This gave rise to a level of sophistication in finance and trade which has been the foundation of all great cities in the modern era. The ability to organize commerce from this side of the Atlantic also allowed the region to remain less tightly bound to the British commercial structure. All this added up to a city enjoying identity, autonomy and diversity resting on a very strong economic foundation.

As stated previously, in the years of settlement and permanent establishment between 1682 and 1700, 10,000 persons concentrated in Penn's city and another 10,000 in the surrounding counties. This was followed by a period from 1700-1730 in which this rapid growth was not maintained. Philadelphia during this time was clearly capable of handling provincial as well as many local needs, thus discouraging would-be town developers.

Between 1730 and 1760 considerable expansion occurred. The rate of land occupation increased with a growth in population. In Pennsylvania, nearly 30% of the towns founded in the region during the 18th century were established in this period. The peak came at the end of this period in the decade from 1756-65, when 29 towns were founded.* After this

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*Lemon, James, The Best Poor Man's Country, p. 123.

flurry, only a few new towns were founded during the remainder of the century.

This wave of urbanization occurred in response to improved economic conditions after 1725, and the new county towns in turn provided the mechanisms for growth by improving trade connections within the area. Development was also stimulated by an increased confidence of British creditors in the area, by the larger and more rapid growth of population permitting larger bulk shipments of imported goods, by new demands in Ireland for flaxseed, by iron exports to England after 1750, and, on the production side by expanded grain acreages for the production of crops on the longer established farms. Despite fluctuations, exports of wheat, flour and capital between 1731 and the middle 1760's, the value of imports increased even more dramatically. Although wars and depressions slowed the movement of goods, from 1740 onward per capita imports were usually doubled and sometimes tripled those of the years around 1730.*

After about 1760 population growth was slower than before. The decreased rate of growth was paralleled by slower changes in other aspects of regional life.

Britain became a customer for wheat, and in 1771 and 1772 the colonial period high for imports and exports was reached. But, the per capita yearly value of imports actually decreased.** After about 1760, the ebullient days of the earlier period were replaced by a leveling off and an actual weakening of the economy. Doubts were beginning to enter the colonists' minds about their role and place in the Atlantic trading system. Economic uncertainties in the years before 1775 contributed to the unrest which led to the Revolutionary War. During the War, both internal and external markets and supplies were radically altered, disrupted or actually stifled.

The disruption of war was more readily weathered by farmers, who continued to produce a variety of commodities, and who produced many of the goods they consumed. Merchants and others who relied on the import-export trade suffered because of their inability to obtain goods. The disruption of war, the alternation of markets, and the uncertain internal situation under the Articles of Confederation continued to affect the American economy until after 1789. But by the last decade of the century, the economy had revived and exports had increased. Philadelphia continued to grow, but Baltimore and New York were now booming as competitors.

Neither the pattern of land use nor the basis of the economy were seriously changed by the Revolution. Wheat continued to be the major

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*Lemon, op cit., p. 223
**Ibid, p. 224

crop as European markets expanded; and ships from Philadelphia continued to play the Atlantic and trade up and down the coast.

Transportation in the 18th Century

Throughout the 18th century waterways continued to be the most important avenue for moving goods. For most of the 17th century, the sparse population and dense woods precluded road building. However, in 1686, not long after the establishment of Philadelphia, a road was constructed out Front Street to Bristol and Trenton. In 1697, several other roads such as the Gray's Ferry, Darby, York, and one toward Lancaster were authorized. These were 50 foot wide dirt roads and also included King's Road to Morrisville and thence to New York, Queen's Road (1706) to Chester, Old York Road (1711) another from Philadelphia through Easton to New York, Egypt Road to Phoenixville, and the Old Conestoga Road (1721) to Lancaster. The King's Highway also connected the West Jersey settlements up and down the River, as stated in the previous chapter.

Like spokes from the hub of a wheel, roads spread out from Philadelphia north, west, south, and east. Besides those already mentioned, early roads were opened to Whitemarsh, North Wales, and Skippack, and up the Schuylkill Valley toward Norristown. In 1722 a road was opened to Doylestown and Easton.

Dirt roads were adequate to handle the limited overland trade in the beginning, but as more and more wagons became employed these roads proved inadequate. Snow covered in winter, rutted and muddy in spring, and alternately dusty or muddy in summer, these roads were a far cry from our modern highways.

While waterways for a long time continued to be the main method of moving goods from the outlying areas to the towns along the Delaware, the reverse trip, carrying goods inland, required the use of overland routes. Indian trails were frequently used, being widened into bridle paths or roads, as use demanded. Until after the Revolution few roads had bridges across streams or rivers. Where they could not be forded ferries were used.

The delay in effective road construction may be attributed to several causes. Waterways were available as an alternative. It was costly to build in areas which were heavily wooded and sparsely settled. Wheeled vehicles were not abundant, especially earlier in the century. But overland communication improved, and by mid-century a two day stage trip connected Philadelphia and New York.

Figure 2 shows the regional development and transportation patterns as of 1800. As the region expanded, and population began to occupy lands lacking access to good water routes, the demand for roads increased.

FIGURE 2
DEVELOPMENT AND TRANSPORTATION PATTERNS 1800

INFORMATION DATE: 1792 - 1809

LEGEND

- Developed Area
- Roads
- Grist Mills
- Iron Works
- Saw Mills
- Glass Works

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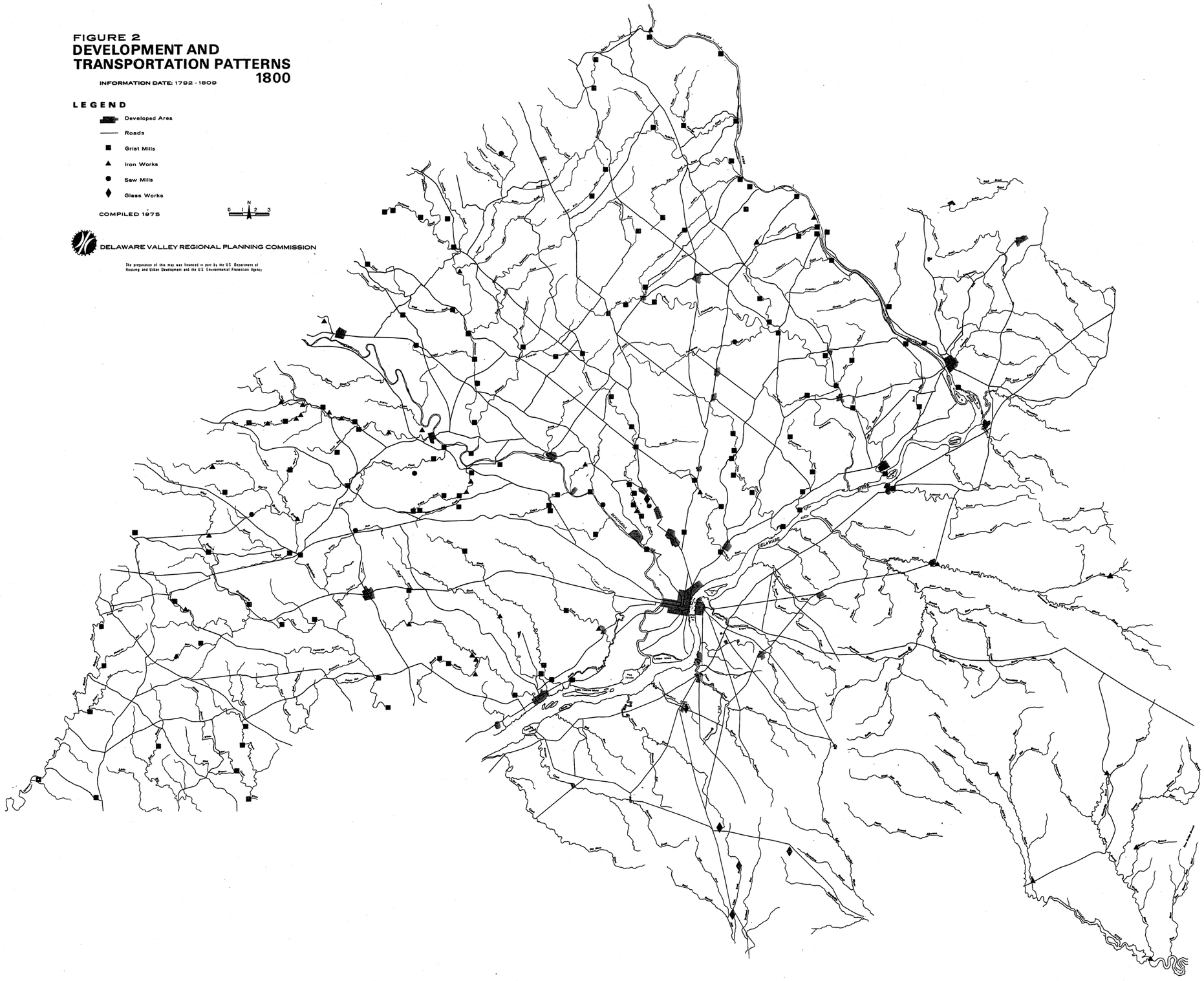
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency



The original road to Lancaster was improved with crushed stone and made into a turnpike in the mid-1790's. This, the first turnpike in the U.S., commenced a "Turnpike Era" in which private companies built and improved toll roads, capitalizing on the demand for better overland routes. The first suspension bridge in America was built across the Schuylkill in 1798. Private enterprise also entered into the waterborne aspect of transportation by constructing canals, dating from the Conewago Canal in 1797.

Agricultural Settlement and Marketing Channels

Farming remained the principal occupation in the region throughout its pre-industrial history. The feudal-peasant system of Europe had dissolved when America was settled, and immigrants, no doubt in partial reaction to this, established family-centered farms in the New World. Before mechanization, extensive capital was not required for agriculture. Land was exceptionally cheap, especially during initial settlement, and later in the western counties. The major investment was labor. As more people settled in the region, farms were divided. Records reveal that in 1700, farms in Philadelphia, Chester, and Bucks Counties averaged 600 acres in size; by 1765 they averaged 135 acres.

Relatively few farms in the Delaware Valley were operated by tenants prior to 1800. The purchase price of land was fairly nominal when compared to land rents in Europe. Also, land at some distance from densely settled areas could be squatted upon with impunity.

As a consequence of the fairly inexpensive price of land, free labor was scarce and dear. Indentured labor was commonly used as were slaves. But because of Quaker disapproval this was less prominent. Most of the labor came from the family itself, with neighborly assistance for major tasks such as clearing land or erecting buildings. Farms tended to be self-sufficient as practical, producing many of their own goods for domestic and farm use.

From its inception until the late 18th century, agriculture in the region centered around grain for domestic use and export, and produce for urban markets. Flax and hemp were also important export commodities. Wheat was the primary commodity of the region, and always enjoyed a demand from markets in Europe.

Early agricultural practices did not include crop rotation. As a result, by the time of the Revolution farm land surrounding Philadelphia, which had at first yielded 20 and 30 bushels per acre, was producing 6 to 8 bushels per acre. This depletion of the soil abetted the spread of agriculture to new, fresh land to the west.

Late in the century soil-conserving crop rotation and the use of lime and manure were coming into widespread use. Corn, which as one of

the rotation crops, began to rival wheat in importance by 1800.

Fruit trees enjoyed extensive planting because their fruit could be reduced to "comfortable drinks." Apples were mostly used for cider, though they were also eaten fresh, dried, stored for winter, and fed to livestock. The settlers enjoyed a variety of liquors, both fermented and distilled.

Serious efforts were made by William Penn to establish vineyards at the present day site of the Philadelphia Museum of Art. And a company formed by several founding fathers of the republic including Jefferson, Franklin and Washington planted European root stock in the vicinity of West Conshohocken. Both efforts failed due to the inability of European varieties to withstand severe winters and plant diseases of the New World.

By the late 18th century large commercial orchards existed for cider making. Prior to mid-century, cider making was a home activity, but mills were introduced after this time. It was not until the 19th century that fruit became popular primarily as an edible rather than drinkable commodity.

Until after the Revolution, livestock was only an incidental element of agriculture. This was especially true of pioneering farms. The abundance of game did not foster a livestock industry. These animals were left to forage in the forest or were fed hay from marshes and swamps. As agriculture matured in the region, pastures were developed and livestock became more important.

The cattle of early colonial days were small, productive beasts valued more for their meat and hides than for their milk. Oxen were the primary motive power on the farm. After about 1790, cattle breeding improved. Various strains were bred which were superior in one aspect or another. These replaced triple purpose cattle - used for meat, milk and motive power.

Transportation was so difficult that only those who lived on the very fringes of Philadelphia were able to supply their produce directly to local merchants. Penn was interested in facilitating ways of selling the products of the labor of his settlers and in 1693 the Philadelphia market was established as part of the City's Charter as a means of providing farmers with an outlet for sales of produce directly to city dwellers. Marketing took place 2 days a week, Wednesday and Saturday. By 1698, similar markets existed at Germantown and in Chester by 1700. A permanent market house was erected for Philadelphia in 1710 at Second & High Streets and later enlarged. The system flourished throughout the 18th century. The same method of encouraging local trade was extended by the Provincial authorities into the interiors and markets were founded in all the early towns such as Lancaster, Reading, and York. The great market fair inaugurated in Philadelphia in 1686 was

held twice yearly in November and May for three days. It was copied after the great medieval fairs of Europe and the custom lasted for nearly a century.

The Country Merchant and the Growth of Small Towns

The country merchant played a major role in the economic development of outlying areas of the region. As more land was cleared and the soil made more productive, a gradual improvement in the scale of living was possible. Surplus products appeared from Europe and the West Indies which had origin in Philadelphia's foreign commerce. The merchant exchanged a very wide assortment of goods for practically everything produced or offered for sale by his rural customers. When he had accumulated a quantity of farm products, he sent them to Philadelphia where they were sold for the coastwise trade or for export and the proceeds were used to restock his store. Well into the 19th century the storekeeper was a banker as well as a middleman for the farmer. He extended credit for goods purchased and helped to finance the farmers of the community. Any yard money he received was either hidden away or loaned out on farm mortgages. Marketing through the storekeeper, while convenient for the farmer, was inefficient. Since the storekeeper took middleman's risks, which were heavy then and shouldered the high cost of transportation, he paid as low a price as possible on farm commodities and charged high prices for his goods, and so managed a nice profit.

With the addition of other small stores and shops of artisans the basis for a town was established. Here again the local merchant might finance the purchase of land and construction of buildings.

Natural Resource Development and Manufacturing

The development of grist and saw mills ran parallel with the growth of the region's small towns but were not necessarily situated there. Almost from the beginning of settlement in the Delaware Valley, they were set up along creeks with sufficient water power to operate their milling mechanisms. Grist mills serving local farms dotted the countryside, preparing wheat for local and export markets. By 1760, over 80 of them were in operation in Philadelphia County alone. (This included modern Montgomery County.)

Saw mills processed the timber of the region, providing building materials and materials for the Atlantic trade. Shipbuilding was established early in the region, with the building, in 1683, of the Amity. The shipbuilding industry flourished, with yards at Philadelphia, Salem, Burlington, and Wilmington being noted for the number and quality of their craft well before the Revolution.

The iron industry in the region was based on the numerous high

grade deposits found and developed in the farther reaches of the region. Their hugh demand for wood as fuel precluded their being located in the densely settled areas of the Delaware Valley.

In 1716 the first iron works was established in the region, located on Manatawny Creek above Pottstown in Berks County. The iron works at Coventry northwest of Phoenixville began the next year. In 1720, the first blast furnace in Pennsylvania, Colebrookdale Furnace, was built on Ironstone Creek in Berks County. Durham Creek, in Bucks County, was the site for another furnace in 1727. The famous iron works village of Batsto was set up on the Mullica River in Burlington County in 1766. From these furnaces and forges came the implements needed by farmers and city dwellers - anvils, pots, stove plates, and chains. These furnaces and forges, scattered over the countryside, provided invaluable support to the Revolutionary Army in casting cannon balls and making items such as camp kettles. At the close of the century, the metal industry was still flourishing providing such finished products as nails, bolts, and wire.

Other economic foundations were being laid. The glass industry which to this day is a major element in the economic base of South Jersey, was beginning to boom in Gloucester County, and in 1785, the spinning jenny was introduced in Philadelphia, marking the beginning of a large textile industry.

By 1790 the population in the city of Philadelphia was engaged in the manufacture of flour, paper, textiles, leather goods, metal products, and other goods. They were home-based activities taking place in the front room of the house facing out on the street. Even metal product fabrication rarely occupied more than two structures. As the city's population grew this style and pattern would multiply itself several hundred times. The end of the 18th century found 30% of the population living in so-called urban areas--a portent of things to come.

CHAPTER III

FROM 1800 TO 1860 : THE INDUSTRIAL REVOLUTION BEGINS

The State of the Region in 1860

The 60-year span of time from 1800 to 1860 is a remarkable period. A resident of Philadelphia going to sleep in 1800 and waking up in 1860 on the eve of the Civil War would have been thoroughly startled by the physical changes surrounding him.

Successive waves of immigration had cast 5.25 million persons into the United States. In 1800 only 6% of the new nation's total population lived away from the Atlantic slope west of the Allegheny Mountains. By 1860 fully half of the nation's population had moved beyond the Appalachian mountain barrier.

From an essentially agrarian society with only 7% of its population living in urban places in 1800, the nation as a whole in a flood of change had created something new in the world and America, the large city. The Census of Population for 1860 showed 25 percent living in urban places. Philadelphia with its 565,000 population was one of nine U. S. cities in 1860 inhabited by over 100,000 persons. Regionwide the population total had reached 907,000.

There was no question that Philadelphia had dominated the nation in commerce, politics, arts, science etc. throughout the 18th and early part of the 19th century. But with naturally increasing population and ever-present waves of immigration the spread westward led to a succession of events which drastically decreased Philadelphia's influence and importance.

It was no longer the capital of the United States or the State of Pennsylvania. As a port it was in a continually losing struggle with Baltimore and New York for the lion's share of international trade.

But as a center where the fruits of the industrial revolution were bursting open with unbelievable advances in technology, particularly in mechanization of fabrication processes thereby touching every aspect of man's private and public needs--food, clothing, shelter, public services, etc.--it was without comparison.

By this time certain outlying concentrations such as Phoenixville,

Norristown and Trenton, that had been market points for agricultural commodities and for transfer and distribution of manufactured goods, were showing signs of becoming industrialized.

Thousands of Irish, German and English laborers had their skills organized into production systems by energetic entrepreneurs to turn the region's natural resources of wood, iron, minerals, wool and easily imported southern cotton into the more than 800 products the area was known to produce in 1860.

Further, while the massive reorganization of work into the factory system was yet to come, the transfer of manufacturing from homes to factories was going on at a significant pace and creating a non-agricultural class who were consumers rather than producers of food.

In Philadelphia's center, undifferentiated importing and general merchandising was rapidly undergoing specialization into hundreds of retail and wholesale operations along commodity lines.

The unbounded energy of the growing nation also expressed itself in the construction of a vast transportation network. Turnpikes, canals and railroads were marvels of engineering for their day. These links encouraged an ever-widening band of agricultural production beyond the city's limits. In turn, this led to the growth of towns that functioned as collection, transfer and shipping points. With the coming of the railroad, particularly after 1850, farm products reached broader markets and the world's finished products were brought to the farmer's door.

As for agriculture in the region, as late as 1860 fully 75 percent of the region's population was listed in the census as rural. The region was blessed with rich productive soils. With industrious European peasant stocks to work the soil, the region's output was a veritable cornucopia. There is hardly a single agricultural staple that was not cultivated and shipped in quantities that were unheard of just a short time earlier. By 1860 all this was possible because farming practices and machinery that had not changed in centuries were suddenly revolutionized. The 20 years prior to the Civil War saw the farmer become a specialist with command of steel plows, grain drills, cultivators, mowers, hay makers and the silo to augment his production to unparalleled output per acre of land. With such specialization the farmer gave up milling, lumbering and trapping. This also meant that the vast populations required in the new industrial system could be fed adequately and economically.

Spatial Patterns in the Growing City

Had aerial photography been possible, a picture of the city in 1860 would have shown unbroken and concentrated settlement between the two rivers covering six square miles.

The city's population had increased between 1800 and 1830 by 108,000. But even more phenomenal was the settling of an additional 376,000 between 1830 and 1860.

To accommodate this multitude, open farm land owned by the original proprietors and settlers was subjected to the rectangular survey system, continuing the original pattern set down by William Penn in his 1682 Plan. Streets were laid out so as to create even rectangles of land that could be built upon, and these in turn were subdivided into narrow house lots. It was simple, cheap, and utilitarian since it treated all land similarly, which was ideal in a booming real estate market composed of hundreds of land speculators, homebuilders and small home buyers.

Locational aspects of the city's economic base will be discussed below in greater detail. The point stressed here is that the radical changes in organization and location of work had only begun to be reflected in physical development patterns. Shops still occupied the front rooms of homes. Even metal shops only took up double lots. Their small size and equally small trade areas were the streams and the rivulettes that provided economic essentials either in the form of work, or the goods and services for people who depended upon them along the miles and miles of streets and alleys. But living among these neighborhood shops and workers sharing the same streets and housing types there was already a small army of commuting workers; downtown businessmen, factory workers, and clerks.

On top of this remarkably even grain of settlement the observer could discern the pattern of things to come; a downtown, six manufacturing clusters, and evidence of class, ethnic and racial enclaves. But the downtown of 1860 was not yet offices and stores. It was composed of wholesalers and retailers who had undergone specialization into hundreds of commodities from the old "general merchant" days of the early part of the century. Manufacturers had moved in right alongside of them to serve a ready market. These were the activities that gave downtown its bulk. A special analysis of 1858 showed no less than 800 different products being manufactured in Philadelphia. And from the Census of 1860, estimates for the number of workers in the downtown wards approached 30,000. From the U. S. Eighth Census dated 1860 we learn that while 15.9% of the male residents of the 6th ward, bounded roughly by the River, Broad, Vine and Chestnut Streets, were engaged in manufacturing activities, the number of jobs held by males in manufacturing in that ward was 324.% of the figure for employed resident males with a job in manufacturing. Thus it was clear that commuting was already an established pattern. This is supported by various reports of the time telling how, each day, thousands of workers arrived in the downtown on foot, by omnibus and horse-drawn street cars.

Beyond the downtown additional manufacturing clusters had developed in a radiating pattern along established streets. In the vicinity of Delaware Avenue and Spring Garden Street, leather and wool manufacturing was underway and mass production of wool carpeting was beginning.

Numerous firms engaged in machinery manufacture and textile products (there were an estimated 10,000 workers in establishments located mainly in the Kensington Area adjacent to the river). Clothing, shoes and hosiery were concentrated in the oldest part of downtown between Second and Sixth Streets and South and Walnut Streets. Market Street for a number of blocks east and west of Center Square, (City Hall had not yet been built) was a focus for printing and furniture manufacture and other wood products. To the northwest at Broad and Spring Garden and westward, locomotive building with 600 employed at the Baldwin works was in full swing.

One fact stands out. The very nature of the grid system, even-sized narrow streets at right angles to one another, was a poorly conceived physical form. What was needed were a few wide streets that would break through the grid to allow traffic to move more freely in several major directions. As early as 1860 it was obviously inadequate and obsolete for the demands of industrialization and the commutation that accompanied it. The first concentrations of production activities away from homes and the beginnings of a central retail, wholesale and business service area had greatly intensified linkages between various segments of the developed portion of the city and thus generated concentrated daily flows of traffic.

Commuters and shoppers moved from the north and west side of town to the downtown. Business traffic moved from downtown and the wharves to the previously-mentioned industrial clusters to the northeast and south.

The existence of the diagonal highways; Germantown Ave., Ridge Ave., Passayunk and Moyamensing Avenues provided little relief, for their narrowness was self-defeating. With the exception of the widening of Delaware Avenue to parallel the river under the private largess of Stephen Girard, no other attempt at the widening of Philadelphia streets in the 19th Century is recorded.

Consolidation of Minor Civil Divisions and County of Philadelphia

The distribution of population in urban Philadelphia before and after the County of Philadelphia's consolidation with its numerous municipalities, is shown in Table 1. Not all jurisdictions are listed. Actually governmental management was in the hands of twenty-eight different townships, boroughs and districts. The condition and functioning of necessary services such as sanitation, public health, police and fire protection were at best poor. These communities seethed with class, ethnic, religious and political unrest and conflict. By the mid 1850's, without any unified governmental controls, community turmoil became a way of life threatening to disrupt the very economic and social foundations of the growing city.

Though the population size and areal expanse of Philadelphia demanded

TABLE 1. POPULATION OF URBANIZED PORTIONS OF PHILADELPHIA COUNTY: 1800-1860

Minor Civil Division [a]	1800	1830	1840	1850	1860 [b]
Philadelphia (old city)	41,220	80,458	93,665	121,376	137,756
Adjacent Urban Districts:					
Southwark	9,621	20,740	27,548	38,799	72,513
Moyamensing	1,592	6,822	14,573	26,979	30,886
West Philadelphia	...	...	2,896	5,571	n.c.
Northern Liberties	10,728 [c]	28,923	34,474	47,223	135,962
Kensington		13,326	22,314	46,774	
Richmond		...	...	5,750	
Spring Garden		11,141	27,849	58,894	76,394
Penn		...	...	8,939	29,963
Outlying Boroughs:					
Frankford	...	1,637	2,376	5,346	23,985
Germantown	...	...	...	6,209	n.c.
Manayunk	...	...	...	6,158	n.c.
Total, urbanized areas	63,161	163,047	225,695	378,018	n.c.
Townships (non-urban)	17,854	25,914	32,342	30,744	n.c.
Philadelphia County	81,015	188,961	258,037	408,762	565,529

a/ Upon City-County consolidation in 1854, the previously existing structure of minor civil divisions was eliminated and replaced by a ward system that encompassed the entire new city.

b/ Population figures for 1860 represent ward equivalents (or near-equivalents) of the former minor civil divisions. The 1860 population of some of these areas is not computable (n.c.), since three former urban places (West Philadelphia District, Germantown Borough, and Manayunk Borough) were absorbed into new wards that were far larger in size (wards 24, 22, and 21, respectively).

c/ Data are for the "in-parts" of Northern Liberties Township, roughly representing the built-up portions of the township that subsequently became separate Districts.

Source: John Daley and Allen Weinberg, Genealogy of Philadelphia County Subdivisions (Philadelphia: City Department of Records, 1966), pp. 92-100.

unified government as a conditon whose time had come, it was the special need for adequate police protection in the wake of rampant public disorder that inspired the movement.

Consolidation of Philadelphia City and Philadelphia County was accomplished in 1854. This did bring the restoration of public order and substantial improvement in public services. Consolidation also fostered the filling in of areas between former political divisions. In many instances, the space was taken up by industrial activities. The industrial areas between present-day Kensington and Frankford are good examples of this.

Population and Industry in the Region

In 1860 nearly 2 million acres were cultivated for a vast array of food stuffs and fiber. About 250,000 persons were recorded as rural residents. Another 85,000 were concentrated in small towns, i.e., the urban centers of that time--such as Trenton, Camden, Norristown, Phoenixville, Pottstown, etc. These centers had their beginnings as collecting transfer and shipping points for agricultural goods. But by 1860 they had developed industrial bases tied largely at first to the raw materials close at hand or the peculiar skills of their local population. Table 2 lists commodities identified as being produced in 1860 in the counties surrounding Philadelphia. Figure 3 shows the more intensely settled areas where these activities took place.

Of even greater significance to the accelerating pace of development are the facilities for movement of goods and people also depicted in Figure 3. The two rivers, parallel canals, railroads, turnpikes, and minor roads become the channels facilitating increased exploitation of natural resources, movement of raw materials, finished products and people.

The Transportation System

Sweeping as all the changes previously described were, the accelerated speeds inherent in the new forms of transportation and communication links represented the most revolutionary break with all of man's past. In some respects the full implications and potential of railroads were never fully comprehended even up to the time of the introduction of the automobile and the airplane.

Roads and Bridges.--As early as 1790 fear of the loss to Baltimore of the trade of the Susquehanna Valley, especially when the great population surge westward was intensifying, led the City of Philadelphia, through a private company, to build the Lancaster Turnpike connecting the two cities.

FIGURE 3

DEVELOPMENT AND TRANSPORTATION PATTERNS 1860

INFORMATION DATE: 1848 - 1860

LEGEND

- Developed Area
- Roads
- Railroads
- Canals

COMPILED 1975

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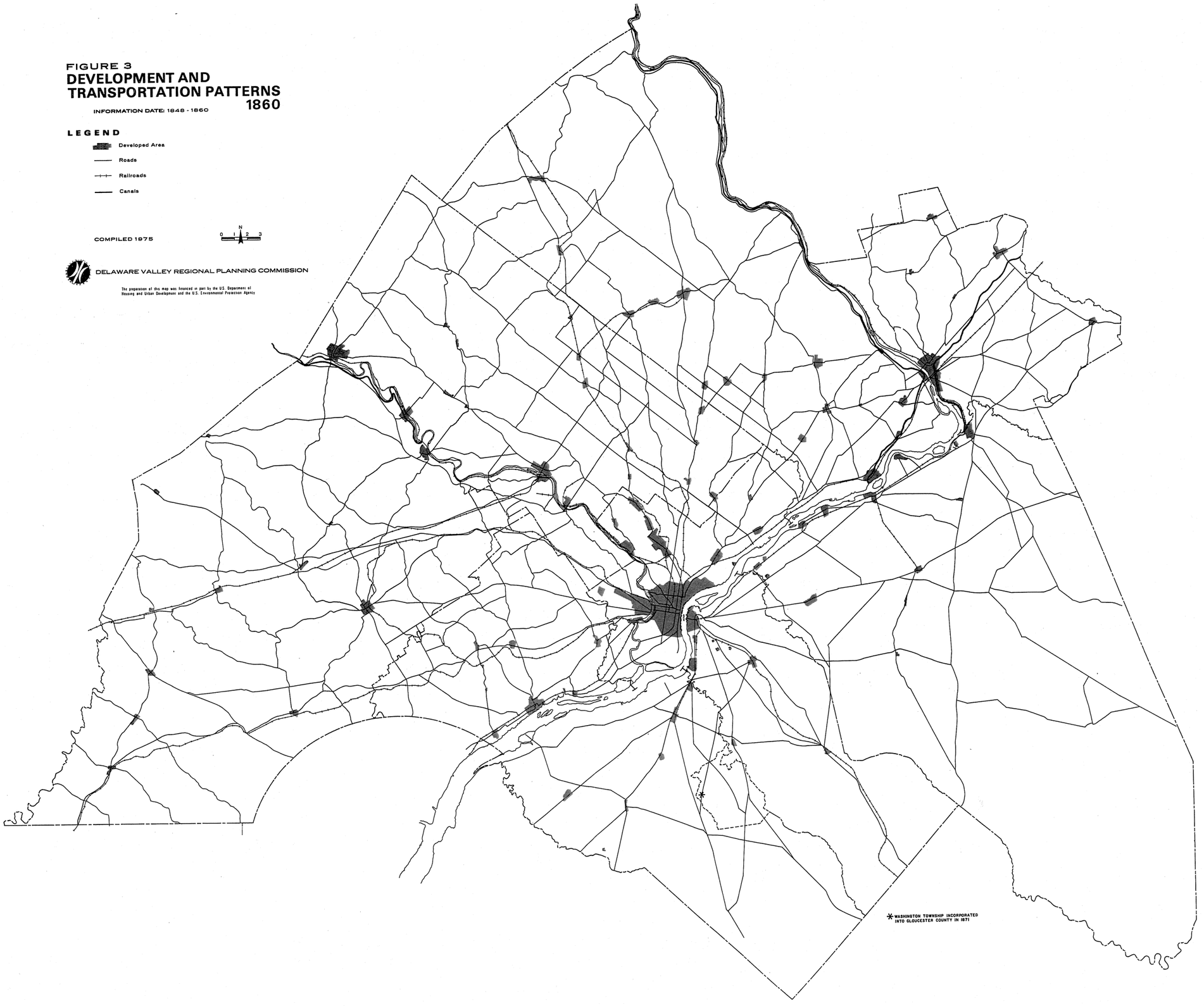
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency



* WASHINGTON TOWNSHIP INCORPORATED INTO GLOUCESTER COUNTY IN 1871

TABLE 2. MANUFACTURING ACTIVITIES IDENTIFIED IN THE COUNTIES OF THE DELAWARE VALLEY OUTSIDE PHILADELPHIA: 1860

County	Manufacturing Activity
Bucks	Cigars
Delaware	Paper; Nails; Wool products; Cotton products; Ships; Small boats
Chester	Fabricated metal; Paper; Machinery; Flour mill;
Montgomery	Foundaries; Paper; Fabricated metal; Cotton products; Flour mill
Camden	Wool products; Machinery
Burlington	Foundaries
Gloucester	Glass
Mercer	Ceramics; Porcelain; Foundaries; Fabricated metal

From 1790 to 1830, Pennsylvania's transportation effort concentrated on road and bridge construction. Many roads were built from the efforts of individual towns which would promote a road or roads to connect with a nearby neighbor. The immediate result of this process was the creation of hundreds of short turnpikes which did not often interconnect, and thus served largely local functions. Great numbers of waystops sprang up along these roads thus creating a system of eating places or inns and lodging facilities throughout the countryside.

In 1832, Pennsylvania had 3,000 miles of turnpike, but this was broken up between some 220 local companies. The individual turnpike companies generally built their own bridges over small streams. Larger rivers were bridged by separate bridge companies. Most of these were mixed corporations; state or local government would pledge to purchase part of the capital stock and private buyers would take the rest. This allowed for greater investment than wholly private companies would likely make. The more important roads and bridges built in this period are listed in Table 3.

The value of the turnpikes was clearly demonstrated, but the cost of transporting goods by land still was enormous. The freight per ton from Philadelphia to Pittsburgh by an all-land route was $125, while a ton could be brought from Europe for 40 shillings, or about $10. As the limitations of the roads became evident, attention was drawn more and more to artificial waterways as a possible solution.

Canal Building.--A great western empire was arising and three eastern cities, Philadelphia, New York, and Baltimore, became rivals for its potentially great trade. Trade routes and travel west of the Alleghenies in the early 19th century were chiefly by way of two natural water routes. These were the Ohio-Mississippi-Missouri river system and the Great Lakes chain. Access to the river system was through Pittsburgh at the head of navigation on the Ohio. Access to the Great Lakes chain was through the eastern end of Lake Erie, where Buffalo now stands. The Erie Canal connecting the Hudson River with Lake Erie was completed in 1825. It furnished an opportunity for all communities tributary to the Great Lakes to ship their products through the canal down the Hudson to New York City, which threatened to seize Philadelphia's supremacy as the shipping and commercial center.

Pennsylvania, concerned lest her western trade be drawn off to rivals of Philadelphia, rapidly constructed between 1826 and 1834 a remarkable system of canals, portages over the Alleghenies and connecting railways from Philadelphia to Pittsburgh at a cost of more than $10,000,000. Known as the Main Line of Public Works of Pennsylvania, it followed the Susquehanna, Juniata and Conemaugh Rivers and totaled 395 miles in length. It was one of the most spectacular engineering feats of the time.

Economically, the Main Line of Public Works could not compete with

TABLE 3. REGIONAL ROAD AND BRIDGE DEVELOPMENT: 1800-1860

Name	Date	Terminals	Purpose
Lancaster Turnpike	1795	Philadelphia-Lancaster-Columbia	Connect Philadelphia and the Susquehanna Valley
Trenton Bridge	1798	Trenton-Morrisville	Cross the Delaware River at Trenton
Market Street Bridge	1800	Center-West Philadelphia	Cross the Schuylkill River
Callowhill Street Bridge	1812	Center-West Philadelphia	Cross the Schuylkill River
Philadelphia-Trenton Pike	1803	Philadelphia-Trenton	Linkage for these centers
Germantown and Reading Turnpike	1804	Germantown-Perkiomen Valley Reading	Connect these areas
Old York Road	1803	Philadelphia-Willow Grove	Extend the existing road from the Germantown Road to Willow Grove

the low level of the Erie Canal though for a time it was successful in bringing a share of Western trade to Philadelphia.

In another direction to the north of Philadelphia, as the result of the opening of vast beds of anthracite coal between the upper reaches of the Delaware and Schuylkill Rivers in the areas of Scranton and Wilkes-Barre, canals appeared to be the most practical and economic answer to the problem of moving bulk cargo of this nature. Canals for this purpose remained in service long after many others were abandoned.

A further motivating force for canal construction was the shortening of transportation links such as the Delaware and Chesapeake Canal which was 13 miles in length and permitted vessels to reach Baltimore directly from Philadelphia, instead of sailing to the mouth of the Delaware and thence to Baltimore on the Chesapeake. The Delaware and Raritan and Morris Canals in New Jersey served the similar functions for the Philadelphia-New York trade. The major canals originating in the region are shown in Table 4.

Railroads.--The initial impetus to usage of railroads was the need to move stone and coal in large quantities at lower costs. The earliest recorded railroad in the region was built in 1800 and connected Crum Creek at Avondale, with Ridley Creek at Leipersville. The road which was about 3/4 of a mile long hauled stone from a quarry.

Their essential value was seen early in the 19th century as a supplementary but integral part of the canal network. Ironically, it was the canal ultimately absorbed and displaced by the railroad, which gave birth to it. The first lines were built as feeders to canal ports from coal and iron mines. They also carried lumber and other minerals. They were also essential overland links between two waterways where terrain prohibited canal digging. The major railroads built prior to the Civil War are listed in Table 5.

The Columbia Railroad connecting Philadelphia and the Susquehanna River (out of which grew the Pennsylvania Railroad) was one such link. But within a few years this short railroad was earning more than all the rest of the state-owned public canals. By introducing and encouraging railroads the canals helped to accomplish a momentous change in the region's economy and also provided new levels of geographic unity that were unthinkable at the beginning of the century.

In 1855 the freight carried to Philadelphia by the Cumberland Valley Railroad indicated important industries: 328,000 lbs. iron; 97,000 lbs. leather; 285,000 lbs. paper; 2,986,000 lbs. blooms and castings; 409,000 lbs. pig iron; 183,000 lbs. pork and bacon; 888,000 lbs. straw paper; 54,000 lbs. flour. From Philadelphia westward the railroad moved 5,522,000 lbs. dry goods; 1,280,000 lbs. nails; 316,000 lbs. whiskey; 497,000 lbs. pig iron; 373,000 lbs. furniture; 2,715,000 lbs. lumber

TABLE 4. REGIONAL CANAL DEVELOPMENT: 1800-1860

Name	Date	Terminals	Purpose
State Works Main Line Delaware Canal Division		Philadelphia to Pittsburgh Easton to Philadelphia	
Delaware and Schuylkill Canal Company	1792	Delaware River-Schuylkill River at Philadelphia	Connect the two rivers
Schuylkill and Susquehanna Canal Company	1811		
Union Canal	1827	Delaware River - Susquehanna River	Divert trade from Baltimore
Delaware-Raritan Canal	1838	Camden-Trenton	Move goods
Lehigh Navigation Company		Luzerne-Easton	Transport coal
Schuylkill Navigation	1824-1825	Philadelphia-Pottsville-Port Carbon	Transport coal
Pennsylvania Canal	1825	Philadelphia-Pittsburgh	Connect the eastern and western waterways of Pennsylvania with Lake Erie
Delaware and Chesapeake Canal	1829	Philadelphia-Chesapeake outlet of the Susquehanna River	Reduce costs of movement between Philadelphia and Baltimore

TABLE 5. REGIONAL RAILROAD DEVELOPMENT: 1800-1860

Name	Date	Terminals	Purpose
Thomas Leiper (private)	1800-1829	Crum Creek at Avondate-Ridley Creek at Leiperville	Hauling stone from a quarry
Philadelphia, Germantown and Norristown	1832-1835	Philadelphia-Norristown	Common carrier
Columbia RR	1834	Part of link to Pittsburgh from Philadelphia	State-owned; part of canal system
Philadelphia and Reading Railroad	1832-1834	Philadelphia-Reading-Mount Carbon	Transport Coal
Cumberland Valley		Philadelphia-Cumberland Valley	
Camden and Amboy	1840	Camden-Trenton	Common carrier
Philadelphia and Trenton RR	1832	Philadelphia-Trenton	Common carrier
West Chester RR	1832	Philadelphia-West Chester	Common carrier
Pennsylvania RR	1853-1855	Philadelphia-Pittsburgh	Transport coal (utilized portage railroad)

and 23,022,000 lbs. coal.

By 1860 terminals for a number of lines can be identified at a number of points on the fringe of the developed city. The Philadelphia and Trenton railroad built its terminal between Front Street and Frankford Road, north of Harrison Street in Kensington, nine blocks from the public market stalls of the growing Kensington-Northern Liberties industrial quarter. The Germantown and Norristown Railroad stopped at Ninth and Willow Streets; the Columbia Railroad, the Reading Railroad, and the West Chester Railroad all located along Broad Street between Vine and Arch Streets. The Southwark Railroad, and the Philadelphia, Wilmington, and Baltimore Railroad skirted the southside settlement, making a dash from Gray's Ferry Road across Prime Street to the Old Navy Yard at the Delaware River.

Intra-City Transportation.--The City of Philadelphia in 1860 was already burdened with an inefficient traffic system. The street system of William Penn's was all too narrow long before the automobile. In a city whose size trebled in 30 years this weakly structured physical form was bound to be a serious handicap for future decades of development.

Public mass transit in Philadelphia had its beginning during this time period, none too soon. In December 1831 the first intra-city Omnibus (stage coach) line in the city opened for service. It ran on Chestnut Street between 2nd and 16th Streets. In January 1858 another significant transit advancement occurred in Philadelphia with the opening of horse drawn street car service. The first line ran on 5th and 6th Streets between Montgomery Avenue and Morris Streets. These lines were the beginning of one of the nation's largest street car systems.

How Things Were on the Eve of the Civil War

The combination of roads, canals, railroads, and urban transit service reviewed above indicate how intensively the city was linked internally as well as to the surrounding counties, the state and nation beyond.

The patterns and foundations for growth were already solidified. Succeeding waves of subdivision and development continued to repeat existing forms with only slight modification due to forces of specialization and new forms of segregation along social, economic class and racial lines.

By 1860 freight and people were able to be moved to New York City in hours instead of days, to Pittsburgh in days instead of weeks.

Transition from a preindustrial English village economy to the industrial big-city, regional economy had occurred at a dizzying pace

and was accelerating even more. Thus the demand for more space, more efficient transportation and communication became unending.

CHAPTER IV

FROM 1860 TO 1900 : INDUSTRIALIZATION AND URBANIZATION

Foundations Laid for the Modern Economy

The Civil War marked the beginning of a forty-year period in which a highly sophisticated and interdependent industrialized economy mushroomed into existence. The introduction of ever-increasing increments of mechanization affected every aspect of the life style, social and economic structure and politics of the region. Relationships between people and methods of doing business which had prevailed from the time of the first settlements were suddenly transformed by increased speed and bigness.

The enormous ordinance and supply need for the war placed unheard of demand upon the Delaware Valley's production capacity. The system responded. Fifty eight new factories were erected in Philadelphia in 1862, 58 more in 1863 and 65 in 1864. The now familiar factory system thus came into its own. The scale of operations multiplied, functions were separated. Specialization in the production of component parts became common. These together with division of labor combined to set the stage for efficiencies that continued to reduce costs and increase output to meet the demands of a growing mass market for years to come.

Major concentrations of activity which had their foundations laid during the first 60 years of the century became clearly visible and permanent. The region was at the fountainhead of cheap coal, iron and timber. Other critical factors influencing location decisions for business such as availability of an abundant skilled low cost labor force, nearness or centrality to market, availability of transportation facilities and support services, combined to make this a golden age of industrial development.

In addition to the large brick structures that housed production lines or stored factory finished merchandise for further work or final shipment, there was the appearance of the department store, specialized retail stores of every description, banking and real estate, personal and professional service buildings. Company managers and entrepreneurs had perceived the value of prime locations on the principal thoroughfares where wagons and buggies pass frequently and where pedestrians are concentrated in the largest numbers.

Technological Innovations

This history would be incomplete without mentioning the introduction and rapid expansion of the telegraph and telephone as instruments to speed and simplify communication. Needless to say the typewriter, introduced in the 1870's, also had a sweeping impact.

The typewriter did more than merely increase ease of correspondence. Prior to its development, most office work was done by men. Women had no skills, or were not permitted by society to labor in the business world. Learning to type was an ability which could be easily acquired, yet was "genteel" enough to be acceptable to a number of middle class women who for financial reasons had to enter the work force. It also offered an alternative to women who might otherwise have had no other choice but to work in factories.

The telephone was invented by Bell in 1876. Bell Telephone Company of Philadelphia was chartered in 1879, and by 1900 had receipts of more than $1.5 million indicating the system's rapid expansion, enormous utility and popularity.

The nation and the region became aware of the magnetic telegraph, invented in 1837, by S. F. B. Morse, when in 1844 he sent the famous "What Hath God Wrought"! message from the Supreme Court building in Washington, D. C. to a point in the center of the city of Baltimore. But it was not until the 1860's that the telegraph linked different locations in the region and the region itself with the nation.

The Golden Age of Railroads

Responding to perceived demand and seemingly limitless potential, the railroad leaders applied identical principles of mechanization to those applied in the factory system: economies of scale, division of labor, and standardization. The railroads emerged unchallenged in their ability to move bulk cargo and finished goods in massive quantities at low cost. But it is standardization that ushered in the "golden age" of railroads. Different track widths and standards in rail profile and guage had hampered transcontinental expansion. Once this problem was solved the speed with which Philadelphia was linked by the Pennsylvania Railroad to Cincinnati, Cleveland, Chicago, St. Louis, Baltimore and Boston was dazzling.

The presence of rails, first as trunk lines and then with additions of branches, acted as generators of industrial development in and of themselves. By 1900, the region was interlaced with a rail network that brought many of the more remote areas into close contact with the region's centers.

The Pennsylvania Railroad had its "main line" along Lancaster Pike, connecting Philadelphia with Lancaster and Pittsburgh and providing branch service to numerous small towns in Delaware and Chester counties, such as Parkesburg, Coatesville, Downingtown, and Ardmore. The Reading Railroad, another major line, followed the Schuylkill River upstream from Philadelphia through several large industrial centers including Conshohocken, Norristown, Phoenixville, Pottstown, and on to Reading.

Before 1860 the Reading had also constructed a line north from Philadelphia to Bethlehem and Allentown which brought places such as Quakertown, Sellersville, Lansdale, North Wales, Ambler, and Jenkintown more effectively into the Philadelphia market system. Finally, to the north and east, two lines were operated through Mercer County and on to New York. One of these followed the New Jersey side of the Delaware River from Camden through Burlington, Bordentown, and Hightstown; another followed the river on the Pennsylvania side from Philadelphia through Bristol and onto Trenton and hence to New York. There was also a trunk line of the Pennsylvania Railroad established by 1900 connecting Philadelphia with Baltimore and passing through Delaware County.

The Reading Railroad was originally developed to haul finished goods to western Pennsylvania and anthracite coal south and east to Philadelphia. By 1874 this railroad owned 100,000 acres of coal mining land and had erected numerous iron furnaces in the Schuylkill Valley. By 1900, the Reading Company had rail lines through many rural areas of Chester and Berks Counties. There was also a branch extending north from the Schuylkill line through Collegeville, Schwenksville, Red Hill, and East Greenville to Allentown. Other lines of the Reading Railroad connected Philadelphia with New York.

A third major railroad, the Baltimore & Ohio also began serving the region during this time period. Generally it served the south and western portions of the region connecting Philadelphia via its own trunk line to Wilmington, Baltimore and Washington, D. C. Direct freight and passenger service to New York was also established about 1887 over Reading and New Jersey Central Railroad trackage. The main Baltimore & Ohio passenger terminal for the region was located at 24th and Chestnut Streets in Philadelphia.

This period also saw the completion of a number of Pennsylvania-Reading Seashore Lines which not only allowed for easy access to the New Jersey Shore, but facilitated the expansion of the glass industry in towns such as Glassboro, Atco, Waterford, and Clementon. Another significant effect was the development of many towns in Camden and Gloucester Counties along the rail lines outside of Camden, e.g., Woodbury, Haddonfield and Swedesboro.

The major centers other than Philadelphia, namely Camden, Trenton,

Chester, and Norristown by 1900 were linked more efficiently to Philadelphia and grew as a result. But, in addition to the subregional areas, the small towns and villages along the railroads tried to capitalize on the more efficient movement of goods and people and develop themselves as intermediate service centers for commercial and trade activities as a result of the railroads' presence.

The Transportation Network and the Pattern of Development

Due to public transportation and communications developments households began to seek residential locations away from undesirable industrial concentrations. The completion of the Girard Avenue Bridge in 1874 linked West Philadelphia with North Philadelphia. The Pennsylvania Railroad built the Broad Street Station in 1886 connecting Germantown and Chestnut Hill with the downtown. In December 1892 the first electric trolley car in Philadelphia began operating on Catherine and Bainbridge Streets. By 1897, the street car system was quite extensive with all lines converted from horse drawn to electric cars.

The suggestion of a radial pattern of development for the region, evident in 1860, was substantially reinforced by rail and road development in the next 40 years. Growth of the towns within this configuration (compare Figures 3 and 4 for 1860 and 1900) had resulted originally from their advantageous trading position with regard to the collection, distribution and exchange of farm produce or finished goods produced in or imported through Philadelphia. From the start they were linked to the region's center by rivers and roads. For bulk cargo the rivers had been the only mode available until well into the 19th century. The Lancaster Pike, earliest of the main roads, was supplemented in the latter part of the century by the Baltimore and Bethlehem Pikes. Clearly these highways linked Philadelphia with major centers outside the region. They also served to connect smaller villages and towns along their rights of way within the region with Philadelphia and other large market centers. In addition there were shorter turnpikes not oriented to the region's center connecting agriculturally-based activity centers with each other. It is these towns, already in existence, that many industries selected because of their locational advantages with respect to the existing transportation system and the availability of cheap labor.

The map of 1900 clearly depicts the fact that the railroads, both trunk and branch lines, have followed the previously established routes of rivers, canals and turnpikes. Developed initially as feeders to canals, as related earlier, they ultimately supplanted them.

Population Distribution

An analysis of the census of population for 1900 reveals that a

FIGURE 4

DEVELOPMENT AND TRANSPORTATION PATTERNS 1900

INFORMATION DATE: 1885 - 1905

LEGEND

- Developed Area
- Roads
- Railroads
- Canals

COMPILED 1975

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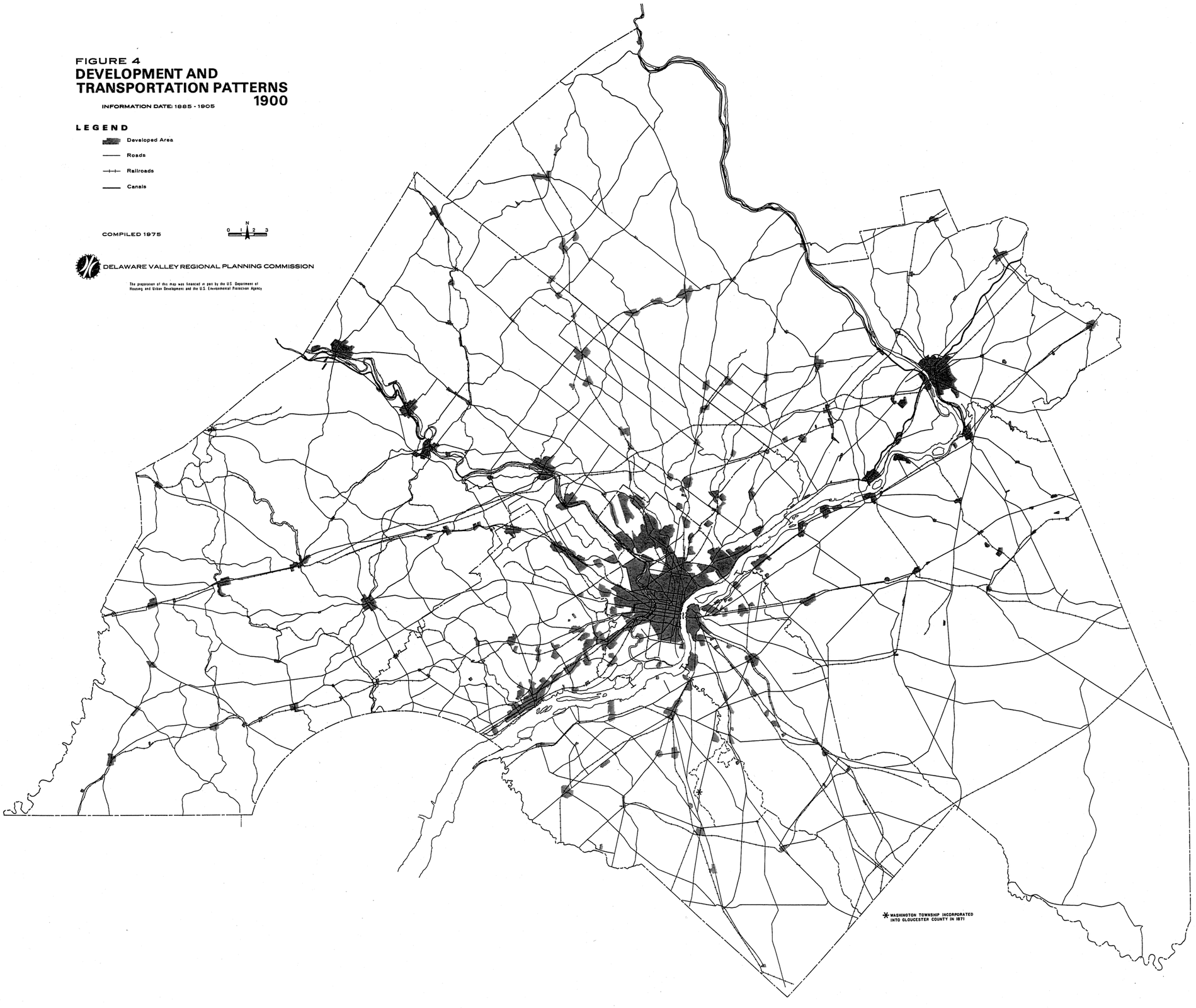
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency



*WASHINGTON TOWNSHIP INCORPORATED INTO GLOUCESTER COUNTY IN 1871

distinct pattern of concentration in the region had emerged. Opportunities created by location with respect to transportation, natural resources, trade and potential employment combined to generate centers with distinct social and political structures. This is revealed in Tables 6 and 7.

TABLE 6. POPULATION BY COUNTY FOR THE DELAWARE VALLEY REGION: 1860 AND 1900

County	Population 1860	Population 1900	Percent Change
Bucks	63,578	71,190	+ 9
Chester	74,578	95,695	+ 28
Delaware*	30,597	94,762	+ 210
Montgomery*	70,500	138,995	+ 97
Philadelphia*	565,529	1,293,697	+ 129
Burlington	49,730	58,241	+ 17
Camden*	34,457	107,643	+ 212
Gloucester	18,444	31,905	+ 73
Mercer*	37,419	95,365	+ 155
Region	944,821	1,987,493	+ 110

*Counties containing cities with populations over 20,000

Source: U. S. Bureau of the Census, Census of Population: 1860, Table 41, pp. 271, 278 and 279.
_____, Census of Population: 1930, Volume I, Table 3, p. 935.

While classification by population size is at best an artificial device it does facilitate description of the regional patterns that had emerged by this time. It further enables one to see what common economic characteristics are associated with centers of a particular size. In turn this permits us to understand their relative importance and the changes they experienced.

Urban centers of the region are arrayed by the size of their population in Table 7. Clearly Philadelphia is dominant. The cities of Camden and Trenton, hardly a match for Philadelphia, are next in magnitude followed by Norristown and Chester and possibly Pottstown. The so-called "small" towns with populations from 5 to 10,000 follow. One important observation to be made is that by 1900 the region was already urbanized. The cumulative population of these centers accounted for 78 percent of the region's total.

TABLE 7. POPULATION OF SELECTED URBAN CENTERS DELAWARE VALLEY REGION: 1900

City	Population
Philadelphia	1,293,697
Camden	75,935
Trenton	73,307
Chester	33,988
Norristown	22,265
Pottstown	13,696
West Chester	9,524
Phoenixville	9,196
Burlington	7,392
Bristol	7,104
Gloucester	6,840
Conshohocken	5,732
Coatesville	5,721

Source: U. S. Bureau of the Census, Census of Population: 1939, Vol. I, Table 3, p. 935.

Philadelphia.--Philadelphia with its massive and highly skilled labor force by 1900 was a pre-eminent center for textile, clothing, machinery and locomotive production. It was a major shipbuilder and a leading center for sugar and petroleum refining. The total value of manufacturers in the region increased four fold from $169 million in 1860 to $750 million in 1900. With this enormous underpinning of "basic" industries, the market for business services, consumer services and goods expanded creating an entirely new type of worker and working environment as well as a new social class. Large department stores, concentrations of specialty retail stores, banking and other financial institutions such as insurance and buildings where personal and professional services were rendered covered the center city landscape.

Philadelphia also continued to grow as the primary port of the region, providing trade connections with other parts of the country and the world. Thus by 1900 it could be said that the enormous diversification of the city's economic base offered a great variety of economic opportunities and this condition spawned still more growth.

Trenton, Camden, Norristown and Chester.--Cities in the next size group like Trenton, Camden and Chester were either single-large-industry towns or had a handful of well known producers serving the national markets. They also contained smaller scale operations in manufacturing and food processing serving the region only. Table 8 reveals how industry concentrated in the surrounding counties.

TABLE 8. EMPLOYMENT & VALUE OF PRODUCTION IN MANUFACTURING FOR COUNTIES AND CITIES IN THE DELAWARE VALLEY REGION: 1860 AND 1900

Area	1860		1900	
	Employment	Value of Production (000)	Employment	Value of Production (000)
Bucks County	1,781	$ 2,905	5,817	$ 10,653
Chester County	4,154	6,386	8,597	13,424
Delaware County	4,368	5,264	14,423	28,444
Chester City			7,906	16,421
Montgomery County	4,966	7,128	18,695	40,691
Norristown			3,597	4,821
Philadelphia	98,983	135,980	265,558	603,466
Camden County	2,528	3,129	12,239	25,281
Camden City			9,677	20,452
Burlington County	2,267	2,772	5,261	8,599
Gloucester County	906	1,013	2,901	4,220
Mercer County	3,880	4,750	16,483	34,254
Trenton			15,296	31,645
Region	123,833	$169,327	326,218	$759,032

Source: U. S. Bureau of the Census, Census of Manufactures: 1860, Vol. III, Table 1, pp. 331-340 and 499-519.
_____, Census of Manufactures: 1900, Vol. VIII, Part 2, Table 6, pp. 760-761 and Table 8, pp. 769-802.

While providing a base sufficient to support a wide range of secondary and support industries, the economic base of these cities was not capable of supporting non-basic industries and services on a scale as extensive as could Philadelphia. In Camden in 1900 nationally important firms included the Esterbrook Steel Pen Factory, Campbell's Foods, the New York Shipbuilding Company, and just one year later (1901) the Victor Talking Machine Company. In Trenton were found the Trenton Iron Works and the Trenton Potteries. Peaker, Sun & Archibald was a major shipbuilding company in Chester and a number of large machinery manufacturing firms were located in Norristown. Trenton, the capital of New Jersey as well as the county seat for Mercer County, performed important governmental and administrative functions. Norristown and West Chester developed as government centers. They also functioned as retail and professional service centers.

Small Towns.--The region's small towns served many functions. Places such as Darby, Yeadon, and Lansdowne could already be regarded as satellite communities of the city of Philadelphia. Here it was a simple case of population and industry expanding outside the city's borders. The same was true for Haddonfield and Collingswood with respect to Camden. However, substantial steel processing was established in Phoenixville, Dupont Chemicals in Gloucester, asbestos in Ambler, textiles in Bristol. Food processing, textiles, furniture, metal fabricating grew in Pottstown as did machinery manufacturing in Lansdale. These places also continued to serve as agricultural commodity collection and shipping points as well as retail centers for consumer goods. In a few cases such as Swarthmore, Collegeville, Princeton, etc., higher education was the major activity. Certain limited services were also provided by these smaller cities such as lodging and dining services for travellers and repair and service facilities for railroad operators. Finally, while it may surprise us today, places like Doylestown, Schwenksville and West Chester were actually summer vacation places. Country fairs, horse racing, etc., were the attractions and numerous small hotels catered to visiting folk from the city.

Agriculture

Total acreage in agriculture for the region increased by 74,300. But a look at Table 9 gives us a portent of things to come. For the most part on a county-by-county basis--with the exception of Burlington--where half the nation's total supply of cranberries were being produced--the acreage increases were modest. But Philadelphia had a significant drop and decline was beginning in Montgomery and Delaware counties.

Suffice it to say agriculture remained a major occupation and way of life for about 300,000 people. The land area preempted for this use

TABLE 9. FARM ACREAGE AND FARMS IN THE DELAWARE VALLEY REGION BY COUNTY: 1860 AND 1900

County	Farm Acreage 1860	Farm Acreage 1900	Number of Farms 1900
Bucks	331,420	358,292	6302
Chester	443,043	447,309	6202
Delaware	105,594	92,498	1677
Montgomery	283,852	270,769	5860
Philadelphia	60,430	36,002	1072
Burlington	284,008	343,096	2549
Camden	73,570	76,535	1133
Gloucester	122,099	148,590	2225
Mercer	127,415	132,726	1573
Region	1,831,431	1,905,817	28,593

Source: U. S. Bureau of the Census, Census of Agriculture: 1860, Vol. 2, pp. 98 and 122.
_____, Census of Agriculture: 1900, Vol. 5, Table 19, pp. 289, 294, and 295.

in 1900 approached 2 million acres. Poultry, beef, dairy products, fruit, wheat, barley for beer, and tobacco in great abundance flowed from the region's 29,000 farms.

CHAPTER V

FROM 1900 TO 1930 : THE DELAWARE VALLEY ENTERS THE TWENTIETH CENTURY

The Delaware Valley Shows its Might

The changes that have been described for the 19th century, extraordinary as was their sweep, are dwarfed when viewed against the backdrop of developments in the first 30 years of the 20th century.

In 1900, the population of the region totaled more than 1,987,000, about 80% of which was urban. By 1930 the population was approaching 3,324,000 and more than 84% were living in areas classified as urban.

Technological advances and consequent economic growth appeared to have momentum without limits. The real evidence of the region's collective industrial might came during World War I. Available records indicate the city's resident labor force increased by 200,000 between 1916 and 1918. Philadelphia was called the "Arsenal of America". The new Baldwin Locomotive plant at Eddystone was converted to the largest rifle manufacturing plant in the world. It employed 15,000 workers. Within a single year the plant turned out 1,600,000 rifles for the American and British armies.

The development of the industrial area between Philadelphia and Chester had no parallel. Steel plants and arms factories sprang up as if by magic and along the river the magnitude of ship construction was the most extensive ever known.

This latter was the federal government's response to the hard reality that there was little merchant marine left to carry the world's goods, due to German submarine campaigns. So scarce was shipping, so high were freight charges, that a vessel might earn the equivalent of its total value in just a few voyages. By 1916 the Pennsylvania shore of the Delaware River had become the greatest shipbuilding center ever assembled by man. Twelve shipyards employed 44,000 men who were building more than one third of the nation's tonnage.

In mid-1917 the Emergency Fleet Corporation, an agency of the United States Shipping Board, initiated the development of a shipyard at Hog Island. Its goal was to produce 180 ships. Within one year fifty shipways were in operation employing 32,000 men. Here again

industrial American genius triumphed, for the vessels were assembled there from parts manufactured elsewhere. For this purpose the railroads displayed their power in their ability to haul huge bulk loads over great distances.

Housing and transportation were severe problems. Workers had to be moved from residential areas in Philadelphia to shipyards at Eddystone, Essington and Chester. Money being no object, because of the all out war effort, the government loaned the Philadelphia Rapid Transit Company $4 million dollars to finance construction of new lines and the purchase of 190 street cars.

By the end of the war certain trends were clearly in evidence. Continually improving efficiencies in production and technology were releasing increasing proportions of the labor force to business and personal service occupations, the so-called "white collar" jobs. In turn these jobs required greater education and specialized skills.

Concurrent with this change the stream of immigration remained constant until 1925 when the nation's "open door" policy was brought to an end. It is estimated that immigration swelled the population from the turn of the century to that time by 300,000 more persons.* Thus one of the basic ingredients for the continued health of the region's manufacturing base, an unlimited supply of cheap labor, could still be depended upon in the early 20th century.

Electricity, Automobiles and Elevators

Technological advances materialized during this time which were to become relentless forces in the alteration of the physical development pattern of the region. Their impact was to be largely centrifugal. The new era was powered by electricity. The supply was limited only by how quickly capital could be assembled and natural and synthetic sources harnessed. The cost of electrical power was calculated in pennies, and from an early date transmission over long distances was completely feasible. With the exception of the World War I effort when demands of such great magnitude were placed on the Philadelphia Electric Company that for a time it could not keep up, electrification of factories, mass transportation and homes proceeded rapidly. And there is hardly any question that the ability to provide almost limitless power over great distances was one of the major forces that broke the bonds of distance and permitted the dispersion of physical settlement.

Side by side with electricity stands the automobile. It made the

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*From 1900 to 1925 census data shows 17 million persons migrated to the United States from other parts of the world.

closing of distance possible. It literally altered our perception and measurement of distance from a linear scale to a time scale. By the end of the decade of the "Twenties" the automobile had widened the choice of homesites for progressively larger numbers of families. It had facilitated a new style of building site design i.e. structures of all types and functions were now accorded substantial amounts of land around them. Also, needless to say, the automobile had already scattered development over a huge area.

Improved subway and elevated facilities and electrification of suburban commuter rail services were also factors that generated the spread of urban development in the region. Even if one did not own an automobile one had no longer to forego the attractions of the country for the conveniences of the city. Expanded transportation facilities promised the enjoyment of both worlds. As the commuter rail and trolley lines were extended, housing and the retail and service activities to meet the needs of the new communities were developed at key locations, like beads on a string. Incorporation, annexation, permanent rather than part-time governments, were in evidence throughout the Philadelphia suburbs.

The dispersion on the New Jersey side of the region was a somewhat different story. For many years, the Delaware River had acted much as a barrier between New Jersey and Pennsylvania. Slow transportation across it by means of ferries limited interaction. At the close of the period, however, major suspension bridges had been built at two points along the river: Burlington-Bristol and Camden-Philadelphia. These new projects allowed vehicular traffic to move with greater ease and increased speed over the river, thus increasing the flow of goods between the states, while also permitting development to take place in the less settled areas surrounding Camden, Woodbury, Haddonfield and Collingswood.

The economic base presented a different picture. Due to inherent inertia, particularly because of the amount of sunk capital in existing plants, offices and stores, business dispersion was much slower. But it was happening. The first throes had been experienced in the removal of the Baldwin Locomotive Work from center city Philadelphia to Eddystone. Lack of space for expansion, cheaper land, access to a cheaper labor pool, reduced costs of inputs to production and ease of movement of production inputs were some of the factors that persuaded this firm to relocate.

New retail and service development away from central Philadelphia included the 69th Street area in Upper Darby. Being the terminus for hundreds of suburban trolley cars, the city subway and numerous buses every day gave this area great retail attraction. Other suburban retail centers were getting started in Ardmore and Jenkintown. The downtown of Camden along Broadway and the inner reaches of the White Horse Pike were also flourishing.

These were some of the more significant centrifugal forces. But the centripetal forces retained their strength buoyed by yet another invention, the elevator. With this device the steel framed skyscraper could now be raised to tremendous heights and at the same time its ground coverage be very limited. This new structure was well suited to many of the activities which had recently emerged as essential to the workings of the modern industrialized society in which "bigness" was now a fact of life. These buildings very quickly became the focus of finance, insurance, law, management, sales and engineering, to mention but a few. The elevator also made possible a completely new structure for residential purposes, the high rise apartment in which several hundred family units could be located on a narrow parcel of land.

The fact is that in 1930 the central city was unchallenged as a center for arts culture, and entertainment. The Academy of Music and the Philadelphia Opera House along with major sports stadia, universities, medical schools reinforced the attraction of the center along with a vast array of specialized manufacturing particularly clothing and ancillary services. As much as anything else, the existence of five major department stores and three minor ones on Market Street in Philadelphia along with hundreds of retail shops on Arch, Chestnut, Walnut and South Streets invested the city with a sense of richness of selection that could meet the demand for consumer goods and services from an ever-growing and increasingly affluent population. The growth and increasingly efficient functioning of all these activities were in no small way powered by a mass transportation system which provided inexpensive, rapid and easy access to "downtown". At its peak it is estimated that close to one half million jobs were located between the two rivers and Spring Garden and South Street. By 1975 this may have dwindled to half that amount.

The Regional Transportation Network

As stated in the introduction, one of the major forces that influenced the shaping of the expanding region was the enormous investment and substantial extension of suburban rail commuter lines, street trolley car lines and subway and elevated rail lines. Development had begun in the 1890's and continued into the 1920's. The most aggressive developer of these rail lines was the Philadelphia and West Chester Traction Company. In 1902 it installed lines to West Chester and Ardmore, and by 1912 was also operating a line to Media. This company also subsidized the construction of the 69th Street Station in Upper Darby, thus creating the first suburban transportation center of considerable magnitude. It was expected that this station would justify the extension of rapid transit from Philadelphia to this point, thereby securing a connection between suburban residences and urban workplaces. The connection was completed by 1907. Also in 1907 the Philadelphia and Western Railroad began operations between 69th Street and Norristown.

In 1912, a line was opened between Villanova and Norristown. This connected to a Lehigh line which terminated at 69th Street as well. Electrified lines linking cental Philadelphia to Paoli and Chestnut Hill were placed in service during World War I. By 1920 a vast rail network for public mass transportation covered the region as can be seen in the map of the system shown in Figure 5. A large portion of the rapid transit development took place within the city of Philadelphia itself.

By 1905 subway-surface street car operations were in service between the Schuylkill River and 15th Street, and by 1908 extended to Juniper Street. The Market-Street subway-elevated train also began operating about this time. Operations between 69th Street and 15th Street began in March 1907 and were extended to 2nd Street in August of 1908, to the Chestnut Street Camden ferries in September 1908, and on to the South Street Camden ferries in October 1908

In 1922, after a delay in construction caused by World War I, the Frankford elevated train line was opened and provided access to Center City and West Philadelphia (via Market Street subway/elevated) from the "Near Northeast" sections of the city. This line also included a spur which extended from Front and Arch Streets to the South Street ferries. The "Frankford El" as it was called, linked "downtown" with Kensington, Richmond, Bridesburg, and Frankford and terminated at Bridge Street.

Other public transit developments of the period included the introduction of a new innovation, the electric bus (trackless trolley), which made its first appearance in Philadelphia in 1923 running along Oregon Avenue. In 1928, the Broad Street subway began operating along an initial segment extending from City Hall to Olney Avenue. Also of major significance to the area's transportation system was the completion in 1926 of the Benjamin Franklin Bridge (formerly the Delaware River Bridge) connecting center city Philadelphia with Camden New Jersey. This bridge replaced the elaborate ferry boat system linking the two centers. Besides providing an automobile roadway, its design also included provision for both streetcar and rapid transit tracks. The street car tracks were never put in place; rather, they were replaced by two additional vehicular traffic lanes. (The rapid transit line however, was completed during the subsequent periods).

In the 1920's, the motorbus also made its appearance. The first local bus line was established in 1923. Thereafter, additional new routes were established as required to serve the expanding region.

The 1920's also brought the introduction of an entirely new form of passenger transport. In July 1926 the first scheduled passenger air service was established in Philadelphia. It flew from the Navy Yard to Washington, and later to Norfolk. It was discontinued in November 1926.

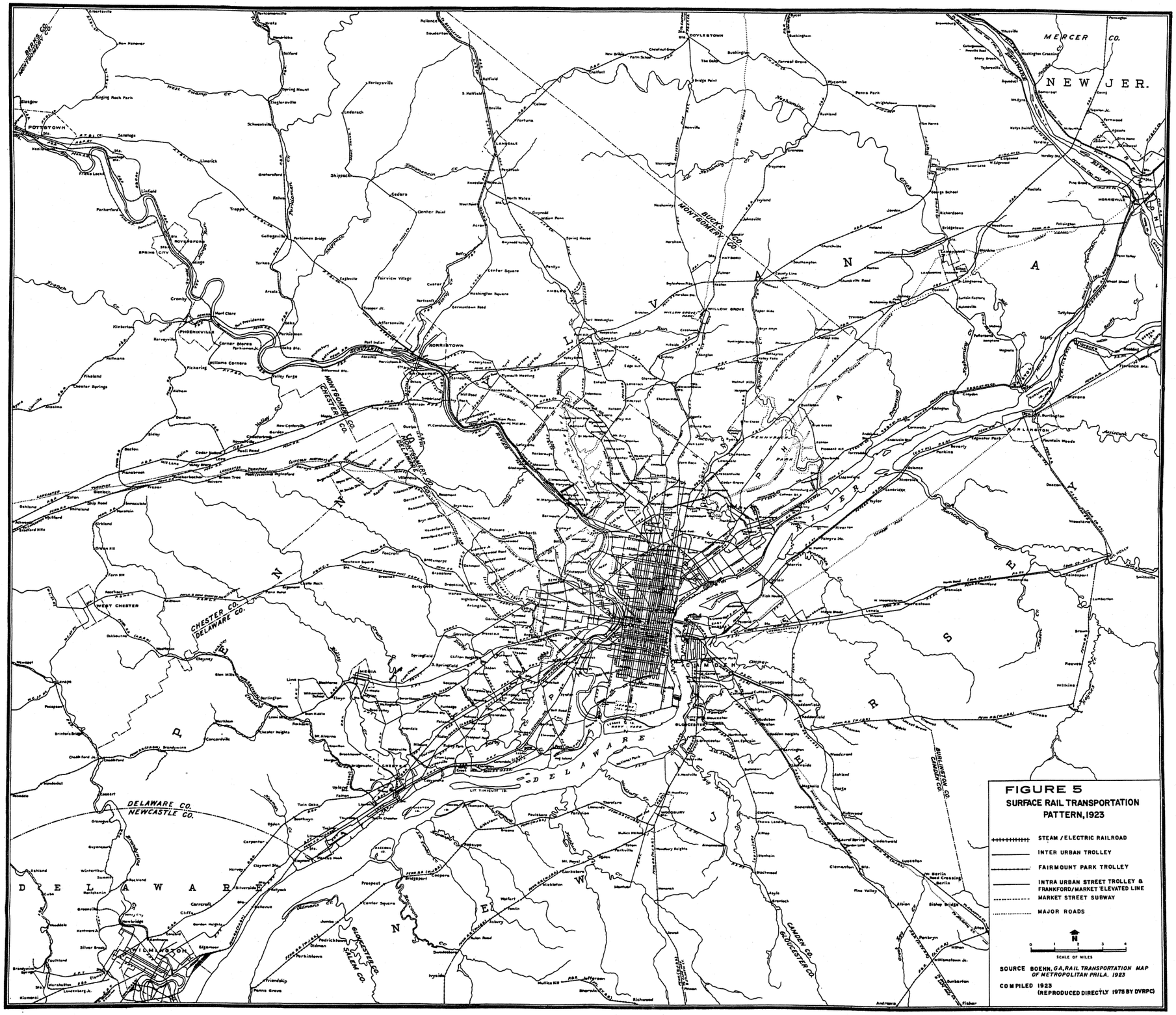
MERCER CO.
NEW JER.
BUCKS CO.
MONTGOMERY CO.
CHESTER CO.
DELAWARE CO.
NEWCASTLE CO.
GLOUCESTER CO.
SALEM CO.
CAMDEN CO.
BURLINGTON CO.
PHILADELPHIA
DELAWARE
SCHUYLKILL
PERKIOMEN
NESHAMINY
POQUESSING
TACONY
PENNYPACK
COOPER
ASSUNPINK
RANCOCAS
POQUESTOWN
NORRISTOWN
PHOENIXVILLE
WEST CHESTER
WILMINGTON
CHESTER
CAMDEN
TRENTON
BRISTOL
DOYLESTOWN
NEWTOWN
MORRISVILLE
LEVITTOWN
BURLINGTON
MOORESTOWN
MT. HOLLY
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FIGURE 5
SURFACE RAIL TRANSPORTATION PATTERN, 1923
STEAM / ELECTRIC RAILROAD
INTER URBAN TROLLEY
FAIRMOUNT PARK TROLLEY
INTRA URBAN STREET TROLLEY & FRANKFORD/MARKET ELEVATED LINE
MARKET STREET SUBWAY
MAJOR ROADS
N
SCALE OF MILES
SOURCE BOEHM, G.A. RAIL TRANSPORTATION MAP OF METROPOLITAN PHILA. 1923
COMPILED 1923
(REPRODUCED DIRECTLY 1975 BY DVRPC)

On the heels of many valiant and ingenious efforts, Henry Ford developed the first practical automobile in 1893. At first only the wealthy owned automobiles, which were regarded mainly as novelties. By 1897 a few motor vehicles were being used for passenger and delivery purposes. But it was Ford's Model T first introduced in 1902 that was truly revolutionary. For the first time, it provided personal, privately owned, motorized transportation at a price the mass market could afford. From this point on automobiles gained popularity at an unbelievable pace because they freed people from reliance upon public transportation and because they were so much faster than horse-drawn vehicles.

New road construction to accommodate the growing use of motorized vehicles was not delayed. The Sproul-Roberts Act, passed by the Pennsylvania Legislature in 1903, created a Department of Public Highways with the authority and power to funnel state funds to counties to assist them in road construction programs. Initially the state subsidized two-thirds of the total cost. Within a short time the subsidy was raised to three-fourths.

The federal government also entered the road construction picture at an early date. The Federal Highway Act of 1916 had the stated goal of upgrading rural roads to assist farmers in the efficient marketing of their commodities. It was to all intents and purposes a subsidy. The act specifically precluded aid to any area that could be defined as urban. By the second decade of the century produce, including milk and other perishables, was carried to markets by truck transport companies. After the war farmers increasingly purchased their own vehicles for heavy hauling. But road construction programs had yet another unanticipated effect. Inaccessible hinterlands could now be reached within fractions of the time it had taken in the horse and buggy days. Thus the foundation for suburbanization was at hand.

With hard surface road networks extending in all directions the use of trucks was not limited to marketing farm products. As a highly flexible inexpensive means for moving raw materials and finished products to factories, warehouses and markets, they established their utility as early as World War I. By 1930 the preemption of certain types of shipping at the expense of the railroads was total and complete.

Also by 1930 a slower, far reaching and debilitating trend could be recognized. For years, Philadelphia, first, because of its importance as a port for inland shipping as well as coastal and international trade; second, because of its old turnpike and road links; and third, because it was a major warehousing and rail terminus--was the point of destination, breakdown, reconcentration and redistribution for a large portion of the region's products. Motor carriers would ultimately cause this concentration to be disassembled and dispersed over a wide area.

Thus by 1930 highway and rail construction had opened the entire

region to development. The movement of people and goods throughout the Delaware Valley at speeds not too different from today's was being accomplished with ease. Figure 6 depicts development and transportation patterns in 1931.

Urban Centers

As stated earlier population increased in the region by 67% in this period. In the twenties, huge amounts of land just beyond Philadelphia's limits and to a lesser extent around smaller cities of the region were being subdivided by developers. The emerging middle class household, taking advantage of better public transportation and private ownership of automobiles, was able to move out to new suburban developments. As seen in Table 10, all the urban concentrations outside Philadelphia grew as immigrants arrived to take advantage of numerous job opportunities and migrants from rural areas continued to move to the larger centers as agriculture became economically less viable for the small farmer. The increase was both in density as well as area, the latter being accomplished by annexation.

TABLE 10. POPULATION OF SELECTED URBAN CENTERS IN THE DELAWARE VALLEY REGION: 1900 AND 1930

City	Population 1900	Population 1930	Increase	% Increase 1900-1930
Philadelphia	1,293,697	1,952,971	659,274	51.9
Trenton	73,307	123,356	50,049	68.3
Camden	75,935	118,700	42,765	56.3
Chester	33,988	59,164	25,176	74.1
Norristown	22,265	35,853	13,588	61.0
Pottstown	13,696	19,430	5,734	41.9
West Chester	9,574	12,325	2,451	28.7
Phoenixville	9,196	12,029	2,853	30.8
Burlington	7,396	10,844	3,488	47.2
Bristol	7,104	11,799	4,695	66.1
Gloucester	6,840	13,796	6,956	101.7
Conshohocken	5,762	10,815	5,053	87.7
Coatesville	5,721	14,582	8,861	154.9
Collingswood	1,633	12,723	11,090	679.1

Sources: U. S. Bureau of the Census, Census of Population: 1900, Vol. 1, Pt. 1, Table 5, pp. 267-271 and 331-350.
_____, Census of Population: 1930, Vol. 3, Pt. 2, Table 12, pp. 188-193 and 665-674.

FIGURE 6

DEVELOPMENT AND TRANSPORTATION PATTERNS 1931

INFORMATION DATE: 1923 - 1939

LEGEND

- Developed Area
- Primary Roads
- Secondary Roads
- Railroad Trunk Lines
- Railroad Branch Lines

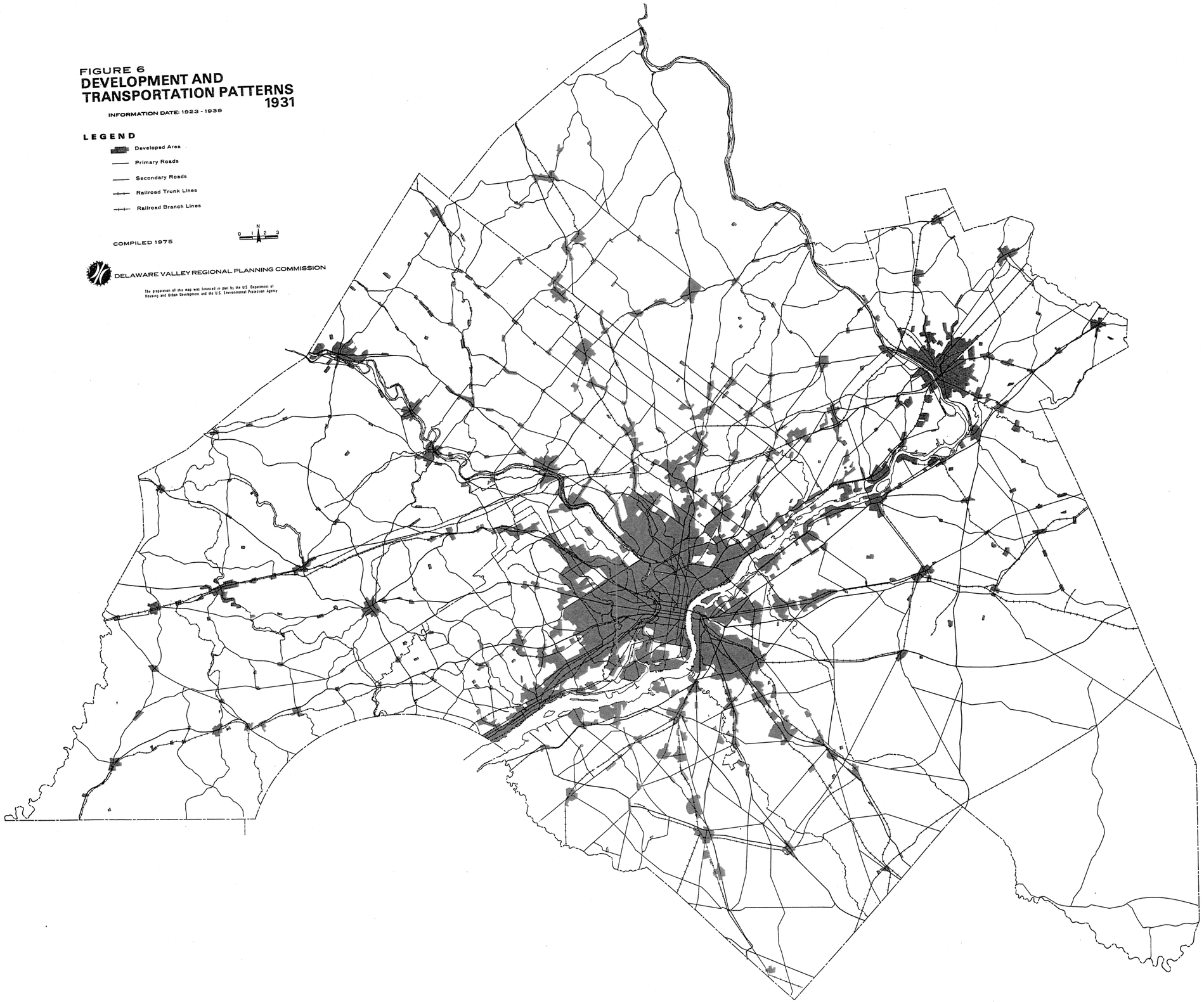
N

0 1 2 3

COMPILED 1975

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency



The greatest amount of growth occurred in those counties which had previously been agricultural. As indicated by Table 11, Delaware, Camden and Gloucester Counties had the largest increases in population, the latter two more than doubling and Delaware increasing three times. Each of these counties witnessed widespread development of new small centers and towns substantial growth of old along with accompanying growth of supporting industries and services.

Philadelphia's growth rate slowed considerably during this time. In a large measure this was due in part to its substantial density on the one hand and the availability of land for development at the farther reaches of its boundaries. Another factor which decreased its growth, but not significantly at that time, was the stream of households moving out to Delaware and Montgomery Counties.

Philadelphia, as a city which contained a large amount of land area, demonstrated one characteristic which set it apart from the other cities in the region: its size and the distinct socio-economic divisions of its population which fostered spatial separation within the city.

TABLE 11. POPULATION BY COUNTY IN THE DELAWARE VALLEY REGION: 1900 AND 1930

County	Population 1900	Population 1930	% Increase	% of Region 1900	% of Region 1930
Bucks	71,190	96,727	36.1	3.6	2.9
Chester	95,695	126,629	32.3	4.8	4.6
Delaware	94,762	280,264	196.1	4.8	8.4
Montgomery	138,995	265,804	91.2	7.0	8.0
Philadelphia	1,293,697	1,950,961	50.8	65.1	58.7
Burlington	58,241	93,541	60.6	2.9	2.8
Camden	107,643	252,312	134.4	5.4	7.6
Gloucester	31,905	70,802	121.9	1.6	2.2
Mercer	95,365	187,143	96.2	4.8	5.6
Region	1,987,493	3,324,183	67.2	100.0	100.0

Sources: U. S. Bureau of the Census, Census of Population: 1900, Vol. 1, Pt. 1, Table 5, pp. 267-671 and 331-350.
_____, Census of Population: 1930, Vol. 1, Table 11, pp. 186-187 and 660-665.

Various areas within the city exhibited distinctive characteristics which set them apart as different "towns" within town. The Northeast was a mill town, which by 1930 had 479,000 inhabitants and more than 2,000 factories. Far from being a place of a mass of isolated and alienated metropolitan workers, the residents of the area had more organized activity than any other district. It was the home of benefit associations, craft unions, fraternal orders and ethnic clubs. The textile and metal working firms had been there from the Civil War on. The abundance of cheap housing held many workers close to these mills.

South Philadelphia served as a port of entry for poor immigrants and Blacks. It was generally a refuge for the poor and contained Philadelphia's ghettos. It contained the largest portion of the Port of Philadelphia and had many factories which utilized these immigrants and poor residents as cheap labor. The area was separated from the downtown area by a district of slum housing and a red-light district on its northern boundary. Though many of South Philadelphia's inhabitants commuted to the downtown area to work in half manufacturing* firms and service trades, South Philadelphia was isolated and left a separate area by this district. Thus set apart, it was a place where poor people could enjoy a stable existence and immigrants could learn American customs and be assimilated while enjoying the support of those with backgrounds similar to their own.

West and Northwest Philadelphia functioned as suburban bedroom communities. Separated from the downtown area by the Schuylkill River, West Philadelphia was a community of solid middle-class homes isolated by distance from the more urban workplaces. Northwest Philadelphia was in a similar position, but also had an industrial area in its inner section. Served by public transit as well as railroads, the Northwest section of the city was a far less restrictive area than West Philadelphia, or even than the Northeast, and population from many different ethnic groups located in this area.

The smaller cities in the region like Trenton or Chester were major industrial centers as well. Their industries of course were not as diverse as those of Philadelphia. All contained large numbers of people employed in the region's basic industries--iron, steel, and textiles--as well as sizeable service sectors. Table 12 shows the major employment sectors in Philadelphia and its satellite cities. Their economic viability depended upon either a few large industries not found in other areas within the region, or on a greater number of smaller industries concentrated in the city. Trenton is the best example of the first type, deriving its industrial income from large steel and pottery factories. Norristown, on the other hand, contained a number of smaller heavy manufacturing concerns which produced limited amounts of various kinds of goods. Camden fell between these two extremes, having

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*Half manufacturing firms were factories which also sold some portion of their manufacture directly on the premises.

four important manufacturing firms--Campbell's Soup, Esterbrook Pens, the Victor Talking Machine Co. (later RCA Victor), and the New York Shipbuilding Co.--which produced the major portion of the city's output as well as many much smaller firms supplying the remainder.

TABLE 12. EMPLOYMENT IN SELECTED INDUSTRIES FOR URBAN CENTERS OF THE DELAWARE VALLEY REGION: 1930

Industry	Phila.	Trenton	Camden	Chester	Norris-town	Lower Merion	Upper Darby
Construction	69,775	3,350	3,820	1,000	838	800	1,488
Textile	61,322	1,240	1,533	3,304	1,274	240	548
Chemical & Allied	18,212	227	1,120	1,600	381	180	388
Blast Furnaces Steel Mills	9,185	3,400	240	1,950	640	122	134
Metal Fabricating	40,747	2,500	3,650	3,300	770	271	620
Steam Street Railroads	32,398	2,050	1,900	650	800	360	708
Wholesale & Retail Trade	141,545	6,420	6,400	2,500	1,500	1,400	3,770
Profession & Semi Professional Services	54,634	3,900	2,300	1,100	1,200	2,058	1,990

Source: U. S. Bureau of the Census, Census of Population: 1930, Vol. 4, Table 12.
(Figures based on interpolations of generalized occupation data)

Being smaller than Philadelphia, these cities tended to be more compact. Expansion of industrial and residential areas had preempted the available land within their corporate limits by 1930. This lack of open area resulted in a slower rate of growth than that of some of the smaller

towns shown in Table 13. The infrastructures in these cities were also pushed to their limits, for they had been established at earlier times, and were not designed to support more than their current level of population. The limitations on these cities resulted in the proliferation of satellite communities which helped to ease the growing pains of the larger centers.

TABLE 13. URBAN CENTER POPULATION AND RANKING: 1900 AND 1930

Urban Center	1900		1930	
	Population	Ranking by Size	Population	Ranking by Size
Philadelphia	1,293,697	1	1,950,961	1
Camden	75,935	2	118,700	3
Trenton	73,307	3	123,356	2
Chester	33,988	4	59,164	4
Norristown	22,265	5	35,853	5
Pottstown	13,696	6	19,430	6
West Chester	9,524	7	12,325	10
Phoenixville	9,196	8	12,029	11
Burlington	7,392	9	10,844	13
Bristol	7,104	10	11,799	12
Gloucester	6,840	11	13,796	8
Conshohocken	5,762	12	10,815	14
Coatesville	5,721	13	14,582	7
Collingswood	1,633	19	12,723	9

Sources: U. S. Bureau of the Census, Census of Population: 1900, Vol. 1, Pt. 1, Table 5, pp. 267-271 and pp. 331-350.
_____, Census of Population: 1930, Vol. 3, Pt. 2, Table 12, pp. 188-193 and pp. 665-674.

Though not literally cities, various townships in the region could be compared with middle-sized cities. They had large populations and sizeable employment sectors similar to those of the middle-sized cities. By 1930, Upper Darby Township had a population larger than that of Norristown and was a center for manufacturing and service retail establishments. It was then the prime site for relocation of Philadelphia manufacturing firms. Lower Merion was mainly the residence of wealthier workers who commuted to Philadelphia. Its population almost equalled

that of Norristown. Very little manufacturing occurred here as an export base but a large service sector developed in response to the high standard of living the people there set for themselves.

The small urban centers were a less homogeneous group than the middle-sized cities as indicated in Table 13. These places while smaller were not as compact as the middle-sized cities. Their boundaries were more flexible and thus allowed for further growth. In fact, annexation of large areas of land in some cases accounted for some of their substantial population growth. Some did not grow as fast as others due to limits imposed by existing systems of sewage disposal, and water and power supply. In other instances decline in demand for local manufactures, due to the rapidly changing tastes in the mass market and shifting availability of resources which also tended to limit growth in these areas, resulted in many shutdowns and buildings remaining idle for years. In still other situations new transportation links lessened the importance of those places which had served as agricultural marketing centers outside of Philadelphia.

In contrast the smallest towns whose increases in population were greatest--Gloucester, Conshohocken, Coatesville and Collingswood--had strong transportation links with either Philadelphia or Camden and their products were essential to the nation's military requirements. This gave rise to increases in their resident labor force.

The Region's Economy

During this period the composition of employment in the region was shifting in ways which indicated the ever-growing importance of the service sector of the economy. As production techniques became increasingly more sophisticated (for example, the use of belt conveyers for continuous flow assembly) fewer workers were necessary to produce a given amount of output. At the same time a larger number of personnel were required to see to the management of production, transportation and merchandising of products. These workers were frequently those children and grandchildren of 19th-century migrants who had not left school to work to help support the family. They had been able to acquire broader educations and thus were equipped to work at the newly emerging skills and professions and were rewarded with higher salaries. This trend is indicated by the large numbers of people employed in the wholesale and retail trade and other professional and semi-professional service categories in Table 14. The table also shows that significant numbers were employed in these sectors across the entire nine-county Delaware Valley Region by 1930. Table 14 also indicates that the two most important industries, in terms of export products which continued to dominate the economy of the region at this time, were iron and steel and related manufactures, and textiles.

TABLE 14. EMPLOYMENT IN SELECTED INDUSTRIES BY COUNTY, DELAWARE VALLEY REGION: 1931

Industry Groups	Bucks	Chester	Delaware	Mont-gomery	Phila-delphia	Burl-ington	Camden	Glou-cester	Mercer
Agriculture	7,167	9,731	3,089	9,330	NA	5,738	2,347	4,977	2,791
Construction	2,821	3,719	8,473	7,225	69,775	2,470	8,335	2,074	5,561
Food	NA	899	1,223	1,595	21,758	NA	3,376	NA	NA
Textiles	3,284	1,725	11,067	7,804	61,322	2,025	2,914	489	3,122
Clothing	2,486	NA	NA	3,506	38,999	NA	NA	NA	NA
Paper & Allied	NA	834	NA	NA	NA	NA	NA	NA	NA
Printing & Publishing	NA	NA	1,974	NA	18,362	NA	3,467	NA	NA
Chemical & Allied	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rubber	NA	NA	NA	NA	NA	NA	NA	NA	3,684
Clay, Glass, Stone	NA	NA	NA	NA	NA	NA	NA	NA	5,618
Primary Metals	NA	5,120	3,490	3,765	9,185	1,907	NA	NA	3,984
Metal Fabricating	2,017	1,839	7,858	7,105	40,747	3,913	7,143	1,089	3,908
Steam & Street Railroads	1,556	2,029	4,465	3,868	32,398	1,100	4,012	1,105	2,755
Wholesale & Retail Trade	3,142	4,071	13,841	10,397	141,545	3,494	13,849	2,689	9,021
Auto Repair Shops	NA	NA	3,854	NA	14,516	NA	NA	NA	NA
Other Domestic & Personal Services	1,745	3,443	8,746	11,950	70,505	2,285	5,050	1,382	5,339
Other Professional & Semi-Professional	2,089	3,454	8,958	8,974	54,634	2,218	5,602	1,456	6,297

Source: U. S. Bureau of the Census, Census of Population : 1930, Vol. II, Employment and Unemployment, p. 365

Agriculture continued to decline in importance within the region. Table 15 indicates the magnitude of change in agriculturally utilized land and in the number of farms in the period 1900 to 1930. The number of farms decreased by at least 25% in all counties except Gloucester, where the number of farms appears to have increased, an observation which may be partially explained by a reorganization of the county's boundaries early in the period. With the decrease in farms, a corresponding drop occurred in the amount of land in farm use. The largest decreases in farm land were in the more urbanized counties, i.e, Philadelphia and Camden, but significant losses were also encountered in counties which had until 1930 been regarded as solid farm counties.

TABLE 15. FARMS & FARM ACREAGE IN THE DELAWARE VALLEY REGION: 1900 AND 1930

County	Number of Farms			Acres in Farms		
	1900	1930	Change	1900	1930	Change
Bucks	6,302	4,360	-1942	358,292	260,972	-98,220
Chester	6,202	4,599	-1603	447,309	375,221	-72,008
Delaware	1,677	689	- 988	92,498	47,569	-44,929
Montgomery	5,860	3,360	-2500	270,769	171,744	-99,025
Philadelphia	1,072	231	- 841	36,002	13,554	-22,448
Burlington	2,549	1,948	- 601	343,096	182,740	-160,356
Camden	1,333	882	- 451	76,535	33,504	-43,031
Gloucester	2,225	2,347	+ 122	148,590	121,369	-27,221
Mercer	1,573	1,131	- 442	132,726	93,051	-39,675
Region	28,793	19,547	-9246	1,905,817	1,298,824	-606,913

Source: U. S. Bureau of the Census, Census of Agriculture: 1910, Vol. VII, Table 1, pp. 451 and 452.
_____, Census of Agriculture: 1930, Vol. I, Table 2, p. 407; Table 3, p. 529.

CHAPTER VI

FROM 1930 TO 1976 : RETROSPECT AND PROSPECT

The treatment of the history of development in the Delaware Valley thus far has confined itself largely to a selective chronicling of what were judged to be critical forces--physical, technological, economic and social--that in part explain where we have been and how we got where we are. Little in-depth analysis was made.

However, in treating the most recent period of development, one cannot ignore the fact that once again, the region has undergone profound, far reaching and unsettling changes within a very short span of years. And more recently external factors, such as the energy shortage, inflation, questioning of government functioning and structure itself, and unremitting examination of social values, turns the present into a time of searching for increased understanding and demands improved foresight.

To this end the treatment of the period 1930 to 1976 has certain objectives which go beyond the preceding ones. These include:

1) To review recent trends of change, including well-known, long-term trends, to determine if they are continuing, speeding up or slowing down, or being modified in other ways.

2) To unearth any new kinds of relationship between various land uses which are emerging and determine their significance.

3) To project the probable impact of recent technical and economic changes on future land development.

Well Known Trends of Change

Land use changes characteristic of the first 30 years of the 20th century have been described in the previous section. If we jump forward to 1976 and look back we see that earlier trends have become set patterns and the rates at which changes have occurred have been accelerated. The most prominent of these are:

1) The rapid expansion of the urban area into its rural hinterland

and corresponding decline of rural pursuits and disappearance of the rural character of the land.

2) The placement of most new construction on previously rural land, with relatively little redevelopment of old urban land.

3) The thinning out of urban uses as development spreads outward, both by a less intense use of the individual tract or parcel and by a greater spacing between urban use parcels with larger and larger empty spaces in between, immense areas of land which are not used for either rural or urban purposes.

4) The formation of these sprawling fingers of urban use along the main transportation corridors and connecting rural roads so that the appearance of urbanization is even greater than the actuality.

5) The relative growth of commercial and industrial land users in both the older and newer suburbs at the expense of the central city of the region, Philadelphia, and the other smaller cities, Trenton, Camden, Chester, and other old towns.

6) The relative growth of upper income group populations in the newer suburbs at the expense of older areas, with the gradual segregation of the region's population into income-segregated and race-segregated residential communities on a grand scale.

7) The abandonment or idling of large areas of old buildings and land in the core cities of the region.

8) The continued development of Philadelphia's central business district (CBD) in contrast to the continued decay of the Camden and Trenton CBSs.

9) The greater degree of specialization of CBDs as office centers, of outlying shopping centers for retail trade and other areas in specialized uses.

10) Balkanization in the form of 354 minor civil divisions in nine counties each acting as independent entities.

Since these trends are directly associated with the development of nearly universal use of the automobile to carry out most of the trips required by life in the metropolis, and auto use has profoundly affected many other aspects of life, the period since the 1920s has come to be known as the "automobile age", or the "motor age". (Perhaps the latter is more descriptive since the motor truck is also a very important factor in the kind of urban pattern created in this period.) This popular impression is quite correct. The present arrangement and scale of

urban land use would never have been built up, and could not be sustained now, without the use of motor vehicles.

While these trends identify the physical changes going on, certain socio-political developments also manifest themselves in the form of increasingly complex government programs administered by a maze of increasingly complex government programs administered by a maze of federal, state, county and municipal (and lately inter-governmental) agencies. The main purposes of these (at least the intended purposes) are: (1) to offset the consequences of the growth in scale of the whole metropolis and its effects on the provision of services to the smallest units of community life, the neighborhoods; (2) to remedy the devastating effect of metropolitan growth on the natural environment; and (3) to put into effect the larger society's concern for the needs of poor and disadvantaged groups which grew to be a powerful force in the period since 1930.

In addition, the past 35 years has been an era of almost continually rising incomes for large proportions of the population due to the superb performance of the nation's industrial system. And until recently it has also been characterized by continually declining, or only slowly rising, costs (relative to total income) for the necessities of life : food, clothing and shelter. The net result has been the ability of individuals, businesses and government to pay for a vast array of services. Thus in addition to the workings of the Federal Government programs, there has emerged a vast complex of public and quasi-public administrations, authorities and systems layered over the region. Just to mention a few, these include: county and minor civil division government, school districts, police and fire districts, water and sewer authorities, state and federal highway systems and administrations. This successive or simultaneous "layering" of bureaucracies, combined with government programs (explained in part by changing social values and their expression through government action) referred to above has, to say the least, made public investment and public action of any kind an extremely complex undertaking.

Taken together all of these have had their effect on development patterns, the physical arrangement of facilities, and the location of population groups as well as their attitudes toward one another, which cannot be ignored in a history of development in the region.

More of the Same Makes Something Different

The trends outlined above were operative from the 1920s. But even up to 1950 they had not yet produced a drastic alteration of the pattern of life in the region. In 1950 the region looked much like it had 20 or 30 years before, although suburbanization based on the logistics of the automobile and the truck started in the 1920s when they first became widely available and a network of paved roads was put in place. Yet

within the short span of 26 years (1950 to 1976), life in the Delaware Valley region has become qualitatively and quantitatively so different that it is hardly recognizable as the offspring of the 19th century railroad-oriented city which preceded it.

For two decades, 1930 to 1950, Philadelphia remained a tightly organized patchwork of rowhouse residential neighborhoods alternating with high employment-density strips of industry and business. At the stations of the suburban railroad network more spacious higher income villages clustered around a few stores. For rich and poor alike the downtown department stores served for shopping needs other than the daily necessities which were found in the strips of stores along main streets throughout the city and smaller urban centers.

Most wholesale business and business services were located in the core area. At the same time most transportation needs were served by the street cars which moved along the grid of streets between Cheltenham Avenue and Snyder Avenue and from the Delaware River to Cobbs Creek. Substantial suburban centers could be numbered on the fingers of one hand: 69th Street, Ardmore, Germantown, Frankford and Jenkintown. Two of these were old town centers located within the boundaries of the city. One was the terminus of a city transit line and the other two were railroad commuter villages grown large.

Trenton and Camden were separate cities, and Chester, Norristown, Conshohocken, Bristol, Woodbury and other lesser centers were country towns with slight connections to Philadelphia. The rural land around the towns and cities was fully utilized by dairying, vegetable growing, and hog and poultry farms, or by the estates and fox hunts of the rich.

Lest this description seems too idyllic it should be noted that the air and streams were more polluted than they are now, the public complained bitterly about the service on the car lines, and the streets already were overloaded with traffic (a major cause of the bad transit service). The railroads already had written off passenger service as a bad investment, the growth of the black ghetto already had produced bitter animosity, urbanization already had swallowed up much of eastern Delaware County and parts of eastern Montgomery County, and important industries were migrating out of the region or to the suburbs at a disturbing pace.

Just 25 years later, in 1976, the urbanized or partially urbanized districts have sprawled over an area with two to three times the radius of the urban area in 1930, while the area in square miles is now six-to-nine times as large. The facts of geographic scale simply demanded a new pattern of urban life. The residents of suburban areas see as much of Philadelphia's central city as residents of Reading or Lancaster, unless they are among the minority of suburban workers who work in the city. The region has been fragmented into a number of

semi-independent urban "domains" which both complement and compete with each other economically and socially. The term polynucleated has sometimes been applied to this kind of territorial arrangement of human settlements, but it is actually inappropriate, for there are no really strong patterns of nucleation or definite subdivisions of the urban area.

Critics of this pattern observe that the low-density region is expensive to keep up, wastes valuable land, and adds unnecessary geographic distances to the problem of accessibility. But regardless of these, our observation is that the region works, and works well enough to sustain itself in economic competition with the rest of the United States.*

Startling as it may be in contrast with the development pattern of 1931, Figure 7 shows the development of the region in 1970. The challenge now is to maintain its viability for future generations.

The Central City

Retention of a large central business district and its supporting transit network, against the floodtide of the automobile era as well as the pressures of business and governmental decentralization, is the most unusual part of the land development history of the region in the past 20 years. In this country, only New York and Chicago are comparable in this respect, and they are much larger cities. Coupled with this has been a revitalization of residential areas.

The Unusual Role of Philadelphia's Central Business District.-- Although it has retained its preeminance as an employment center in the region, Philadelphia's CBD nevertheless has undergone great changes since 1946. It was then the wholesaling and warehousing center of the region and a great manufacturing district. Food wholesaling was deliberately removed to South Philadelphia to clear the Old City area for revival as a historic monument and residential quarter. The other goods-handling activities formerly in the northeast and northwest quarters declined naturally, leaving a painfully-congested area for more modern quarters in both the city and suburbs. On the south side, decaying slum areas have been rehabilitated for occupancy by high income

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*For a long time wages as reported by the Bureau of Labor Statistics and incomes reported by the Census have been slightly lower in the Philadelphia metropolitan area than in the other six or eight largest metropolitan areas. Living costs however typically showed a larger gap, so that Philadelphia families, statistically at least, enjoyed real incomes comparable to the best. Living costs have tended to rise faster here in recent years, and the region's relative advantage may be disappearing.

FIGURE 7

DEVELOPMENT AND TRANSPORTATION PATTERNS 1970

INFORMATION DATE: 1965 - 1972

LEGEND

- Developed Area
- Limited Access Highways
- Primary Roads
- Railroad Trunk Lines
- Railroad Branch Lines

COMPILED 1975

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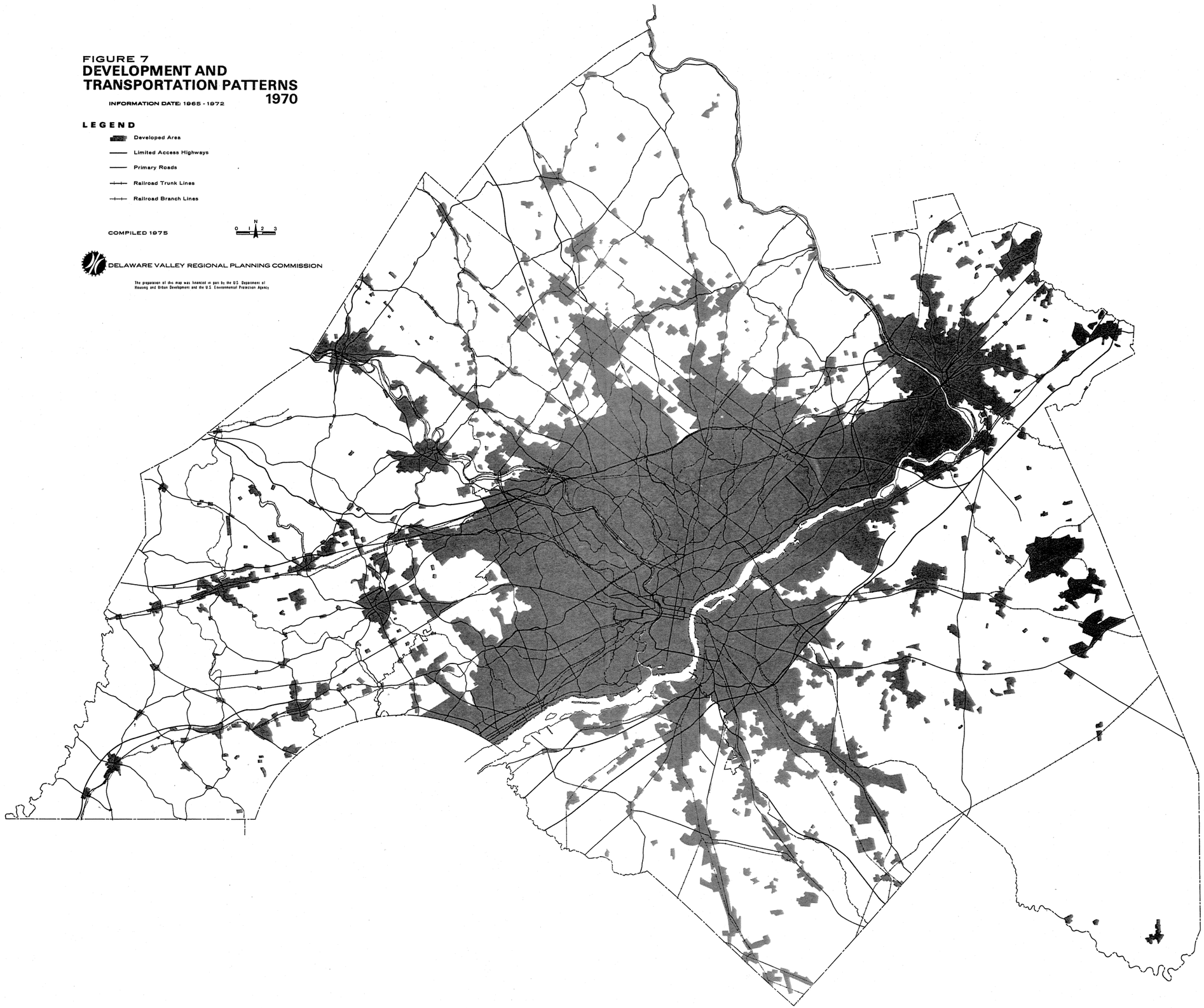
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

The preparation of this map was financed in part by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency



residents with a taste for in-town living. In the core area large-scale new office building development came late in the great office building boom, having gotten underway only after the completion of Penn Center (1965). With this development its role as an office employment center was confirmed. In this respect it is now similar to most other North American CBDs, being now specialized for the 9-to-5 accommodation of a commuter office work force, with substantially reduced activity after dark.

In-Town Living.--The re-occupation of old areas close to the central business district of the city by higher income residents has appeared as a trend all over the United States in the last ten years. It appeared earlier in certain eastern cities, and Philadelphia was one of the leaders in this. The trend is still quantitatively small compared to even the present paired-down, suburban settlement pattern. But it has taken hold now in almost all sectors of the periphery of Center City and appeared in Germantown and Frankford, and in some of the old towns in the suburbs. In some of these areas the urban renewal program has been used to further the pattern, and the largest, the Society Hill area in Philadelphia, is distinctly the product of redevelopment.

The rehabilitation of rundown areas is paralleled by an increasing interest and effective activity on the part of residents of many other older neighborhoods not yet abandoned by the middle and upper-middle classes, directed toward preserving them and retaining their present occupancy. The values sought here are much the same: neighborhood sociability and local control over a small well-defined "turf" with much of the daily activity accomplished by walking rather than driving, and reduction of the daily commute to a walk or short transit ride or walk to a commuter railroad station. As a bonus the homeowner has little land to care for and a reduced burden of property tax and heating bills.

Just as the suburbs would be impossible without (high energy-cost) auto transportation, in-town living would be impossible without (high energy-cost) air-conditioning; and there are other limits, present and future, to the pattern. As in the case of the exurbanite movement, suitable sites will soon become scarce and over-expensive. The fiscal problems of the cities threaten to cut into services and impose much higher tax levels in the future, and we cannot predict what effect these will have on the in-town living trend.

The Sad Fate of Redevelopment.--In 1976 the state of redevelopment, once eagerly awaited as the savior of our central cities, is that it is nearly dead even though its name has been changed to urban renewal. The accumulation of problems arising out of cumbersome laws and procedure, growing bureaucratization, the displacement of minority groups, rising costs and shrinking finances, has reduced new program commitments to

near zero. The several authorities in the region are having great difficulty in completing present projects and disposing of land inventories in accordance with their original plans. For the most part completed projects have not accomplished the high social goals once set for the whole program, and most of its former backers are disillusioned.

The most successful parts of the urban renewal program have nevertheless had one important impact on Philadelphia. It has helped to save the city from the loss of its three large universities and two of its medical schools, and has taken advantage of the large state and Federal investments in historic site restorations to create a tourist attraction and residential area of great value to the city, particularly in maintaining the viability of Center City.

New Kinds of Patterns

The explosive growth experienced by the Delaware Valley region in the post-World War II period demanded new patterns of urban development. Some of these were in fact new to the region, others were simply the further development of forms which had appeared earlier; all, however, have had a great impact on the form of the region and the nature of urban life.

Suburban Shopping Centers.--These existed well before the Second World War (Suburban Square in Ardmore is one of the first such centers in the United States), but in the late 1940s the pattern of unitary ownership and management of large auto-oriented centers with high-rental tenants carefully chosen to fit a pre-conceived market strategy, matured and was spread systematically by large scale developers. By 1960 many such centers were in existence. Since 1960 the pattern for new centers has undergone a considerable further change. New centers now include entertainment and restaurant facilities, offices and community facilities. They serve a broader range of purposes for more hours of the day than before, and may be on the way to becoming the core of a much more interesting and complete community life in the suburbs.

The newer centers are larger and have a greater variety of retail and service businesses also, and these, plus extensive continuing development of the familiar business strips along main regional arteries such as routes 130, 611, 202, and 309, have made the suburbs much more independent of central Philadelphia. A greater part of the suburban population therefore now has no compelling direct economic link with the central city as far as retail trade and services are concerned. In this region the "revolution" is over and the present hierarchy of suburban centers may very well be fixed. The evolution of the centers into something more than just a place to shop may or may not occur, but there are not likely to be many more of them nor are they likely to be displaced for a long time to come.

Suburban Apartments.--Almost unknown at the end of World War II, apartments in the suburbs were encouraged by the FHA "608" program as a means of quickly meeting the pent-up, war's-end demand for housing. Yet the great suburban housing boom of the 1950s focussed mainly on owner-occupied family houses on large plots, designed to fit the needs of the large families and the optimistic ideas about the ever-rising value of a home, characteristic of the time.

In the early 1960s the suburban market for apartments was increased by the desire of older people to move out of the city and the beginning trickle of refugees from the family house neighborhoods (divorcees, widows, the unhandy or bored-with-lawns, or cardiac-case homeowner). The rapid growth of business and industry in the suburbs with their new transient technicians and management personnel also both contributed to the market and prepared the ground in the regulatory environment of the areas in which they settled.

By the mid-1960s nearly a third of all new dwelling units in the region were apartments, and the suburbs shared almost equally in the trend. The rapidly rising cost of land and the shortage of investment capital in the late '60s gave further support to the trend, while forcing many developers to hunt farther out in the fringes of the urban area for sites. At the same time demographic and social trends were giving more support on the demand side of the equation. By 1969 one-half of all new units were apartments, and apartment groups were being built at the far limits of urbanization.

The proportion of new units built as apartments continued to rise until 1971 but has slipped back somewhat since then. It is still high compared to the 1950s. The decline is probably a consequence of the extreme difficulty of getting land zoned for apartment development and the rapid increase in the price of the product, rather than any lessened desire of consumers to choose apartments in preference to houses.*

In spite of this recent decline in popularity, apartment living seems to be here to stay, a permanent fixture in all parts of the urban area. In 1970, 27 percent of all units in the region, 22 percent of all units in the suburbs and 33 percent of those in the four large cities were apartments. Like shopping centers, the individual development units

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*There is no doubt that the present demographic structure of the population would favor more apartments. But with new housing available only to the top level of income groups, the product mix has shifted to fit their tastes, which are biased by the tax advantages of ownership as composed to renting. The condominium apartment formula is one answer to this but it is still an awkward, risky and expensive device compared to simple home ownership.

have become larger and more apt to include additional facilities such as convenience shops, community club rooms, restaurants and particularly recreation facilities. Many offer free bus service to nearby towns or shopping centers and commuter rail terminals.

The growth of suburban apartment living has expanded the choice of housing units available in the suburbs and made it possible to conveniently live one's whole life there. As in the case of the more varied services available in the suburban shopping centers, the affect has been to cut off more suburban people from any interest or knowledge of the central cities and further divide the region into competing, nearly self-sufficient "domains".

New Towns.--The first new town development in the region was Levittown in Bristol Township, Bucks County, which almost overnight created housing for 60,000 persons; this was followed by a similar development in Willingboro Township, Burlington County. Both of these were started in the 1950s and no other developments of similar size have appeared since then. (Beckett New Town, a proposed development in Gloucester County, is proceeding much more slowly than originally intended.) Given the present difficulties in land assembly, the slow housing market and the poor financial records of new towns in other regions, future additional new towns seem unlikely.

Other Large-Scale Housing Development.--House building has steadily fallen into the hands of the larger-scale builders. This has come about for several reasons, among which must be noted the land-price difficulties described in Chapter VII (see Land Constraints). To assemble a large enough tract for large-scale development the developer must go far out into the country side and through use of "straw names" and similar devices along with great patience assemble four to ten or more farms. Only an efficient large-scale builder with plenty of capital and a long range point-of-view can afford this or benefit from it. To outweigh the poor location in the minds of buyers he must conduct a skillful and professional marketing operation and supply extras in the package such as recreation facilities, special police protection, schools etc. In some cases commercial areas have been included making the largest of such units come close to the status of real new towns. (They have fallen short of this goal however in scale and in the lack of lower-income customers and sites for basic employment.)

The effect of the dominance of large scale developers in the housing market has been to focus recent growth heavily in certain areas. These high growth areas were not scattered randomly. They were concentrated in Willingboro (formerly Levittown, N. J.), lower Bucks/Northeast Philadelphia, Lindenwold/Cherry Hill, east central Chester County, Doylestown/Lansdale/Route 309 in central Bucks and Montgomery Counties, and northeast of Trenton in Mercer County.

Several schemes have been proposed and even reached the stage of being authorized by state and local development regulations, which would make development of housing on large tracts cheaper and more flexible as to type of unit, and permit better design of the subdivision in relation to the topography. These include planned unit development, cluster zoning, and saleable development rights. Up to now this widely held hope for the future has had very limited acceptance.

The Emergence of the County Seats and College Towns.--In the suburban counties, the county seat towns--Doylestown, Norristown, West Chester, Media, Woodbury and Mount Holly--have emerged as important places as suburbanization has increased the importance of the county governments. College and university towns also have developed rapidly and come to influence large areas because they offer cultural attractions which are rather sparse in the suburbs. The combination of college and county seat in West Chester is particularly powerful. Glassboro and Princeton are already developed as sub-regional centers, and Collegeville could emerge as a growth center.

Exurbanism Unlimited.--Second homes, acquired as refuges from the (allegedly unwholesome) urban environment, underwent phenomenal growth in the 1960s although general economic conditions reduced this in more recent years. The Atlantic seashore and the Poconos were favorite choices for location by residents of the Delaware Valley region, but many found more accessible locations within the nine counties. Wooded areas, abandoned farms and stream banks in upper Bucks and Montgomery Counties, western Chester County, the banks of Perkiomen and Nockamixon and French Creeks, and streams in the Pine Barrens as well as many other locations have shared in this.

Summer homes (which are apt to be transformed into year-round homes in any case) are matched in extent by full-time "road-runner" (houses on road frontage only) homes scattered to the far corners of the region. Both summer and full-time homes in exurban locations depend logistically on the paved rural secondary roads (developed by the states with Federal assistance) over which auto and school bus commutation is possible, and several essential service systems (wells and pumps, septic tank and tile field sewage disposal, bottled gas) which are reasonably economic in individual owner operation. All of these were originally developed to serve the farm population in the 1920s and 1930s, but serendipity intervened and they now serve to undermine the farm economy over a vast area near our cities.

To appreciate the extent of the road runners and summer homes in the region one has only to look at the aerial photographs of the rural sections of the suburban counties. There is little remaining completely rural area left in the DVRPC region outside of the state forests in Pine Barrens and a few townships in western Chester County.

The people who live in the exurban homes come from all walks of life, from farm laborers to artists and writers who sell their output in distant urban markets (Philadelphia and New York). For many, exurban life is an expression of ideology as well as a place of residence. They travel long distances to work in urban places and save little or nothing in total cost when the time and cost of travel are included in the housing package. Bucks and Mercer Counties offer the special case of the high income bracket professionals and literati who sell their skills in New York while enjoying the bucolic residential life. But we suspect that even in these areas people with mundane pursuits and jobs closer to home actually outnumber the conspicuous stars.

There are, of course, many jobs in the smaller centers in the region, and in urban centers such as Allentown, Reading and Wilmington which lie just over the borders of the region so that one need not travel all the way to Philadelphia for work. More recently plant locations have spread into the suburbs where they have increased the potential number of exurbanites in the outermost zones. To a great extent exurban growth is closely related to suburban growth.

Exurbanism Limited.--Many people simply regard exurban growth as the precurser of suburban growth, and believe that every township so affected now will eventually be urbanized. This is a completely unwarranted belief since even moderately full urbanization with density levels similar to present suburban standards would require an enormous population to fill up the present exurban area. Nevertheless most farmers hold to this belief and price their land accordingly.

A much smaller (and more likely) number of added residents and their attendant services, however, will suffice to change the appearance of a rural area to a suburban sprawl area with all the worst features of both worlds. Exurbanites, unlike their dirt farmer neighbors, are opposed to this and as soon as they realize that continued development will destroy the rural values which they sought, they have been apt to form political groups seeking to use the township government to stop further growth.

In the Delaware Valley region, growth of jobs in the suburban centers and in neighboring metropolitan areas brought every corner of the region within reach of a substantial number of job opportunities in the early 1960s. Exurban settlement followed, as well as a large spread of suburban densities of settlement. Regulations and practices designed to inhibit further development spread to the same areas not long after. At the end of the decade only a small minority of local governments lacked land use and subdivision controls, building codes, and officials to enforce them. In Pennsylvania the counties were empowered to complete the process if the local governments failed to do so and Bucks County recently did impose controls on a rural area.

In recent years the Federal Government and the state government

(under federal prodding) have entered the field via environmental controls on sewage disposal systems. Toughened regulation of individual systems will make exurban housing more difficult to develop in the many areas which have poor drainage or clay soils. Regulations plus grants and loans are forcing the construction of new disposal systems in previously developed areas, and the provision of adequate facilities in all new development areas. These are likely to channel growth into partially developed areas and reduce new scattered development in the future.

It seems therefore that the time of the exurbanite has come to an end. Most semi-rural areas are now fighting off further settlement with effective tools for the purpose. But practically no pristine areas remain as fresh fields to conquer in any case.

The Decline of Agriculture

Land used for crop production and pasture has been declining in the region for a half-century. Even so, a substantial industry remains and the value of production is large. Dairying is the largest land user, with vegetables and fruits (for fresh food markets, canning and freezing) coming in second. Cattle finishing for slaughter is important in terms of value, with the King Ranch being the largest single farm operator in the region. Hog producers are dependent on urban garbage for feed, and are declining as that source declines. Poultry raising was once important but has now nearly disappeared. Horticultural specialties (nurseries, producers of flowers, etc.) is the highest per-acre value branch of agriculture. It is the largest in absolute value after dairying and is entirely dependent on the nearby urban market. Many establishments are located in highly urban situations.

Technical change in agriculture in the past has concentrated on reducing labor inputs and getting the highest volume of product out of the best-adapted land. Even though the volume of product has expanded enormously, far less labor is required than in the past, and considerably less land. Correspondingly the demands upon management for technical skills and large capital inputs have increased enormously.

This combination of circumstances has driven large numbers of farm operators and farm labor off the land and forced the abandonment of large areas of former crop land in areas where conditions do not favor the new forms of agriculture. Eastern Pennsylvania and southern New Jersey have resisted this trend perhaps more successfully than any other part of the nation, partly because of the presence of religious and ethnic groups who value their rural heritage more highly than most others and are willing to work harder for less return than others, but also because milk marketing controls (unlike most other agricultural support programs), actually work to keep farm families on the land, in this largest of agricultural industries. As a consequence the Delaware Valley region has not suffered the devastation of its rural areas which

is so obvious in other parts of the east and south.

Nevertheless the rural areas do suffer from too intimate a mixture with urban activities. Farmers find it difficult to compete for workers in the urban labor market as well as being tempted themselves to hire out, and particularly they lose family members to outside jobs. As soon as they have mistakenly sold some frontage land to exurbanites they find the school taxes rising. For some, urban water and air pollution raise costs. For others the controls on pesticides and herbicides imposed by the urban environment are crippling. In return for these they receive an enormous capital gains potential on the value of land owned. But this can be realized only by selling out.

Strong concern since 1970 has been raised about the situation of remaining farms in urbanizing areas, and after many fits and starts legislation has been enacted recently to reduce the burden of property taxation created by rising (urban) land values. But it must be noted here that farm land has generally gone out of cultivation faster than urban development has absorbed it, and that farm land is going out of use in completely rural areas almost as fast as in the urban regions. Urbanization cannot be blamed as the main cause of the loss of cultivated land except in the inner suburbs.

The Department of Agriculture began a course of action in the 1960s designed to shift farm land and families into non-farm activities while maintaining the farm location and community. It has supported the conversion of farm land into recreation spaces and assisted rural communities in the development of urban infrastructure. With the return of high agricultural prices as world food shortages appeared in the last six years, however, it has ended the soil bank program and stepped up its programs for expanding crop production of both new and traditional crops. Its long-term bias has been toward the retirement of marginal land from cultivation and providing assistance to successful farm operators to grow bigger. Hence it has never articulated any consistent policy on urban growth, for or against its expansion into farm areas but the general effect of its actions has been to let urban growth eat up some of its problems, especially excess land and farmers.

If it is true that we have entered a time of chronic world food shortages this lackadaisical policy could change quickly into emphasis on putting every acre of reasonably good land in crop production. The government would have a good reason for this. The rising value of agricultural exports has recently helped off-set the rising cost of oil imports and shored up the dollar in a situation which might have been disasterous. In spite of this the value conferred on land by agricultural activities is still far less than that created by the lowest of urban uses. Thus without controls or some form of subsidy no one can afford to hold land for cultivation if an urban use is offered for it.

In the end the present situation of the farm economy of the region

is ambiguous and its effect on urban development is uncertain.

Transit Improvements

It was mentioned above that the Philadelphia area had retained a network of transit lines of unusual scale and that the large central business district owed its continued existence to this support. The most important elements in this system were inherited from the pre-automobile period and few improvements were made after completion of the Broad Street subway in 1928. These included the opening of a rapid transit train line connecting center city Philadelphia and center city Camden via the Benjamin Franklin Bridge in 1936; and the gradual replacement of most street car lines with more maneuverable motor buses.

In the meanwhile, until interest revived in the 1950s, a number of low traffic-density commuter rail lines were allowed to go out of service, and the railroad companies would have been happy to scrap them all. Surface transit was cut back drastically also and ridership declined sharply on all facilities.

The Philadelphia city administration became convinced in the mid-1950s, however, that this would be disasterous for both downtown and the commuter rail-oriented residential districts within the city. It initiated the present system of subsidies to the commuter lines and established the Urban Traffic and Transportation Board to study the whole region's transportation problems. Later it initiated the acquisition of the privately owned bus and street-car lines and joined with the Pennsylvania suburban counties in establishing the Southeastern Pennsylvania Transportation Authority (SEPTA) to operate all the lines in southeastern Pennsylvania.

The Delaware River Port Authority, originally established to provide trans-river transportation and promote economic activity in the port, had the same perceptions, and after many studies, developed the present Lindenwold high speed line using the pre-existing Benjamin Franklin Bridge line and an old commuter rail right-of-way. This project is unusual in that it was from the start frankly based on a subsidy derived from tolls paid by auto drivers traveling the same route into Philadelphia.

Completion of the Lindenwold line set off a large land development boom in the empty spaces at the far end of the line. The new development includes a large shopping and office center, apartments, and moderately priced houses as well as high priced houses, and is one of the few places in the region where middle income families can find new housing convenient to good transportation into Center City and good local services.

The attempt to save Camden's central business district by putting a high speed line station on South Broad Street failed however, and this

should be noted as a lesson. Transit facilities in the present environment are generally not used by shoppers and probably will not be until private auto transportation becomes much more expensive.

Another example of the impact of highway oriented transportation on existing rail transit was the deterioration of the formerly-elaborate Pennsylvania-Reading Seashore Railroad system connecting Philadelphia with the communities and shore resort areas of southern New Jersey. South Jersey communities had been served by commuter railroad lines of both the Pennsylvania Railroad and the Reading Company for many years. The opening of the Benjamin Franklin Bridge in 1926, coupled with the establishment of bus service from these communities across the bridge into Center City Philadelphia, resulted in a severe decrease in commuter rail patronage. In 1933 the operations of the two railroads were consolidated into the Pennsylvania-Reading Seashore Lines, and duplications of service were eliminated. However, commuter patronage continued to dwindle, and by 1971 all passenger railroad service in southern New Jersey had been discontinued except for that between the rapid transit line terminus at Lindenwold and seashore points.

The main lesson to be derived from the history of recent transit development is that the opening of new land for intensive settlement is among the most important considerations in the choice of routes and stations and in the economics of the operation. This was clear in the minds of the engineers who laid out subway and street-car lines in the pre-auto age, but it seems to have been forgotten in the long drought of the intervening period. It needs to be re-learned now because it seems likely that development in the region might re-install the transit system, perhaps with many changes and improvements, to its former importance as the shaping force of the urban region.

At the present time, a massive public transit project, the Center City commuter tunnel connecting the two major commuter railroad segments of the SEPTA system (formerly Penn Central and Reading Lines), is on the brink of becoming a reality. If it is built this improvement could represent a major break-through in the process of re-orienting the region away from dependence on auto transportation.

The Federal Government is supporting the Center City Tunnel project as part of a nationwide program of support for mass transit improvements and development of technology in mass transit as an alternative to automobile transportation. This is perhaps the most significant aspect of the renewed interest in transit because to fill the need there must be great improvements made, and decisions about the systems to be adopted must be made at the national level because of the scale and complexity of the systems, the massive capital investments required and the time-scale of the process of putting such systems into use. Only the Federal Government can bear the risks involved in this and coordinate a nationwide application of a new system.

At the same time it must be noted that the transit mode has a very long way to go if it is to again be a major factor in intra-regional mobility. Only 5 percent of the daily trips made in the region use transit. A huge investment and many years of work would be required to restore levels of transit availability characteristic of the pre-1946 period.

Federal and State Programs and Their Regional Impact

There are a number of students of urban development for this period who believe that actions of Federal and State Government have had significant impacts in shaping the region, whether such was intended or not. Not a few have maintained that the lack of an overall policy on regional growth against which the panoply of Federal subsidies could collectively be reviewed for consistency or inconsistency, constructiveness or destructiveness, in and of itself was a policy. Yet the Federal Government has taken the position right along that while such programs as highway construction, Federal Housing Administration, and Comprehensive Planning Assistance were interventionary in nature, they were simply correcting ills or inequities that were unremediable by any other approach and/or they were assisting certain sectors to achieve goals which they could not otherwise achieve. But they hastened to add that the impersonal workings of the free market were not really being distrubed.

An analysis of these programs and the verity of the the above assertions has the potential for a major work. All that can be attempted here is to list the more important of the programs and some of their negative as well as positive consequences as viewed through the eye of a critic.

The Federal Highway Construction Programs.--The Federal Highway Act of 1916 was intended to benefit the farmer, particularly by giving him access to railroads at shipping points. It expanded his marketing radius and made movement in rural areas faster and cheaper. The act specifically precluded aid to any area which could be defined as urban. It was a source of direct assistance in road construction until the Highway Act of 1944 was passed. That act authorized appropriations for post-war construction of highways and bridges to connect, by direct routes, the principal metropolitan areas, cities, and industrial centers of the nation. One and one-half billion dollars was set aside for this program, to be distributed over a three-year period. Forty-five percent of these funds was to be spent on the federal interstate highway system, established by this act, 30 percent on roads feeding into this system, and 25 percent on projects on selected roads in metropolitan areas. The needs of central cities were not viewed as of particular importance; more emphasis was placed upon integrating the metropolitan areas into a cohesive national network than upon the particular city in relation to its environs. An attempt was made to upgrade

circulation within the cities, but it was considered less important than the need to unify the four corners of the nation for national defense.

The Highway Act of 1956 was even more sweeping. It authorized appropriations for continuing the construction of highways and established a national system of interstate and defense highways to be completed within 13 years of the date of passage of the act. It created the Highway Trust Fund which received revenues from taxes on motor tires, fuel, trucks, and buses to support construction of these highways. Thus, automobile users subsidized the construction of more highways. The act also provided that the federal share on any project constructed pursuant to its provisions would be 90 percent, while the state's share would only be 10 percent. Eager to expand the road system within their boundaries, the states rushed into the program.

In this region, between 1950 and 1973, more than 160 miles of federally-funded highways were opened for use. Included were six limited access expressways and several bridges spanning the Delaware River. The system was further enhanced by numerous county and state highways which linked into the new highways. The consequences in terms of hastening massive dispersion of population and business from the central city and the transformation of the countryside is to a large extent the central point of this entire chapter.

The passage of the Highway Act of 1962 restored some balance. It outlined a new national policy which required that transportation systems be treated in a framework of comprehensive planning. No longer could highway development be separated from that of other forms of transportation or from its impact upon the shape and nature of communities and larger areas. State and local agencies were required to coordinate with each other in formulating plans "with due consideration to their probable effect on the future development of urban areas of more than 50,000 population".

The Mortgage Insurance Program of FHA.--The Housing Act of 1949 which created the Federal Housing Administration (FHA) and the Veterans Administration (VA) programs for home mortgage insurance was, among other things, the expression of thanks of a grateful nation to its veterans of World War II. The policy expressed was that every American family with a stable income and good financial reputation that wished to own its own home should have the opportunity to do so. This was made possible by stipulating a set of minimum purchase terms that could be met by a large percentage of middle income households; namely a minimum equity contribution of ten percent of the purchase price under FHA and as little as five percent or less under VA, interest at four-and-one-half percent (this rose by only one-and-one-half percent in the next ten years of operation) and as long as 25 years to retire the principle.

In its generosity the program was unprecedented. Supplemented by federal income tax regulations which permitted interest paid on home mortgages to be deducted from adjusted gross income, the argument for ownership was very compelling. This was the good news.

There is another side which is seldom studied and evaluated. Its aspects can be alluded to here only very briefly. The law which created FHA virtually assured its total independence from supervision save for the power of the purse held by the Congress. Even the creation of the Department of Housing and Urban Development in 1961 did not compromise this condition.

In the absence of legislatively-stipulated policies as to specific areas where the program should be applied, the matter was left solely to the discretion of the agency. As the program unfolded, literally hundreds of thousands of new dwellings were built and financed in suburban locations under this program, making possible the abandoment of housing in the older cities. From the vantage point of 1975 it's now pure conjecture to say what might have happened had the program been applied more selectively. Let it suffice to say that had areas inside the older cities whose housing was in good condition been covered as generously as new housing outside them, the entire history of housing in the region for the past 25 years might have been different.

Actually it was not until 1965, after 15 years of operations, that FHA was compelled to change its direction, but by that time the bulk of the post-war housing stock had been built, the pattern of development had been set and the new directive had little impact.

The Comprehensive Planning Assistance Program.--Recognizing the need for governmental planning to guide physical development, Section 701 of the Housing Act of 1954 provided for federal assistance to state, and local governmental units for comprehensive land use planning. The objective of the program was to "strengthen planning and decision-making capabilities...and thereby promote more effective use of the nation's physical economic and human resources." States and municipalities upon meeting administrative standards could receive as much as three-fourths, and rarely less than two-thirds, of the cost of a proposed planning effort. Of great importance was the requirement of the first Urban Renewal Administration that a comprehensive plan be completed by a municipality as a prerequisite to their accepting an application for urban renewal funds. All of this indeed held out great promise that at last new development and re-development would be accomplished in a rational and orderly fashion according to a plan.

But this was not always to be the case. By 1970 at least 300 of the 354 political jurisdictions in the Delaware Valley Region had comprehensive plans and zoning ordinances intended to function as one of the instruments to effectuate these plans. By and large, outide the

older cities, the 10,000 square foot residential lot and multiples of this was the standard set in these plans. Under this restraint, the achieving of higher densities of development, with the exception of high rise luxury apartments and garden apartments in the near suburbs, was effectively prevented.

The Housing Act of 1966 made metropolitan planning organizations eligible for comprehensive planning assistance program. This was followed in 1967 by the Delaware Valley Regional Planning Commission's receipt of 701 funds which then for the first time could be used for region-wide comprehensive land use planning.

Industrial Development Bonds.-- One consequence of increased development, for many municipalities, was that the taxes collected on residential land were inadequate for the provision of necessary services. This led to another unforeseen consequence, namely, intense competition for "clean" industrial and commercial uses.

This competition was heightened and reenforced by the introduction of tax-free industrial development bonds intended to fund industrial land acquisition and development. Such bonds could be issued by a state, county or municipality, subject to whatever limits were set by state law on size classes of political jurisdiction and the limits to amounts and types of debt they could incur. They were viewed as being intended to achieve a public purpose, namely creation of employment and increased taxes, and as such were ruled by the Internal Revenue Service, until 1965, to be in a class with municipal bonds.

Lower land costs, tax concessions, and for a time non-union labor, all were the enticements that ultimately led hundreds of Philadelphia's largest employers and financially strongest firms to desert the city.

Indirect Impact of the Federal Department of Agriculture Policies on Reducing Rural Poverty.--True irony exists in the phrase inscribed in stone over the main entrance to the U. S. Department of Agriculture building in Washington, D. C.: "Dedicated to Preserving the Family Farm". Its planners and economists throughout the decades of 1930, 1940 and 1950 declared that the only solution to rural poverty was migration. The farm units and systems of tenure, particularly in the south, served only to perpetuate and intensify the misery of their occupants. Through vast grants to land grant college extension services, investments were made in research to advance technology in every aspect of agricultural enterprise--seeds, fertilizer, cultivation equipment, processing and storage, etc. The net effect is visible in every major city in the northeastern United States. These programs had the net and final result of making even subsistence farming impossible and thus stimulating massive migration to northern and west coast cities of a segment of the population that was least urban and

least prepared for survival in the urban environment at that time.

The Impact of Inheritance Taxes on Regional Agricultural Stability.-- Under present regulations, the first $60,000 of value in real property of bona-fide farms is exempted from inheritance taxes. Assuming the proprietor of a hypothetical dairy farm of 80 acres dies the land is likely to be valued at $160,000. His outbuildings and home may add another $70,000 to the value of the estate.

This then means that $170,000 of value is subject to inheritance taxes which can be as much as 22%. This means the farmer's heirs must pay the Federal Government (the State of Pennsylvania also has inheritance taxes) over $30,000 to keep the farm intact. More often than not the family is forced to sell the farm to the buyer with available cash who is able to make the "quick deal". This person has often been a speculator or developer.

Some Conclusions.-- This review of federal and some state legislation has been undertaken to focus on and emphasize the importance of and the urgent need to consider all future legislation and plans that are directed to regional growth and improvement within a total framework. That is to say that the policy implications of various programs individually and in combination must be thoroughly analyzed for their positive and negative impacts as well as their potential for being in conflict with one another or in conflict with goals which have been created by the collective constituency that comprises the Delaware Valley region.

CHAPTER VII

TECHNICAL AND ECONOMIC CHANGES : THE FUTURE

The Framework of the Automobile Era

The automobile era of urban growth was characterized by the trends of expansion described above. Associated with it was a well defined set of technical and economic forces, set in motion in the 1920s when widespread truck and auto ownership became possible and the federal and state governments launched highway construction programs which opened the countryside to scattered urban developments. This took place in an institutional setting which included a free land market and favorable treatment of land in the tax system with regulatory power in the hands of the smallest unit of local government, and the organization of land development through private enterprise in small units.

Economically the nation went through alternating periods of recession and heated boom, with an overall rate of increase in real income unparalleled in all history. Accompanying this, population increased spasmodically at high overall rates and migrated into the nation's cities and suburbs at amazing speeds.

Technical changes in industrial processes and in building construction and the transformation associated with the use of trucks rather than rail transportation for most goods and raw materials added a new dimension to the pattern of suburbanization in the later part of the period from 1950 onward. Behind this trend was a time of cheap energy supply, including particularly cheap petroleum for motor fuel, and cheap natural gas as a convenient space heating and process heat source for the thousands of small activity units scattered over the new urban landscape. In addition land was cheap.

In the 1920s and 1930s capital was also cheap. The national income grew as fast or faster than the consuming habits of the population. There was immigration from Europe of trained workers and capital; taxes were low and the habit of saving was regarded as a great national virtue; the poor and the sick suffered in silence; and most of all, the progressive improvement of industrial and farm technology went on at a furious pace. All of these furnished a wide margin of surplus income which could be devoted to further expansion of the social infrastructure, to research and development, and to satisfy the ever-growing needs for more, and more advanced, machinery and equipment in the

productive sectors of the economy.

Cheap capital made it easy to make the immense investments in new housing and suburban infrastructure of streets, pipes, wires, schools, etc., and to lightly turn over the older houses, pipes and wires to the new migrants who flocked into the old cities. It also made it easy to build new factories and to acquire sites for them which were much larger than needed for current operations and to lay on the symbols of prestige: broad lawns, the latest modern architecture and ample space.

Cheap capital went with cheap land at the beginning of the auto era. Rural owners could not appreciate the extent to which urban uses would eventually expand outward into the countryside. Only experience could teach this lesson. Eventually they learned and this advantage ran out, but for many years it was easy to acquire cheap land with cheap capital at the edge of the city, build immense subdivisions of homes, and then look to the state highway department for support when the new homeowners found their path to work was getting crowded.

The Post Automobile Era, A New Framework

If only one or two of these forces had existed the history of urban development since the 1920s would have been different. The end of a trend of change is signaled either in the completion of the change, or by the reversal or redirection of the basic sources of change or by the appearance of completely new kinds of change. The trend of change called the automobile age has not quite run to completion yet but the wellsprings of this kind of change are running dry in almost every one of the respects noted above. There is also a pervading sense that the end patterns resulting from the automobile age are not as desirable as they once were believed to be, and that the huge metropolis, regardless of how it is patterned, is itself undesirable because it is politically and socially unmanagable, as well as much more expensive to operate than anyone believed before it was built. Perhaps this revulsion, which is very wide spread among younger age groups, will become the basis for completely new patterns of land development, perhaps for a flight from the large metropolis altogether.

It is the basic forces enumerated above which are of primary interest here since a change in them must lead to new trends whether we like them or not. These are reviewed here.

Truck and Auto Ownership.--These have gone about as far as they can go. Only in the lowest income group is there less than one car per family. In the upper income groups there is one car per licensed driver and drivers' licenses are universal for those who are eligible. At rush hour there is close to one car on the road per worker and the streets

are almost everywhere used to capacity. This does not argue that auto ownership and use must now decline, but it does say that little further increase is possible, and that further land use change from this source will be limited.

Trucks also seem to have saturated their potential use and the possible impact of further increases in ownership and use is limited. Truck drivers have become one of the best organized and most demanding of labor groups. The future may see rising, rather than declining labor costs for truck transport of goods, similar to the case of railroad and transit transportation. For many years it was possible to increase driver productivity by increasing the size, loading capacity and speed of the vehicle. But this too seems to be foreclosed in the future. Operating characteristics of vehicles have been improved very substantially in the past, also, but now seem to be headed for a decline.

Streets and Expressway Improvements.--Highway construction, which expanded the usefulness of motor vehicles so fortuitously in the early motor age, faces an uncertain future. Building new limited-access facilities is now the only way to add anything significant to the system. But the combination of inflated construction costs, sky-rocketing land acquisition and clearance costs, and capital shortages seriously impair the prospects of completing presently planned facilities which are now expected to barely do better than maintain present speeds in the more congested areas. In the meanwhile as the whole system has gotten bigger and older, maintenance costs have crept up to absorb a larger and larger share of the budget. Without Draconian measures the highway system of the region is not likely to get much better than it is now. Furthermore such measures grow more and more unlikely every year now, as the popular appeal of the system declines and community after community finds it can block this or that part of the program to serve its own self-interests.

It is still relatively easy however, to build new links in the far suburbs and rural areas beyond, where land is cheap, interchanges are simple, and the public wants new roads. An obvious impact of building such facilities will be the continuance of the spread of metropolitanization in those areas, and the likely disintegration of the nearby county towns.

In the matter of opening land for access to motor transport, again it is not likely that any new substantial change will be made since virtually all land in the region has access to paved roads.

Thus it is concluded that the impact of highway improvement programs which were for forty years a major factor in metropolitan expansion, will soon be reduced to a minor factor affecting only the fringes of the region.

In making this projection into the future however caution focuses attention on significant improvements in vehicle and highway performance that are conceivable if presently known technologies prove to be successful in application to the control of vehicles on the freeway system. The arguments against the effectiveness of this kind of change are that even though much larger volumes of traffic might be moved on the freeway system, the local access system is so poor that the net gain will be slight for presently developed areas. (This of course would favor new development in far outlying zones.) Also, it is more likely that application of the new technology would focus on improvements in safety, pollution abatement and fuel economy rather than more and faster traffic. They might indeed result in slower traffic on the links in rural areas and faster movement on the presently crowded central area links, and therefore have the opposite effect to that mentioned above.

These marginal effects however are not likely to be significant compared to the impacts of fuel shortage which are described below.

Land Constraints.--Although significant improvements in transportation facilities are not in sight, an enormous area of land lies within easy access of the centers of employment and the new potential centers in the suburbs. In 1960 more than half the land within the Penn-Jersey Cordon Area (55 percent or 400,000 acres) was still available for urban development. Since then vast new areas have been developed beyond the 1960 cordon line while seven-eighths of the previously available land within it is still available. It appears that although the land is physically suitable and eminently accessible it is still not used. Instead, land as much as ten miles beyond the cordon is being cut up for intense urban development. Clearly this has nothing to do with traffic congestion, air pollution, neighborhood crime waves, or any of the other familiar urban ailments. It is a consequence of the fact that the land closer to the metropolitan center is priced out of reach by the owners.

As it is now, a landowner can sit on land indefinitely at almost no cash out-of-pocket cost. When he sells, his capital gain is taxed at half the normal income tax rate. His one cash cost, the local real estate tax, is deductible on his federal income tax form. With every rule in his favor the landowner, if he is able, waits for the highest possible price. As a consequence most sales of land to developers are out of the estate of a dead owner because his estate can rarely pay the taxes due. The supply of land is thus essentially governed by a random process based on the actuarial life table of the few thousands of owners who control the land stock of the region. To get enough for each year's development, developers must hunt over a huge area.

Development under these circumstances looks more like a case of measles on areal photographs of the region than the outcome of a rational process. If there were effective measures to force land onto

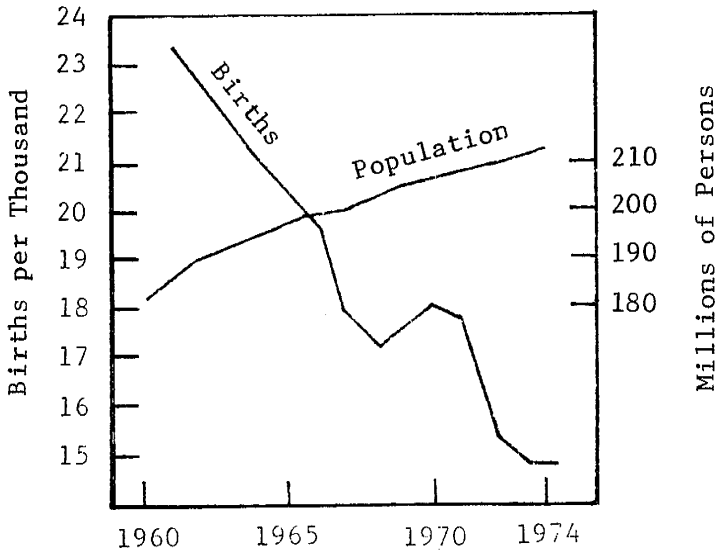
the market at reasonable prices, a much different region might gradually appear on the framework of the old.

Changes in the Economy.--Per capita income, expressed in current dollars, increased in the United States from $704 in 1929 to $1,224 in 1945 and $3,924 in 1970. In the 1960s inflation crept ever upward while credit restraints failed repeatedly to slow it. Instead tight money produced steady rises in unemployment, and ate away at the basis of growth in productivity by starving capital investment in productive facilities.

At the regional and national levels actually productivity ceased to grow in the 1970s and inflation soared out of control. At the same time the long-term fossil fuel crunch was turned into an immediate crisis by the actions of the oil exporting countries. The real income of the nation, and the free world generally, has persistently fallen short of the expectations of consumers. Indeed, total real income may not be increasing at all at the present time, while the prospect is that a nation with every consumer and worker group organized to demand an ever-increasing share of output is completely unequipped to face the realities of declining real income. Persistent inflation is the consequence. The resulting political and social unrest may escalate to a level not seen in the United States since the 1860s, and itself become a barrier to recovery.

Population Growth.--Since 1960 the crude birth rate (births/1000 of total population) has declined dramatically in the United States (see Figure 8) from 24 per 1000 to 15 per 1000, which is below the 1935

Figure 8. U.S. BIRTH RATES AND POPULATION



level. A slight upturn since 1974 is seen by some analysts as proof that the long decline was just a product of "delayed" births and that childbearing which was put off in the sixties will now take place. Unfortunately, for this point of view, the recovery has a long way to go and surveys of desired completed family size among women of childbearing age indicate that the present generation will barely replace itself (an average family size of 2.1 children is required) over the long run. Other surveys have shown that large upswings of birth rates have taken place only when the members of one generation felt that their life was substantially better than that of their parents.

We have little reason to assume that any time in the near future we will see economic and social conditions which will duplicate the high optimism and sense of well-being of the baby boom years. We also have to assume that buoyant population growth will not resume before the year 2000. Total U. S. population will be stable by then at approximately ten percent above the present 220 million level.*

With total population stable, metropolitan areas may still grow by migration from rural areas and small towns, if that movement off-sets the normally lower birth rates of the urban regions. A recent Census Bureau study, however, indicates that for the first time since the 1930s the drift of migration now is away from the metopolitan regions generally, with only the southern and southwestern metropolitan areas growing as a result of migration.

This is undoubtedly a reflection of the fact that the current recession has affected job availability most severely in the northern and western regions of the country. New Jersey, which includes one-third of the Delaware Valley region, is the worst hit with 13 percent of the work force unemployed. The great depression of the 1930s produced a substantial return migration from the large cities to rural areas. It is a measure of the severity of the current recession that it has caused a return movement reminiscent of the thirties, unlike any other of the several recessions since 1946.

All of this adds up to a cessation of rapid growth. The region grew by 14 percent in 1940-50, by 18 percent in 1950-60, and 11 percent in 1960-70. Its growth through the next three decades was projected in 1973 to be: 1970-80, 8 percent; 1980-90, 9 percent, and 6 percent in 1990-2000. These projections now appear to be very dubious. It is very unlikely that growth will resume anything like the scale of the last three decades.

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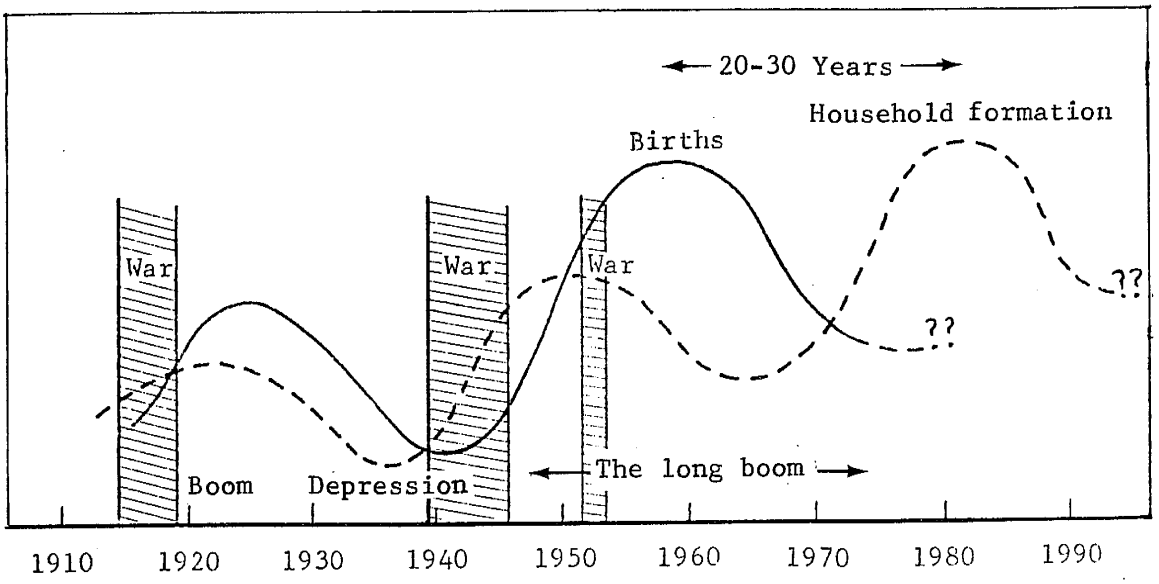
* Growth may continue however as a result of in-migration. This depends on future policy toward migration and there is no crystal ball capable of forecasting such matters.

These figures, however, are stated in terms of population. The unit which is more significant for land development is households.

The present age structure of the population is affected by two baby booms, that of the 1920s (post World War I) which was relatively short-lived, and that of 1946-1965 which was twice as long (see Figure 9).

Figure 9. BIRTHS AND HOUSEHOLD FORMATION



World Wars I and II and related economic swings set in motion a wide fluctuation of household formation and births which will still be effecting housing needs in 1990. It takes about 20 to 30 years for a generation to go through the cycle of settlement and child-bearing to settlement of the children. The two war booms came 25 years apart with the baby boom of the first war coming into production just in time for the baby boom of the second post-war period.

A generation takes from 20 to 30 years to form new households, find housing and produce another generation of children. We can easily predict from the diagram that the number of new households formed will rise rapidly in the late seventies to a peak in the eighties, and beyond that the number will fall off. Since most of the households formed in the fifties and sixties will still be occupying housing units in 1980, the demand for housing units will be at an extreme peak in that year.

The children born to the new parents of the 1970s and 1980s affect this only indirectly. If there were many children in large families the demand would focus on large family houses, probably in the suburbs. If there are only a few children, smaller units will do, many of them apartments. The latter is the present prospect but this could change. We can be sure, however, that demand will fall off in the 1990s when the small cohorts being born now come into the housing market.

The implications of these conclusions for land development in the region are substantial. It appears that large scale new family house development in the suburbs will not be needed unless there is a rapid turn-around in economic conditions. A great many new smaller units will be needed, but the constraints on land development noted above seriously impair our ability to supply them, at least in the suburbs. This situation could accelerate the out-migration of the region's most valuable resource--young adults at the beginning of their working lives.

On the other hand, many older developed areas do not object to renewed development and in many ways the older communities offer suitable sites for the smaller families now being established. It is conceivable that much reconstruction could take place in these older areas if some of the institutional and economic obstacles are cleared away. A moratorium on the application of property taxes to new structures, for example, is relatively easy to arrange, and it would go a long way toward encouraging replacement of old structures in high tax-rated municipalities.*

Black Population Movements.--Migration of blacks into the central cities of the metropolitan areas was a major feature of the growth of population in the whole period since 1940. Since blacks also had higher birth rates, and it was the childbearing age group which migrated, they also contributed disproportionately to the growth of population by natural increase. Their birth rates, however, have followed the same trend downward in recent years as those of whites, although at higher levels.

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*It is not the purpose of this paper to suggest such remedies. The point is made only to show that it is probably easier to make this kind of change than to open new land in the suburbs. The same reform applied to vacant land in the suburbs would just raise land prices another notch.

In the 1960 decade blacks were migrating into the region at the same time that there was a small net movement of whites out. We have no evidence that a similar differential movement continues today. We do know that massive migrations of blacks from the rural south has come to an end, largely because the reservoir of mobile young adults has been drained and, secondly, because alternative destinations in the southern cities have become much more popular.

Nevertheless, expansion of black-occupied neighborhoods has continued. The Census of 1970 showed extensive growth of black-occupied tracts in Philadelphia and in the suburban counties since 1960. At the same time the growth rate of the small black populations in the suburbs was higher than that of the city.

As the population group with the highest proportion of young adults who will be seeking housing in which to set up new households, blacks are certain to continue both of these trends. Increasingly, however, this will put them into a more competitive situation with whites, since the total number of housing units is not increasing fast enough to accommodate total projected growth in households.

Industrial Technology.--Industry has continued its progress in every branch of technology in recent years although man-hour productivity growth has slowed. Yet these changes have made little difference in the requirements for the physical envelope within which industrial activities are carried out. Innovations in the field of processing and assembly of products permit a greater through-put of materials and parts and a greater output of finished product per square foot of space, but the stocking of additional parts and materials and storage of greater output take up the slack in space needs. There are also innovations in stock and parts storage and handling and computerized inventory control which limit this effect. Many innovations save waste and reduce the size and weight of the output, while the testing and quality control and research departments expand to ensure reliability of the more sophisticated outputs, and to contrive ever more sophisticated outputs.

These generalizations, however, apply to one kind of industrial establishment. There are two other kinds of industrial operation with distinctive typical physical envelopes which have not changed much in the past and do not show any current tendency to change. These are the "loft" industries of the central cities and the extensive land users such as the oil refineries and steel and chemical works along the river front. The former are stagnant in technology and have lost employment by migration out of the region. Hence no new buildings have been built in many years, although many large old factory buildings abandoned by firms migrating to the suburbs have been converted into loft buildings.

The plants of the latter group are made up of highly specialized giant-sized machinery sitting in the open with very few operating employees

per acre of ground, sometimes with and sometimes without offices included. Much of the human labor accomplished on the site is maintenance work or construction and installation of new or replacement equipment. This labor may or may not be done by contractors whose locations are reported somewhere else. Both of these factors are erratic in their effect and land consumption per worker figures are highly variable. This group of industries has tended to leave central area locations and move to the far edges of urbanizations in the region.

The trend of industrial location to the suburbs continues to drain Philadelphia's remaining reservoirs of suitable firms. Only a minor part of its work force remains in these industries in situations which are likely to cause them to migrate. The City has rather successfully developed several large industrial areas of the type which is now attracting growth. In other words, the City contains some of its own suburbs. Rapid losses, therefore, are likely to slow down soon.

Slow decay of the loft and extensive land-user industries will probably continue. But, in general, the prospects for Philadelphia and other older urban areas are not bad, at least they are no worse than for the region as a whole.

Growth of industry in the suburbs will continue mainly because of growth in total industrial employment. Non-manufacturing employment also will grow in the same general areas, and at a faster pace because non-manufacturing is growing faster. But, both will use much the same kind of facilities which have characterized new facilities in the recent past.

Average density of employment in both new and old facilities is rising, contrary to the commonly held view. Land prices have risen very high and the cost of holding unnecessary land has risen as both taxes and interest rates rose. Large areas of reserve space acquired earlier are being put to use and new plant sites are more closely fitted to present requirements.

The Availability of Cheap Energy.--Alternative sources of energy to those which now heat and light our homes and work-places, fuel our industry, and move our goods and persons, have been explored endlessly in the technical and popular press, since the 1973 embargo of oil exports from the Middle East. A few conclusions from this literature are possible:

1) Domestic sources of oil and gas are running out and the substitutes are much more expensive.

2) Coal is the only feasible alternative source that is as cheap and abundant as Middle East oil.

3) Even if the governments in control of the oil didn't make

it difficult for the industrial countries, we would soon run out of cheap fuel because the Middle East oil resource, huge as it is, is still a finite resource, and present rates of growth in comsumption are trending toward infinity along with world population growth.*

4) Various scenarios for the turn-around of growth are projected but none of them are pleasant or provide anything like our previous access to cheap energy and materials resources.

5) Almost no one writing in the technical literature is willing to assume that some technological "fix" will stave it all off for another generation.

Any reasonable scenario must include a price rise on motor fuel amounting to another doubling of the present price (which is about double the 1970 price) in the next year as price control on domestic "old" oil is abandoned. At this level active investment in several domestic alternatives becomes likely (shale oil, high-cost natural gas, liquification of coal, methanol from wood or coal). Then within a ten to fifteen year period the use of these resources will be developed to replace foreign oil imports and the decline of present domestic production. The fastest possible development of off-shore and Arctic sources will merely go toward keeping the import cost burden from becoming completely unmanageable in the meanwhile.**

In the meanwhile, also, motor and heating fuel prices will have doubled again to the point that they will be roughly ten times the price levels (relative to most other goods and services) which prevailed in the long period from 1920 to 1967 when automobile and truck transportation reshaped the urban world. Under these conditions consumption will shrink rather than grow and far-reaching adjustments will be made in urban travel and locational patterns.

There is a tendency at the present time, to assume that high fuel costs and scant supplies can be offset readily by savings made possible by the use of smaller cars and more efficient engines, and by car-pooling and increased use of transit; and that since population growth beyond the present level will be slight, the increase in fuel use

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*One author has declared Friday, November 13, 2026 to be doomsday, since his curve of world population growth shows an infinite growth rate beyond that time.

**Imports were on 6% of total liquid fuel supply at the time of the first embargo but by now they have risen to 40% of the supply, already a nearly unmanageable figure.

required for growth will be slight. We noted above in connection with housing growth that even though population was tapering off the number of active consuming units was due for a much greater growth through the 1980s. With respect to engine efficiencies we must also consider the negative effect of air pollution control devices and the elimination of the use of lead additives neither of which has been carried through the active car fleet. The optimistic mileage claims for the recent car models also must be discounted to a considerable extent since they apply to a properly tuned car in the most economical version of any given line, while actual average cars carry heavy loads of extras: air conditioning, automatic drive and power accessories, as well as more powerful engines, and are operated in a poorly tuned state by average skilled drivers (who are forever in a hurry!).

To maintain our present style of life much more effective means must be found by the average family to reduce fuel consumption without substantially impairing the standards of maneuverability, safety and comfort now available, or raising the capital investment in the vehicle. It would be easy enough to supply the present passenger miles of travel with one third or less of present fuel consumption by substituting two wheeled vehicles, but they are much less safe and comfortable.

The sad fact is that in mass production technology we do not now have a car which is economic enough to meet the need. It may be that one is possible, and when the motor industry finally gets the message it will handily save the day, but this cannot be counted on. The average family will be faced with doubling its outlays on gas at the same time that its electric bill is doubled, its heating fuel bill is quadrupled, and it is getting no increases in real income. It seems likely that when it is time to re-examine the options on location, relative travel costs will be given much more consideration than in the past.

The End of Cheap Capital.--The interest rate paid on government bonds fell below two percent in the 1930s on several occasions and did not rise above two-and-one-half percent until the onset of the war time economy in 1940. In the post-war years except for the brief "Truman" inflation, rates hovered between four and five percent until a long rise began under President Eisenhower's conservative fiscal management. There was a respite under President Kennedy and Johnson before the southeast Asian war inflation began to force up rates in 1968. By now long-term rates are non-existant, there being almost no new long-term borrowing. Short-term borrowing is at rates three or four times those of the 1930s.

To the lender the higher rates are seen as an offset for future inflationary decline in the value of the dollar loaned. The effect on borrowers however is devastating, for if inflation is ever controlled

they face disaster.* As a consequence deep cuts have been made in every kind of capital investment with housing construction (especially for the lower income groups) as the first victim. Local government programs, including school construction, and state highway development work are the second and third victims. As far as growth and change in the land use pattern of the region are based on these investment categories, growth and change have slowed to a crawl.

How long will such conditions continue? There are several reasons for expecting that the capital shortage will last a long time. Investment requirements to develop the new sources of energy are enormous. Other materials resources are in the same state. We have skimmed the cream off the world's resources. The lower quality resources which we must now exploit require far more capital investment and greater energy consumption than before. Other consequences of the energy problem are shifts in the equipment required for delivering and using new energy sources and investments required to reduce energy waste (such as adding extra insulation to existing structures). Exotic energy sources are all enormous capital users. If public transit and rail freight transportation are to be substituted for the energy-expensive auto and air transport modes immense investments are needed to create new and rehabilitate old facilities.

Renewable resources are hardly in any better state. Reckless exploitation of available soils, fisheries, range land, and forests all over the world have left them in a state which requires extensive restorative investment just to maintain present outputs. The remaining unused areas, naturally, are those which were least usable and require the greatest inputs of effort to produce any output. Our air and water resources have been treated the same way and require huge capital investments to control pollution.

In human resources the situation is mixed. The precepitous decline in birth rates in the 1960s will relieve us of heavy new investments in education by 1980, and provide an unusually large proportion of active workers in the population. Beyond 1990 however the proportion of pensioners will rise rapidly. Medical service costs and investments in medical facilities are already a large part of the national income. Advances in medical technology in earlier years largely resulted in saving young people for active working lives. Increasingly they now

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*Another effect is not widely understood. Since most new facilities have an economic life of 20 or more years, borrowing to finance them on terms of 8 or 10 year loans carries added penalties. Very large immediate repayments are required and may strain the available cash. If balloon notes are used, the re-financing at their term may be uncertain.

have the effect of adding years of dependence to older persons' lives, or maintaining terminally ill people in half-alive condition.

The complexity of the physical plant and stock of educated personnel required for deployment of the full range of medical technology has grown by an order of magnitude since 1960. The chronic state of bankruptcy in the whole medical care delivery system primarily reflects this condition. The fact that the service personnel at the bottom, and technological personnel in the middle, now are organized and demanding "living wages" is also escalating costs much faster than in other service trades.

The United States also is faced with the consequences of an accumulated gap in the efficiency of its industrial equipment as compared with its trade competitors in world markets resulting from a low rate of investment over the past 15 years. Additional drafts of investment capital are required to catch up and restore the margin of superiority required to support our higher wage rates.

Other demands upon the pool of savings appear at every hand: recreation areas, research and development, care of the handicapped, education of the retarded, prison reform, economic development in depressed areas, foreign aid, assistance to disadvantaged minorities and a host of others. A commission on national priorities which delivered its report long before the energy crunch, concluded that the total of needs far exceeded the nation's ability to generate capital and surplus income, and that all the groups demanding one or another kind of investment or assistance for some worthy cause would have to scale them back by at least a half to fit the available resources.

The Impact of Technical and Economic Changes

It is apparant that the conditions which favored the rapid conversion of the urban region into an organism with automobiles acting as corpuscles in its blood, no longer prevail. On almost every point there is either no more room for change or change is blocked. Ominous signals are apparent. Capital to make any needed adaptations to the new situation will be very dear. Recent immigrant groups with great potential for problems appear while there are still great difficulties for the previous groups to overcome. Income growth is slight; land is made available for use only by an irrational and inadequate process.

By far the most serious difficulty facing the region, and the nation, is that the liquid fuel which feeds our transportation system is becoming prohibitively expensive and setting us at the mercy of a small volitile group of princes and dictators with objectives at variance with our own and little experience with the exercise of power. Commutation by automobile over long distances will not be possible for the greater part of the urban work force which now does so.

Under the new ground rules the low density pattern of the past will prove to be increasingly uneconomic. Employers located in sites distant from large residential populations, and inaccessible except by car, will have to supply transportation or pay extra travel allowances, or seek new locations. Families living in residences far from work places will face the same kind of choices.

Similarly, workers who work at locations far from home for reasons related to their job careers, will feel a new pressure to seek less promising jobs closer to home, or to move their homes at the price of severing present community ties. Employers drawing upon the unique skills of employees whose homes are far away will lose these skills unless they pay extra for travel or move into locations where transit service makes it possible to assemble such skilled personnel from a large part of the region.

These considerations are the foundations of metropolitan growth, for the economic superiority of the metropolis has been based on the superior size and variety of its skilled work force as an attraction and growth promoter for business, and on the superior range and income characteristics of jobs which it offered to workers with skills and ambition. For the latter it also offered the opportunity to choose and stay in a compatible residential community without being forced to move periodically in pursuit of career opportunities.

The threat of high-priced motor fuel therefore calls into question the value of the whole metropolitan framework for our economic life. If means cannot be found to maintain the present degree of mobility of the work force with respect to jobs then the metropolis may well have to begin to shrink. Perhaps some of the changes in trends described above are telling us that it has already begun to do so.

The Near Future : A Tentative Projection

Development in a huge metropolitan region is the outcome of thousands of decisions made by actors whose basis for decision making often is inaccurate, inadequate or poorly evaluated. Much decision making is follow-the-leader behavior, once a trend is established. Before a trend is established many decision makers prefer to do nothing, or repeat previous mistakes even when they know them to be mistakes.

The present situation is confusing and upsetting. If we can believe the implications of the changes in underlying demographic, economic and technological forces outlined above, it is the end of an era. The entire careers of all of the actors involved have taken place within this era. No one has a reasonably certain formula for what will work in the new era. Many ideas and schemes will be tried with varying degrees of success. Given the increasing uncertainties of the time, few risks or new paths will be taken and as a consequence the status quo will prevail.

Eventually a new leadership will be established and the followers will have visible trends to reassure them as they take action. It is conceivable that the new courses of action might be so constructive and far-sighted that the region would attract more migrants than leave it, and regional growth would resume as the environment for both employers and residents improves in comparison with alternative locations in other urban regions or rural areas. Considering the difficulties, this is indeed the most challenging scenario. But the elements which can be conceptualized with this as a hypothesis are applicable to less perfect, and more likely, schemes of action. We will project the basic scheme of post-auto era development therefore as a guide which lists all of the trends which are consistent with the basic necessities of the times, expecting that in fact some will not materialize or will be much less effective than seemed likely here.

Higher Densities will be the rule in construction (floor space or dwelling units per acre of land) and in use of space (employees/sq. ft., D.U./structure), fewer and smaller parking spaces will be provided and much less ornamental open space will be retained.

By-passed Land will be taken into urban use in the central part of the region and in the more convenient parts of the existing corridors of recent growth outside of this area. Land and buildings developed earlier will not stand idle and much new construction will take the form of additions to older units rather than new establishments on entirely empty land. It is likely for example that many of the shopping centers which now have huge parking lots fully used only in the Christmas rush, will have office buildings and service business shops added over the parking lots.

Rehabilitation and Re-use of older structures, often with intensification of use, will be much more popular. The most important of these adaptations will be the conversion of old family houses into multiple unit structures. Also, combinations of residential and commercial use may regain some of their older attraction.

Coordinated Land and Transit Development. Large new investments in new rail lines or even great changes in the technological character of existing lines are not likely because of the huge capital investments required for such facilities. Extension of service on unused rail lines and improvement of existing service however require relatively little capital and can greatly expand the usefulness of the rail system even if they do not greatly extend its area of service. As such improvements are planned it will be obvious that there are many opportunities to make coordinated land use changes at stations on the lines which will promote exploitation of the system's transportation capabilities. Assuming that the many institutional obstacles to such development can be overcome a great part of the growth need for housing in the region could be supplied this way, and some of the need for highly accessible office and light industrial space could also be satisfied.

APPENDIX

MAP DOCUMENTATION

The seven maps reproduced in this report were compiled by DVRPC from a variety of historical and current sources. The following map documentation sheets describe each map, its sources and limitations.

All maps were compiled at a larger scale, as indicated on the documentation sheet, and reduced for publication herein. Original-scale copies are available at cost from the Mapping Division, DVRPC.

Map Documentation: Figure 1

MAP TITLE: Development and Transportation Patterns, 1700.

DESCRIPTION: Existing development and major land transportation routes as of 1700. Philadelphia'a development extent is specifically portrayed whereas other regional settlements are represented generally as symbols. Developed area is shown in halftone.

SCALE: 1 inch : 2 miles

AREA OF COVERAGE: Region

SOURCE AND DATE OF INFORMATION:

Cunningham, John T. This is New Jersey. New Brunswick, N. J.: Rutgers University Press, 1953.

Eshleman, Frank H. Map Showing Location and Date of Earliest Highways Leading From Delaware and Schuylkill Rivers to the Susquehanna River and Branches. Lancaster, Pa.: 1907.

Gabriel, Thomas. An Historical and Geographical Account of the Providence County of Pennsylvania; and of West New Jersey in America. London, 1698.

Harris, In. A Map of the Improved Part of Pennsylvania in America Divided into Counties, Townships and Lots. 1720.

Reps, John W. Town Planning in Frontier America. Princeton, N. J.: Princeton University Press, 1965.

LIMITATIONS: Source maps of this period are few and of questionable geographic accuracy. This map has been compiled using a modern base for reference with details presented in their logical locations as interpreted from a variety of contemporary accounts. Surface water plate was derived from a modern (1970) base map and has been modified to generally conform to river and stream alignments depicted on an 1860 source map (Lake and Beers).

Map Documentation: Figure 2

MAP TITLE: Development and Transportation Patterns, 1800.

DESCRIPTION: Existing development pattern that includes point industrial locations; and land and water transportation routes as of 1800. Half-toned areas represent location as well as estimated extent of urban development.

SCALE: 1 inch : 2 miles

AREA OF COVERAGE: Region

SOURCE AND DATE OF INFORMATION:

Bining, Arthur Cecil. Pennsylvania Iron Manufacture in the 18th Century. Harrisburg, Pa.: Pennsylvania Historical Commission, 1938.

Cunningham, John T. This is New Jersey. New Brunswick, N. J.: Rutgers University Press, 1953.

Eshleman, Frank H. Map Showing Location and Date of Earliest Highways Leading from Delaware and Schuylkill Rivers to the Susquehanna River and Branches. Lancaster, Pa.: 1907.

Howell, Reading, F. Map of Southeastern Pennsylvania, 1792. Facsimile in archives of Pennsylvania Historical Society (3 sheets). 1899.

Mills, Jon. Plan of City of Philadelphia and Environs. 1809.

LIMITATIONS: Source maps have questionable geographic accuracy. Details on this map have been located in reference to documented landmarks as they exist today. Industrial activity cannot be assumed complete, especially in New Jersey. Purpose was to show the pattern of contemporary industrial development.

Map Documentation: Figure 3

MAP TITLE: Development and Transportation Patterns, 1860.

DESCRIPTION: Existing development pattern and major land (roads and railroads) and water (rivers, streams and canals) transportation routes as of 1860. Half-toned areas represent location as well as estimated extent of urbanized areas. All county boundaries shown are as of 1871, when the Gloucester/Camden County border was established.

SCALE: 1 inch : 2 miles

AREA OF COVERAGE: Region

SOURCE AND DATE OF INFORMATION:

Ash and Smith. Map of Delaware County. 1848.

Brown and Painter. Map of Chester County. 1847.

Lake, D. J. and Beers, N. S. Map of Vicinity of Philadelphia and Wilmington. Philadelphia: Stone and Pomeroy, 1860.

Morris, W. E. Montgomery County, Pa. Philadelphia: R. P. Smith Co., 1849.

Morris, W. E. Bucks County Pennsylvania 1850. Philadelphia: R. P. Smith Co., 1850.

Pennsylvania Economic League. Penjerdel Governmental Studies Monograph No. 2: Geographic Development and Population Growth in the Penjerdel Region. Philadelphia: Pennsylvania Economy League, 1962.

LIMITATIONS: The Lake and Beers map provided a very detailed representation of all but the outer extremes of the region. Data presented in this map is fairly accurate. Data was generally verified using contemporary insurance atlases.

Map Documentation: Figure 4

MAP TITLE: Development and Transportation Patterns, 1900.

DESCRIPTION: Existing development pattern and major land (road and railroads) and water (rivers and canals) transportation routes as of 1900. Half-toned areas represent the location as well as estimated extent of urbanized areas.

SCALE: 1 inch : 2 miles

AREA OF COVERAGE: Region

SOURCE AND DATE OF INFORMATION: Pennsylvania Economy League. Penjerdel Governmental Studies Monograph No. 2: Geographic Development and Population Growth in the Penjerdel Region. Philadelphia: Pennsylvania Economy League, 1962.

U. S. Department of the Interior, Geological Survey. Quadrangle Topographic Series for Metropolitan Philadelphia. Surveys were conducted from 1885 to 1905. Published 1907.

LIMITATIONS: All detail was derived from contemporary USGS maps. The extent of urban area was estimated from patterns of detail depicted on source maps, i.e., patterns of roads and buildings and place, name, type, size.

Map Documentation: Figure 5

MAP TITLE: Surface Rail Transportation Pattern, 1923.

DESCRIPTION: Existing surface rail transportation pattern as of 1923. All railroad, inter-urban trolley and intra-urban trolley street car routes in the Philadelphia Metropolitan Area are shown. Station stops are indicated. Also, routes are generally labeled with the operating company's name.

SCALE: 1 inch = 1.33 miles

AREA OF COVERAGE: Region (except for outer extremes)

SOURCE AND DATE OF INFORMATION: Boehn, G. A. Rail Transportation Map of Metropolitan Philadelphia. 1923. (Direct Reproduction)

LIMITATIONS: Scale is not consistent with other maps of the development history series, which were drafted at 1 inch = 2 miles. Purpose of this map was to illustrate the intense pattern of public mass transit existing in the region in the 1920s.

Map Documentation: Figure 6

MAP TITLE: Development and Transportation Patterns, 1931.

DESCRIPTION: Existing development pattern and major land transportation routes (primary and secondary roads, and railroads) as of 1931. Light-toned areas represent the location as well as estimated extent of urbanized area.

SCALE: 1 inch : 2 miles

AREA OF COVERAGE: Region

SOURCE AND DATE OF INFORMATION:

Boehan, G. A. Railroad Map of Metropolitan Philadelphia. 1923.

Pa. Department of Highways. Road Type Map of Pennsylvania Showing State Highways and Main Connecting Township and County Roads. Harrisburg, Pa.: Bureau of Publications, State of Pennsylvania, 1931.

Rand McNally and Co. Road Map of Pennsylvania. (Includes Southern New Jersey.) Printed for American Gas Co., Chicago, Ill., 1939.

Regional Planning Federation of the Philadelphia Tri-state District. Regional Plan for the Philadelphia Tri-state District (map series). Philadelphia: Breuker and Kessler Co., 1931.

LIMITATIONS: The basis for classifying primary and secondary roads was contemporary road maps. Urban areas are represented as they were depicted on maps produced for the 1931 Tri-state Regional Plan. Canals were not shown because of their decline in importance, and to delete unnecessary detail from map sheets.

Map Documentation: Figure 7

MAP TITLE: Development and Transportation Patterns, 1970.

DESCRIPTION: Existing development pattern and major land transportation routes (limited access and primary roads, and railroads) as of 1970. Light-toned areas represent the location as well as estimated extent of urbanized areas.

SCALE: 1 inch : 2 miles

AREA OF COVERAGE: Region

SOURCE AND DATE OF INFORMATION: Delaware Valley Regional Planning Commission. Map of 1965 Urban/Built-up Area Revised to 1972. Philadelphia, 1973.

Delaware Valley Regional Planning Commission. 1970 Regional Surface Transportation Map. Philadelphia, 1970.

Delaware Valley Regional Planning Commission. Railroad Service Map, 1970. Philadelphia, 1970.

LIMITATIONS: National Aeronautics and Space Administration. 1972 U-2 High Altitude Aerial Photography of the Delaware Valley Region. Flt. No. 72-209 - Dec. 3, 1972. Available from NASA (Sioux Falls, N. D.). Published 1973.

The urbanized area indicated for 1970 was derived through the analysis of contemporary aerial photography. The purpose of the analysis was to delimit the region's built-up areas from its rural areas. Although the 1970 urban area appears to be disproportionately large as compared to 1931, its portrayal is accurate.

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