THE INDUSTRIAL GEOGRAPHY OF WOOLLEN TEXTILE MANUFACTURING IN POLAND AFTER 1870

by

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Thesis submitted for the degree of Ph.D.

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The thesis describes the geography of the woollen textile industry in Poland during certain periods of particular interest after 1870. The geography of the industry is defined as the distribution of the varied types of mills of which the industry was composed, and the distribution of the employment and output. The industry is studied in the years between 1870 and 1914, in the 1930's, and in the period since the second World War.

Within this framework the thesis attempts to outline the distinctive patterns which developed in the distribution and form of the Polish industry during its growth in the environments of capitalism and socialism. The geography of the growing capitalist industry is studied in the period before 1914 and the pattern of development in the 1930's is also analysed, while the geography of the socialist industry is treated throughout the post-war years.

The distribution and form of the industry is described at the beginning of the two periods of growth after 1870 and 1945 in relation to the location and characteristics of the market for woollen textiles. The characteristic aims of capitalist and socialist management, which influenced the
distribution and form of the industry, are observed. Attention is paid to the characteristic scales of operation and to the structure of production in the mills in each important textile town and to the contrasts between the mills in the various towns at the conclusion of the period of growth in each environment. The changing distribution of the industry among its locations and the factors affecting the choices of new locations and the abandonment of others in the two environments are investigated during the periods before the first and after the second World Wars.
Panorama of Lodz
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The bleaching works of Kopisch, and later Peters, at Emilie Street in Lodz (now 8th March Street), according to a contemporary engraving from the mid-nineteenth century.

The mill belonging to A. G. Borat & Co., in Zgierz in the 1890's in which 3,200 woollen spindles, 41 powered looms and 41 hand looms were installed in 1893. The spinning and weaving sections were powered by steam and 360 workers were employed.
Since the second World War the attention of the public has been continually directed to the political dichotomy of the world. Reports of the suspicious actions and hostile policies of the communist states and of the solemn protests and military preparations of the western nations have been the daily recipe of all those who twist the pages of the daily press or listen to the radio and the experience of a whole lifetime for those who have yet to attain the age of thirty. As the communist ogre has been carefully tended in Western Europe and North America, so the wickedness of the capitalist world has been denounced by those beyond the ideological curtain. As one who has known only this post-war political and economic situation, I welcomed the suggestion by Professor H.C. Darby in August 1963 that I should equip myself with an eastern European language, transfer my geographical interests to Poland, and take the opportunity of studying the communist scene at first hand. The warm personal links which were established with my hosts, may have contributed only a little to the greater mutual understanding of eastern and western Europe, but I also hope that this study of the Polish woollen textile industry, which differs so markedly from the industry
in my native West Riding, will prove to be the first of a
series of stronger and more permanent bridges linking the
studies of the geography of the capitalist and communist
worlds.

Among the relatively well tilled fields of industrial
and economic geography that in which the textile industry is
located has been intensively cultivated both in capitalist
and communist countries. Little, however, has been done to
link the two bodies of research or to undertake comparative
studies of the industry in the two economic environments.
Hitherto geographical studies of the industry in the English-
speaking world have emphasized the choices of location and
the distribution of textile manufacturing, but they have
assumed the existence of a whole range of economic conditions
which have been fundamental to the pattern of the industry in
Britain, Germany or New England, but which have not existed
in Russia for half a century or in eastern Europe and China
for twenty years.

As the result, some features, which this study shows to
have varied widely between the capitalist and communist forms
of the industry, have been ignored. Moreover little light
has been shed on the geographical significance of the
communist approach to the development of the industry.
Studies of the textile industry in both the East and West have neglected in particular the character of the individual units of which the industry is composed and which give to the industry a distinctive visual presence. Substantial differences were discovered between the scale of mills in the capitalist and socialist forms of the woollen textile industry in Poland, and this study also shows that the structure of production in the mills differed between the two forms of the industry. These differences contributed substantially to the contrasts between the patterns of distribution and the choices of locations of the industry during the capitalist and socialist periods of development in Poland.

This study brings to the attention of English-speaking geographers no materials which are not already known to Polish scholars. However the majority of those who have consulted the archival records from the nineteenth century in Poland have done so in search of materials concerning the cotton textile industry or the development of the industrial cities of Poland rather than in search of the story of woollen textile manufacturing. Much remains to be culled from archival sources in both Poland and Russia which is relevant to the woollen textile industry. Many of the folios and manuscripts which emanate from the early twentieth century and the inter-war years are,
as yet, completely unexploited other than in this study.
For the direction of my attention to several valuable archival
records of the industry I must thank Professor L. Straszewicz
of Katedra Geografii Ekonomicznej on the University of Lodz,
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of the thesis has been greatly assisted through the work of
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University College London. The majority of the maps and
diagrams were prepared by Miss Mary Lawson and Mr. C. Cromarty,
and the text owes much to the criticisms and suggestions of
Professor W.R. Nead, who first suggested that I should take
up the subject of the textile industry.
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ABBREVIATIONS

APL, Wsg. U., Lodz  National Archives in Lodz, Acts of the Magistrates of Lodz
APL, Izba  National Archives in Lodz, Chamber of Commerce
GUS  Chief Statistical Office
KIK  Urban Commission for Economic Planning
MPL  Ministry of Light Industry
WAPB  County Branch of the National Archives in Bialystok
ZIW  Woollen Textile Enterprise

CONVERSIONS

Fud  16.38 kilogram
Vioret  1.066 kilometre
Ton  All tons are metric.
CHAPTER I
INTRODUCTION

The Relationship between Geography and Society.

Geography is the description of the earth's surface. Description involves the recognition, classification and enumeration of phenomena, and geographical description requires the description and explanation of the distribution of the phenomena which form the surface of the earth.

Much of the earth's surface carries a cultural landscape - the product of man's occupancy and it is of academic interest to the geographer, and perhaps of greater and more mundane significance to society, to ask whether the distribution of cultural additions to the landscape follows any pattern which is capable of rational explanation, or whether human action is unordered and human choice is a random selection among unassessed alternatives.

Man does not act in a vacuum, and therefore it is reasonable to examine his patterns of behaviour against the background of his environment. The distribution of land.

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2. P. Roget, Thesaurus of English Words and Phrases, London 1952
3. C. Sauer, The Morphology of Landscape, University of California, 1925
4. Land is understood to include all the free gifts of nature and, in particular, the established distribution of land and water which is inherited by all men.
of other men with like and unlike beliefs and behaviour, and the distribution of man-made additions to the surface of the earth, may all affect human decisions, and, in the effect of those factors upon human decisions which, in turn, affect the form of the earth's surface, the geographer senses and claims a particular interest.

Unfortunately the individuality of human choice does not permit the establishment of immutable laws of human action, but, as every group of men possesses a commonly accepted philosophy and an associated appreciation of the environment, so every society establishes its own economy in which it attempts to enact its philosophy as it struggles against or cooperates with its environment. As each society creates characteristic outward forms of settlement and land-use, so, in the mass, these may be recognised as characteristic landscapes. Thus it is to the differences in belief and action among societies that the geographer must turn if he wishes to explain some of the differences in the pattern of the cultural landscape, and, in recent years, to the two most important philosophies and economic systems of the world—capitalism and communism.

An Approach to the Geography of Manufacturing Industry.

The geography of manufacturing industry is, primarily, the description of the distribution of factories and workshops,
that is, of the physical expression of economic activity in
the landscape. In the case of a complex industry including
several processes with characteristic and different scales
of production which produce a diversity of end-products, such
a description also involves a comparative explanation of the
distribution of the various sections and a classification of
the various forms of structural integration in each unit or
grouping of the industry. Careful analysis of the distribution
of industry requires the recognition of the processes within
each mill and the position of each product in relation to the
other processes of production.

Any explanation of the distribution of industry is
likely to pose questions concerning the efficiency of the
locations of factories in relation to sources of raw materials
and fuel end in relation to the distribution of the markets
for the finished products. In particular it may be possible
to assess the extent to which the optimum distribution pattern
is distorted as a consequence of imperfections in the state of
competition in the factor or product-markets, or as the result
of changes in the relative importance of the original factors
of location.

But factories are passive additions to the landscape and
the distribution of economic activity can only be measured by
such facts as the output, the number of workers, the wage payments or the turnover of raw materials in each factory or workshop, town, province or country. Unfortunately the detailed distribution of any one of these measures of industry alone does not always give an accurate indication of the distribution of the industry as a whole, but a comparison of the distributions of several of these measures may yield new facts about the spatial relationships of the industry, in addition to correcting inaccurate impressions of the distribution of the industry.

Much of the available data from past times only permits static pictures of industry to be drawn at a restricted number of moments, whereas in reality the continuity of economic activity through time ensures that the structure and distribution of industry do not remain unchanged. Industrial growth and decay arise out of technical advances and industry is constantly readjusting to the character and location of the factors of production and the demand in the product-market. Such changes in the economic environment of industry alter the weight of the factors of location, but their effects on the size, structure and distribution of industry can only be recognised over lengthy periods of time. In a twelve-month span it is difficult to recognise correctly the direction of the processes of change in any industry, and even more difficult to measure them accurately.
Because the economic environment of industry rarely continues unchanged over a period of years, industry is always coming into, but rarely arriving at, a state of equilibrium with its environment. The structure and distribution at any moment is not a true reflection of the contemporary environment for only part of either represents the reaction of producers to the economic forces which currently surround industry. In a time of change the patterns of change alone indicate the long-run end towards which industry is moving at any moment, and therefore the processes of change are usually more accurate reflections of the influence of the environment upon any industry and of the extent to which it is profitably or inefficiently located, than is the extent structure of the industry.

The discussion of the location of the chosen industry in this study lays emphasis upon the location factors which were considered to be important by Weber and Greenbut, notably the distribution of raw materials and fuel, labour and markets in relation to the site of the factory. However it is apparent from this study that such other factors as the existing distribution of the industry – the factors of agglomeration – and the social costs of further growth in existing centres of

production - the factors of deglomeration - were also considered by producers in the chosen industry in their location decisions. The influence of these factors on the geography of the industry is also considered.

Unfortunately little direct information is available about the costs of production and therefore it is difficult to weigh accurately the influence of each factor in location decisions. In the absence of such facts the information yielded by a study of the changing distribution and spatial relationships between factories, workers and output, based on more comprehensive, but less detailed statistics, may best indicate the importance of some of the location factors.

The study attempts to outline the relationship between the distribution and structure of a chosen industry, that is, between the geography of the industry, as that has been outlined above, and the two major world economic systems of capitalism and communism. In each case the industry is examined during periods when, and in areas where both systems existed in relatively pure and simple forms. The study seeks to discover whether the processes affecting the choice of locations and the structure of production differed in response to contrasts in the social and economic environment by comparing the geography of the industry under the two systems. In the case of each system the
industry is examined over a period during which the chief elements in the environment remained constant, and during which the industry appeared to be moving towards only one overall equilibrium position.

In all these methods of analysing the geography of any manufacturing industry exact statistical comparisons alone can lead to conclusions of value. Only the exact measurement of the influence of each factor in an industry's environment will produce an accurate report of the differing effects of particular economic systems upon the distribution and structure of the industry, and, for this reason, it is difficult to omit a formidable statistical scaffolding from the text.

The Choice of Industry and Area of Study.

The manufacturing of woollen textiles is one of the oldest of the factory industries. It was among the first to adopt the large-scale, mechanised methods of production associated with the introduction of steam power, and one of the first to be changed from a widely scattered domestic and workshop craft into a localised capital and labour-intensive industry. In central and western Europe and in North America woollen textile manufacturing now has a history of operating with steam power in mills of about a hundred years, dating from the mid-nineteenth century and encompassing periods of
growth, stagnation, decline, and, in some countries, renewed growth or thorough-going rationalisation in recent years.

In an industry which is common to almost all the most important industrial nations in the world and which has such a long history as a factory industry, it is possible to compare the different stages of growth, decline and rationalisation in its development either from the contemporary position of the industry in a number of countries or from the history of the industry over the whole period of its development in one country. This study adopts the second method based on the example of the industry in Poland.

The woollen textile industry in Poland has experienced all the stages of development which have been listed above within the last hundred years. Furthermore the Polish industry has developed both under a capitalist economic regime and, more recently, under a communist government. Indeed, the geographical development of the industry in Poland can only be fully understood against the background of the expansion of European capitalism from the west in the nineteenth century and of communism from the east in the twentieth across the borderland area between eastern and western Europe which is Poland—a country which, as the result of the changing balance of power between Russia and Germany, has been subject to territorial redefinition on five occasions since the late
nineteenth century. Until the outbreak of the Second World War the industry was privately owned and controlled. It experienced growth in the late nineteenth and early twentieth centuries as a result of the western European interests in the markets of the Russian Empire, but this growth ended in 1914 and was replaced by inter-war stagnation and depression. Since 1945, under the influence of Russian example and exhortation, the communist government has rationalised the industry and it has grown a second time.

The study of the industry begins in the mid-1870's. The Kingdom of Poland (Krolestwo Polskie) had been an integral part of the Russian Empire since 1815 and economically unified with Russia since 1851, but the industry on the Polish lands of the Russian Empire only reached the threshold of the application of steam power to the weaving and finishing processes and of the complete transformation from a handicraft to a mechanised mill industry about 1870. The woollen spinning section was already using steam power widely, but this section was small in relation to the weaving section and did not include the spinning of worsted yarn. Thus the majority of the mills and workshops were still operated by hand in 1870. The 1870's were a crucial time in the development of the industry for, although

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1. The Polish lands included some areas within Russia proper up to 1914 which ethnically were completely Polish and which have been included in Poland since 1919, such as the town and environs of Bialystok.
handicraft workshops continued to enter the industry after 1870 and some still existed in 1965, they became a minor source of growth after that decade as the industry became increasingly mechanised.

The rapid change to steam power was encouraged by a sudden growth of the industry, which began in the late 1870's after a period of forty years of stagnation. The industry grew in response to the reform of Russian rural society in the previous decade, which had replaced a feudal economy by monetary transactions and had freed the serfs, thus opening a large market in the Russian Empire for the products of manufacturing industry. The economic environment of the industry was also substantially improved in the mid-1870's when the Tsarist government reversed its tariff policy and began to restrict imports of foreign manufactures with increasing severity.

The study is concluded in 1965 at the end of the second Five Year Plan in Poland and the completion of twenty years of communist control in the industry. 1965 was also important in the development of the industry because it saw the beginning of a period of experiment in industrial organisation by the communists which may be recognised in retrospect as the end of monolithic and all-pervading state control in industrial
decisions and may mark the re-introduction of some of the freedom of individual entrepreneurial choice which had characterised the industry under capitalism.

The Plan of the Thesis.

The thesis may be divided into three sections. Chapters II and IV describe the geography of the industry at two important moments in its development — in the mid-1870's and immediately before the first World War — while the important influences on the location and structure of the industry and some of the geographical results of capitalist control in the intervening years are discussed in Chapter III. In contrast to this study of the growing industry, Chapter V considers briefly the geographical results of capitalism in the depressed industry of the 1930's.

Chapter V also serves as a basis for the measurement of the nature and extent of the post-war reorganisation of the industry by the communist government. The differences between the geography of the industry in the late-1930's and 1945 and the industry in 1965 are outlined in Chapter VII following a discussion in Chapter VI of the policies and problems which caused and influenced the changing post-war geography of the industry.

The third section of the thesis, in Chapter VIII, compares the economic environments of capitalism and communism in Poland,
as they affected the industry, and the contrasting processes of change in the geography of the industry before and after 1945.

This outline of the study may suggest that the approach of the study is historical, rather than geographical. The study covers almost a hundred years, but the great length of this period and the chronological arrangement of the chapters do not transform a geographical discussion into history. The aim of the study is not to show that time of itself brings changes or that relationships through time are important. Rather it attempts to examine the proposition that industries in capitalist and communist economies possess typical and different geographical patterns and that these patterns are the direct consequence of the inherent contrasts within the two economic systems. In order to facilitate this approach no attempt has been made to achieve a chronological continuity of description from 1870 up to 1965, and in the periods in which conditions were abnormal, such as the years of war and the 1920's, the industry has not been considered.

It may also be suggested that a study which compares an industry at two different moments of time or in two periods should examine the industry over the same territory at both dates. But Maps 1a, b, c and d on page 24 show that the
area of Poland varied considerably between 1870 and 1965. The boundary changes in the present century, in adding large areas of territory to the south and west of the country also added the Bielsko-Biała centre of the woollen textile industry to Poland in 1919 and the Lower Silesian and Zielona Gora concentrations of textile towns after 1945. At the same time the variations in the eastern frontier of the Polish state on Map 1 do not adequately reflect the effects upon the industry. Prior to 1914, when the Polish Kingdom was united with the Russian Empire, the eastern boundary of the united state was the Pacific coastline of Siberia, whereas after 1918 the de jure eastern frontier of Poland has always also been the de facto boundary of the country both politically and economically.

Comparability of area, like comparability of statistics, is a desirable situation. This study attempts to achieve some comparability in that the industry in the Białystok and Łódź regions, which are considered throughout\(^1\), receive greater emphasis than those branches of the industry which have only been included in Poland since 1919 or 1945, and no attempt

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1. It may be objected that Białystok lay outside the Kingdom of Poland in the nineteenth century. It is included in the discussion of the industry between 1870 and 1914 because it was always a truly Polish area in race and culture, and, between 1851 and 1914, it was subject to the same economic environment as the Kingdom of Poland.
MAP 1a  The Boundaries of Poland 1870 - 1965
MAP 1b  Poland 1870 - 1914
MAP 1c  Poland 1919 - 1939
MAP 1d  Poland 1945 - 1965
has been made to consider the industry in other parts of the Russian Empire in detail. However, a neglect of the industry in those areas which have been added to Poland since 1870 or of the industry in other parts of the Russian Empire before 1914 would involve an abstraction from reality which would jeopardise the value of the conclusions. The spatial and cost relationships between all the groupings of the industry and the sources of raw materials, labour, transport and markets were considered in entrepreneurial decisions, and such decisions in all parts of the country affected the development of the industry in the Bialystok and Lodz regions to some extent at all times since 1870. Insofar as the growth or decline of the industry in these areas has affected the development of the industry in the two regions, it must, and has also been considered.

Comparability of area cannot be preserved, but, in all the periods in which the industry is examined, it is located within an area of relatively homogeneous economic environment, that is, in an area under the control of one government and under one economic system. In each period the industry is treated after the method of J.A. Morris in his study of the southern Piedmont area of the U.S.A.¹ The whole industry in the Russian Empire is considered before 1914 and the

economic environment which the industry faced throughout the Empire is examined, but the emphasis of detail is restricted to the branches of the industry on the Polish lands. An examination of the Polish industry within its local economic environment before 1914 would not yield explanations of either its size or the form, and the location of the industry in that period may only be adequately explained by a consideration of the location of the Kingdom of Poland between western Europe and Russia. In the chapters dealing with the independent Poland after 1918, the industry and its environment are studied within the boundaries of the Polish state, for, since 1918, these have marked the limits of the distinctive and relevant features of the economic environment of the industry.

In this study capitalism and communism are not defined comprehensively or exactly for, like the absolutes of perfect competition and monopoly, neither economic system has existed in a pure form in Poland since 1870. Even in 1965 the achievement of a communist society was far distant and the primary stage of the building of socialism was still being accomplished. At all times under both systems some place has survived for the individual profiteer and some influence, however reluctant, has been exerted by the government. It is only possible to claim that, in the period in which the capitalist industry is studied, the direct influence of the
government in managerial decisions was very weak and that, since 1945, private enterprise has been most severely restricted. Moreover both eastern and western economists have recognised that in the late nineteenth century and post-war periods, typical examples of capitalism and communism respectively were flourishing in Poland.¹

**The Geographical Literature of the Textile Industry.**

In eschewing either an historical approach to the subject or strict comparability of area, and in adopting a comparison of economic systems as the foundation, this study differs from others of the textile industry by geographers. Several historical-geographical studies of the industry have been undertaken for various parts of the world including Poland, which have attempted to consider all the factors which have affected the development of the industry, but these have only dealt with the industry in capitalist environments and have assumed the existence of a


whole range of distinctive capitalist economic conditions. Moreover these studies have discussed the development of the industry through time rather than at any particular moment and have frequently failed to distinguish clearly between discussions of the processes of development in the industry through time and pictures of the industry at any one important point in time.

Other studies in depth have laid the emphasis in the explanation of the distribution and form of the industry upon one selected group of factors, either technical or economic, or have attempted empirical analysis of the factors affecting location decisions through the use of case studies. With the exception of Luttrell these studies also lay emphasis on the changes rather than the forms of the industry at any particular moment and all ignore the fact, which this study demonstrates, that the basic patterns of distribution and structure in the industry might have been entirely different but for their development within capitalist economies.

7. Morris, op. cit.
A specific study of the development of the industry under the influence of a capitalist environment in Lower Silesia has been undertaken, but this did not proceed to a comparison with the subsequent development of the industry under communism after 1945, and Werwicki's further description of the development of the Bialystok industry indicates only a little of the basic character of communist industrial policy and problems in Poland. Only Krzyglod has considered the geographical significance of post-war Polish industrial policy in detail, but his study embraces the whole of industry and pays little attention to the effects of policy on individual branches. Thus the recognition and explanation of contrasting geographical patterns in the textile industry under the capitalist and communist systems remain unattempted, and the distinctive processes and directions of development in the distribution and structure/in the two environments remain to be compared and contrasted.

Much attention has been paid by Polish geographers and economic historians to the textile industry, but almost all have restricted their studies to cotton textile manufacturing or to the general industrial and urban development of the Lodz complex of textile towns. Cotton textile manufacturing

has always employed rather more people since 1870 than the woollen and worsted branch and has generally been undertaken in larger units, which were almost entirely located in Łódź and Fabianice until the 1950's. Moreover scholarship in the development and problems of the Łódź area has been encouraged by the survival of rich archival materials while those for Białystok, Warszawa and the Western Territories have been largely destroyed, and those covering the former Austrian territories of Galicia and Sławk Cieszynski have been lost or are only available in Vienna.

Very little detailed work upon the geography of the woollen textile industry in any part of Poland has been undertaken in this century, with the exception of Warwicki's studies of the Białystok region, the description of the industry in the Kingdom of Poland between 1852 and 1864 by Łukasiewicz, and the official descriptions of damage to the industry during the World Wars.1

In the context of the geographical literature of the textile industry at large it is hoped that this study will fill a certain gap. In the study of the industry in Poland in particular the study continues the work of Łukasiewicz

1. GUS, Ście Zakładów Przemysłowych 1945r., Warszawa 1947, Table 1.
   Komitet Ekonomiczny Ministrów, Sprawozdanie Komisji Ankietowej badania warunków i kosztów produkcji oraz wymiany, Tom 14, Przemysł Włókienniczy, Warszawa 1928.
after 1884 and extends it by including developments in the industry in other parts of the country and by examining the relationships between the regional groupings of the Polish industry. At the same time the study advances the understanding of the geography of the woollen textile industry in general by analysing the basic differences of approach to the industry by the two most important forms of industrial society in the world and by contrasting the effects of the two upon the geography of the industry in Poland since 1870. In so doing it links previous studies of the industry, both capitalist and communist, and contributes to the explanation of the differing patterns in the cultural landscape. Thus the study may serve as an introduction to the neglected subject of the influence of economic systems upon the geography of industry in a period when the continuing modification of both the capitalist and communist systems has obliged geographers to explain industrial distributions and structures against the background of an increasingly complex intermixture of government control and private initiative.
CHAPTER II

THE WOOLLEN TEXTILE INDUSTRY ON THE POLISH LANDS OF THE RUSSIAN EMPIRE ABOUT 1876.

It was suggested in the previous chapter that a full understanding of the geography of the woollen textile industry depends upon an appreciation of the character of the economic and social environment. On the Polish lands of the Russian Empire¹ the explanation of the changing geography of the industry between 1870 and 1914, in particular, requires an analysis of the distinctive features of capitalist philosophy and practice in their influence upon the industry, and it will be shown that the capitalist environment favoured the growth of certain basic patterns of distribution and structure in the industry.

Primitive and uninhibited Capitalism flowered luxuriantly throughout the industries of Europe between 1876 and 1914. The right of the industrialist to produce or to cease production, and of the consumer to buy, to refuse to buy, or to substitute one good for another without let or hindrance, pressure or coercion by states or governments in the pursuit of individual satisfaction, was acknowledged and defended. Late nineteenth

¹ Including the Bialystok area which lay outside the Kingdom of Poland in this period.
century European governments purposely and frequently attempted to affect the economy of the nations only in such matters as the support of or devaluation of the currency or the regulation of foreign trade in order to secure the wealth or security of the nation. Save for regulations governing the use of labour the industrialist was unfettered by the state. In this period the aggregated patterns of entrepreneurial behaviour were dominated by the necessity to make profits and were as severely regulated by the possibilities of private gain as they have been under mid-twentieth century communism in Poland by the subordination of individual profit to the requirements of the whole nation.¹

¹ A. Gerschenkron, Agrarian Policies and Industrialisation: Russia 1861–1917, in The Cambridge Economic History of Europe, vol. VI, part II, ed. H.J. Habakkuk and W. H. Postan, London 1965, p. 383, in a discussion of the industrial development of the Russian Empire in the nineteenth century, summarized the significance of the economic environment as follows: “Investment aimed at the highest profits ... went straight to wherever the physical and human conditions were at the time most favourable”, and,

¹ I. Ihnatowicz, 2 badan nad kapitalem obcym w okresie lodzkie w latach 1860–1880, in Kwartalnik Historyczny, IXII, 1956, 4/5, pp. 246–247, in commenting upon the economic changes in the Russian Empire between 1860 and 1880 wrote: “The basic law of the capitalist system and the motive of all economic actions in the system is the aspiration for profits. Therefore it is necessary to explain the attraction which Lodz exercised over the inflow of foreign capital and the share of this capital in the industry of Lodz.”
Within the Russian Empire the balance of payments deficit and the consequent downward pressure on the Russian rouble led to a major change in the opinion of the period, in the economic environment of the industry in 1877.\(^1\) The reversal of the foreign trade policy of the Russian government in that year caused a change in the pattern of decisions of entrepreneurs in respect of the woollen textile industry in the Polish lands of the Empire at the moment when the industry was on the threshold of exploiting steam power to the full for the first time. This change resulted in a new and distinct "Eldorado of primitive capitalist accumulation" in the Russian Empire,\(^2\) and, as the result, the mill industry of 1914 was almost entirely the product of the post 1876 economic environment and owed little to the foregoing conditions, and more to the existing distribution and scale of the industry in 1876.

The important elements in the economic environment after 1876 will be discussed in the next chapter together with an analysis of their effects upon the geography of the industry between 1877 and 1924, and the industry will be described at the end of this period in Chapter IV.

Chapter II serves as a basis for comparisons with the

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2. K. Luxemburg, Rozwój przemysłu w Polsce, p.27, Warszawa 1957.
MAP 2 Poland in 1876
The geography of the industry in the years up to 1914. In this chapter the distribution and scale of the industry are described on the eve of the period of rapid growth, and the contrasts between the regional groupings of the industry are examined. Consideration is also given to the distribution and character of the markets for woollen and worsted yarn and cloth in relation to the location and capacity of the industry on the Polish lands and to the available supplies of management and capital for the expansion of the industry.

The Distribution and Scale of the Industry about 1876.

Two important concentrations of the woollen textile mills existed in 1876 on the Polish lands belonging to the Russian Empire. Map 2 (on page 46) shows that the two groupings were located in the towns of Bialystok and Lodz, and in the smaller towns and villages around these centres. 123 woollen textile mills and workshops were active in Bialystok and in the powiaty of Bialystok, Bielsko and Sokolka in 1876, employing 3,900 people and producing woollen goods to the value of 3,543,000 roubles. In Kaliska and Piotrkowska gubernii 310 productive units employed about 7,000 people, with a value of output in 1876 of ten million roubles, and in the ten gubernii of

1. For all foreign words see page 18.
the Kingdom of Poland as a whole 337 woollen textile mills and workshops employed about 7,600 people in 1876 and produced between 10,500,000 and 11,000,000 roubles.1

The other forms of the industry existed in 1876. Some merchants in Lodz, Pabianico, Zdunaka Wola and Zgiersa gave out yarn to be woven by independent weavers and their families in their homes. This form of production flourished in both groupings of the industry and one estimate suggested that in 1878 there were 3,600 of these weavers in the towns and villages in the area between Kalisz and Lodz - 2,780 in Turek, 640 in Zdunaka Wola and 200 in Czorkow.2 Most of these weavers produced cotton and linen cloth and not all were weaving wool.

1. Details of the industry in 1876 are based on:
   Obzor Kaliskoj Gubernii za 1876 god., Table 2, Kalisz 1877
   Obzor Lublinskoi Gubernii za 1876 god., Table 2, Lublin 1877
   Obzor Losninskoi Gubernii za 1876 god., Table 2, Losna 1877
   Obzor Petrockovskoj Gubernii za 1876 god., Table 2, Piotrkow 1877
   Obzor Plockoj Gubernii za 1876 god., Table 2, Plock 1877
   Obzor Radomskoi Gubernii za 1876 god., Table 2, Radom 1877
   Obzor Siedleckoj Gubernii za 1876 god., Table 2, Siedlec 1877
   Obzor Suwalskoj Gubernii za 1876 god., Table 2, Suwalki 1877
   Obzor Warsawskoj Gubernii za 1876 god., Table 2, Warszawa 1877

P.A. Orl'ov, Uказатель фабрик и заводов Европейской России, Petersburg 1881.

Pamiętnaia Knizka Grodnenskoi Gubernii na god 1876, Grodno 1876, pp. 2, 3.
See note A on page 489.

2. H. Kagiell, Ryc przemyslu tkackiego w Krolestwie Polskim od 1815 roku, in Ekonomista 1880, 18, p.6.
MAP 3  Woollen Textile Mills in 1876

The open circles represent the largest mills according to the number of employees and their areas are proportional to the number of employees in each mill. The details of employment are as follow -

<table>
<thead>
<tr>
<th>Mill Number</th>
<th>Owner or Firm</th>
<th>Number of Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A. Koos</td>
<td>800</td>
</tr>
<tr>
<td>2</td>
<td>J. Heinzel</td>
<td>754</td>
</tr>
<tr>
<td>3</td>
<td>R. Kindler</td>
<td>510</td>
</tr>
<tr>
<td>4</td>
<td>A.G. Fiedler</td>
<td>480</td>
</tr>
<tr>
<td>5</td>
<td>A. Duchols</td>
<td>420</td>
</tr>
<tr>
<td>6</td>
<td>W. Zachert</td>
<td>280</td>
</tr>
<tr>
<td>7</td>
<td>Knitzer i Meyer</td>
<td>257</td>
</tr>
<tr>
<td>8</td>
<td>H. Kornichau</td>
<td>240</td>
</tr>
<tr>
<td>9</td>
<td>J. Goertz</td>
<td>200</td>
</tr>
<tr>
<td>10</td>
<td>G. Koos</td>
<td>200</td>
</tr>
</tbody>
</table>


Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kieleckoj Gubernii za god 1876, Table 2, Kielce 1877
Obzor Lublinekoj Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Lomzinskoi Gubernii za 1876 god, Table 2, Lomz 1877
Obzor Petrokowskoj Gubernii za 1876 god, Table 2, Piotrkow 1877
Obzor Plockoi Gubernii za 1876 god, Table 2, Plock 1877
Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzor Sedleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
Obzor Suvalskoi Gubernii za 1876 god, Table 2, Suwalki 1877
Obzor Warsawskoj Gubernii za 1876 god, Table 2, Warszawa 1877
Paniatnaja Knizka Grodnenskoj Gubernii na god, 1876, Grodno.
WOOLLEN TEXTILE MILLS IN 1876

- One mill employing more than 200 people
- One mill employing between 4 and 200 people
- Towns and villages with more than one mill
- Exact location of mills in powiat unknown

Number of workers:

- 0
- 200
- 500
- 1000

Scale 1:3,000,000
The second form of production outside the mills was the weaving of cloth and woollen goods by hand for the needs of the family rather than for sale. In 1870 there were almost 140,000 looms producing cloth in this branch of the industry in the Kingdom of Poland to the value of 300,000 roubles. Most of this branch of the industry was located in rural areas away from the centres of the mill industry and the lines of improved transport.

These two branches of the industry are not relevant to this study of the factory industry, apart from the reduction which they caused in the demand for the products of the textile mills, for they were not part of the modern mill industry and represented a stage in the development of textile production which antedated the Industrial Revolution.

The Białystok Region of the Industry.

The woollen textile industry in the Białystok region in 1876 was located in the town of Białystok and in the surrounding villages. Białystok was the largest settlement in the region and Maps 3 and 4 (on pages 50 and 54) show

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2. Based on material supplied by Dr. S. Misztal (I.G. PAN Warszawa) from lists of mills and workshops in the Gubernia of Grodno in the Leningrad state archives. P. A. Orlov, op. cit.
3. Pamiętnica Kniiga Grodnońskiej Gubernii na rok 1870, 1876, Grodno.
that a larger number of mills and workshops were located there in the early and mid-1870's than in any of the other centres. However the maps of the distribution of employment and of the value of production in the region on pages 58 and 69 show that Bialystok did not dominate the region in those respects.

27 mills and workshops, or 22 per cent of the total for the region, were located in the town in 1876, but there were seventy in the Bialystok powiat and another fifteen at a greater distance from Bialystok in the Bielski powiat. Map 4 indicates that mills and workshops were located in 25 villages and that the most important concentrations were in Ciechanowiec, Knyazyn and Michalowo. The number of units in the villages varied widely. In both Choroszcz and Dobrzyniewo the industry was represented by one very large mill, while in Michalowo there were about twenty small mills and, according to the number of mills, Michalowo was the second centre in the region after Bialystok.

About 110 units in the region, or over ninety per cent, were engaged solely in the weaving of woollens in 1876. Only eight mills were spinning woollen yarn and two or three larger mills undertook both spinning and weaving. As a result weaving mills and workshops were located in 23 of the centres of the industry about 1870, and in sixteen centres weaving was the only section of the industry. These centres included those
MAP 4  Woollen Textile Mills in the Bialystok Region in 1870

The open circles represent mills employing fifty or more workers and their areas are proportional to the number of employees in each mill.

Sources - D.A. Timirjazev, Statisticzescikj atlas glavniejszich ostrasloj promysznosti Euroejskoi Rossii, Petersburg 1869

Material supplied by Dr. S. Misztal (I.G. PAN Warszawa) originally taken from lists of mills and workshops in the Gubernia of Grodno in the Leningrad state archives.
WOOLLEN TEXTILE MILLS IN THE BIALYSTOK REGION IN 1870

SCALE 1:1,000,000

Locations of mills

Number of workers

○ Less than 50 workers

- Locations of mills

- Number of workers
of least importance in respect of employment and the value of
output, such as Ciechanowiec and Grodek, despite the large
numbers of workshops there, and Krolowy Most, Nowe, Rozalin
and Swiniobrod in each of which only one weaving workshop was
located. The distribution of the spinning mills was less
ubiquitous, but spinning and spinning and weaving mills were
operating in all the most important centres of the region
- Dzialystok, Chorozecz, Michalowo and Supraśl - and also in
Knyszyn and Wysikow.

The mills which undertook more than one of the basic
processes of textile production\(^1\) included some of the largest
and most fully mechanised units in the region. H. Komichau
(number 8 on Map 3) was spinning and weaving wool in the
largest mill in Dzialystok in 1876 and the cloth was also dyed
in the mill. Three other units completed two of the basic
processes, but the others all undertook only one process.
In Supraśl three mills were spinning and weaving woollens,
including that of W. Zachert, the second largest mill in the
region (number 5 on Map 3), and at Chorozecz the largest mill
in the region (number 1 on Map 3), which belonged to A. Hoes,
was also both spinning and weaving wool.

\(^1\) Spinning, weaving, dyeing, finishing.
These mills were important in the region because, despite the fact that they accounted for a very small proportion of the total number of units, they employed very large numbers of workers and produced a large proportion of the value of output of the region. The contrast between the scale of production in these mills and in the other mills represented the difference between the steam-powered and the handicraft, water and horse-powered industry. Among the largest mills those of Koces in Choroszcz, Bucholz and Zachert in Supraśl, and Goorts in Dobrzyniewo, numbered 1, 5, 6 and 9 respectively on Map 3, all used steam power and so did at least fourteen other, smaller mills, chiefly in Michalowo. By the mid-1870's Koces had installed more than 200 looms in his mill and Zachert had 4,060 woollen spindles and a hundred looms when the average number of looms in the weaving sheds in Bialystok was only thirteen. Bucholz also had forty to fifty steam-powered looms, but the other mills and workshops, which accounted for 95 per cent of the total number of the units in the region, almost all operated on less than twenty looms and more than two-thirds of the mills and workshops had less than ten looms each. The average number of looms in the workshops in Grodek about 1870 was only five, in Krynki less than four, and even in Michalowo only nine.
MAP 5  Employment in the Bialystok Region in 1870

The open circles represent fifty or more workers and their areas are proportional to the number of workers in mills and workshops employing four or more workers in each town or village. The Bialystok region included the town of Bialystok and Bialostocki, Bielski and Sokolski powiaty.

Sources - D.A. Timirjazev, Statisticzaski atlas glavnjejazich
estrasnej promyshlennosti Europejskoj Rosii, Petersburg 1869

Material supplied by Dr. S. Mieztal (I.G. PAN Warszawa)
originally taken from lists of mills and workshops in the Gubernia of Grodno in the Leningrad state archives.
EMPLOYMENT IN THE BIALYSTOK REGION IN 1870

SCALE 1:1,000,000

Number of workers:

- Less than 50 workers
- 50 to 200
- 200 to 500
- 500 to 1,000

Locations:
- Dobrzyniewo
- Wasiłkow
- Pieszczaniki
- Skorupy
- Topole

Legend:
- Knyszyn
- Worszyly
- Sochonie
- Suprasl
- Rosalin
- Krolowy Most
- Grodek
- Swinobrod
- Michalowo
- Clychanowiec
- Siemiatycze
The location of the large mills and those employing steam power shows that the distribution of the mills and workshops alone was a poor indication of the true relative importance of the centres of the industry. Supraśl, where only six mills were located, had a greater potential for production than the whole of the industry in Bialystok, and the production capacity of the one, very large mill in Choroszcz was greater than the whole industry in either Bialystok or Supraśl. Only one of the large, mechanised mills was located in Bialystok in 1876, despite the large number of units in the town.¹

Map 5 shows that the most important concentrations of the industry in the mid-1870's were in Bialystok, Choroszcz and Supraśl, according to the distribution of employment. 3,900 people were employed in 1876 in the region, but only 660, or seventeen per cent, were in the industry in Bialystok. 900 were in the mills in Supraśl and about 800 in Choroszcz. About 200 workers were employed in the only mill in Dobrzyń, 170 in the mills in Michalów and about a hundred in Knyszyn, but the numbers of workers in the other centres were very small.

¹ A. Werwicki, Bialostocki Okręg Przemysłu Włókienniczego do 1945 roku, p.35, Warszawa 1957, suggests that in 1867 the mechanised group had not included more than twenty per cent of the mills in the region.
The distribution of the industry in Map 5 bears little relationship to the distribution of mills and workshops on Map 4. There was a smaller proportion of the regional employment than of the mills in Bialystok, while in Supraśl, a quarter of the employment of the region was concentrated in only four mills. Thus the distribution of employment suggests that Choroszcz and Supraśl were as important as Bialystok, and that all the other centres were of relatively little importance, despite the large numbers of units which were operating in some of them.

The distribution of employment reflected more closely the distribution of the multi-process and mechanised mills than the total number of mills. These large mills employed very large numbers of workers which were far in excess of the average among the unmechanised, single-process mills. Map 4 shows that Moos was employing between eight and nine hundred people in his mill in Choroszcz in the early 1870's, or almost as many as in the whole industry in Bialystok at the same time, and the mills owned by Zachert and Bucholz in Supraśl employed 420 and 260 respectively. Kammischau employed 250 people in Bialystok and Goorts 210 in Dobrzyniewo. At the same time ten weaving sheds in Michalowo, which used steam power, employed only 200 people, but in general the unmechanised weaving shops employed even fewer workers and almost half of them in 1870 employed less than ten people each.
MAP 6 Value of Production in the Bialystok Region in 1870

The open circles represent the output of yarn and cloth to the value of 50,000 roubles or more and their areas are proportional to the value of production in mills and workshops employing four or more workers in each town or village.

Sources - D.A. Timirjazev, Statisticzesci atlas glavnieszych ostraslej promyslennosti Europejskoj Rossii, Petersburg 1869

Material supplied by Dr. S. Kiształ (I.G. PAN Warszawa) originally taken from lists of mills and workshops in the Gubernia of Grodno in the Leningrad state archives.
VALUE OF PRODUCTION IN THE BIALYSTOK REGION IN 1870

SCALE 1:1000000

P. PIEŚCJANIKI - Value of production (thousand roubles)
R. ROZALIN
W. WASILKOW - Less than 50

0 50 200 500 1000
The distribution of the industry according to the value of the goods produced, which is portrayed for 1870 on Map 6 (on page 62), confirms the impression of the distribution of the industry which has been gained from the distribution of employment. The most important concentrations of the industry were headed by Biłgoraj, which accounted for twenty per cent of the value of output from the region in 1876, and Supraśl, with about a quarter of the value, but the mill at Choroszcz only produced about twelve per cent of the regional output. The share of the industry in Mińsk Mazowiecki was also about twelve per cent, and among the other minor centres Dobrzyniewo accounted for about five per cent and Knyazyn for three or four per cent of the total value. Map 6 shows that the other centres of the industry were of very little individual significance.

The composite picture of the Biłgoraj region in 1870 and 1876, based upon the distribution of mills and workshops, employment and the value of output, shows that, although the industry was widely scattered among the towns and villages of the western part of Grodzieńska gubernia, only those centres in which large-scale, mechanised mills were located - Biłgoraj, Choroszcz, Dobrzyniewo, Mińsk Mazowiecki and Supraśl - were important, and that, with the exceptions of Biłgoraj and Mińsk Mazowiecki, these centres derived their importance from a few large mills, rather than from a large number of mills and workshops.
The Lodz Region of the Industry.¹

The larger of the two groupings of the woollen textile mills on Map 3 is located in and around the town of Lodz. In 1876 there were 307 mills and workshops in the region, which were located in nine towns and several villages. The largest concentrations were in Lodz, with 73 mills and workshops; Tomaszow, with 91;² and Zgiers, with thirty mills; 113 other units of production were located in the small industrial settlements around Lodz of Brzesiny, Konstantynow, Ieczyca, Ozorkow and Fabianice.

As in the Bialystok region, some of the centres of the industry had large numbers of units, but contributed little to the value of output or the number of workers. The average number of employees in each of the mills and workshops in 1876 in Lodz was forty and in Ozorkow 26, but in all the other centres except Fabianice the average was much smaller. In Tomaszow it was sixteen, in Zgiers seventeen, and in the Lodzki powiat and the other parts of the region in Kaliski and Piotrkowska gubernii four or less. The industry in the Lodzki

¹ Based on Obzor Kaliskoi Gubernii za 1876 rod, Table 2, Kalisz 1877, Obzor Petrokowskoj Gubernii za 1876 rod, Table 2, Piotrkow 1877, APL, reg. M. Lodzi, 3983.
² Including ten mills which were located in the environs of the town which lay within Brzesinski and Rawski powiats.
Novoradomski and Piotrkowski powiats and in the towns of Brzeziny and Lask, where no units employed more than four or five people, accounted for thirty per cent of the units in the region, but employed only five per cent of the workers and contributed only two to three per cent of the value of output. As a result the industry was effectively concentrated in the two centres with many mills — Lodz and Tomaszow — and in the three centres with smaller numbers of mills — Ozorkow, Pabianice and Zgiers which are shown on Map 3. The weaving sheds which employed less than four workers each are omitted.

TABLE I

The Industry in the Towns of the Lodz Region in 1876 (in percentages)

<table>
<thead>
<tr>
<th>Towns and environs</th>
<th>Mills</th>
<th>Employment</th>
<th>Value of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomaszow and environs</td>
<td>42</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>Lodz</td>
<td>34</td>
<td>49</td>
<td>56</td>
</tr>
<tr>
<td>Zgiers</td>
<td>14</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Ozorkow</td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Pabianice</td>
<td>1</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

Sources — Obzor Kaliskoj Gubernii za 1876 god., Table 2, Kalisz 1877.

The distributions of the industry according to the three criteria of numbers of mills, employees and the value of output give three contrasting pictures of the relative
importance of these five major centres. 24 per cent of all the mills and workshops in the region were in Lodz in 1876 and thirty per cent in Tomaszow, ten per cent in Zgierz and less than one per cent in Pabianice, but the proportion of the regional employment in Lodz was forty-five per cent, in Tomaszow only twenty-three per cent and in Pabianice and Zgierz about nine per cent each. The distribution of the value of output, which is shown on Map 8 (page 73), reflects the distribution of the mills and workshops even less accurately than the distribution of employment on Map 7 (on page 68). Fifty-four per cent of the output was produced in Lodz in contrast to only seventeen per cent in Tomaszow, fifteen per cent in Pabianice and about five per cent in Zgierz.

If the very small workshops in the Lodzki, Noworadoski and Piotrkowski powiaty and in Brzeziny and Lask are omitted, the distribution of mills is as shown on Map 3 and in Table 1 (on page 65). Thirty-four per cent of the remaining productive units in the region in 1876 were located in Lodz.

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1. The omission of the craft workshops which employed less than four workers each clarifies the relationships between the centres of the true mill industry and makes for greater comparability between the details of the industry in Lodz, the Bialystok region and the other parts of the Lodz region. The small workshops were not included in the lists of the mills in either Lodz or the Bialystok region and it has already been pointed out above on page 48 that they were part of the domestic weaving industry.
MAP 7  Employment in 1876

The open circles represent fifty or more workers and their areas are proportional to the number of workers in mills and workshops employing four or more workers in each town or village.

Sources -

Obzor Kaliskoj Gubernii za 1876 god., Table 2, Kalisz 1877
Obzor Kieleckoj Gubernii za gud 1876, Table 2, Kielce 1877
Obzor Ljublinskoi Gubernii za 1876 god., Table 2, Lublin 1877
Obzor Lomzinskoi Gubernii za 1876 god., Table 2, Lomza 1877
Obzor Potrokovskoj Gubernii za 1876 god., Table 2, Piotrkow 1877
Obzor Plockoj Gubernii za 1876 god., Table 2, Plock 1877
Obzor Radomsкоj Gubernii za 1876 god., Table 2, Radom 1877
Obzor Sedleckoj Gubernii za 1876 god., Table 2, Siedlce 1877
Obzor Suvalskoj Gubernii za 1876 god., Table 2, Suwalki 1877
Obzor Warsawskoj Gubernii za 1876 god., Table 2, Warszawa 1877
Pamiatnaja Knizka Grodnenskoj Gubernii na god, 1876, Grodno
EMPLOYMENT IN 1876

Number of workers

- Less than 50 workers

P. PABIANICE
Z. ZGIERZ

KALUSZYN

KALISZ
OPATOWEK
LASK

SANDOMIERZ

CHMIELNIK
ALEKSANDROW

ZAWIERCIE
PILICA

SCALE 1:3,000,000
and forty-two per cent in Tomaszow, but twice as many people were working in the industry in Lodz as in Tomaszow and they produced three times the value of output. Furthermore the two mills in Fabianice, which accounted for only one per cent of the remaining mills in the region, employed as many people as the thirty mills in Zgierz and produced three times as much. Lodz and Fabianice were responsible for larger shares of the regional output than of the number of employees or mills, and the value of output per worker in those towns was higher than in any of the others in the region in 1876.

The differences in the average numbers of workers in the mills of the different towns may have been partly caused by the uneven distribution of woollen spinning mills for, in 1876, the spinning mills employed more people on average than the weaving mills. In Lodz spinning mills employed an average of 56 people each against 38 in the weaving section and in Ozorkow the averages were 53 for spinning and seventeen for weaving. The average numbers of employees in both sections of the industry in Tomaszow and Zgierz were smaller than in Lodz.

The ratios between the numbers of mills in the two sections varied widely among the towns of the region. In Tomaszow there were about five spinning mills to over eighty weaving units and in Lodz five spinning to 68 weaving mills, while in Ozorkow and Zgierz the ratios were five to fifteen
and six to twenty-four respectively, so that, although the ratio of spinning to weaving mills in Tomaszow and Zgierz, for example, varied widely in 1876 the average numbers of workers in the mills in both towns were the same. Thus the spinning mills do not appear to have been a significant cause of the differences in the average sizes of mills between the towns of the Lodz region except in Osorkow, where spinning mills accounted for a larger proportion of the mills and workshops than in any of the other centres. The distribution of spinning mills followed that in the Bialystok region in that the industry in all the more important centres, except Fabianice, included a well-developed woollen spinning section, while the industry in the minor centres was only composed of small weaving shops.

The contrasts between the average scales of employment among the towns of the Lodz region may also have been caused by the differing extent to which the weaving section was mechanised. All the largest mills in the region employed steam power to drive their machinery and the contrasts in scale between these mills and the unmechanised workshops were very considerable. The largest mills in the Lodz region in 1876 were those belonging to Heinzel and to Kunitzer i Meyer, which were in Lodz, and to Kindler in Fabianice, which all employed steam power for weaving. These mills, which are
numbered 2, 7 and 3 respectively on Map 3, employed about 1,500 workers in 1876 and 860 looms. None of them employed less than 250 workers or 150 looms at a time when no mill using hand or water power, and indeed no other mill in the region, employed as many as 200 workers or had more than a hundred looms. While four mills in Lodz employed more than a hundred people each in 1876, only two in Tomaszow and one in Zgierz employed more than a hundred workers and more than 150 people.

At the same time the small weaving unit was more important in the industry in Tomaszow and Zgierz than in Lodz, Ostrów and Fabianice although over half of the mills and workshops in all these towns except Fabianice employed less than twenty workers each. However over a quarter of the mills in Tomaszow and Zgierz employed less than ten people in 1876, but only eleven of the total of 73 units in Lodz, where the extent of mechanisation was far greater, employed so few people. Thus the greater extent of mechanisation in the weaving section in Lodz and Fabianice, which was reflected in the large mills in those towns, than in Tomaszow and Zgierz was probably an important cause of the differences between the average sizes of mills among the towns in 1876.
MAP 8  Value of Production in 1876

The open circles represent the output of yarn and cloth to the value of 50,000 roubles or more and their areas are proportional to the value of production in mills and workshops employing four or more workers in each town or village.

Sources -
- Obzor Kaliskoj Gubernii za god 1876, Table 2, Kalisz 1877
- Obzor Kieleckoj Gubernii za god 1876, Table 2, Kielce 1877
- Obzor Ljublinskoj Gubernii za 1876 god, Table 2, Lublin 1877
- Obzor Lomzinskoj Gubernii za 1876 god, Table 2, Lomza 1877
- Obzor Piotrovskoj Gubernii za 1876 god, Table 2, Piotrkow 1877
- Obzor Plockoj Gubernii za 1876 god, Table 2, Plock 1877
- Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
- Obzor Sedleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
- Obzor Suvalskoj Gubernii za 1876 god, Table 2, Suwalki 1877
- Obzor Warsavskoj Gubernii za 1876 god, Table 2, Warsawa 1877
- Pamiatnaja Kniska Grodnenskoj Gubernii na god, 1876, Grodno
VALUE OF PRODUCTION IN 1876
(1000 roubles)

- Less than 50

SCALE 1:30000000
The very large, mechanised mills were giants in the industry of 1876 and it is apparent that the location of a few of them in one town was sufficient to raise the town to a position of primary importance in the industry throughout the country and to concentrate in that town a number of workers which appeared to be completely out of proportion to the number of mills. Moreover the labour productivity was probably greater in the mechanised mills than in the handloom workshops, and the existence of one of the very large mills in a town tended to increase the proportion of the regional value of output which was produced in that town. Lodz and Pabianice in particular owed their dominance in the employment and value of output of the region to the location in those towns of all the largest of the mills, and the absence of very large mills from the industry in Tomaszow, Zgierz and Ozorkow caused those towns to have smaller proportions of the total employment and output than of the mills in the region.

It is important to notice that the woollen spinning and weaving sections of the industry in the Lodz region were completely vertically disintegrated in all centres, and that the large scale of some mills owed nothing to the integration of the processes of production. Multi-process mills, which employed more people and produced larger outputs by value on
average than single-process undertakings in the Bialystok region hardly existed in 1876 in the Lodz region, and were not the cause of the differences in the scales of mills between the towns of the region.

The contrast between the distribution of mills and of the value of output among the towns of the Lodz region in 1876 was even greater than the contrast between the distribution of mills and of employment. This contrast has already been explained in part by the greater degree of mechanisation and larger scale of production in Lodz and Fabianice than in the other centres, leading to greater labour productivity. However the remarkable concentration of the production of the region in terms of value in these two towns, which is evident from Map 8 (on page 73), and Table I, and the very low proportion in Tomaszow in relation to the proportion of the mills cannot be entirely explained by differences in the scale of production between the towns.

**TABLE II**

**Labour Productivity in the Lodz Region in 1876**

<table>
<thead>
<tr>
<th>Town</th>
<th>Value in Roubles</th>
<th>Output per Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabianice</td>
<td>about 2,600</td>
<td></td>
</tr>
<tr>
<td>Lodz</td>
<td>1,795</td>
<td></td>
</tr>
<tr>
<td>Tomaszow</td>
<td>1,125</td>
<td></td>
</tr>
<tr>
<td>Ozorkow</td>
<td>1,094</td>
<td></td>
</tr>
<tr>
<td>Zgierz</td>
<td>955</td>
<td></td>
</tr>
</tbody>
</table>

Sources - *Obzor Kaliskoj Gubernii za 1876 god.*, Table 2, Kalisz 1877; *Obzor Petrokovskoj Gubernii za 1876 god.*, Table 2, Motrykow 1877.
Large differences existed between the labour productivity of the industry in Lodz and Pabianice and the labour productivity in the other centres of the region. These differences are illustrated in Table II. They were caused in part by the specialisation among the towns in the weaving of different types of cloth. All the mills in Lodz and Pabianice and some of those in Zgiers were weaving light-weight cloth, both woollen and the new worsteds, flannels, linings and head scarves from a mixture of woollen and cotton yarns, while the mills in Tomaszow specialised in heavy woollen cloths, such as coatings, rugs and blankets of a hundred per cent wool content. In Zgiers in 1879 the value of cloth produced in the heavy woollen group of weaving mills was 64 roubles per pound, while among the semi-woollen cloth and worsted weavers the value was 78 roubles per pound, but this comparison cannot be extended to the other centres in the region because of the lack of statistics and because the quality of cloth may have varied between centres. Nevertheless the difference in the value of the two types of cloth associated with the specialisation among the centres upon the production of one or the other, appears to have accounted for a part of the contrasts in the distribution of labour productivity.

1. Based on P.A. Orl'ov, op. cit.
Almost all the industry in the Lodz region and all the mills of importance in 1876 were concentrated in the five towns of Lodz, Ozorkow, Pabianice, Tomaszow and Zgiers, of which Lodz was the largest source of employment and output. However, a division of the region on the basis of products is more meaningful than a classification according to the overall size of the industry in each town because it connects the specialisations of individual towns and the differences of scale among the mills. The semi-woollen and light-weight woollen cloth towns of Lodz and Pabianice were also the chief centres of large-scale mechanised production, while the industry in Tomaszw and to a large extent in Zgiers, was dominated by smaller units of production, a lower degree of mechanisation, and a dependence upon the traditional heavy woollen goods of the Polish lands of the Russian Empire. In contrast to these towns the industry in Ozorkow, although including both spinning and weaving sections, depended upon spinning for about half of the employment and output, and was consequently a centre of mechanised spinning mills of medium scale, employing between twenty and a hundred workers, and of small-scale woollen weaving workshops.

The Industry in other parts of the Kingdom of Poland.¹

Maps 3, 7 and 8 show that in the other parts of the

¹ Based on Table 2 in Obscr... Gubernii za 1876 rok, for the ten gubernii of the Kingdom of Poland. See note A on page 489.
Kingdom of Poland large-scale, mechanised mills were the most important form of the industry. 23 small handicraft weaving workshops existed in 1876 with a combined labour force of 120, but the important units of production were a few large mills using steam power, which were located away from the concentrations of the industry. The most important of these were the spinning and weaving mill belonging to Repphan in Kalisz with 150 employees and the weaving mill at Opatowiec employing 480 people, which were the remnant of the early nineteenth century Kalisz region of the woollen textile industry in Poland. Other important mills were the woollen spinning mill of Brauss at Zawiercie, and the weaving mill of Moes at Pilica, which both employed about 200 people. With the exception of the mill at Zawiercie all these mills were producing heavy woollen cloth and the output per employee per annum of 1,030 roubles was very similar to those of the heavy woollen weaving mills in the Lodz region.

Contrasts between the Regions and between the Centres of the Industry in 1876.

The chief contrasts between the industry in the textile towns and villages of the Bialystok and Lodz regions have been noted above. A wider comparison of the industry is now required in order to establish the important similarities and contrasts between the industry in the two regions, for these
similarities and contrasts are important to the explanation of the decisions of entrepreneurs in the industry between 1876 and 1914.

Considerable differences in the scale of the industry existed between the centres which arose from differences in the mechanisation of production. The differences in scale were manifest in the uneven distributions of the large mills, employing more than a hundred people each, and of the small-scale, handicraft workshops, which employed less than twenty workers each.

The workshops dominated the industry throughout the Polish lands of the Russian Empire in numbers, accounting for about two-thirds of all the mills and workshops, but the group produced less than a third of the output and employed only a third of the workers in the industry. Workshops were of less significance in the Lodz region than in the Bialystok region and accounted for rather more than half, in comparison with three-quarters, of the total number of units there.

Mills which employed a hundred people throughout the Polish lands, in contrast, numbered only seventeen and were restricted to a few of the towns. The importance of the large mills in the distribution of the industry as a whole in 1876 has been indicated above, but it appears that the existence of large mills in a town was not only a cause, but also a symptom of the importance and strength of that location
in relation to others. In particular the strength of these locations rested not only in the greater resilience of companies with large fixed assets in times of economic difficulty, but also in the contrasting skill and experience of the management and labour in the two groups of mills.

The quality of labour and management were probably higher in those mills and in those towns where German textile producers and workers were living. The Germans had migrated from the textile areas of Bohemia, Saxony, Silisia and even Wesphalia to the Polish lands of the Russian Empire during periods of depression in the German Industry since the 1620's and thus had sustained an inflow of the techniques and skills of textile production from western Europe which were in advance of those employed in mills owned and directed by Poles.

The German share in the textile industry in both regions was very considerable by 1876. In Lodz at least 65 of the 73 mills were owned by Germans or by people with Teutonic names and 35 also employed foreign managers and foremen who were often German.¹ In Zgierz at least three-quarters of the mills were owned by Germans and in Tomaszow Germans owned the chief mills in the town.² Kantouffel has calculated that for the Bialystok region eighty per cent of the value of output was

¹ Based on APL, Mag. H. Lodzi, 3983.
² P. Krajewski, Przemysł Królestwa na wszechstronie przemysłowej wystawie Cesarstwa w Petersburgu r. 1870, p. 8, Warszaw 1870.
produced in mills and workshops under German ownership, but that only 64 per cent of the mills and workshops belonged to Germans. Twenty per cent only of the output was in the hands of Jews and Poles, but they owned about 34 per cent of the units.¹

These figures suggest that, although German entrepreneurs and workers were to be found in mills of all sizes in both regions, they were chiefly employed in the larger mills. At the same time the Polish element among the entrepreneurs and skilled workers was largest and most widespread among the smallest units of the industry in which the extent of mechanisation and the standards of production were relatively low. Thus Germans were responsible for a larger proportion of the industry in the centres of large-scale mills than in places where the industry was composed only of small workshops. The importance of skilled German capitalists and workers was greater in the Lodz region than in the Bialystok region or in the isolated concentrations of small-scale industry in other parts of the country. Within the Lodz region the existence of the cotton and other branches of the textile industry in Lodz and Pabianice, in which Germans also played a large part, increased the supply of skilled workers in those towns to the

¹ A. Manteuffel, Historia Bialostockiego przemyslu welnianego w 19 wieku z uwzględnieniem początku wieku 20-tego do wojny światowej, p.22, Praca dyplomowa S.G.P.i S., Warszawa 1934, Typo-script.
DIAGRAM 9  The Distribution of the Woollen Textile Industry in 1876

The columns represent the proportion of the total number of mills employing four or more workers, of workers, and of the value of output in each town or village in the Kingdom of Poland, but only in each town of powiat status or in each powiat in the Bialystok region. Towns and villages in Kingdom of Poland and powiaty in the Bialystok region in which mills were located, but which did not account for one per cent of the total number of mills or workers or contribute one per cent of the total value of output, have been omitted.

Sources -
Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kielcekoj Gubernii za god 1876, Table 2, Kielce 1877
Obzor Ljublinskoj Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Lomzinskoj Gubernii za 1876 god, Table 2, Lomza 1877
Obzor Petrokovskoj Gubernii za 1876 god, Table 2, Piotrkow 1877
Obzor Plockoj Gubernii za 1876 god, Table 2, Plock 1877
Obzor Radonskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzor Sadleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
Obzor Suvalskoj Gubernii za 1876 god, Table 2, Suwalki 1877
Obzor Warsavskoj Gubernii za 1876 god, Table 2, Warszawa 1877
Pamiatnaja Knizka Grodencskoj Gubernii na god, 1876, Grodno
THE DISTRIBUTION OF THE WOOLLEN TEXTILE INDUSTRY IN 1876.
relative disadvantage of the centres of the industry in the
Bialystok region and of Ozorkow and Tomaszew in which only
woollen textiles were produced.

The comparison of the industry in the two regions above
and the composite picture of the distribution of the industry
in Diagram 9 (on page 83) show that in 1876 Lodz was the
most important centre of the woollen textile industry in all
respects. Moreover as the centre in which modern techniques
and scales of production in the industry were most firmly
established in 1876, it was potentially the strongest centre
of the industry. Among the other centres only Ozorkow,
Pabianice and Supraśl, excluding the single-mill locations,
were concentrations of large and medium-scale mills and of
mechanised production in the ownership and under the direction
of Germans. It was the industry in these towns which was most
efficient and was best adapted to take advantage of the large
markets for textile goods in the Russian Empire about 1876.

The industry was also located in about 45 other places
in the Kingdom of Poland and in the concentration of villages
around Bialystok, but many of these were single-mill locations
or were the location of only a few small, handloom workshops.
Among the other centres, such as Bialystok, Tomaszew and Zgierz,
the industry was usually a concentration of many small units,
largely worked by hand, which accounted for few employees and
contributed relatively little to the output of the industry.
Much of the industry in both these groups of centres was doomed to disappear if the western European pattern of development in the industry spread to Poland, as the improvement of communications and the expansion of large-scale, factory production occurred. In the 1870's the developing situation in the market for cloth was revealing large potential regional patterns of expansion and decline, prosperity and depression among these groups of textile towns, and it is to these influences on the evolving distribution and scale of the industry that this study now progresses.

Markets and Regional Patterns of Change in the Industry, 1870-1876.

The deficiencies of static pictures of an industry at particular moments of time have been explained in Chapter I. The foregoing description of the industry in 1876 is necessary for it records the distribution and form of the industry immediately prior to an important change in its economic environment, but it does not allow a full comparison to be made with the industry in 1914 and it does not form an adequate basis for an explanation of the processes of geographical change which occurred between 1876 and 1914.

The year 1876 must be placed in its economic environment, and its position in relation to the crests and troughs of the
waves of boom and depression in the domestic and international economy must be shown. The influences upon the industry and trends within its geography cannot be accurately analysed in that year alone, nor can an accurate judgment be made as to whether that year was characteristic or atypical of the period from which it has been chosen to be the representative. Only a wider view over a series of years will permit an analysis of the changes which were occurring within the geography of the industry, and make manifest the position of the static picture in the industry's evolutionary course.

One of the basic influences upon any industry is the market for its products. Both the size and location of the industry are at least in part a response to the characteristics and location of the product-market, and the history of each firm is a reflection of the fluctuating levels of demand against the varying intensity of competition by other producers in the market.

In the mid-1870's some centres of the woollen textile industry on the Polish lands of the Russian Empire were experiencing depression and industrial stagnation with falling numbers of mills and workshops, employees and output, while in some other centres, the industry was growing rapidly and was altering its structure and technology through the entry of new
mills and the inflow of capital. The divergent patterns of development among the regions and centres between 1870 and 1876 may be explained against the background of the changing characteristics of the markets for the industry's products and of the supplies of entrepreneurship and capital. In particular the substantial contribution of German managerial ability, skill and investment to the growth of the industry cannot be fully explained without a description of the location and characteristics of the markets for cloth before 1876, which attracted the German contribution to the industry.

The Location of the Markets for Polish Cloth.

The remarkable concentration of the woollen textile industry in two small areas of the Polish lands of the Russian Empire, which has been outlined in this chapter, and the specialisation in those areas upon the production of cloth, suggests that the products of the industry were sold not only to the population in the towns and villages of the two regions, but also over a wider area of the Russian Empire. It appears that the location of the market for each firm was closely associated with the size and age of the mill.

In the Bialystok region 22 of the 43 firms in the town of Bialystok about 1870 were selling their cloth in the town,
while the majority of firms in Grodek, Krynki, Michalowo and Zabludow were also selling at least some of their cloth in the town. Some of the cloth which was woven in mills and workshops outside Bialystok was also sold in and around the place of production. Five of the workshops in Krynki sold their cloth in the village or "locally"; seven workshops in Michalowo sold their cloth in part "in Bialystok" and part "locally," and four firms in Zabludow disposed of their products similarly in local markets. Thus many firms in the region were selling their goods locally, but details are only available for seventy per cent of the mills and workshops and these were only responsible for forty per cent of the regional value of output. Twenty-eight per cent of this proportion of the total output was sold "locally" and a further sixteen per cent was sold in Bialystok by firms which were located in other centres of the region. Thus seventy per cent of the productive units in the region in 1870 sold forty-four per cent of their output locally or in Bialystok or in both markets.\footnote{The distribution of sales is based on a list of the mills and workshops in the Bialystok region for 1870 derived from lists of mills in the Leningrad state archives and supplied by Dr. S. Misztal (I.G.PAN Warszawa). See Note A on page 489.}

Fifty-four per cent of the output of the 76 mills and workshops was sold directly "in Russia" and especially in the towns there. Sales in Russia differed from local sales in the opinions of the producers and this difference was based on the...
location of the two markets. Sales to Russia referred to markets located to the east, southeast and northeast of Bialystok which were presumably beyond the limits of Polish culture and the Polish language. Pawlicka suggests that in 1872 the manufacturers in Bialystok sent their goods by rail to the northeast, to the Baltic coast markets of Lithuania, and to St. Petersburg.\footnote{1}

A clear distinction existed between the scale of the mills which were selling locally or in Bialystok and the mills which found markets in Russia. The mills which sold directly to the Russian market produced cloth to the value of 43,400 roubles each on average in 1870, while those selling within the region produced an average value of 29,200 roubles each. At the same time those selling directly to Russia had an average of eighteen looms each while the others only possessed seven looms apiece, and those selling to Russia employed an average of forty workers each, which was four times the number for the other mills and workshops. In 1870 the five largest firms in Bialystok were all selling their goods in Russia, while firms selling "locally" or "in Bialystok" were almost entirely small workshops and included few of the large or medium-scale mills. The largest of the firms which sold their

\footnote{1. J. Pawlicka, Z dziejow przemyslu wołnianego w białostockim okręgu włocieniowym (XIXw.), in Przegląd Włókienniczy, 1959, p.326.}
products within the region in 1870 employed 48 people and produced cloth to the value of only 52,000 roubles on twenty steam-powered looms. Thus the large and medium-scale sections of the industry in Bialystok were producing almost entirely for the Russian market.

The foregoing analysis only includes about seventy percent of the firms in the Bialystok region in 1870 and it does not draw equally on the pattern of sales of all sizes of firm. As the result it is probable that the division of the output according to the place of sale which has been outlined above is an underestimate of the true extent of the dependence of the woollen textile industry in the Bialystok region upon the Russian market. There are at least two causes for this error.

In the first place the size of the sales in and around Bialystok was probably in excess of the local level of demand. 33 firms indicated that they sold exclusively in local markets or in Bialystok and sales made "locally" were probably for local consumption by the Polish population, but a part of the sales in Bialystok was undoubtedly made to the merchants who frequented the town. In 1870 cloth to the value of 265,000 roubles was sold in Bialystok, and the whole of this cannot have been consumed by the inhabitants of the town and its environs alone when the population of the region was less
than 100,000. Furthermore the product of the region was unlikely to find a large local market for it was of relatively good quality whereas the local demand was for coarser cloth. Some of the cloth which was bought by merchants was almost certainly subsequently retailed in Russia, thus increasing the dependence of the industry in the region upon Russian rather than upon Polish markets.

The existence of indirect exports of this type to Russian markets also throws doubt upon the true destination of the cloth which was sold "locally" by firms in Bialystok. Those sales accounted for 348,700 roubles' worth of cloth. The majority of firms which disposed of their cloth in this way were small-scale producers and it is possible that some of them preferred to sell their cloth locally to peripatetic merchants rather than attempting to deal directly in far-distant foreign markets. Thus some of the cloth which was sold "in Bialystok" and also some sold "locally" was probably retailed and consumed in Russia.

The second cause of error in the estimate of the proportion of the regional output which was sold in Russia arises from the lack of details of the location of the markets of some of the other mills in the region and especially the

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1. Darniestnaja Knyzka Grodzenskoj gubernii na rodi 1870, Grodno.
larger mills. The four largest mills in the region, belonging to Bucholz, Goertz, Moes and Zachert, have been excluded from the foregoing discussion, as also has been the mill belonging to F. Aunert in Supraśl. All these mills sold their products in Russia -- Moes had warehouses in St. Petersburg and Moscow, and also sold cloth in Odessa, Karkov, Poltava and Kiev; Zachert sold cloth in these cities and also in Riga as well as in the Kingdom of Poland, and Bucholz and Aunert were selling in the same markets in the late 1860's. In 1870 the mills of Aunert, Bucholz, Moes and Zachert produced 35 percent of the value of output of the Bialystok region, and almost all of their cloth was sold in Russia. When the sales by these firms are added to those amongst the other 76 mills and workshops, it appears that at least half of the cloth was sold directly by producers in Russian markets and that the total sales of Bialystok cloth in Russia accounted for more than this proportion.

To the extent that the industry was not producing primarily for the local market or for the Polish market in general, but that the larger part of the product was transported several hundreds of kilometres from the region to the markets of Russia, the industry in the Bialystok region

1. Ibid., pp. 37, 41, 43, 45.
in the 1870's occupied a peripheral, if not eccentric, location.¹

The location of the market for the products of the industry in the Lodz region in the 1870's is less certain. Some of the cloth was sold in the Kingdom of Poland and some in Russia, where producers in all centres of the Lodz region enjoyed a market in the western parts of the country, and sales were also made as far east and south as Moscow, Odessa and Tbilisi. Unfortunately the exact proportion of the product supplied to each of these markets are not known.²

An indication of the relative sizes of sales by the producers of the Lodz region in Russia and in the Kingdom of Poland may be gained from a comparison of the output of the

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¹ The explanation of this strange location of the industry may be discovered from the close correlation between the oldest mills in the region and the most complete dependence upon the Russian market. The oldest mills had been established prior to the abolition of the import tariff which had severed the industry in the Kingdom of Poland from its valuable markets in Russia between 1831 and 1851. The founders of these mills — Aunert, Bucholz, Moe, Kommichau and Zachert — were Germans who established their mills just within the Russian customs frontier, that is in the Russian market, but as close as possible to their original mills in German lands. All the skilled staff were also migrant Germans, and the effort of migration and of settling in foreign, greenfield locations was justified by the access which these locations afforded to the coveted Russian markets.

² J. Jaworek, Kalendarz Polski ilustrowany Jaworskiego 1869, p.87, Warszawa 1869; 1871, p.66, Warszawa 1871.
F. Krajewski, op.cit., p.6.
Obzor Kaliskoj gubernii za 1864 god, p.24, Kalisz 1875
... za 1875 god, p.16, Kalisz 1876.
industry in the Kingdom with the total consumption of woollen and worsted cloth in the Russian Empire in 1876.\textsuperscript{1} Seventeen per cent of the value of output of the woollen textile industry in that year, or fifteen per cent of the value of cloth consumed, throughout European Russia and the Kingdom of Poland, was produced in the Lodz region. In the same year the population of the Kingdom of Poland was only eight per cent of the total population of the Russian Empire. This does not prove that half of the output of the Lodz region was sold in Russia for the quality of the cloth produced in the sixty gubernii varied and, if the example of the Bialystok region is true for the whole of Russia, the quality was probably higher in the Lodz region than in Russia. Furthermore in a year when the value of cloth produced in the Kingdom of Poland was about 10,500,000 roubles, imports of woollen and worsted cloth into the Empire from Western Europe, which may have been sold in any part of the country, were valued at 10,450,000 roubles.\textsuperscript{2} In these circumstances it is possible that the population of the Kingdom of Poland accounted for more than eight per cent of the consumption of cloth of the

\textsuperscript{1} Consumption is defined as production plus imports of cloth, but minus exports, and is calculated by value.

\textsuperscript{2} Obzor vneshnjej torgovli Rossii za god 1882, pp.15-29, Petersburg 1883.

Russian Empire in 1876, and that the larger part of the product of the industry in the Lodz region was sold in Polish markets.

No conclusion can be reached upon the exact proportion of the output of the Lodz region which was sold in Russian markets in 1876, but it would be surprising if the dependence of the industry upon sales in Russia was as great as that of the industry in the Bialystok region. The mills in Choroszcz, Dobrayniewo, Supraol and other important producers in the Bialystok region had been closely and often exclusively operated since their establishment in the 1830's and 1840's with the purpose of making sales in Russian markets. The interest of the industry in the Kingdom of Poland, in contrast, had only been reawakened to the prospects of the Russian market in the mid-1850's, and the twenty years which had elapsed since the blockade of the Crimean War had included a period of severe social unrest throughout the Empire. In contrast to the history of 35 years of sales by the chief firms of the Bialystok region in Russia, only a few years had been available for the producers in the Kingdom of Poland to establish contacts in the Russian markets.

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1. I.I. Janzull, Przemysł fabryczny w Krolestwie Polskim, p.45, Petersburg 1887. Between 1820 and 1831 the industry in the Lodz and Kalisz regions had grown rapidly on the bases of the immigration of German textile workers and of sales to Russia, but, with the imposition of the tariff on goods imported into European Russia in 1831, the markets had been lost and the industry in the Kingdom of Poland had stagnated and declined until the mid-1850's.
The proportion of sales in the markets of the Empire by firms in the Lodz region was growing in the early 1870's for the increase in the value of output of the Lodz region was greater than the growth in the industry of the Russian Empire as a whole. Over the period from 1870 to 1876 the increase in the value of output by the industry in the Kingdom of Poland was about twelve per cent,\(^1\) while in Russia it rose by only two per cent.\(^2\) In the same period the value by which cloth imports exceeded exports increased by 107 per cent and the total value of cloth consumed in the Empire rose by ten per cent.\(^3\) The share of the producers of the Kingdom of Poland in the total production and consumption of woollen and worsted cloth in the Empire was increasing while the share of the Russian industry, including the Bialystok branch, was declining. The regional contrast in the growth of the industry in the Empire shows that the redistribution of markets was to the advantage of producers in the Lodz region rather than to producers in other parts of the Empire, despite the eccentric location of the Lodz region in relation to the distribution of the population of the Empire.

1. I. Poznanski, Proizvoditel'nie sily Carstva Polskago, p.54, Petersburg 1880.
2. D.A. Timiriazeva, op.cit., p.139.
3. Ibid. p.140. Possible changes in the level of stocks within the Russian Empire have been ignored.
The Characteristics of the Markets for Polish Cloth.

The most important characteristics of the market for cloth in the Russian Empire between 1870 and 1876 were the long-run growth of demand, which had begun in the mid-1850's, the increasing substitution of industrial goods for the products of domestic industry, the rising level of imports and the short-run fluctuations in the level of the market. The value of output of the woollen textile industry in the Kingdom of Poland rose by 450 per cent between 1854 and 1876, but this increase was ten times as great as the growth in the population. \(^1\) Peasant and land reform in 1864, leading to the establishment of a monetary economy in the countryside, and the appearance of cheap, factory-produced textiles brought by the new railways probably led to widespread substitution of the cloth from Bialystok and Lodz, Fabianice and Supraśl, Tomaszow and Zgierz for the products of domestic industry in rural areas.

Some of the factors which were causing the growth in demand throughout the Empire were also probably diverting some of it to producers in the Kingdom of Poland and thus raising the total level of demand for the products of Polish mills.

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The bleaching works at Kopisch, and later Peters, at Emilia Street in Lodz (now 8th March Street), according to a contemporary engraving from the mid-nineteenth century.
The removal of the tariff between Russia and the Kingdom of Poland in 1851 had opened the large Russian market to Polish goods, but it offered the Russian producer little opportunity for increased sales in the relatively minute Polish market. The ending of serfdom in Russia in 1861 created a market for cheap, mass-produced consumer goods among 55 to sixty per cent of the Russian population, or about 35,000,000 people, whereas the complementary reform in Poland in 1864 affected less than 4,000,000 people directly and, following an earlier reform, widened the economy of the country to a lesser extent and caused a much smaller rise in the demand for the products of factory industry. 1 These potential advantages in favour of the industry in the Kingdom of Poland were realized for it by the construction of railways from the Kingdom into Russia, from Warszawa to St. Petersbourg in 1862 and to Moscow in 1870, which opened up markets in the western areas of European Russia for Polish producers. 2

The industry in the Łódź region was in a superior location and was better prepared to take advantage of these markets than the industry in the Bialystok region or the industry in Moscow and St. Petersbourg. Not only was the

1. A. Gerschenkron, op. cit., p. 764.
2. The early 1870's were a period of relatively intense activity in railway construction throughout Russia in an era in which railway building was almost continuous. Between 1869 and 1872 the length of railways in Russia increased from 4,790 wiorst to 15,680 wiorst (J. Bloch, Finanse Rosji w XIX wieku na tle ogólnych dziejow, vol. III, p. 80, Warszawa 1883).
industry in Lodz and the surrounding centres located nearer
to the sources of experience, skill, technical innovation and
capital in the textile industry in western Europe, but the
population of these towns already included a large western
and central European element as a result of the immigration
of German textile producers and employees. At the same time
branches of the industry in other parts of the Russian Empire
did not enjoy any greater tariff protection from competitors
in western Europe than the industry in the Kingdom of Poland.
Indeed the removal of the protective tariff in 1851 removed
also the raison d'être of the Bialystok branch of the industry
for the advantage of location just within the tariff border
was transferred from the Russian-Polish boundary to the Polish-
Prussian frontier. Thus these factors were potentially
favourable to the industry in the west of the Kingdom of Poland,
but did not favour the industry in Bialystok.

Not only was the demand for cloth in general increasing
in the Russian Empire in the 1860's and 1870's, but the demand
for wool cloth was turning increasingly to lightweight and
unmilled goods. This change also tended to favour the industry
in the Lodz region rather than in Bialystok and, more
particularly, the mills in Lodz, Fabianice and Zgierz which
specialised in the weaving of this type of cloth.
The whole of the increasing demand in the Russian Empire in the early and mid-1870's was not realized by the woollen textile industry in the Kingdom of Poland, in the Bialystok region or in other parts of the Russian Empire. Despite the tariffs on imported textiles, the value of imports rose quickly between 1870 and 1875. Table III indicates that imports of semiwoollens and worsteds rose in every year from 1870 to 1875, finding a willing market in the Empire. In this period Russian markets came to depend to an increasing extent upon imports for the type of goods which were produced in Lodz and Fabianice. The consumption of foreign woollens of the type woven in all the other centres of the industry, in contrast, did not increase
to a substantial extent. Table III shows that, although imports of woollens doubled between 1870 and 1873, they declined again in the years up to 1876.

The increase in the value of imported woollen and worsted cloth in the years from 1870 to 1876 was slightly greater than the growth in the value of the output of the woollen textile industry in the Empire. Foreign competition proved that it was strong, despite the tariffs levied on cloth imports and some producers in the Lodz region were obliged to raise the quality of their goods in order to resist foreign competition.1 Fourteen per cent of the demand for wool cloth in the Empire was met by imports by 1876, and the chief exporters to the Empire were Germany, which supplied 55 per cent of the imports, Great Britain, France and Austria.2

The weaving section of the industry drew most of its supply of yarn from western Europe in the 1870's and especially the lighter and finer yarns. 11,000,000 roubles' worth of yarns were imported annually on average between 1870 and 1876 at an average price of about fifty roubles per pud. In that period the total output of yarn in the fifty gubernii of

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2. Obzor vniesenni torgovli Rossii za god 1874, Petersburg 1875.
European Russia was only two to three million roubles per annum at thirty to 35 roubles per pud, and the value of the output of woollen yarn in the Empire did not exceed 6,000,000 roubles per annum.\(^1\) The imports of yarn countered a large deficit in domestic production and, in the absence of anyworsted spinning, provided the entire supply of this new yarn. Two-thirds of the imports were from Germany and the balance came chiefly from Great Britain and France,\(^2\) and it is not surprising that spinning mills were important among the new, large-scale mills which were built by Germans in the Kingdom of Poland between 1870 and 1876.\(^3\)

A fourth characteristic of the demand for woollen textiles in the 1870's was the importance of the rural areas, where over eighty per cent of the population lived. Sales of woollen cloth were made chiefly to the more wealthy elements in the population and therefore the fluctuations in demand were not as great as in the market for the cheaper cotton goods, but, in the short-run, the level of demand was partly a function of the success of the harvests. Poor harvests caused temporary, but large falls in the demand for the products of industry, and

\(^1\) D.A. Timiriazeva, _op. cit._, pp.139-140.

\(^2\) _Obzor vniessnial torsovali za god 1874, 1882_, Peterburg, 1875, 1883.

\(^3\) Woollen spinning mills of large and medium-scale were built at Lodz, Olsorkow, Sope, Soenowice and Zawiercie in these years. All the mills used steam power and most employed more than fifty workers each.
the growth of the industry in the 1870's was interrupted by
the bad harvests of 1871 and 1873. The European economic crisis
of 1873 also depressed the level of demand despite the fact that
cyclical movements in the world economy, which were appearing in
the more advanced and interdependent economies of western
Europe, had not affected the economy of the Russian Empire
greatly before 1876. The woollen textile industry was supplying
the home market and was not exporting to Europe, and therefore
it was affected only insofar as external economic difficulties
created shortages of credit at home. The severe depression
in the industry in 1876 was the result of the financial
difficulties of the Russian government in 1875 and 1876 and of
pessimism in business circles which led to such a shortage of
credit.¹

In each period of difficulty the number of mills, the
number of employees and the total output of the industry all
decayed as producers ceased to operate, as workers were laid
off and as mills were closed. Production recovered with demand
as conditions in rural areas improved or as bankers and money-
lenders were prepared to grant credits again. It has already
been suggested that the characteristics of demand exerted
localised pressures upon the regions and centres of the
industry, and between 1870 and 1876 the periodic depressions

were not felt equally in all centres of the industry, and
the recovery was more rapid and more complete in one area
than another.

The likely effects of each of these four characteristics
of the demand for cloth upon the development of the industry
in each region and centre have been briefly noted already.
It appears that the industry in the Lodz region and in Lodz
and Fabianice in particular, was most likely to benefit from
the spatial relationship between the demand for cloth and the
supply of management and capital. Not only the buoyancy of
production in the industry in these towns, but also the
attraction of new German entrepreneurs, despite the reductions
in the tariff on imported cloth in 1857 and 1868, testified to
the favourable economic environment of the industry in the
Lodz region up to 1877.¹

Patterns of Change in the Industry in Response to Market
Conditions and other Factors, 1870-1876.

The fluctuations in the demand for wool cloth between
1870 and 1876 produced a wide variety of reactions in the
individual regions and centres of the industry and contrasting
patterns of regional growth and decline. The industry in the

¹. In 1868 the rates of tariff on imported milled woollen goods
were reduced from 88 copecks to 154 copecks per lb., to
40 to 120 copecks per lb., and on unmilled goods from
55 to 132 copecks per lb., to 50 to 110 copecks per lb.
Lodz region reacted more favourably in years of buoyant demand and showed more resilience in years of economic difficulty than the industry in the Bialystok region.

Table IV shows that over the period from 1870 to 1876 the number of mills and workshops in the Bialystok region declined. In the same years the average number of workers fell from 37 to 31 per unit as the total number of workers fluctuated freely in sympathy with the conditions in the market. Between 1871 and 1872 the number fell by fourteen per cent after the poor harvest of 1871, and in 1874 it declined again. The depression of 1876 was also mirrored by a fall of four per cent. Table IV also indicates that the value of output in the region declined with the numbers of mills and employees by sixteen per cent between 1871 and 1872, by ten per cent between 1873 and 1874, and by 26 per cent between 1875 and 1876.¹

¹ Based on material supplied privately by Dr. S. Misztal.
### TABLE IV

Changes in the Industry 1870-1876

<table>
<thead>
<tr>
<th>Lodz Region</th>
<th>Bielystok Region</th>
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<tbody>
<tr>
<td><strong>Mills</strong></td>
<td><strong>Workers</strong></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
</tr>
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</tr>
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<tr>
<td>1874</td>
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</tr>
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<table>
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<th></th>
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<tr>
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<td>22</td>
<td>600</td>
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<td>1871</td>
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<td>2</td>
</tr>
<tr>
<td>1874</td>
<td>30</td>
<td>1,740</td>
</tr>
<tr>
<td>1875</td>
<td>40</td>
<td>1,728</td>
</tr>
<tr>
<td>1876</td>
<td>73</td>
<td>2,899</td>
</tr>
</tbody>
</table>

Sources: Table 2 of the *Obzor... gubernii of the ten gubernii of the Kingdom of Poland for the years 1873, 1874, 1875, 1876 and Pamiątnańa Kniżka Grodneyskoj gubernii for the same years and for 1870.*


Material supplied by Dr. S. Misztal.

In the Lodz region the industry felt the effects of the poor harvest of 1871. A number of firms went into liquidation in Lodz in 1872 and employment fell by six per cent, but over the whole period the number of mills in Lodz, Fabianico,
Tomaszow and Zgierz rose from almost 140 to about 200 and the region did not appear to feel the effects of either the poor harvest of 1873 or the recession of 1876. Between 1875 and 1876 the employment in the industry of the Lodz region rose by sixteen per cent and the value of output by thirteen per cent, and the mid-1870's were a period of mill building and expansion in the Kingdom of Poland. S. Rosenblatt opened the largest woollen spinning mill in either the Kingdom of Poland or the Bialystok region in Lodz in 1873, and P. Mitzner opened another new steam-powered woollen spinning mill in 1875 in the town. In the same year new, steam-powered spinning mills were opened in Zawiercie and Sopol on greenfield sites, and in Osorkow, where a spinning mill had already been opened in 1874. Some of the mills of medium-scale in Lodz were introducing steam-powered looms for the first time, and with the advance in mechanisation the average number of employees in the mills of the Lodz region was also growing. In 1873 it was 22 per unit and by 1876 it had reached 27 per unit.

Thus the scale of operations in the industry as a whole in the Bialystok region and in the individual mills was falling in this period, but in the Lodz region both the total number of units and the average size of units were increasing.

1. J. Lukasiewicz, op.cit., pp.184, 192, 194-195. Obzor Petrokowskoi Gubernii za 1876 god, Table 2, Piotrkow 1877. Obzor Kaliskoi Gubernii za 1873 god, 1874, 1875, 1876, Table 2 Obzor Petrokowskoi Gubernii za 1873, 1874, 1875, 1876, Table 2 Obzor Wilemskoi Gubernii za 1873, 1874, 1875, 1876, Table 2 APL, Leg. E. Lodz1, 3960, 3963.
The growth of the industry in the Lodz region was not reflected in all centres. Table IV shows that the growth in Lodz was very substantial and that the number of mills and workshops rose rapidly between 1870 and 1876. The average number of workers in each mill rose also from 27 to forty. In Tomaszow the number of mills rose from 65 in 1869 to 91 in 1876, but the average number of employees per mill remained about thirteen to fourteen. The number of mills also increased in Ozorkow from fifteen in 1873 to twenty in 1876, but again the average number of workers in each mill remained about the same. Only in Zgierz did the industry contract and there the number of mills fell sharply from 52 in 1872 to thirty in 1876. Thus the growth of the industry in the Lodz region was confined to Lodz, Ozorkow, Fabianice and Tomaszow, but even among these centres the rate and nature of growth varied.

The increasing scale of operations in the mills in Lodz was caused by the mechanisation of the weaving section. The average scale of production in the units in other centres was not increasing in this period because, whereas new mills were entering the industry in Lodz in large numbers, in the Bialystok region and Zgierz few mills were being established and the total number of mills was actually falling, and in Tomaszow the

2. Obzor Kaliskoi Gubernii za 1873 god, 1874, 1875, 1876, Table 2
Obzor Petrokovskoi Gubernii za 1876 god, Table 2
AFL, Mag. M. Lodzi, 3985.
majority of mills and workshops which were entering the industry were small and the machinery was operated by hand.

The causes of the growth of the industry in Lodz, Ozorkow, Fabianice and Tomaszow in the period of general depression in the Empire and in other centres on the Polish lands were complex. The factors which led entrepreneurs to build and open mills and workshops in Lodz, Ozorkow and Tomaszow and which led others to leave the industry in Zgiers and Bialystok were associated with the localised effects of the characterisation of demand which were outlined above and also with certain other advantages which the industry in some centres of the Lodz region possessed.

One of the factors which favoured the industry in Lodz rather than in the other centres was the buoyancy of demand for the goods in which producers in Lodz specialised. This trend in demand, which has already been noted above, caused the value of production in the town to treble between 1872 and 1876. In Tomaszow the value of production was slightly less in 1876 than it had been in 1872 and in Zgiers, where it had fallen in every year since 1872, it stood in 1876 at 42 per cent of the output of 1872.¹ The demand for the light-weight and unmilled cloth which was being produced in Lodz also appeared in the growth of the imports of these types

¹ J. Lukasiewicz, op.cit., pp.194-195. Obzor Petrokovskoj Gubernii za 1876 god, Table 2
of cloth into the Empire. Thus the centres which specialised in the production of this cloth flourished in the mid-1870's while the heavy woollen centres of Ozorkow, Tomaszow, Zgierz and the whole of the Bialystok region, Kalisz and Opatowek remained depressed. Entrepreneurs wishing to enter the industry in the period tended to draw the obvious conclusion from this contrast in fortunes and to enter the semiwoollen and light-weight cloth weaving or the spinning section rather than the depressed heavy woollen section, and to establish their mills and workshops in the chief and most flourishing centre of light-weight cloth production rather than in towns which specialised in the production of other types of cloth.

The majority of mills which entered the industry in the Lodz region between 1870 and 1876 were owned by Germans or by people of Teutonic race. For those who emigrated from Germany to establish mills inside the tariff barrier of the Russian Empire the Lodz region was in a superior situation to its rival in and around Bialystok. The region lay closer to Germany and to the industrial areas of Europe in general than either of the Bialystok or Russian centres of the industry, and a large business community of Germans connected with the textile industry had been established in Lodz and the surrounding towns since the 1820's. The Moscow and St. Petersburg centres were located closer to the markets of the
Empire than the industry in the Kingdom of Poland and the industry there also grew in this period, though less strongly than in Lodz and Tomaszow. The Bialystok region, in contrast, located poorly between the Russian and Lodz groupings of the industry and poised between the sources of innovation and entrepreneurial ability and the largest markets of the Empire, proved to be an unattractive location for new firms. As a result the industry in the Bialystok region declined in all respects between 1870 and 1876.

The entrepreneur entering the industry may also have been influenced by the external advantages which were unconnected with the situation in the market for cloth, but which favoured the existing centres of the industry as opposed to greenfield sites and the Lodz region in opposition to the Bialystok region.

Almost all of the new mills which were built in the period from 1870 to 1876 were located in established centres of the industry and not in new locations. The vertical disintegration of the spinning and weaving sections in both the majority of existing mills and among the mills which entered the industry tended to draw firms which spun yarn to centres of weaving and weaving firms to centres of spinning.

1. D.A. Timiriazeva, op.cit., p.139.
In 1870 Lodz was the undisputed metropolis of the textile industry as a whole of the Polish lands of the Russian Empire and the leading centre of the cotton textile branch of the industry. Some woollen spinners may have foreseen a wider range of sales for their yarn than in centres where only the woollen branch of the industry was located, and in the weaving section the ease of supply of cotton yarns for the weaving of semiwoollen cloth was an advantage not possessed by Tomaszów or Zgierz, or the centres of the industry in the Białystok region. The size and variety of the textile industry in Lodz also ensured that a more comprehensive supply of marketing organisations and raw material merchants, and a fuller range of ancillary and financial trades and services was available than in the less important centres of the industry.

Perhaps the most important external advantage which Lodz possessed, which proved to be of great importance in the period of mechanisation of the industry, was the railway. Throughout the period from 1866 to 1876 Lodz alone among the established centres of the region was connected to the railway, which linked the coalfields of Sosnowiec and Upper Silesia with the markets for cloth in western Russia. The relative ease and cheapness of the supply of raw materials and fuel by railway were important to entrepreneurs in the period in spite of the small part which transport costs contributed to the total costs.
of textile production. Also alternative supplies of fuel, such as wood, were in limited supply around the established centres of the industry by 1670 and the available water power was insufficient to drive large-scale mills. Coal, permitting the use of steam power, was only permitted to enter the region itself on a large scale by the existence of the railway.

Much of the growth of the industry in Lodz and the decline of Zgiers have been ascribed to the railway monopoly of Lodz, but this ignores the growth of the industry in Tomaszow in the same period and the fact that the industry in Bialystok declined during the period despite the fact that the railway from Sochowic to St. Petersburg passed through the town. In the case of Tomszow it should be noted that the mills were smaller than in Lodz and few were using steam engines for the scale of production in heavy woollen weaving was smaller than in the mills weaving light-weight cloth. In view of the variations between the fortunes of the textile towns it is only possible to conclude that the railway assisted the growth of the industry in Lodz, but that several other factors, which have been discussed above, also favoured the establishment of new mills in the town during this period in preference to other centres of the industry.


A Summary of the Industry in 1876.

In the 1870's the industry was emerging from an era of hand production and craft manufacture and was achieving the Industrial Revolution by the adoption of large-scale, mechanised production based on steam power. The largest mills in all the centres were already using coal and steam power and the relative economic strength of these units, as a result of lower costs of production and the desire of investors to see a profit on large quantities of fixed capital, guaranteed the continuance of the industry more securely than in the centres of small-scale, handicraft production. The extent of mechanisation was greater in the Lodz region than in the Bialystok region and was growing more rapidly in Lodz than in any of the other centres in consequence of the fact that many of the new firms which were entering the industry were located in the town.

In 1876 Lodz had become the largest centre of the woollen textile industry in the Polish lands of the Russian Empire as its specialist branch of the industry had been favoured by the burgeoning demand for light-weight, semi-woollen and unmilled cloths and also by the more general advantages associated with the railway and the external economies of agglomeration. However the home industry had failed to secure the full
increase in demand in the Russian market for these types of cloth and producers in Germany, Great Britain, France and Austria were supplying increasing quantities of woollen textiles to the imperial markets. At the same time it must be noted that the expansion of the industry in the Kingdom of Poland between 1870 and 1876 owed much to immigrant German management and capital. In the same period poor harvests and international and domestic economic depression were slowing the growth of demand for the heavy woollens of Tomaszow and were causing a decline in that branch of the industry in the Bialystok region and Zgiersz.

In this chapter a picture has been drawn of the distribution and scale of the industry, of the location and characteristics of the markets for cloth, and of the consequent contrasting regional patterns of growth and decline in the period between 1870 and 1876. This picture serves as a basis for the measurement of later changes in both the economic environment and the geography of the industry up to 1914. The interaction of the industry's economic environment and its geography, and the patterns of change in the distribution and scale of the industry in the capitalist economy of that time will now be discussed in Chapter III.
CHAPTER III

ECONOMIC ENVIRONMENT AND THE PROCESSES OF CHANGE
IN THE GEOGRAPHY OF THE INDUSTRY 1877-1914

The description of the woollen textile industry on the Polish lands of the Russian Empire in the previous chapter showed that the industry in the mid-1870's was in the process of changing from a small-scale, handicraft trade which was widely scattered over the country to a mechanised, large-scale, factory industry which was concentrated in a few important centres. In the late-1870's the economic environment, which had favoured only a few centres and a few sections of the industry, changed, and the conjunction of more favourable economic conditions and the emergence of a large-scale factory industry led to a substantial and rapid growth of the industry on a capitalist pattern. Table V indicates the size of this growth up to 1897, and by 1914 the industry had become even larger.\(^1\) The growth was not only achieved by an increase in the number of mills and workers in the prosperous few among the textile towns, after the manner of the mid-1870's, but by an expansion in almost all except the smallest centres, including

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2. Rozm. Wielki przemysł Krolestwa Polskiego przed wojną, p. 139, Poznan 1918.
3. Przemysł Krajowy, a commercial and industrial periodical, includes many references in 1912, 1913 and 1914 to the building of new mills and the enlargement of existing mills.
some of those which had been affected by decline and industrial stagnation before 1877.

**TABLE V**

<table>
<thead>
<tr>
<th>The Growth of the Industry between 1876 and 1897</th>
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<tr>
<td></td>
</tr>
<tr>
<td>1876  1880  1897</td>
</tr>
<tr>
<td>1880 1880 1897</td>
</tr>
<tr>
<td>Number of Mills  100 142 349</td>
</tr>
<tr>
<td>Number of Workers  100 171 551</td>
</tr>
<tr>
<td>Value of Output  100 227 448</td>
</tr>
</tbody>
</table>

*Obzor Kaliskoj Gubernii za 1880 god*, Table 2, Kalisz 1881.
*Obzor Petropovskoj Gubernii za 1880 god*, Table 2, Piotrkow 1881.
*Obzor Warsavskoj Gubernii za 1880 god*, Table 2, Warszawa 1881.

Chapter III outlines the changes in the economic environment in the late-1870's, which led to the sudden and substantial growth of the industry between 1877 and 1914, and discusses the influence of the characteristics of the capitalist environment upon the form and the distribution of the industry's expansion in this period.
The Economic Environment.

The changing geography of the industry between 1877 and 1914 was dominated by two factors in the economic environment. Throughout the period typical forms of capitalist control and decision-making existed throughout the industry. Secondly, the industry of the Russian Empire was protected by the levying of substantial tariffs on imports of yarn and cloth. The major characteristics of the demand for cloth and the supply of capital and management in the early and mid-1870's, which were discussed in Chapter II, continued throughout the late nineteenth century, but after 1876 they acquired a new significance for the industry in the changed economic environment.

Industrial growth in the late nineteenth and early twentieth centuries was only possible where individual entrepreneurs or companies foresaw the opportunity of private profit in the structure of the economic environment and the characteristic feature of capitalist action in the industry was the individual, private and independent nature of decisions by firms. The individuality of capitalist action, in contrast to the collective character of socialist decisions in the industry after 1945, affected both the choices of locations and the structure of the industry, and gave rise to patterns of distribution and structure in 1914 and the 1930's which bore the imprint of the characteristic capitalist aims and methods of industrial development.
The mill belonging to A.G. Borst & Co. in Zgierz in the 1890's in which 3,200 woollen spindles, 41 powered looms and 41 hand looms were installed in 1893. The spinning and weaving sections were powered by steam and 360 workers were employed.
The industry in 1877 in Russia and the Kingdom of Poland was composed of many independent units of which the majority were small in scale. No overall control by state or private monopoly existed in the industry and so entry was free and unfettered, even to foreigners. When the prospect of profit appeared to be satisfactory to the entrepreneur he was able to establish a mill or workshop whenever and wherever he chose in the Empire. Each producer was free to choose a site for his mill where the possibility of profit seemed to be the best—whether he followed other producers to the established centres of the industry or whether he branched out to settle in a greenfield location. Between 1877 and 1914 the choices of locations by the many new firms were characteristic of this individual independence, but in the mass they created the collective chaos which characterises the geography of uncontrolled capitalist industrial development. The industrial landscape, which the freedom of entry to the market produced, was characteristic of the capitalist environment, and it will be seen in later chapters that the absence of this freedom under socialism after 1945 led to the development of a new and different distribution and structure in the industry.

1. After a protest by manufacturers in Moscow in the late 1880's about the influx of German industry into the Kingdom of Poland a language test was imposed on all immigrants into the Empire. This seems to have had little effect upon the entry of foreign producers.
As the freedom of entry into the industry continued throughout the period, the number of mills and workshops varied as the prospect of profit increased or declined, and the growth of the industry over the whole period was not continuous. The level of demand for woollen textiles was still determined by the success of the harvests, but also, to an increasing extent, by the level of prosperity in urban areas. The industrialisation of Europe, the strengthening of the economic links between countries and the growing interdependence of national economies all made the individual nations increasingly liable to the cyclical movements in the world economy. In Russia cyclical movements of this type were now, but the growing industry experienced trade cycles every eight to ten years after 1677, and the expansion of the industry became a series of short-run advances, followed by falls in the level of demand and contraction in the industry.

Four major trade cycles occurred in the Russian economy between 1877 and 1914. Each cycle carried production up to a new peak, but in the following slump many mills and workshops were closed and the number of employees and the value of output of the industry fell. Mills re-entered or entered the industry for the first time as demand recovered after each slump, and the level of employment and output grew again.

Woollen textiles did not suffer as severely as other industries for woollen goods were semi-luxuries, but the relatively gentle movements of demand associated with the trade cycles before 1914 were reflected in wide fluctuations in the numbers of mills and workers. These movements in the level of demand affected the various regions and centres to differing extents, accentuating the decline of the industry in some places while only restricting the growth in other centres to a small extent. The cyclical movements of the economy also caused regional contrasts in the scale and structure of the industry, and the absence of trade cycles in the period after 1945 was reflected in the absence of these periodic/regional variations in the form and size of the industry.

The considerable growth of the industry between 1877 and 1914 on the capitalist pattern, which has been outlined above, was encouraged by the protective tariff policy and the consequent restriction of imports, which the Russian government adopted in 1877, in association with the growing market for woollen and worsted cloth in the Russian Empire which was discussed in Chapter II.

The demand for woollen textiles in the Empire increased throughout the period with the growing population. In 1870 the population of the sixty gubernii of European Russia and
the Kingdom of Poland had been about 75,000,000 but by 1912 it had risen to about 135,000,000, and the total population of the Empire in that year was 168,000,000.\footnote{J. Jaworski, \textit{Kalender Polski ilustrowany Jaworskiego za rok 1869}, p.2, Warszawa 1869. \textit{Jozegodnik Rosii za rok 1912}, p.33, Petersburg 1913.} Woolen and worsted goods were probably consumed chiefly by the wealthier elements in the population and therefore the increasing proportion of the population in urban areas was probably a second important factor causing the growth in demand. The increasing urban element in the population also offset the depressive effect upon demand of the absence of improvement in the standard of living of the vast majority of the people in the rural areas. Thus the increase in the output of the industry greatly surpassed the seventy per cent growth in the population.

The great increase in the demand for woollen textiles in the late-nineteenth century probably included a substantial degree of substitution of factory products for the cloth from the domestic, handicraft looms. In 1876 the proportion of the population which was buying the products of factory industry was still small. As the transport network was extended this proportion was raised and the goods produced in the textile mills of the Kingdom of Poland were sold in increasing quantities.
In Caucasus, Central Asia, and Siberia, in addition to European Russia. The length of the railways in 1912 in the Empire was four and a half times as great as it had been in the mid-1870's.1 The constant increase in the population and the increasing accessibility of all parts of the Russian Empire caused a continuing rise in the level of demand for woollen textiles and sustained the growth of the industry from 1877 until 1914.

Against the background of the growing population and the increasing ease of transport and of communication the reduced and restricted level of foreign competition also ensured long-run growth in the industry within the Empire. The initial cause of the restriction of imports was the adoption of measures by the Russian government to improve the balance of payments in 1877 and to refurbish the gold reserves of the Empire2, but from 1882 onwards the regular, year-by-year

1. W.I. Csary, (ed.), Statisticeski Jezegodnik, p.669, Petersburg 1914. In 1912 there were 63,972 vias or railways in the Empire.
2. From 1877 the Russian government required all tariffs on imported goods to be paid in gold. This led to an immediate devaluation of the rouble by about thirty per cent and a gradual depreciation in the following two years until the rouble stood at about sixty per cent of the official exchange value for 1875. The "Gold Tariff", as it was named at the time, made the exporting of goods to the Russian Empire less profitable, reversed the rising level of imports, and protected producers of industrial goods in the Empire more securely than before from western European competitors.
increases in the level of import duties confirmed the protectionist nature of the government's policy. The result of this policy was that, despite the growth of demand within the Empire for woollen textiles, the value of imports of wool goods into the Empire in 1913 was only eighteen per cent higher than it had been in 1876 and the value of imported woollen and worsted yarns was only 124 per cent greater. Some measure of the consequent growth of the industry's output in the intervening period is given by the value of imports of wool in 1913, which stood at twelve and a half times the level of 1876.

The immediate results of the imposition of the "Gold Tariff" were as important as the long-run effects of the policy of protection upon the geography of the industry in 1914. The producer who was already operating within the Empire in 1877 enjoyed aeller's market in the short run, supplying both the former customers for Polish and Russian textiles and also those who had purchased imported goods before 1877. The profitability of this situation encouraged both Polish and Russian entrepreneurs to build new mills and proved to be a powerful and immediate attraction to those producers in western Europe who had suddenly been deprived of their markets in Russia to

Obzor vnieszaniaj torgovli Rossii za god 1882, pp. 20-29, Petersburg 1883.
establish branch plants within the tariff boundary.¹ Several large-scale enterprises in western Europe opened mills in the Empire and many individual entrepreneurs from Germany moved into the Polish lands and began production. The number of employees in the industry in the Kingdom of Poland doubled between 1877 and 1882 and the value of output increased threefold. However the choices of location by producers showed a preference for some parts of the Polish lands rather than others, and so the distribution as well as the form of the industry changed within a few years of the imposition of the new tariffs.

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¹ Dziennik Łódzki, 29 maju, 1884r.
² J.B. Hopfenstand, Tomaszow Rzawski, in Dziennik Łódzki, 29 maju, 1885r.
³ W kwestyj fabrykantow – niemcow, in Dziennik Łódzki, 3 październiku, 1885r.
⁴ Dziennik Łódzki, 14 kwietnia, 1886r.

Ownership of the Woollen Textile Industry of the Kingdom of Poland in 1886
(as indicated by the value of output in thousands of roubles)

<table>
<thead>
<tr>
<th></th>
<th>Poles</th>
<th>Jews</th>
<th>Germans¹</th>
<th>Foreigners²</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Stuffe and woollens</td>
<td>30</td>
<td>927</td>
<td>2,011</td>
<td>1,693</td>
<td>4,669</td>
</tr>
<tr>
<td>(2) Worsted, Lightweight and Semi-woollen cloth</td>
<td>-</td>
<td>3,490</td>
<td>7,972</td>
<td>1,224</td>
<td>12,686</td>
</tr>
<tr>
<td>(3) Wool spinning</td>
<td>56</td>
<td>2,450</td>
<td>1,585</td>
<td>8,174</td>
<td>12,265</td>
</tr>
</tbody>
</table>

Source - Dziennik Łódzki, 19 czerwca, 1887r.

1. Germans who had lived in Poland for, at least, 25 years in 1886.
2. People who had settled in Poland within the 25 years before 1886.
Capitalist Processes of Growth and the Geography of the Industry.

The years from 1877 to 1914 formed a period of growth in the woollen textile industry, continuing by steps from the peak of one boom to the peak of the next, but the rate of growth over the whole period was slower than in the first few years after the imposition of the "Gold Tariff". Under capitalism the growth was achieved by an increase in the total number of mills and workshops and by an increase in their average scale of operations.

Changes in the Number of Mills and Workshops.

The freedom of entry of mills in the capitalist environment of the late nineteenth century and the necessity of avoiding debts or losses caused the number of mills and workshops in the industry to fluctuate widely in this period. Prosperity in the industry attracted firms to enter, but, at the first indication of a down-turn in demand, inefficient and financially weak firms began to close their mills.

Maps 12 and 13 (on pages 142 and 148) show that by 1910 few of the mills which had existed in 1876 had survived the varying economic vicissitudes of the intervening years and that those which had left the industry had been replaced by new mills. The industry grew over the period in spite of the large
DIAGRAM 10  Growth of the Industry in Lodz
1874 – 1901

Source: Obzor Petrokovskoj Gubernii, Table 2, Piotrkow, for each year from 1874 to 1901. Details of the woollen textile industry were not published in full for 1882 or at all in 1896, 1902-3, 1905-1913 in this source.
GROWTH of the
INDUSTRY in LODZ
1874-1901
number of units which were closed in each depression because the number of mills which survived each period of economic difficulty was larger than it had been after the previous depression. The cyclical behaviour of the demand for woollen textiles, the wide fluctuations in the numbers of mills, and the consequent patterns of the scale and age of mills were all peculiar to the capitalist development of the industry and did not appear after 1945.

Between 1876 and 1912 the number of mills and workshops in the Kingdom of Poland and the Bialystok region rose from about 430 to 847, but the number of firms which actually entered the industry between those years was considerably in excess of 417. In Piotrkowska gubernia alone 113 new firms were established between 1876 and 1880, 116 between 1891 and 1895, and 139 appeared between 1908 and 1912, giving a total of 368 for only one of the two major concentrations of the industry in only twelve of the 38 years in the period. Many mills and workshops entered the industry during the period, but only some of these remained in 1912. Many which had joined the industry between 1877 and 1912 and many which had entered before 1877 left the industry. 163 firms left the industry in Piotrkowska gubernia, for instance, between 1880 and 1884, and between 1895 and 1900 the number of active mills
declined by 71.\textsuperscript{1} The diagrams of the growth of the industry in Lodz, Ozorkow and Tomaszow between 1873 and 1901 (on pages 130 and 135) indicate the extent of some of these fluctuations.

In order to judge accurately whether the industry was growing or declining at a time when the number of units was fluctuating so violently it is necessary to compare the number of units at one point in the trade cycle with the number at an identical point in preceding and later cycles. Table VI shows that in the Bialystok region the total number of units was growing from trade cycle to trade cycle. Between the depressions of 1877 and 1884 the number of mills rose from 117 to 160 and in the depression of 1892 the number was 223, but it had reached 195 and 275 respectively at the peaks of the two preceding booms. In the depression of 1899 the number of mills and workshops in the region was 385, but in the previous year it had reached 510, and the number was larger again in the depression of 1909 than it had been in 1899.\textsuperscript{2}

\textsuperscript{1} Based on - Obzor Petrokovskoi Gubernii za god 1876, Table 2
\textsuperscript{2} Based on - Pamjatnaja Knjiska Grodnenskoi Gubernii za god ..., for all years from 1876 to 1915.
### TABLE VI

Fluctuations in the Numbers of Mills in the Trade Cycles

<table>
<thead>
<tr>
<th>Years of Depression</th>
<th>Bialystok</th>
<th>Biala Stocki powiat</th>
<th>Lodz</th>
<th>Ozorkow</th>
<th>Tomaszow</th>
<th>Zgiersz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876</td>
<td>27</td>
<td>64</td>
<td>(73)</td>
<td>(20)</td>
<td>(91)</td>
<td>39</td>
</tr>
<tr>
<td>1884</td>
<td>50</td>
<td>76</td>
<td>65</td>
<td>10</td>
<td>119</td>
<td>39</td>
</tr>
<tr>
<td>1892</td>
<td>87</td>
<td>82</td>
<td>114</td>
<td>18</td>
<td>723</td>
<td>40</td>
</tr>
<tr>
<td>1899</td>
<td>181</td>
<td>116</td>
<td>206</td>
<td>Under 10</td>
<td>514</td>
<td>18</td>
</tr>
</tbody>
</table>

1. Number in 1877 was the lowest in the cycle.
2. 1885
3. 1891
4. 1900

(-) Not a year of depression in this town — the number of mills had been rising for several years and continued to rise in 1876 and 1877.

Sources — Obzor Petrokovskoj Gubernii za god, Table 2, for all years from 1876 to 1904.

Pomiatnaja Kniha Grodnoeskoy Gubernii za god, for all years from 1876 to 1913.

Table VI also shows that wide fluctuations in the numbers of active mills were not always a sign of this type of long-run growth in the industry. In some centres the periodic increases in the number of mills were followed by even larger falls in the times of depression. In Zgiersz the number of mills rose from 39 in 1885 to 45 in 1890, but Table VI shows that by 1900 it had fallen to only eighteen, and Diagram II shows how similar fluctuations led to a fall in the number of mills in Tomaszow.¹

¹ Obzor Petrokovskoj Gubernii za god 1885, Table 2, Piotrkow 1886
   .... 1890, Table 2, Piotrkow 1891
   .... 1900, Table 2, Piotrkow 1901.
DIAGRAM 11  Growth of the Industry 1873 - 1901

DIAGRAM 11a  in Ozorkow

Source - Obzor Kaliskoj Gubernii, Table 2, Kalisz, for each year from 1873 to 1896. Details of the woollen textile industry were not published after 1876 in this source.

DIAGRAM 11b  in Tomaszow

Source - Obzor Petrokovskoj Gubernii, Table 2, Piotrkow, for each year from 1873 to 1901. Details of the woollen textile industry were not published in 1896, 1902-3, 1905-1913 in this source.
GROWTH of the INDUSTRY 1873-1901

in OZORKOW

in TOMASZOW
Thus, behind the cyclical growth and decline which occurred in centres, the industry in some towns was growing in the long run while in others it was declining. The numbers of mills grew from trade cycle to trade cycle in all the major centres between 1876-1877 and 1884-1885, but after that year appeared to be declining in Tomaszow and Zgierz, and later in Ozorkow. The number of mills continued to grow from one cycle to the next in Bialystok, the Bialostocki powiat and in Lodz throughout the period up to 1914.

Thus the cyclical behaviour of the capitalist economy resulted in long-term growth of the industry in some towns and its decline in others. Both the form and the distribution were affected, but before it is possible to analyse the incidence of the cyclical movements of demand it is necessary to refine the picture of the fluctuations in the numbers of mills which has already been given.

Changes in the Scale of the Average Mill

Increases in the number of mills did not guarantee the growth of the industry as a whole, but neither did a fall in the number of units in a town necessarily involve a decline of the industry there. In the Bialystok region the number of units was increasing with each trade cycle, but the average scale of the mills, as measured by the number of employees,
was declining. In 1884 the number of workers in each unit averaged 37, but in every cycle after that year the average fell until it reached 21 in 1909. As a result the number of employees in the region grew to a smaller extent than the number of mills, rising from 3,900 in 1876 to 7,980 in 1910. In Zgierz, where a substantial reduction in the number of mills occurred between 1865 and 1900, employment remained stable for the average number of workers in each mill rose from nineteen in 1876 to 35 in 1885, 38 in 1892, and to 32 in 1900.¹

The explanation of the diverging scales of production among the mills of the two regions lies in the differing economic strengths of their locations, and these will be discussed later in this chapter. The processes which were creating the structural contrasts between the regions were characteristic of the capitalist environment for they were based upon the freedom of entry into the industry for all mills and workshops and the cyclical movement of the whole economy.

The fluctuations in the numbers of mills tended to lead to an increase in scale in towns in which the industry was growing through the replacement of the small workshops with

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¹ Based on Pamiątnaia Knizka Grodnoaska Gubernii za god ..., from 1876 to 1913.
Obzor Petrokovskoi Gubernii za god ..., from 1876 to 1904.
larger mills. A large proportion of the units in both regions in 1876 was composed of very small, handicraft workshops, but during the period up to 1914 the proportion of the larger mills in the total increased. The larger mills with more advanced techniques and cheaper methods of production and considerable fixed assets, survived the periodic depressions in demand more successfully than the small units, which often disappeared in times of falling demand in the product market. The fixed capital of the large-scale mill continued to exist even when the operating firm was in liquidation and such mills were frequently taken over by other firms and production continued, but the small workshops represented little invested capital, and were more easily abandoned or transferred to other activities. Thus the average size of the unit which was forced out of the industry in each depression was usually small while the size of new mills entering the industry tended to increase with every trade cycle as the result of technical advances in production.

The replacement of smaller by larger mills occurred in Piotrkowska gubernia and it caused an increase in the average number of employees in the mills. In 1876 there had been 286 mills and workshops in Piotrkowska gubernia and 256 in 1884, but in 1893 only 74 of the 276 active mills dated from before

J.B. Hopstenstand, op. cit.
1877 and 63 from the period between 1877 and 1884, that is, from the period of the first full trade cycle after the imposition of the import tariffs. Thus in the two trade cycles between 1876 and 1893 three-quarters of the mills which had been working in 1876 had left the industry and almost half of those which had existed in 1884 had disappeared. Moreover all these mills and workshops had been replaced by others. The majority of the firms which had owned the larger mills in 1876 and 1884 still existed in 1893, but most of the firms with small mills and workshops had disappeared.

In the same period some of the largest mills were built, notably those spinning worsted yarn, which employed several hundred workers each. In Piotrkowska gubernia eight mills had employed more than a hundred people in 1876, but by 1884 the number had risen to 27, by 1893 it was 38, and by 1901 it

1. P.A. Orl'ov and S.G. Dudagov, Ukaratel' fabrik i zavodov Evropejskoj Rossii, Petersburg 1894. Only 261 of the 276 mills and workshops in this list gave the year of establishment.

2. Some of the mills which left the industry may have re-entered under new ownership or direction, but this complication does not invalidate the general hypothesis that some mills and workshops did leave the industry permanently and that new, and often larger, mills were built which replaced them.

3. Based on Obzor Petrokovskoj Gubernii za roд 1894, Table 2, Piotrkow 1895.

P.A. Orl'ov and S.G. Dudagov, op.cit.
had reached 62.¹ A few large mills were built in response to every major improvement in demand in the late-nineteenth century and these rarely ceased production for more than short and infrequent periods up to 1914. These mills came to account for an increasingly large proportion of the total number. They also caused the average scale of the mills to rise from one trade cycle to the next. It will be seen later that part of the increase in the numbers of employees in the mills was caused by the enlargement of existing mills, but part was caused by the fact that a larger proportion of the small units than of the large mills left the industry in periods of depression and that these small units were often replaced by now and larger units.

The process of replacement of small by large units affected the regions and the centres of the industry in different ways. In towns, such as Lodz, in which the number

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¹ L. Jezioranski, Księga adresowa przemysłu fabrycznego w Królestwie Polskim na rok 1904, Warszawa 1904. Obzor Petrokovskoj Gubernii za god 1876, Table 2, Piotrkow 1877.

P.A. Orl'ov, Uказатель фабрик и заводов Европейской России i Герцогства Полского, Петербург 1881.

P.A. Orl'ов, Указатель фабрик и заводов Европейской России i Герцогства Полского, Петербург 1897.

P.A. Orl'ov, and S.G. Budagov, op. cit.

The rapid increase in the number of large-scale mills in the total was partly caused by the more rapid development of the spinning section than the weaving section after 1876. The capacity of spinning had been smaller than that of weaving and there had been no worsted spinning. Many spinning mills entered the industry after the imposition of the import tariffs and these were usually larger in scale than the weaving mills and workshops. The largest mills in the industry by 1890 were all in the worsted spinning section.
MAP 12  Mills entering the Industry in the Bialystok Region 1877 - 1913

The area of each circle is proportional to the number of mills which entered the industry between 1877 and 1913 and which were still in production in 1914. The shaded segments in each circle represent the proportion of the total number of mills in production in 1914 which had been established prior to 1877 and the proportion of the total number of employees in those mills in 1914.

Source - Material supplied by Dr. S. Wisztal (I.G. PAN Warszawa).
MILLS ENTERING THE INDUSTRY IN THE BIALYSTOK REGION 1877-1913

SCALE 1/1000000

- Mills founded before 1877
- Employment in mills founded before 1877

Number of mills

BIALYSTOK 173

O 2
K2
20
of mills grew with every cycle, this process of change tended to cause the scale of the mills to rise rapidly and the employment and output of the industry to grow quickly. In other towns, such as Ozorkow, Tomaszow and Zgierz, in which the number of mills entering the industry in each cycle was fewer than those leaving, the growth in the scale of the mills was achieved by the reduction in the number of small-scale mills and the expansion of the surviving units, but the overall size of the industry in terms of employment grew very little. Many of the centres in the Bialystok region where small-scale units accounted for almost all the industry in 1876 were threatened, by this process, with an absolute decline in the number of employees in addition to the fall in the number of units. While the skyline of Lodz bristled with the chimneys of new mills in the 1880's and 1890's, those centres in which the industry had been composed of small-scale workshops enjoyed little physical expansion and witnessed the abandonment of many small workshops and mills and, in some cases, the disappearance of the industry.

Expansion of Existing Mills.

The growth of the industry was not caused entirely by increases in the numbers of mills. Some mills were enlarged or rebuilt and businesses grew in situ as the demand for
woollen textiles increased. Maps 12 and 13 (on pages 142 and 148) show that in all the important centres in 1914 except Konstantyrow and Suprael the few mills which had been founded before 1877 accounted for a disproportionately large part of the total employment, having, in many cases, been enlarged substantially during the intervening period.

In Piotrkowska gubernia the enlargement of mills was an important cause of growth in the industry between 1876 and 1914. Twenty spinning mills in the gubernia increased their employment by 76 per cent between 1884 and 1893 from 2,950 to 5,180 workers, and in this period only three of the mills reduced their numbers of workers. In the same period the employment added as the result of the opening of new spinning mills was 3,760. In the weaving section the number of workers in the 82 mills, which were already in production in 1884, rose from 6,810 to 8,920 between 1884 and 1893, an increase of 31 per cent, whereas the additional employment in the 89 mills which were opened in the same years was 7,200. Both sections of the industry grew more rapidly between 1876 and 1893 in respect of employment from the entry of new mills than from the enlargement of existing mills, but both processes contributed substantially to the growth of the industry.¹

¹ Based on P.A. Orl'ov, (1897), op.cit. P.A. Orl'ov and S.G. Budagov, op.cit.
Both processes of growth continued in the later trade cycles of the period after 1893. New firms continued to enter the industry and new mills were built while established mills were enlarged. In particular the growth of the scale of production in the mills which had been established before 1893 was very considerable in the years which followed. In 67 mills the aggregate increase in employment over the period from 1893 to 1901 was 11,350, or 81 per cent, although ten of these mills employed fewer people in 1901 than in 1893. The 67 mills had accounted for 59 per cent of the employment of the industry in the gubernia in 1893, but by 1901 their share had risen to 64 per cent.\(^1\) Between 1901 and 1910 the existing mills increased their sizes again. 59 mills achieved an aggregate increase in employment of fifteen per cent while 79 firms which had begun production in the period accounted for 3,180 of the total of workers in 1910, or nine per cent of the employment.\(^2\)

Thus the long-run growth in demand for woollen textiles and the short-run cyclical fluctuations of the trade cycle combined to facilitate the enlargement of a few of the mills which were founded in each cycle, but to force almost all the others out of the industry. In Piotrzkowska gubernia the

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1. Based on L. Jezioranski, op.cit.
2. Based on L. Jezioranski, op.cit.
entry of new mills was the more important process of growth up to 1893, but after that year the expansion of production in existing mills was the chief source of growth in the industry. As the result of the enlargement of existing mills and the replacement of small units by larger ones during the trade cycles the industry of 1914 was dominated by an enlarged number of very large-scale and long-established mills, despite the fact that the greater number of units in the industry were small and recently-established.

One particularly important cause of the enlargement of existing mills was the increase in the vertical integration of production between 1876 and 1914. The integration of several processes of production had only been undertaken in two or three mills in 1876, but it was common in the long-established centres of the industry, such as Lodz and Tomaszow, by 1914, and among the older mills. Multi-process mills were usually several times larger than single-process units in terms of employment, and therefore the limitation of the development of these mills in any location tended to depress the average scale of the mills there. In Bialystok and Lodz in 1910 the mills which undertook more than one of the basic processes of spinning, weaving, dyeing and finishing employed an average number of workers which was six times larger than
MAP 13  Mills entering the Industry in the Kingdom of Poland
1877 - 1909

The area of each circle is proportional to the number of
mills which entered the industry between 1877 and 1909 and
which were still in production in 1910. The shaded segments
in each circle represent the proportion of the total number
of mills in production in 1910 which had been established prior to 1877 and the proportion of the total number of
employees in those mills in 1910.

Source - Russia Ministerstvo Finansov i Ministerstvo Torgovli
i Promyslenosti, Spisk fabrik i zavedov Rossii 1910g.,
Moskva, Petersburg, Warszawa
MILLS ENTERING THE INDUSTRY

IN THE KINGDOM OF POLAND 1877-1909

Number of mills

Scale 1:3000,000
the average among the single-process mills in either town, despite the existence of some large worsted spinning mills in Lodz. In Tarnawa the ratio of employees between the two groups of mills was about four to one.\textsuperscript{1} Mills in centres in which the mill industry had only a short history before 1914, such as Pabianice and Zdunska Wola, or in which a shortage of investment capital existed and the possibility of mill expansion was restricted by frequent and severe reductions in the level of production, such as the Bialystok region, usually undertook either spinning or weaving, but rarely both. In the other centres, in which multi-process mills developed, the average scale of the mills tended to be larger.\textsuperscript{2}

Not all the centres of the industry in the Lodz region experienced an enlargement of existing mills. It is not surprising that in Lodz, Zdunska Wola and in other towns in which mills were enlarged and rebuilt, the total number and average scale of mills was also rising, for all three processes were evidence of the burgeoning prosperity. However the number of units also grew rapidly between 1876 and 1914 in Bialystok, but the average scale of the mills, as measured in

1. Based on Russia, Ministerstvo Finansov, \textit{op. cit.}

2. The regional incidence of changes in the structure of the industry will be examined in detail in Chapter V.
terms of employment, declined. In other centres, in which the number of mills and workshops was not increasing in the long run, the existing mills were not greatly enlarged. The number of mills in Ochorow, Supraśl and Tomaszow grew until the mid-1880's, but the decline after that date was accompanied by little increase in the scale of mills. Also in the isolated mills in Choroszcz, Dobrzyniewo and Opatowek, which failed to attract other mills to neighbouring sites between 1876 and 1914, the numbers of employees in the mills immediately before 1914 were less than in 1876.

The freedom of entry into the industry and the cyclical movement of the economy, which were the products of the capitalist environment, combined with the long-run growth in demand between 1876 and 1914 to produce a wide variety of scales among the mills in the Lodz region. The industry grew by an increase in the number of mills, by the replacement of small units by larger ones, and by the enlargement of existing units and the vertical integration of production. The consequent structural pattern was typical of industry in a capitalist environment. The number of mills tended to

1. In the case of Bialystok the increase in the number of units in the town was conforming to a typical process governing the redistribution of the industry under capitalism, and the impression of great prosperity which this gave to the industry was erroneous. The industry in the town was, in fact, in a weak economic position in comparison with Lodz. The weaknesses of the industry and its location in the 1870's were discussed in part in Chapter II and will be considered further in the later part of this chapter.
decrease with increasing age, but the average scale of mills tended to increase with the length of their establishment. The majority of mills and workshops were always to be found among the small-scale units employing less than forty or fifty workers each, but in the growing industry of the Lodz region an increasingly large proportion of the total employment became concentrated in the fewer, large-scale, long-established mills. In the Bialystok region the processes of growth were identical, but the balance between them was not the same as in the Lodz region, and therefore the structure of the industry developed rather differently.

**Structural Changes in the Industry of the Bialystok Region.**

The same processes of expansion were occurring in the Bialystok region as in the Kingdom of Poland. New mills were built and existing mills enlarged, but the entry of new mills was the greatest source of growth. The enlargement of mills with improvements in the demand for woollen textiles in the Bialystok region was more restricted than in the Kingdom of Poland because the industry was less favourably located, for the reasons which were discussed in Chapter II. Furthermore few large-scale mills entered the industry in the Bialystok region between 1877 and 1914 because the inferior location deterred the potential entrepreneurs with the large
supplies of investment capital. Fewer of the mills which were founded in the region survived the repeated periods of severe depression in the market. In 1910 only 24 of the 123 units which had existed in 1876 still survived; all except fourteen of the 63 units which had been founded between 1877 and 1883 and which had been operating in 1884 had disappeared, and all but fifteen of the sixty mills which had been established between 1884 and 1890 and which were operating in 1890 had left the industry. Table VIII, on page 157, shows that, whereas 22 per cent of the mills in the Kingdom of Poland were established between 1877 and 1891, only sixteen per cent of the mills in the Bialystok region dated from that period. Over half of the mills in the Bialystok region in 1910 had been established since 1902 against only 43 per cent of those in the Kingdom of Poland.

The surviving mills grew with each successive trade cycle after the manner of the industry in the Lodz region, and the progress of growth is illustrated in Table VII on page 153. The table shows that the average number of employees in 1876 was 51, but that among those mills which had been founded before 1876 it had risen to 58 in 1884, to

1. H. Łoski, Kronika białostocka, in Dziennik Łódzki, 22, października, 1886r.
2. Based on P.A. Orl'ov and S.G. Budagov, op. cit., Russia, Ministerstvo Finansov, op. cit.
### TABLE VII

Changes in the Scale of Mills in Selected Years in the Bialystok Region as measured by numbers of workers.

(Hills grouped by the year of establishment)

<table>
<thead>
<tr>
<th>Year of establishment</th>
<th>1876</th>
<th>1884</th>
<th>1890</th>
<th>1901</th>
<th>1910</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876 and before</td>
<td>31 (16)</td>
<td>38</td>
<td>46</td>
<td>Not</td>
<td>109 (287)</td>
</tr>
<tr>
<td>1877 - 1884</td>
<td>--</td>
<td>15</td>
<td>24</td>
<td>Not</td>
<td>57 (369)</td>
</tr>
<tr>
<td>1885 - 1891</td>
<td>--</td>
<td>--</td>
<td>15 1 (56) 2 available</td>
<td>23 (313)</td>
<td></td>
</tr>
<tr>
<td>1892-1901</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>available</td>
<td>22 (38)</td>
</tr>
<tr>
<td>1902 - 1909</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>16 (38)</td>
</tr>
</tbody>
</table>

1. 1885-1890
2. Employment in 1893

(---) Figure for the Kingdom of Poland.

Sources -
- P.A. Orl'ov, Ukazatel fabrik i zavodov Europeiskok Rossii i Gor'kov Pol'akov, Petersburg 1887.
- P.A. Orl'ov, Ukazatel fabrik i zavodov okrain Rossii, Petersburg 1895.
- P.A. Orl'ov and S.I. Bodagov, Ukazatel' fabrik i zavodov Europeiskoi Rossii, Petersburg 1894.
- Remiatnaja Knizhka Grodnenskoi Gubernii za god 1876, Grodno, Ministerstvo Finansov, Bpiskop fabrik i zavodov Rossii 1910g., Moskva, Petersburg, Warszawa.
46 in 1890, and to 109 in 1910. The same pattern of growth occurred among the surviving mills from the groups which had been founded between 1877 and 1883. Thus the mills with the largest labour forces were generally the oldest and those which had entered the industry most recently were usually the smallest. However the comparison in the table with the growth of the mills in the Kingdom of Poland during the same period indicates the relative weakness of the growth of the industry in the Bialystok region.

Growth in the Bialystok region through the enlargement of mills was limited by the weak economic position of the majority of the small-scale and technically backward units in the region between 1877 and 1914, and also by the inferior location of the region, which combined to restrict the number of mills which survived in periods of depression and which had the opportunity of expansion in later cycles. Moreover Table VII shows that the average scale of the mills on entry to the industry in the Bialystok region did not increase, in contrast to the Lodz region. This was the result of the fact that very few large-scale mills were added to the industry in the Bialystok region after 1876. Most of the new mills were small in scale and even in 1907 and 1908 many of those which entered employed less than ten people. Indeed few of the units which
were founded at any time between 1876 and 1914 employed more than fifty people either at the date of establishment or in 1914.¹

Contrasts in Scale between the Industry in the Bialystok and Lodz Regions.

The two basic processes of growth in the industry of the Bialystok and Lodz regions were identical, but the balance between them and the details of change within them in the two regions were very different, with the result that the structure of the industry in the two areas began to develop along divergent paths. At the same time the industry in all the centres of the Lodz region developed towards broadly similar, but not identical structures, and in the Bialystok region it also followed the same basic pattern of structural change. The most important contrasts in the developing scale of the industry were regional and were not to be found within the individual regions.

The average employment in the mills of the Lodz region in 1876 had been lower than in the Bialystok region, but the greater degree of survival and the larger increase in scale among the mills of the Lodz region had caused the reversal of

¹ Based on P.A. Orlov (1887), op.cit., P.A. Orlov and S.G. Budagov, op.cit., Russia, Ministerstvo Finansov, op.cit.
this position. Moreover the average size of mills on entry to the industry in the Lodz region increased between 1877 and 1914 while it remained the same in the Bialystok region. Thus, although the number of units had grown to a greater extent than in the Lodz region between 1877 and 1914, the relative importance of the Bialystok region in terms of employment had declined. The contrasting structures were not only apparent in the statistical differences but also in the visual contrasts between the industrial landscapes of the two regions.

One of the major differences in the structure of the industry, which was clearly visible in the landscape, was the complete absence of any of the very large mills, employing more than a thousand workers each, from the Bialystok region in 1910. This was largely a function of the complete absence of worsted spinning from the Bialystok region. Moreover the proportion of the mills which were employing more than a hundred people each in the Bialystok region was much smaller than in the Kingdom of Poland. Among the 227 mills in the Kingdom in 1910, for which details of employment are available, 36 employed over a hundred workers each, nine more than 500 workers each, and nine more than a thousand workers. These mills accounted for almost 24 per cent of those which were
listed for the Kingdom of Poland in 1910. In the Bialystok region eight woollen textile mills employed more than a hundred people each and only one employed more than 500, and these mills were only four per cent of the total number in the region.1 The distribution of these mills is shown on Diagram 14 (on page 159), which illustrates the contrasts in scale between the industry in the two regions and in particular the complete absence of very large mills from the Bialystok region.

### TABLE VIII

The Composition of the Industry according to the Year of Establishment of the Mills in 1910. (percentages of all mills in existence in 1910)

<table>
<thead>
<tr>
<th>Year of establishment</th>
<th>Kingdom of Poland</th>
<th>Bialystok Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876 and before</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>1877 - 1884</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>1885 - 1891</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>1892 - 1901</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>1902 - 1909</td>
<td>43</td>
<td>51</td>
</tr>
</tbody>
</table>

Source — Russia, Ministerstvo Finansov, Spisok fabrik i zavodov Rossii 1910г., Moskva, Petersburg, Warszawa.

1. Based on Russia, Ministerstvo Finansov, op. cit.
DIAGRAM 14 Distribution of mills employing over 100 workers in 1910

Source - Russia Ministerstvo Finansov i Ministerstvo Torgovli i Promyshlennosti, Spisok fabrik i zavodov Rossii 1910 g., Moskva, Petersburg, Warszawa
DISTRIBUTION OF MILLS EMPLOYING OVER 100 WORKERS IN 1910

Number of mills

Workers

0

500

1,000

5,000

10,000

15,000

Łódź
Tomaszów
Pabianice
Zgierz
Sosnowiec
Częstochoa
Marki
Zduńska Wola
Kalisz
Opatów
Konstantynoł
Białystok
Choroszcz
Dojlidy
Dobrzyń
Suprasł
The basic causes of the widening structural contrasts between the two regions were the growing difference in the size of the mills on entry to the industry, the larger number of mills which left the industry in periods of depression in the Bialystok region, and the smaller growth of the surviving mills there than in the Lodz region. These differences may be attributed to the less favourable location of the industry in the town of Bialystok and its environs than in the Lodz region, which was discussed in Chapter II. The location of the industry in the Bialystok region was considered to be inferior to that of the Lodz region in the period of the influx of capital and entrepreneurship from western Europe by those wishing to invest large sums in the industry for they neglected the region, and the region proved to be uneconomic even for several of the large mills which had been located there before 1876 and which left the industry between 1877 and 1914.\(^1\)

Each depression severely reduced the numbers of mills in both regions, but it has been pointed out above that the potential dangers in the trade cycles for the industry in the Bialystok region, where a very large proportion of the industry

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1. For details of the large mills which left the industry in the Bialystok region after 1876 see p. \(^{171}\).
was in small-scale workshops and where credit and capital were severely limited, were greater than for the Lodz region. In the Kingdom of Poland the proportion of large mills was greater and the financial superstructure of the companies and firms was more institutionalised, while the other major competitor of the Bialystok industry, the Russian woollen textile industry, had a higher technical standard and larger scales of production.¹

Producers in the Bialystok region resisted the economic weakness of their location in relation to the Lodz and Russian branches of the industry in two important ways between 1877 and 1914, which helped to perpetuate the spatial contrasts between the form of the industry on the Polish lands of the Empire. They reduced the cost of production by reducing the quality of the raw materials through the addition of pulled rags to the more expensive virgin wool, which was the major raw material for the industry in other parts of the Empire at that time.² Also, in the absence of large investments in the region, they continued to depend on the cheap labour of the family in the small workshops at the time when production in the Lodz region was almost entirely in mills employing full-

¹ A. Verwicki, Bialostockiego Okręg Przemysłu Włókienniczego do 1945 roku, Warszawa 1957, p.61.
² Piekiewicz, op.cit.
time, hired labour. Thus the industry in the region continued to expand with successive trade cycles on the basis of its specialisation on a cheaper product, but it was an expansion of the small-scale workshops rather than the development of a large-scale factory industry after the manner of the Lodz region.

The absence of capital for the expansion and mechanisation of production in the Bialystok region after 1876 resulted in only 47 per cent of the units being mechanised in 1910 in contrast to 72 per cent of the units in the Lodz region. Moreover many of the mechanised mills in the Bialystok region were using small electric motors and some were still employing water power. Thus the chief technical pressure, which led to increases in the scale of production in industry throughout Europe in the nineteenth century, was applied more slowly and to less effect in the Bialystok region than in the competing centres of the woollen textile industry.

The lack of capital and the absence of large mills in the Bialystok region in contrast to the proliferation of both in the Lodz region originated in the preferences of the

2. Based on Russia, Ministerstwo Finansow, op.cit., Hanteuffel, op.cit., p.32.
entrepreneurs who entered the industry between 1877 and 1914 for the one region rather than the other and for some towns in preference to others. The choices of location for mills in this period were rooted in a series of factors which were distinctively capitalist in selection and aim, and which produced a distribution of the industry which was characteristic of capitalism. It is unlikely that socialist control in the industry would have produced the same pattern of distribution.


In a capitalist environment the changing distribution of the industry was the aggregate of the individual location decisions of every entrepreneur, both of those who were entering the industry and of those who were already producing woollen textiles and who were constantly reappraising the profitability of continuing to produce. Firms entering and firms leaving the industry all affected its distribution, as also did those firms which expanded their operations on existing sites. The changing distribution between 1877 and 1914 was typical of the pattern of capitalist industry for it was the response to the narrow range of location factors
which individual entrepreneurs are believed to consider.¹

It has been shown already in this chapter that the mills which entered the industry between 1877 and 1914 varied widely in scale, but that the majority were small. In discussing the location decisions of firms these mills are divided into two groups according to the scale of production. Many small-scale producers lived and worked locally in the textile areas and could or would not look beyond them, but some producers envisaged large investments in mills and plant and wanted to operate in the most profitable locations, whether they were in the Russian Empire or in Europe as a whole. This second group included individuals and also joint-stock companies, investing their shareholders' money, and to whom the return, rather than the congeniality of the location, was the touchstone of sound locational decisions.

Small-scale producers with little capital tended to enter industry wherever they were living rather than to move long distances and establish themselves in new and strange environments. In the period from 1877 to 1914 small-scale investments were attracted to the food-processing, timber,

E.M. Hoover, The Location of Economic Activity, New York 1948.
For a comparison with the wider range of factors affecting the location of socialist industry see Chapter VI below and
brick and ceramic industries in some parts of Poland, but in
the textile concentrations the majority of small-scale
producers followed the local industrial specialisation.¹
Younger sons of weavers established their own weaving sheds
or people with a little capital, chiefly Jews, opened workshops
on a scale commensurate with the size of their savings, but
many of these workshops never possessed more than ten looms or
a couple of rag-pulling machines and this scale of operation
could not compete with the mechanised spinning section. Most
of the small mills and workshops were only able to undertake
the weaving of cloth and therefore the obvious locations,
given the vertically disintegrated structure of the industry
and the associated need to be near to supplies of raw materials
and marketing facilities, were the towns in which the industry
was already established or the neighbouring settlements.

The location decisions of the group of small-scale
producers will be examined in the context of the Bialystok
region, in which they were particularly important, and the
description and analysis of the location of the larger mills
will be restricted to the Kingdom of Poland, where they were
the dominant element in the industry.

The Bialystok Region.

The small-scale producer was almost the only source of entrepreneurship in the Bialystok region throughout the period from 1876 to 1914, and small workshops owned and directed by Jews became increasingly important in the structure and to the continued existence and growth of the industry. While the proportion of small units in the hands of Jews was rising in the late nineteenth century the German share of the industry was declining as the larger mills were closed and the firms liquidated.\(^1\)

Between 1877 and 1910 the industry became concentrated in a smaller number of towns and villages and, in particular, in Bialystok. Diagram 16 (on page 175) shows that the proportion of the mills and workshops which were located in Bialystok grew during most of the period from 1876 to 1914, and Map 12 (on page 142) clearly shows that, while many mills entered the industry in Bialystok in the period, very few new mills appeared in any of the other centres of the region. Despite the increase in the number of units the number of mills and workshops in all the other centres, except Grodek, decreased between 1879 and 1910 or failed to increase. The number of mills and workshops in Bialystok rose from 39 to 103 while in

\(^1\) A. Manteuffel, *op. cit.*, pp.23, 28.
DIAGRAM 15  The Concentration of the Woollen Textile Industry of Poland in Lodz (1876 - 1914)

The graph is derived from information about the woollen textile industry within the Kingdom of Poland only. Because information is only available for the whole country for a few years between 1876 and 1914, the graph only represents the changes in the years of depression in each of the trade cycles - 1876, 1884, 1893, 1901 - and in 1914.

Sources
- D. P. Kandourov, Fabrično-zavodskija pravilatija Rossiskoj Imperii, Petrograd 1914
- S. Koszutski, Nasz przemysł włókienniczy na początku XIX wieku
  Warszawa 1905

Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kieleckoj Gubernii za 1876 god, Table 2, Kielce 1877
Obzor Lublinskoj Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Lodzinskoj Gubernii za 1876 god, Table 2, Łódź 1877
Obzor Piotrkowskoj Gubernii za 1876 god, Table 2, Piotrków 1877
Obzor Plockoj Gubernii za 1876 god, Table 2, Płoć 1877
Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzor Sedleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
Obzor Suwalskoj Gubernii za 1876 god, Table 2, Suwałki 1877
Obzor Warsawskoj Gubernii za 1876 god, Table 2, Warszawa 1877
P.A. Орлов, Указатель fabrik i zavodov Europejskoj Rossi i
Carstva Pol'skago, Petersburg 1887

P.A. Орлов, Указатель fabrik i zavodov okrain Rossii,
Petersburg 1895
THE CONCENTRATION OF THE WOOLLEN TEXTILE INDUSTRY OF POLAND IN LODZ (1876 - 1914.)
Michalowo it fell from 43 to seven, in Knyazyn from 21 to two, and in Wesilkow from eleven to four, and the industry disappeared entirely from thirteen of the very minor centres in which it had existed in the 1870's. The only centres in which the number of mills grew, were Bialystok and Grodek, where the number rose from fourteen in 1879 to sixteen in 1910. In these two centres and in Choroszcz, Dobrzyniewo, and Dojlidy employment had grown, but, in all other centres, there were fewer employees in 1910 than there had been in 1879.¹

The explanation of the concentration of the industry in Bialystok, according to Worwicki, was the railway monopoly of the town until the late 1880's.² The easy access to raw materials and to markets, which the railway afforded, assisted Bialystok to become the break-of-bulk point for the industry. After 1887 the railway from Bialystok to Wolkowysk passed close to Grodek and provided the industry there also with improved links with the supplies of rags from east Prussia, the areas of wool production in south Russia, and the Russian markets for cloth.

However this explanation of the concentration of the industry in Bialystok is inadequate for it assumes the existence

¹ Based on P. A. Orl'ov, op. cit., (1881)
² Pamiątnaja Knižka Grodzenskaj Gubernii na god 1876-1913
³ Ministerstwo Finansow, op. cit.
² A. Worwicki, op. cit., p.45.
⁴ Słownik Geograficzny Królestwa Polskiego, t. XII, p.372.
⁵ Warszawa 1892.
of the whole capitalist environment which permitted and influenced the process of redistribution in the industry.

The decline of the industry in the other centres of the region occurred during the periodic depressions which affected all the centres, but War 14 shows that during the improvements in the demand for textiles, which followed each depression, the industry grew only in Bialystok and did not recover in the other centres. The large mills in Choroszcz, Dobrzyniewo and Supraśl did not attract new industry to those locations, and in the depression of 1900–1903 the firms of Alt, Aunert and Zachert in Supraśl were all forced out of the industry. One of the mills was never subsequently reopened, but in the absence of the fluctuations of demand or of the individual freedom to enter or leave the industry it is unlikely that this redistribution would have occurred.

The process of concentration was assisted by the ease with which small-scale workshops could enter the industry. Small units represented little invested capital and the losses involved in the closure or abandonment of such workshops was small. Frequently machinery could be sold to other firms and the building turned over to some other use. It is noticeable that the large-scale mills in Choroszcz, Dobrzyniewo and Dojlidy, which were specific in their use
and represented large-scale investments, continued to exist and to produce. Among the small, handicraft workshops, labour, and not premises or plant, was probably the critical location factor. Income was more important than the return on investment and so labour tended to redistribute itself among the centres according to the possibility of employment and a cumulative process of migration to Bialystok strengthened that location in relation to others in the region. Between 1677 and 1914 the population of the town grew with the industry as the number of employees in the town rose from 660 in 1876 to 4,500 in 1906. In the same period the numbers of employees of the industry in the Bialostocki powiat grew from 2,920 to only 3,630.1

The Lodz Region.

Both groups of producers contributed to the growth of the industry in the Lodz region by the building of new mills between 1877 and 1914. The vast majority of the mills, including all those employing less than 900 people in 1910, were located in centres of the industry which had been established before 1876, but, through the preferences of entrepreneurs for one textile town rather than another, the distribution of the industry in the region was changed. In

1. Pomieszcza Knizka Grodnenskoj Gubernii za rod 1876, 1913.
particular it became concentrated in one centre after the pattern of the Bialystok region, and Diagram 13 shows that the proportion of the mills and workshops of the region which were located in Lodz rose from 24 per cent in 1876 to 72 per cent at the end of the period.\(^1\)

The growth or stagnation of the industry in any centre in the Lodz region was largely the result of the choices of location for the large-scale mills. Map 13 (on page 148) shows that many of the large-scale mills, like the smaller units, which entered the industry between 1877 and 1909, were located in the established centres, but that a few were built in towns in which no textile tradition existed which were at considerable distances from Lodz.

The distribution of large-scale mills is shown in Diagram 11 (on page 135). The diagram shows that only five mills were located in greenfield sites away from the established centre of 1876, but these were the largest mills in the industry. Among the mills which employed more than a thousand people in 1910 two were built in Sosnowica, one in Czestochowa and one in Warsaw, which were all new locations for the industry, and only one had been located in Lodz.

Among the six mills which employed between 500 and a thousand

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1. Based on D.P. Kandojrov, Fabriano-zavodskaja predprjetija Rossiskoj Imperii, Petrograd 1914 Obzor Petrokovskoj Gubernii za god 1876 to 1904, Table 2.
DIAGRAM 16  The Concentration of the Woollen Textile Industry of the Bialystok Region in Bialystok (1876 - 1914)

The graph is derived from information about the woollen textile industry within Bialystok and Bialostocki, Bielski and Sokolski powiaty only. The graph represents the changes in the distribution of the industry in the years of depression in each trade cycle - 1876, 1884, 1892, 1899 - and in 1914, and may therefore be compared with the changing distribution of the industry in the Kingdom of Poland, which is illustrated in Diagram 12

Sources - Pamiątna Knizka Grodno Guberni, Grodno, for 1876, 1884, 1892 and 1899.

Material supplied by Dr. S. Misztal (I.G. PAN Warszawa)
THE CONCENTRATION OF THE WOOLLEN TEXTILE INDUSTRY OF THE BIALYSTOK REGION IN BIALYSTOK (1876 - 1914).

Diagram showing the concentration of mills and workers over time from 1875 to 1915.
workers, in contrast, all except one were located in Lodz. The exception, which employed 965 people, was in the greenfield location of Czestochowa. Twenty of the mills which employed between a hundred and 500 people were located in Lodz, six in Tomaszow, two in Pabianice and one in Konstantynow.¹

The explanation of the preference of the large-scale producer for the established centres of the industry and for Lodz in particular lies in the cost-saving location policy of capitalist industrialists. The scale and variety of the industry in the textile towns offered opportunities of lower costs of production which were not available in other parts of the Polish lands. Some of the towns had already acquired certain external advantages by 1876, which were noted in Chapter II, and which tended to reduce the cost of production for all firms located there. Transport and marketing services, which facilitated the movement and supply of raw materials and the disposal of finished goods, were only available in those towns and in Warsaw. More specifically a supply of skilled labour was available in centres with many textile mills which led to higher labour productivity there than in other areas of the country where experience of textile production or even of factory labour of any type did

¹. Russia, Ministerstwo Finansów, op.cit.
not exist among the population. Also the existence of ancillary trades in the textile towns reduced delays and overhead costs in comparison with the mills which were in new and distant locations.

The concentration of the industry in Lodz, which is illustrated by Diagram 13, rather than in other centres of the Lodz region, may be explained against the background of the structure of the industry. More than three-quarters of the large-scale mills which entered the industry between 1877 and 1914 only undertook a selection of the processes of textile production. Most of the mills relied on others for the supply of yarns or for sales of yarn, for the dyeing and finishing of yarn and cloth or for the washing of wool, and the vertically disintegrated structure of the industry strongly influenced firms to locate close to several sources of raw materials or to commission firms. This structural incentive for the concentration of the industry in the established centres favoured Lodz to a greater extent than the other towns. The light-weight woollen cloth weavers drew yarn from both woollen and cotton spinners and the woollen spinning mills relied upon the cotton branch of the industry for the supply of one of their basic raw materials – cotton waste. Complementary branches of the industry and a comparable range of processes of production did not exist in any of the other
centres in the region.1

The vertically disintegrated structure of the industry encouraged the development of the system of commission spinning and commission weaving, but these forms of the industry were restricted to Lodz and, to a lesser extent, to Fabianice and Zgiers, and they did not develop at all in the Bialystok region. Commission spinners and weavers did not produce goods for sale, but depended upon the orders of mills in which the capacity was insufficient or unsuitable to supply the entire needs of the other processes of production. Alternatively they relied on orders from other single-process mills and from producers and merchants who did not possess mills. The demand for commission services was greatest in the towns where the number of mills was largest and the products of the industry most varied, but where, inevitably in the capitalist system, the production capacity of the industry was most unbalanced and the greatest risks of bottlenecks in production occurred. These conditions were fulfilled best in Lodz, and 33 of the 49 commission woollen and waste spinners in the Kingdom of Poland in 1905 were located there while there were eleven in Fabianice and only one in Tomaszow. The dominance of Lodz among the commission weavers in the same year was even greater. 41 of

Dziennik Łódzki, 29 maju, 1884r.
the 49 were located in the city, six were in Zgiersz and there was one each in Fabianico and Tomaszow.1

The growth of the spinning section and its concentration in Lodz and Pabianice was an important element assisting the concentration of the industry. The choice of Lodz as a location for spinning mills probably arose from the fact that many of the mills were using increasingly large quantities of cotton and woollen waste up to 1914 in the spinning of semi-woollen and woollen-waste yarn. As the supplies of Russian and Polish wool decreased spinners' waste was substituted for expensive imported wool. The waste spinning branch of the industry was introduced into the Kingdom of Poland after 1876 and it was located in Lodz, Pabianice, Sosnowiec and Zgiersz. Most of the mills were owned by Germans who had owned similar mills in Germany, but who had lost their markets in the Russian Empire after the imposition of the "Gold Tariff". The woollen and waste spinning section was drawn to the textile towns where the output of cotton and woollen waste was large and where semiwoollen cloth was woven, especially cloth of low quality. Thus the chief markets for the woollen-waste yarn among the Polish textile towns were in Lodz. Therefore the spinning mills tended to be located in Lodz rather than in the other centres where the supply of raw

1. Based on L. Jezioranski, op.cit.
   Polska Naroda Ekonomiczna, Prace, p.38, Petersburg 1919.
materials was smaller or less varied, or where the weaving section was small, or where it specialised in the production of woollen cloth of good quality.¹

The external economies associated with the concentration of the industry, which have been outlined above, favoured the established centres of the industry in opposition to greenfield locations, but, by the same token, they also favoured the towns with the largest numbers of mills and the widest variety of branches of the textile industry and ancillary trades and services. Thus Lodz was favoured to a greater extent than the other centres in the region and the concentration and rapid growth of the industry in the town may have been sufficient to encourage other firms to establish their mills there. For the individual entrepreneur with little interest or knowledge of the exact costs of production in each town or at every available site, a process of follow-my-leader to the centres of greatest obvious prosperity and the largest volume of business must have favoured Lodz and have led to the neglect of such centres as Ozorkow and Zgierz.

Another and more simple explanation of the concentration of the industry in Lodz, and to a lesser extent in Toraszow, and of the relative decline of the other established centres between 1876 and 1914 is that Lodz continued to enjoy a monopoly.

¹. Dziennik Łódzki, 29 maju, 1884r.  
of the railway until the mid-1880's which was only shared after 1886 by Tomaszów. None of the other centres of the region was linked to the railway before the end of the century. On the other hand all the new locations of the large-scale mills were in railway towns and were linked directly by rail with both the coalfields and the chief markets for their products throughout the period.

It is probable that all the factors which have been outlined above affected the decisions of the firms which located their mills in the Lodz region, but these factors were obviously not of such importance to the companies which built five of the largest mills in Częstochowa, Scosnowiec and Warszawa. In seeking reasons for the spatial divorce between these mills and the traditional textile towns it is important to notice that all three locations, while avoiding the established textile towns, were within the same westerly part of the Kingdom of Poland and western extremity of the Russian Empire. None was further east than Warszawa and there was no comparable investment in the period in the Bialystok region.

All five mills were built by textile producers whose headquarters and original mills were located in western Europe.

1. Dziennik Łódzki, 22 lipca, 1884r.
The mills in Sosnowiec were owned by Germans, one in Czestochowa was built by a French company, and the other by a Belgian firm, while the mill in Warszawa was owned by the English firm of Briggs Brothers. All these firms sought profits through production within the tariff boundary of the Russian Empire, but, simultaneously they wished to remain as close to Bradford, Roubaix, Saxony and Verviers as possible. Thus the western areas of the Kingdom of Poland were considered to be suitable, although the textile towns were rejected in favour of other locations.

The entrepreneurs who entered the Kingdom of Poland in the late nineteenth century to establish these large mills were accustomed to the spatial coincidence of coal mining, heavy metallurgy and textile manufacturing and to the consequent local supply of fuel and joint supply of male and female labour. These mills all required quantities of coal and numbers of unskilled, cheap workers which were far in excess of any previous experience in the woollen textile industry. The mill of Allard Rousseau in Lodz, which employed over 900 people in 1888 was consuming 10,000 tons of coal per annum. Not merely was there little competition for female labour in the Upper Silesian coalfield in this period, but the coal was also cheaper in Czestochowa and Sosnowiec than in the Lodz region or Warszawa, which were 250 to 300 kilometres from

the coalfield. At the time when these mills were under construction the price of coal in Lodz was five times as great as in Sosnowiec and twice as great as in Czestochowa, and in the towns without railways, such as Ozorkow, Fabianice, Tomaszow and Zgierz, it was even more expensive. It is probable that the savings in the costs of transport were greater and more obvious advantages than any external economies which the established textile towns could offer at the time.

Markets also exerted a different influence upon the location of these mills than upon the location decisions of other firms. All the mills spun worsted yarn and the average scale of production was clearly larger than that in any of the woollen spinning mills. Whereas woollen spinners often supplied yarn only to producers in the same town, the worsted spinning mill, with a larger output, was obliged to find markets in a number of centres and probably in more than one region. Immediately before 1914 about half of the output of the worsted yarn of the Kingdom of Poland was sold in the Moscow and St. Petersburg concentrations of the

1. L. L. Janszull, Przemysł fabryczny w Królestwie Polskim, p. 74, Petersburg 1887. The average price of coal in sonecza per pud in 1886 was as follows - Sosnowiec 2.4, Czestochowa 6.15, Lodz 11.5, Zgiers 12.36, Warszawa 13, Tomaszow 14.4, Fabianice 14.9.
W. Kwesty fabrykantów – niemoć, in Dziennik Łódzki, 3 października, 1885r.
S. Kosowtcki, op. cit., pp. 52-54.
industry. It is unlikely that the costs which were incurred as a result of the distance from these markets were as great as the savings in the costs of labour and of the transport of fuel, which were achieved in the locations of Sochowiec and Czestochowa.

Summary

During the period from 1877 to 1914 the search for private profit, the freedom of entry of mills into the industry, the restriction of imports of woollen textiles into the Russian Empire, and the growth of demand within the Empire created an ideal environment for the growth of the woollen textile industry on the Polish lands of the Empire. The freedom of entry in the environment of the trade cycle also permitted wide and frequent fluctuations in the number of mills and workshops which were producing at any time, and the combination of long-run growth and short-run depression resulted in contrasting structures and scales of production in the Bialystok and Lodz regions and facilitated a redistribution of the industry.

2. Szarpow, O Lodzi i Sochowicach, in Dziennik Lodzki 17 March, 1886r.
The industry became characterised by a wide variety of scales of production among the mills, a dominance by a few large-scale mills, and a vertically disintegrated structure of production. At the same time the industry as a whole became increasingly concentrated in one town in each of the two regions and declined absolutely in many of the other centres, while the large-scale mills, although continuing to expand in the Lodz region, declined in the Bialystok region in number and scale and began to be located in the type of coalfield industrial complex in which they were to be found in western Europe at that time.

The increasing variety in the structure and distribution of the industry, which was developing in the environment of individual enterprise between 1877 and 1914, was significantly altered after 1914. The economic environment between the wars was never characterised by the same prospect of prosperity or long-run expansion and the changes in the geography in those years were the outward consequences of a defensive reaction by the industry to unfavourable economic conditions. 1914 marked an important change in the fortunes and the patterns of development in the industry - a change from the geography of industrial growth under capitalism to the geography of decline. Therefore Chapter IV, in which the industry in
1914 is described, serves not only as an illustration of the results of the processes of development after 1876 which have been described in this chapter, but also as a comparison with the industry in the late 1930's at the end of a period of stagnation and decline.
CHAPTER IV

THE WOOLLEN TEXTILE INDUSTRY ON THE POLISH LANDS OF THE RUSSIAN EMPIRE ABOUT 1914

Considerable changes occurred in the geography of the woollen textile industry on the Polish lands of the Russian Empire between 1876 and 1914. The geography of the industry was described for 1876 in Chapter II and the changes in its distribution and form between 1876 and 1914, which reflected the processes of development in the capitalist economy, were outlined in Chapter III. Chapter IV examines the extent to which the changes in the distribution and form of the industry had progressed by 1914.

The substantial increase in the number of mills, employment and output between 1876 and 1914 was noted in Chapter III, and basic pattern of the redistribution of the industry was indicated. The industry had not disappeared entirely from any of the important centres of 1876, but the relative importance of the textile regions and towns had been substantially altered. It was suggested in Chapter III that the pattern of redistribution was the consequence of the capitalist economic environment in which the industry was developing. Chapter IV indicates the extent of the changes by 1914 and, in examining the developing
spatial divergence between the location of the industry and the sources of raw materials, fuel and markets, labour and investment capital, it indicates the consequence of this pattern of capitalist development in terms of the mounting direct costs of production in the older centres of the industry.

Chapter III showed how the neglect of the lesser centres by new firms and the concentration of mills in a few textile towns between 1876 and 1914 caused the development of spatial contrasts in the scale of the industry and led to the weakening of the economic position of the industry in many smaller centres, but also tended to increase the indirect costs of production as the result of the industrial congestion in the complementary large concentrations of mills. The comparison of these processes with the development of the industry under socialism in the later chapters will indicate the extent to which the wide possibilities of viable alternative locations for the industry were ignored under capitalism and how, as the result, both the direct costs to producers and the indirect losses to the community, which the production of woollen textiles incurred throughout the country, were unnecessarily increased.
The Distribution and Scale of the Industry about 1914

The woollen textile industry on the Polish lands of the Russian Empire in 1912 included 608 mills and workshops and employed about 66,000 people. Thus the number of mills increased between 1876 and 1912 by about eighty per cent and the employment had risen almost sixfold. Nevertheless the industry remained largely in the two major concentrations where it had been located in 1876, in and around the towns of Bialystok and Lodz, although the number and distribution of the towns and villages in which the industry was operating had changed.

Changes in the Location of the Industry since 1876

In the Bialystok region the industry had disappeared from several of the villages since 1876 despite the increase in the total number of mills in the region. In the Kingdom

1. Based on A. Krzyzanowski and K. Kumaniecki, Statystyka Polski, p.182, Krakow 1915. Those figures include the many small, craft weaving sheds of the type which were noted in Note A on page 439, which were still active in 1914, chiefly in Aleksandrow, Brzeziny, Konstantynow, Lask, Osorkow, Turek and Zdunyka Wola. Several had begun to use electric power before 1914, but most were still unmechanised and lower labour costs and low prices for the finished cloth enabled them to withstand the competition of the mill industry. The figures do not include the domestic industry which, according to Koschut, employed 12,900 weavers in 1900 in Kaliska and Piotrkowska gubernia and which produced worsted, semiwoollen and cotton cloth with yarn supplied by the mills in Lodz and Pabianico. (Przeglad Techniczny, 1915, p.282, and Przemysl Krakowy, 1913, 16).
MAP 17 The Decline of the Woollen Textile Industry
1876 – 1914

Sources –

D.P. Kandourov, Fabriko-zavodskaja predprijatija Rossijskoj Imperii, Petrograd 1914

Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kieleskoj Gubernii za god 1876, Table 2, Kielce 1877
Obzor Ljublinskoy Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Lomzinskoy Gubernii za 1876 god, Table 2, Lomza 1877
Obzor Petrokovskoj Gubernii za 1876 god, Table 2, Piotrkow 1877
Obzor Plockoj Gubernii za 1876 god, Table 2, Plock 1877
Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzor Siedleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
Obzor Suvalskoj Gubernii za 1876 god, Table 2, Suwalki 1877
Obzor Wrazawskoj Gubernii za 1876 god, Table 2, Warszawa 1877

Puniznaja Knizka Grodmanskoj Gubernii na god, 1876, Grodno
A.R.S. Sroka, Przemysel i Handel Królestwa Polskiego 1914,
Warszawa 1914

Material supplied by Dr. S. Misztal (I.G. PAN Warszawa)
THE DECLINE OF THE WOOLLEN TEXTILE INDUSTRY 1876-1914

- Mills in 1876 but no mills in 1914
- Fewer mills in 1914 than in 1876
- Fewer workers in 1914 than in 1876
- Fewer mills and workers in 1914 than in 1876

SCALE 1:3,000,000
of Poland the number of locations had increased in spite of the disappearance of the industry from a number of places since 1876.\(^1\)

The changes in the number of locations, which are shown on Maps 17 and 18 (on pages 141 and 145), conceal the fact that the industry had chiefly disappeared from the less important centres of 1876 and that some of the new locations had become of comparable importance in the industry of 1914 with such towns as Tomaszkow and Zgierz. Map 17 shows that the industry had disappeared from at least three of the towns and villages in the Bielystok region where it had existed in 1876 and from nine locations in the Kingdom of Poland. In most of these places in 1876 there had been only a few small workshops, or only one, in which cloth had usually been woven by hand. The only exceptions had been a mill at Pilica, which had employed 200 people and had used steam power in 1876, but which had been burnt down; a spinning mill at Zawierecze which had also used steam power and employed 200 people, which had changed to the spinning of cotton-waste yarn; and a hand-weaving mill near Sandomierz, which had employed ninety workers in 1876. Thus the disappearance of the industry from the twelve locations between 1876 and 1914 had little effect upon the overall distribution of the industry.

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1. See Note B on page 494.
The twelve locations had been more than replaced in 1914 by the appearance of the mill industry in at least eighteen other places, and these are shown on Map 18. These locations may be divided into three groups. Several mills had been built between 1876 and 1914 in Bolchatow, Turek, Zdunyka Wola and also in Pabianice, where mills had existed in 1876, in the place of the domestic weaving industry of 1876. Many of the mills had developed out of the merchanting and outwork systems of organisation in the towns and had been built by the merchants who had formerly controlled the supply of yarn to the weavers. By 1914 about forty mills and workshops of this type existed in Zdunyka Wola, but the numbers of mills, no distinct from merchants' headquarters or small weaving workshops, in Turek and Helchatow were less certain. In those towns and in Pabianice the number of mills was also uncertain because many were weaving both cotton and woollen cloth and so were sometimes classified in one or the other branches of the textile industry, and sometimes in both. The chief products of these centres were worsted and semiwoollen cloth and there was little woollen spinning, with the exception of Pabianice, for the mills in these centres had always relied closely upon Lodz and Ozorkow for their supply of yarn.  

MAP 18  The Growth of the Woollen Textile Industry
1876 - 1914

Sources -
D. P. Kandourov, Fabrično-zavodskija predprijatija Rossii skoj Imperii, Petrograd 1914
Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kieleckoj Gubernii za god 1876, Table 2, Kielce 1877
Obzor Ljublinskoj Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Lomzinskoi Gubernii za 1876 god, Table 2, Lomza 1877
Obzor Petrokovskoj Gubernii za 1876 god, Table 2, Piotrkow 1877
Obzor Plockoj Gubernii za 1876 god, Table 2, Plock 1877
Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzor Siedleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
Obzor Suwalskoj Gubernii za 1876 god, Table 2, Suwalki 1877
Obzor Warsavskoj Gubernii za 1876 god, Table 2, Warszawa 1877
Pamiatnaja Knizka Grodnenskoj Gubernii na god, 1876, Grodno
A. R. S. Broka, Przemysł i Handel Królestwa Polskiego 1914
Warszawa 1914
Material supplied by Dr. S. Wiesztal (I. C. PAN Warszawa)
THE GROWTH OF THE WOOLLEN TEXTILE INDUSTRY 1876-1914

- No mills in 1876
- More mills in 1914 than in 1876
- More workers in 1914 than in 1876
- More mills and workers in 1914 than in 1876

See inset
The mills were small in scale. Only one in Zdunska Wola employed more than a hundred people and almost all had less than fifty workers, while in Turek almost all the weaving was still done by hand. The industry in Zdunska Wola accounted for about seven per cent of the mills and employed about three per cent of the labour force of the industry in the Kingdom of Poland, but, apart from Zdunska Wola, the addition of these centres in the period between 1876 and 1914 did not affect the general distribution of the industry very greatly in 1914.¹

A few isolated mills in new locations in 1914 did make an important change in the general distribution of the industry. The five worsted spinning mills in Czestochowa, Marki and Sosnowiec were differentiated from other mills by their large scale of production. In 1910 they employed an average of 1,400 people each when the average number of workers in each mill for the whole industry did not exceed a hundred. The five mills accounted for about fourteen per cent of the employment in the industry on the Polish lands by 1914 and Diagram 24 (on page 247) indicates that the two mills in Sosnowiec employed about five per cent of the labour force in 1914 and the two mills in Czestochowa about six per cent.²

¹ Based on D.P. Kondurov, Fabrichno-evodskija predprjatija Rossii, imperii, Petersburg 1914.

² Based on Russia, Ministerstvo Finansov, Spinok fabrik i evodov Rossii 1910 g., Moskva, Petersburg, Warszawa A.P. Smola, op. cit.
Among the new locations in the Kingdom of Poland and the Bialystok region few were occupied by more than one mill in 1914 and most of the mills employed less than a hundred people, so that these locations were of little importance in the general distribution of the industry. With the exception of the five worsted spinning mills the capitalist development between 1876 and 1914 did not favour any scattering of the mills to form a new distributional pattern of more and smaller-scale concentrations of the industry. In the same period the widespread disappearance of the industry from the small and isolated centres and the establishment of new, small-scale mills in other centres of this type throughout the country demonstrated the relative instability of the single-mill location in the economic environment of the trade cycle, which caused most firms to leave the industry within twenty years of starting production.

**Changes in the Distribution of the Industry among the Surviving Locations since 1876.**

Despite the three-part expansion of the industry into new locations, which has been outlined above, Maps 19, 20 and 22 (on pages 199, 201, and 207) indicate that the centres in which the largest numbers of mills had been located in 1876 were still the most important concentrations of the industry in 1914. The most important centres were Lodz and Bialystok, in that order, and they were followed by Zgiers, Tomaszow,
MAP 19  Woollen Textile Mills in 1914 (1)

The area of each open circle is proportional to the number of mills in each town or village which is indicated within each circle.

Source - D.P. Kandourov, Fabrično-zavadskaja prepričatija Rossijskoj Imperii, Petrograd 1914
WOOLLEN TEXTILE MILLS IN 1914 (1)

Number of mills

- One mill

Scale 1:3,000,000
MAP 20  Woollen Textile Mills in 1914 (2)

The area of each open circle is proportional to the number of mills in the town or village which is indicated within each circle.

Sources — A. R. S. Sroka, Przemysł i Handel Królestwa Polskiego 1914, Warszawa 1914
Material supplied by Dr. S. Misztal (I.G. PAN Warszawa) — for details of the Bialystok region.
WOOLLEN TEXTILE MILLS IN 1914 (2)

Number of mills

- One mill

B. BELCHATOW
C. CHOROSZCZ
D. DOBRZYNIEWO
Dn. DOJLIDY
Dn. DOJNOWO
K. KONSTANTYNOW
Kn. KNYSZYN
L. LASK
Oz. OZORKOW
P. PABIANICE
Pi. PIESZCZANIK
R. ROZALIN
S. SUPRASL
T. TOPOLE
Tj. TYKOCIN
Z. ZABLUDOW
Zg. ZGERZ
Zj. ZLATORIA
Wysoki STOCZEK
Dzikie
Turek
Kalisz
Zdunska Wola
Czestochowa
Kamienna Polska
Sosnowiec
Warszawa
Tomaszow
Nowe Miasto
Konskowola
Annopol
Frampol
Bialystok
Grodex
Michalowo
Ciechanowiec
Zambrow
Ibs
Marki
Wrocław
Zgorzelec
Raczkowice
Zlotoria/Ciechanowice
Wysoki Stoczek
Dzikie
Turek
Kalisz
Zdunska Wola
Czestochowa
Kamienna Polska
Sosnowiec
Warszawa
Tomaszow
Nowe Miasto
Konskowola
Annopol
Frampol
Bialystok
Grodex
Michalowo
Ciechanowiec
Zambrow
Ibs
Marki
Wrocław
Zgorzelec
Raczkowice
Zlotoria/Ciechanowice

SCALE 1:3,000,000
Michalowo and Fabianice. However the second group of towns were less significant than they had been in 1876 in relation to Bialystok and Lodz. The location factors of the capitalist industry, which were discussed in the previous chapter, had favoured Bialystok and Lodz at the expense of the other towns which had been important centres of the industry in 1876.

Diagrams 15, 16 and 21 (on pages 169, 175, and 204) show that the proportion of the mills and workshops in the Kingdom of Poland which had been located in Lodz in 1876 and also of those in the Bialystok region which had been in Bialystok had risen very substantially during most of the period up to 1914. However the proportion of the mills on the Polish lands which were located in Ozorkow, Tomaszow and Zgierz and also the proportion of the mills which had been located in many parts of the Bialystok region outside Bialystok in 1876 had fallen very considerably by 1914.

The decline in the proportion of the mills did not affect these other centres to an equal extent. The total number of mills in Grodek, Michalowo, Fabianice and Zgierz increased between 1876 and 1914. In Grodek and Fabianice, where the railway and the development of the mill industry from domestic weaving respectively introduced exceptionally favourable conditions for the industry, the increase in the number of mills was sufficiently large to raise these locations' proportions of
The columns represent the proportion of the total number of mills employing four or more workers in each town or village in the Kingdom of Poland and the Bialystok region. Broken lines indicate the proportion of the total number of mills in each town or village in 1876, except in the cases of Grodek Michalowo, Supraśl and Wasilkow. The mills in these villages in 1876 were included in the Białostocki, Bielski and Sokolski powiaty and are included in the columns for those areas. The solid line in the columns for each of the powiaty indicates their proportions of the total number of mills in 1914, including those in Grodek, Michalowo, Supraśl and Wasilkow. Towns and villages in which mills were located, but which did not account for one per cent of the total number in either 1914 or 1876, have been omitted.

Sources - D.P. Kandourov, Fabricno-zavedskijaprodprjatiya Rossijskoj Imperii, Petrograd 1914
THE DISTRIBUTION OF MILLS
IN 1914

1876
the total number of mills. In the other centres, in spite of
the increases in the number of mills, the proportion of the
mills in the industry as a whole fell between 1876 and 1914.
Sixteen per cent of the mills in the Bialystok region in 1876
had been in Michalowo, but in 1914 the proportion was twelve
per cent, while in Zgiersz the proportion of the mills in the
whole industry had fallen from over seven to less than five
per cent.

Both Maps 19 and 20 show that the industry in Ozorkow and
Tomaszow suffered an absolute decline in the number of mills
between 1876 and 1914. In Tomaszow the number fell from 91 to
36 and in Ozorkow it was halved, and the proportion of the
total numbers of mills in the industry in both towns fell to
less than a third of the level in 1876. Thus the centres in
which the largest numbers of mills had been located in 1876
after Lodz and Bialystok and which had accounted for 24 and
six per cent of the mills on the Polish lands of the Russian
Empire only included seven and two per cent of the mills in
the two regions in 1914.¹ Two primary centres of the industry
had developed from among several textile towns which had been
of approximately equal importance in 1876. In 1914 the other
towns around the primary centres were still important locations,
but they had become of secondary importance only.

¹ Based on D.P. Kandourov, op.cit.,
Material supplied by Dr. S. Wisztal.
MAP 22  Woollen Textile Mills in the Białystok Region in 1914

The open circles represent mills in which fifty or more workers were employed. The areas of the open circles are proportional to the number of workers employed.

Source - Material supplied by Dr. S. Misztal, (I.G. PAN Warszawa)
It was suggested in Chapter II that the distribution of employment gives a more accurate picture of the changes in the distribution of the industry than the distribution of mills. There were about 57,000 employees of the industry in the Kingdom of Poland in 1912, but the industry in the Bialystok region only employed about 9,000 people. Thus the true importance of the Bialystok region was less than the number of mills suggested, for whereas 266 of the 808 mills and workshops on the Polish lands were in the Bialystok region, or 33 per cent, less than fourteen per cent of the employees were to be found in the region.\(^1\) The number of mills in the Kingdom of Poland had increased by about eighty per cent between 1876 and 1912 while it had more than doubled in the Bialystok region, but in 1912 the employment in the Kingdom of Poland was more than six times as great as in 1876 when the labour force in the Bialystok region was only twice as large.

The distribution of employment also corrects the impression of the relative importance of the individual centres of the industry which was given by the distribution of mills. Maps 23 and 25 (on pages 211 and 212) show that the two primary centres retained their dominance, but in the case of Bialystok, the true importance of the town was less than the number of mills alone suggested. 57 per cent of the employment in the

\(^1\) Based on A. Krzyzanowski and K. Kumaniecki, op.cit., p.182.
Bialystok region was located in Bialystok in 1914, and over sixty per cent of the employment in the Kingdom of Poland was in Lodz. However Diagram 24 indicates that, in relation to the whole of the industry on the Polish lands, Bialystok had become of less importance as a centre of employment than it had been in 1876, while the proportion of the total employment in Lodz had doubled. Some of the other centres, in contrast, were more important than the distribution of mills in 1914 indicated although their proportion of the total employment in many cases had fallen since 1876. Diagram 24 indicates that Tomaszow and Fabianice each accounted for about six to seven per cent of the industry's employment, but that Zdunsko Wola and Zgiers, in spite of the large numbers of mills in those towns, accounted for only about three per cent. The omission of such centres as Kalisz, Opoczno and Ostrzew from Diagram 24 indicates that they accounted for less than one per cent each of the employment in 1914. Among the centres of the Bialystok region Chorosszcz, where only one mill was located, employed two per cent of the workers in the industry on the Polish lands while Michalowo, with two per cent of the mills, had less than one per cent of the employment. Only Suprasl among the other centres of the region accounted for more than one per cent of the workers.1

1. Based on D.P. Kandourov, op.cit.
The areas of the open circles are proportional to the numbers of workers in woollen textile mills which employed four or more workers in each town or village.

Source - D.P. Kandourov, Fabricno-zavodskaja vredrijatija Rossiskoj Imperii, Petrograd 1914
EMPLOYMENT IN 1914

Number of workers

- Less than 50

34,690 workers in Lodz

WYSOKI STOCZEK

SCALE 1:3,000,000
The changes in the distribution of employment which are indicated in Diagram 24 demonstrate that where the number of mills had shown a tendency to stagnate between 1876 and 1914 the total number of employees had not increased very greatly, despite an increase in the average scale of mills. This stagnation was confined to the long-established heavy woollen centres of Choroszcz, Dojlidy, Kalisz, Opatowek, Oszorkow, Supraśl, Tarnowskow, Wasilkow and Zgiersz. The number of employees had been halved since 1876 in Opatowek, Oszorkow and Supraśl, although the number of mills in Opatowek and Supraśl showed no change. In Tarnowskow the labour force had increased from 1,460 to 2,300 in 1910, but the number of mills had fallen and in Wasilkow the number of employees had been maintained in spite of the closure of several units. Only in Zgiersz was employment substantially higher in 1914 than it had been in 1876, and only in Zgiersz had the number of mills also risen considerably. The labour force there had been trebled, but some of the increase occurred in mills which were producing other types of cloth than heavy woollens.¹

The analysis of both the distribution of mills and employment about 1914 reveals that the industry in the heavy

¹. Based on D.P. Kandourov, op.cit.
Russian, Ministerstvo Finansov, op.cit.
A.S. Sroka, op.cit.
DIAGRAM 24  The Distribution of Employment in 1914

The columns represent the proportion of the total number of workers in the industry in each town or village in the Kingdom of Poland and the Bialystok region. Broken lines indicate the proportion of the total number of workers in each town or village in 1876, except in the cases of Choroszcz and Suprasl. The workers in these villages in 1876 were included in the Bialostocki, Bielski and Sokolski powiaty and are included in the columns for those areas. The solid line in the column for the Bialostocki powiat indicates the proportion of the total number of workers which was employed in that powiat in 1914, including those of Choroszcz and Suprasl. Towns and villages in which mills were located, but which did not account for one per cent of the total number of workers in the industry in either 1914 or 1876 have been omitted. Initials refer to the placenames in Diagram 21.

Source - D.P. Kandourov, Fabrično-zavodskaja pradrijačija Rossiskoj Imperii, Petrograd 1914
woollen towns in general failed to grow between 1876 and 1914 and that the importance of these towns in the distribution of the industry as a whole declined. Substantial increases in the level of employment were limited to a few centres which had specialised in the production of new types of goods, but the structure of the industry in these towns varied widely with the type of specialist product.

The new centres of worsted spinning were important in the distribution of employment in 1914. None of the worsted spinning mills were located in the Bialystok region or in the stagnating centres of heavy woollen manufacturing in the Kingdom of Poland. The largest mills in 1914 in this group were in Lodz, thereby strengthening its dominance over the other centres, and in the three new locations of Czestochowa, Herki and Sosnowiec. The importance of these mills to the changing distribution of employment, although they were few in number, is illustrated by the fact that 2,600 people were employed in the worsted spinning mills in Lodz alone in 1910 when no other centre of the industry except Bialystok and Lubianice employed more than this number and when the larger part of the worsted spinning section was not located in Lodz, but on greenfield sites where 7,200 people were employed in 1910.¹

¹. Russias, Ministerstvo Finansov, op.cit.
A second group of the centres in which the industry was larger in 1914 than it had been in 1876 included the towns of Bialystok, Grodek and Michalowo, where the industry had maintained its competitive ability by specialising in the production of cheap cloth of low quality and by substituting pulled rags for wool. In contrast to the very large worsted spinning mills the rag-pulling works were very small, often employing less than ten people each. The increase in the number of mills in the Bialystok region between 1876 and 1914 was greater, but the increase in employment was far less, than in the Kingdom of Poland. In 1914 5,300 people were employed in Bialystok, 570 in Michalowo and 380 in Grodek.¹

Dolhutki, Lodz, Pabianice, Turek, Zdunyka Wola and Zgiers formed a third group of towns in which the industry had grown between 1876 and 1914. The mills in these towns specialised in the production of semiwoollen cloth. This branch of production had been established in mills in all these towns except Turek in 1876, but most of the mills, except in Lodz, had developed since 1876 from the system of domestic production. About 2,000 people were employed in Zdunyka Wola by 1914 and in Pabianice there were almost 3,000 employees, but the industry in Delchatow and Turek was small, and in Zgiers the growth in the semiwoollen section was partly offset by the decline in the activity of the heavy woollen mills.

¹ Based on material supplied by Dr. S. Mieczal.
MAP 25 Employment in the Bialystok Region in 1914

The areas of the open circles are proportional to the number of workers in woollen textile mills which employed four or more workers in each town or village.

Source - Material supplied by Dr. S. Kiształ (I.G. PAN Warszawa)
EMPLOYMENT IN THE
BIALYSTOK REGION IN 1914

SCALE 1:1,000,000

0 DODRZYNIEWO
DK DZIEK
KM KROLOWY MOST
T TOPOLE
WS WYSOKI STOCZEK

Number of workers

- Less than 50

0 200 1000 5000
The changes in the size of the industry in the individual centres and in the relative importance of the textile towns, which have been outlined above, were closely reflected in the differences in scale between the mills in each of the towns. Locations in which the mill industry had only appeared since 1876 were characterised by mills which undertook only one process and, with the exception of worsted spinning mills, had few workers. The majority of mills in Biechaczów, Turek and Zdunska Wola were not twenty years old in 1910 and their opportunities for expansion had been small in comparison with a large number of mills in the older centres. Thus the average number of employees in the mills in Zdunska Wola in 1910 was 24 when the only mill which was founded before 1889 and which had survived to 1910, which employed nearly 400 people, was excluded. In the Białystok region the average number of workers in each mill was 21 and only nine of the mills employed more than a hundred people.¹

In the towns where the industry had a longer history of growth, and even in those towns where the number of mills had fallen and the industry stagnated, the proportion of large mills was higher than in Zdunska Wola or in the Białystok region. A quarter of the mills in Tomaszów employed more than a hundred people in 1910, and the average labour force

¹ Based on Ruscia, Ministerstvo Finansov, op.cit.
was 64 workers. Only eight per cent of the mills in Zgierz employed more than a hundred workers, but the average was still much higher than in the Białystok region, Turek or Zdunska Wola, at sixty to seventy workers per mill. In Pobianice the oldest mill employed 2,200 workers and the average was over a hundred per mill, but the highest average of workers per mill in the Polish lands was in Łódź. About 140 people were employed, on average, in each woollen textile mill in the city in 1910.¹

The supremacy of Łódź, despite the very large number and wide variety of scales of mills in the city, may be attributed to the fact that many of the largest mills in the industry were located there. 33 mills in the city employed over a hundred people each in 1910, seven more employed over 500 workers, and another three mills had labour forces in excess of a thousand people. Only Pobianice among the other centres was the location of a mill employing over a thousand people, with the exception of the mills in Częstochowa, Narki and Sośnowiec. Among the four mills which employed between 500 and a thousand workers which were not located in Łódź, two were in Tarnowskie and Zgierz, and the other two were located in Chorzów and Częstochowa.² Thus the distribution of large-scale mills in 1910 was a good indicator of the relative importance of the individual centres of the industry.

1. Ibid.
2. Ibid.
Summary.

Between 1876 and 1914 the most significant change in the woollen textile industry on the Polish lands of the Russian Empire was its rapid growth. At the same time the industry has been redistributed among the towns and villages by wide spatial contrasts in the rate and direction of change in the numbers of mills and workers. As the industry had grown the variety of its products had increased and some of the most virile growth points had been the towns, such as Częstochowa, Łódź, Sosnowiec and Zdunyka Wola, in which production had specialised upon one of the new products. Moreover the change in the industry from handicraft and workshop to mechanised production in mills was largely complete in the Kingdom of Poland by 1914 and the number and importance of the locations of small-scale production of this type had been substantially reduced.

In addition to these changes certain distinctively capitalist patterns of development had appeared in the distribution of the industry since 1876. By 1914 the mill industry was concentrated in a limited number of towns, of which the majority were the sites of several mills and the source of employment for several thousand workers, and which were dominated by the largest concentration of the industry in
Lodz. Each of the towns specialised in the production of certain types or qualities of yarn or cloth. Moreover, the growing dominance of Lodz after the mid-1880s and the appearance of large-scale mills in the western part of the Kingdom of Poland were accompanied by the neglect and absence of industrial development in the Bialystok region.

It was suggested in Chapter III that the patterns of change in the geography of the industry cannot be explained in the absence of a discussion of the location of the factors of production or of the markets for the products, and the most important of the factors which were influencing the locational decisions of entrepreneurs between 1876 and 1914 were discussed. In this chapter the distribution of the industry at the end of the period of growth in a capitalist environment has already been described. Now it is necessary to examine the extent to which the patterns of growth in the capitalist industry, which have been outlined above, had created and exacerbated spatial problems in relation to the supplies of raw materials and fuel for the industry by 1914 and had led to rising external diseconomies of production in those centres of the industry which the entry of new mills had confirmed so strongly since 1876.
The Location of the Industry in relation to its Factor, Raw Material and Product Markets about 1914.

The preceding description of the distribution of the industry about 1914 shows that the substantial growth since 1876 had been largely confined to the western part of the Kingdom of Poland. The expansion of the industry was achieved by large inputs of labour, management and capital, and it enlarged the industry's demand for raw materials and fuel and increased the industry's product. Much of the increase in the number of mills was achieved through the investment of western European capital and the immigration of entrepreneurs and skilled workers from Germany and Belgium. The much larger supply of unskilled labour continued to come from among the population of the Kingdom of Poland and the Bialystok region. On the other hand the increase in the output against the background of the concentration of production in a smaller number of important locations resulted in a widening of the raw material hinterland of the industry and a spatial expansion of the market area. Chapter II showed how the industry of 1876 had been located on the periphery of its markets. The enlargement of production and the consequent areal extension of both the search for raw material sources and for markets tended to aggravate this situation and create increases in the cost of transport. At the same time the concentration of the industry in a few towns led to congestion and to external diseconomies of production.
Sources of Capital and Management and the Ownership of the Industry about 1914.

The growth of the industry between 1876 and 1914 was largely achieved by the inflow of foreign capital and entrepreneurship in response to the favourable market conditions within the Russian Empire.\(^1\) A large part of the industry had been in foreign hands in 1876 and this situation had continued up to 1914, but foreign producers who had entered the industry after 1876 had preferred locations in the Kingdom of Poland to the Bialystok region. Manteuffel has shown that the German interest in the Bialystok region actually declined after 1876 and that by 1894 it was responsible for only a quarter of the mills and workshops.\(^2\)

In the Kingdom of Poland over 400 of the 540 units in 1914 were owned by foreign companies or by people of Teutonic name. Mills owned by foreigners entered the industry throughout the period after 1876 and were of all scales of production, but they included all except one of the eleven mills on the Polish lands which had been founded in the period and which

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1. See Table in footnote 1 on page 127.
employed more than 500 people in 1910.\(^1\) As the result
foreigners may have controlled as much as ninety per cent of
the labour force in the industry of the Kingdom of Poland by
1914.\(^2\)

The mills which were established by foreigners were usually
located in the older textile towns for all producers, whether
German or Polish, preferred the large and prosperous centres
to the risks of a greenfield location. Nevertheless the only
significant expansion into new locations in the period was
achieved by foreigners in Częstochowa, Marki, Sosnowiec and,
to a lesser extent, in Zduńska Wola, but the foreign interest
was restricted to the western parts of the Kingdom of Poland.
There was no substantial movement of foreign capital and
entrepreneurship into the woollen textile industry further
cast or in the Białystok region, where the industry was largely

1. A.B.S. Broka, *op.cit.* In 1897 127,000 Poles depended on the
woollen textile industry for their livelihood, including
the families of workers, according to Grabaki (*Rocznik
Statystyczny Krolestwa Polskiego* 1914, p.60, Warszawa
1915), and 62,700 Germans, whereas 39,500 Jews, whose
place of birth was not given and also 2,200 Russians
drew their living from the industry in the Kingdom of
Poland. These figures suggest that Germans formed a
large proportion of the workers on the mill floor in
addition to holding a dominant position among the
groups of mill owners and managers.

2. Russia, *Ministerstvo Finansov, op.cit.*
in the hands of Polish Jews. The western European industrialists appear to have settled as close to their homes as was compatible with their object of locating within the Russian Empire.

The Distribution of the Product Markets about 1914.

It was suggested in Chapter III that the growth of the industry on the Polish lands of the Russian Empire was closely connected with the increasing demand for woollen textiles in European and Asiatic Russia between 1876 and 1914. The industry not only maintained its share of the Imperial markets in the period, but succeeded in substantially enlarging its share of the total output of woollen textiles in the Empire. Fifteen per cent of the cloth which was consumed in the Empire in 1876 had been produced in the Polish lands and in 1910 42 per cent of the value of output of yarn and cloth was produced in the Kingdom of Poland.¹

The Polish share of the Imperial market had not grown equally in all sections of the industry. According to the weight of goods produced, Tennenbaum calculates that 36 per cent of the output of woollen yarn in 1910-1912 came from the Kingdom of Poland and 33 per cent of the woollen cloth, but that eighty per cent of the worsted yarn and 62 per cent of the semi-woollen cloth were produced in the Kingdom of Poland.²

¹ L. S. Kossuth, *op. cit.*, p.280. Imports of woollen goods in 1910 were only six per cent of the value of output of the industry in the Empire.

from 1876 to 1914 the Bialystok region's share of the value of output of the Empire, in contrast, did not increase and remained at about three to four per cent although following the decline in the quality of Bialystok cloth, its share of the output of the Empire by weight probably increased slightly.¹

The true extent of the Polish industry's dependence upon the markets in Russia was greater than its share in the output of woollen textiles in the Empire suggests, for the products of the Kingdom of Poland and the Bialystok region had become complementary to, rather than competitive with, the products of the industry in Russia since 1876. The best qualities of worsted and woollen cloth were imported into the Kingdom of Poland either from western Europe or from Russia, while producers in the Polish lands were specialising in the goods of poor and medium qualities and in the spinning of worsted yarn. In the years before 1914 the quality of Polish textiles had declined partly to combat increased competition from imports of German cloth and partly as the result of the substitution of waste and pulled rags for wool in the period when the Polish market was demanding increasing quantities of goods of superior quality. Sales of better quality Russian textiles in the Kingdom of Poland were large and growing in the years before

¹ Based on A. Krzyzanowski and K. Kumaniecki, *op.cit.*, p.177.
1914, and the share of Polish goods on sale in Russian markets also increased.¹

Rose suggests that Russian cloth accounted for two-fifths of the consumption of cloth in the Kingdom of Poland in the years from 1908 to 1911 and imported cloth for three to four per cent.² This estimate suggests that only about a quarter to a third of the output of the industry in 1913 was sold in the Kingdom of Poland and that all the balance of production was sold in other parts of the Russian Empire. The industry in the Bialystok region was selling its products almost entirely in markets to the east, northeast and southeast of the region, finding little opportunity for sales of its low quality goods in the Kingdom of Poland, and relying on the Russian market after the loss of much of the Far Eastern trade following the Russo–Japanese war.³

   H. Tennenbaum, op. cit., p. 288. Tennenbaum maintained that the producers on the Polish lands were not interested in the Polish market and neglected it.
   Kohn states that by 1918 the potential of production in the industry in the Kingdom of Poland was twice as great as the level of demand for woollen textiles there.
3. J. Pawlicka, 2 dzisień przemysłu woliżynnego w bielostockim okręgu wlokienniczym (XIX w.), p. 327, in Przegląd Wlokienniczy 1959, pp. 324-327, Łódź 1959. Sales of goods beyond the Russian Empire were very difficult and small in 1914 because the industry was paying tariffs on imported raw materials, and on exports of cloth.
Although producers in the Kingdom of Poland and the Bialystok region sold their products throughout the Empire, the most important markets were in the area of European Russia which lay nearest to the Kingdom of Poland. About a quarter of the cloth output of the Kingdom of Poland in 1913 was sold in central and northern Russia; a fifth was sold in the Ukraine and southern Russia, and fifteen per cent in Lithuania and Belarusia. Thus at least sixty per cent of the woollen textile output of the Kingdom of Poland was sold in European Russia. Only about a tenth of the cloth was sold in the more distant parts of the Empire in Caucasus, Siberia and southwest Asia.¹

Many of the large firms in 1914 sold much of their output in the Russian market. The distribution of the representatives, shops and warehouses of these firms in the cities of Russia about 1914, which is shown on Map 26 (on page 231), supports the estimate above of the importance of the markets in the western part of the Russian Empire to the Polish industry. The firm of J. Heinzel in Lodz, which owned one of the largest mills, was exporting seventy per cent of the output to Russia in 1913 and P. Rathe exported 95 per cent of the cloth which was woven in his mill in Lodz in the same year. Each of these

¹. Polska Narada Ekonomiczna, Prace, p.54, Warszawa 1919.
The map shows the number of representatives selling cloth in Russian cities on behalf of woollen textile firms in the Kingdom of Poland and the Białystok region together with the number of warehouses maintained in Russian cities by firms in the Kingdom of Poland and the Białystok region. Open circles represent the locations of woollen textile producers and crosses the locations of the representatives and warehouses.

Sources - D.P. Kandourov, Fabrično-zavodskija predprjatija Rossijskoj Imperii, Petrograd 1914
Russia, Ministerstvo Finansov i Ministerstvo Torgovli i Promyšlennosti, Spisok fabrik i zavodov Rossii 1910-g., Moskva, Petersburg, Warszawa
A.R.S. Sroka, Przemysł i Handel Królestwa Polskiego 1914, Warszawa 1914
REPRESENTATIVES
AND
WAREHOUSES
1910-1914

S SUPRASL
C CHOROSZCZ
B BIALYSTOK
M MARKI
W WARSZAWA
Z ZGIERZ
L LODZ
T TOMASZOW
O OPATOWEK
Zw ZDUNSKA WOLA
Cz CZESTOCHOWA

Lines not numbered - 1 Representative

0 0 200
miles kms
firms employed representatives or owned shops and warehouses in Russia and so did 22 of the other large firms in Lodz. Map 26 shows that 23 firms in Lodz were represented in Moscow, seventeen in St. Petersburg, twelve in Odessa, eleven in Kharkov and eight in Rostov-on-Don, and that a few were also represented in Kiev, Riga and some other cities. Sixteen of the firms were also represented, usually by warehouses, in Warszawa. The majority of mills in Tomaszow and Zgierz which sold cloth in Russian markets were also represented in Moscow and St. Petersburg, and others in Odessa and Kharkov. One mill in Tomaszow, which employed nearly a thousand people, sold only ten per cent of its product in the Kingdom of Poland before 1914. Ninety per cent was sold in Russia and the Far East. Five of the largest firms in the Bialystok region were represented in St. Petersburg and four in Moscow, after which Kharkov and Riga were the most important cities, but these details of representatives and warehouses omit all the independent merchants who bought Polish cloth from the smaller firms and subsequently retailed it throughout the Russian Empire.

2. A.R.S. Stoka, op.cit.
Thus the distribution of the representatives of the large firms shows that the chief markets for Polish textiles were in the southwest, central and northwest areas of the Empire and that these areas were probably served from Moscow and St. Petersburg in the north, and from Kharkov, Kiev, Odessa and Rostov in the south. Several of the representatives and warehouses in Kharkov and Rostov were involved in the sales of Russian wool, and the importance of these cities in the distribution of sales of cloth was probably not as great as the number of representatives and warehouses suggests. The distribution of representatives of the industry in the Bialystok region suggests that the chief markets for Bialystok cloth were still those to the northeast around Riga and St. Petersburg, and also along the railway to Moscow.

The distribution of the representatives of the large worsted spinning firms indicates their dependence upon sales in a number of centres and regions of the weaving section. Whereas firms producing cloth were only represented in Warszawa on the Polish lands of the Empire, three of the five worsted spinning mills employed representatives in Moscow, the largest centre of the woollen textile industry in the Empire after Lodz, but two were represented in Warszawa and two in Lodz.
In addition to the sales by the large firms much cloth was sold by merchants or directly by firms without representatives or shops in areas outside the chief cities. The most important of the markets for the industry were in the western part of the Empire. Much of the area to the northeast, east and southeast of the Kingdom of Poland, including Lithuania, Polesie and Ukraine, was historically and linguistically connected with Poland having been a part of Poland before 1772. Sales of cloth in these areas were probably easier than in the areas of Russian culture, greater poverty and more scattered population, which lay further to the east. Moreover these areas lay between the chief centre of the Russian woollen textile industry in Moscow and Lodz, whereas the other parts of the Empire all lay closer to Moscow than to the Kingdom of Poland, and the high rail tariffs on Polish goods increased the advantage of the Moscow manufacturers in areas which were relatively distant from Lodz. In the lands which lay between Lodz and Moscow, the rail tariffs were less of a handicap for producers in the Kingdom of Poland, and the southwestern areas of the Empire were also almost equidistant from the Moscow and Lodz groupings of the industry.

The woollen textile industry in both the Kingdom of Poland and the Bialystok region was producing predominantly for distant

1. Polska Naroda Ekonomia, op.cit., p.54.
markets by 1914. Much cloth was sold locally by small-scale producers to merchants who subsequently hawked their wares throughout the Empire and of whose influence upon the size and distribution of the demand for Polish cloth little is known. However to the extent that the large-scale producers in Lodz, Tomaszów or Biłystok maintained separate shops and warehouses, and employed representatives in other cities in the Empire, they acknowledged that alternative locations had been available for their mills which would have been closer to the product markets, but that other factors than proximity to markets had weighed more heavily in location decisions.

The Distribution of Supplies of Raw Materials about 1914.

If the industry was not located close to its markets, neither was it close to the sources of raw materials or fuel in 1914. Even in 1876 wool had been brought from southern Russia and a little from western Europe to supplement the supply of Polish wool, but by 1914 the output of Polish wool was negligible in relation to the demands of the industry in the Kingdom of Poland and the Biłystok region at 70,000 pud per annum, and it was only used in the heavy woollen mills producing goods of relatively high quality in Opoczów and Tomaszów.

Most of the wool was brought long distances to the mills. In 1910 Lodz received 1,216,000 pud of wool by rail and in 1911 805,970 pud of foreign and 146,785 pud of Russian wool. At the same time the substitution of rags for wool had led to a dependence upon western Europe for the second raw material of the industry. Rags were imported into both the Lodz and Bialystok regions from distant sources of supply and in 1910 662,000 pud of rags entered Lodz by rail.¹

Russian wool from Rostov, Kharkov and Belgrad was used in the spinning of woollen yarns and it was mixed with woollen and cotton waste to produce low quality semiwoollen cloth.² However the supply of Russian wool, which the protective tariffs from 1877 onwards had attempted to foster, had been declining as arable agriculture replaced nomadic and pastoral forms of economy between 1876 and 1914. In this period the number of sheep in the Kingdom of Poland fell by three-quarters and in the Empire as a whole by over a quarter.³ The wool supply of the Empire had not been adequate to meet the demands of the industry as early as 1887 and manufacturers were obliged to turn increasingly to the finer imported wool from the southern hemisphere in the years before 1914 which was treated

³ M. Lewy, Życie ekonomiczne Królestwa Polskiego, p. 92, Warszawa 1915.
spinners had been using throughout the period. In 1911
1,519,000 num of wool was imported into the Kingdom of Poland
from abroad and 465,000 num of Russian wool was used. Two-
thirds of the imported wool was washed, but only half of the
Russian wool, so that the actual dependence on imported wool
was rather greater than these figures indicate. Another
estimate gives the total consumption of wool by the industry
in the Kingdom of Poland in 1914 as 33,400 tons, of which
27 per cent came from Russia. Most of the imported wool
centered Europe through the German North Sea ports, where
heavy port dues were levied, and its journey across Prussia
by rail increased the cost of supply still further, while
Russian producers were able to import wool directly through
Russian ports and so avoided these expenses. By 1914 the
industry on the Polish lands, which had originally depended
upon local supplies, was buying its wool and rags from
increasingly distant sources, and it had come to depend for
the bulk of its supply on imported wool or rags on which
it paid import tariffs.

Few of the mills had been mechanised in 1876, but by 1914
over seventy per cent of the mills were using steam power.

1. Dziennik Łódzki, 13 kwietnia 1837r.
3. H. Gliwic, Przemysł i handel Polski i wielka wojna, in
Polska w czasie wielkiej wojny, ed. M. Handoleman,
including all the large mills. Only four of the mills were within 200 kilometres of the coalfields of Sosnowieco and Upper Silesia, and in 1912 the woollen textile industry in the Kingdom of Poland consumed 454,200 tons of coal and coke at an average of 1,113 tons for each mill which used steam power. In the same year the mechanised mills in the Bialystok region consumed 45,000 tons at an average of only 350 tons per mill. The railway had enabled large quantities of coal to be brought to Lodz and Bialystok throughout the period, to Tomaszow and Grodek from 1886 onwards, and to Kolice, Opatowek, Fabianice, Zdunska Wola and Zgiers from 1903, but in all cases fuel was the heaviest item in the raw materials which were consumed and was a considerable element in the cost of transport. Lodz, for example, was obliged to draw a third of its supply in 1914 from the Upper Silesian coalfield in Germany and two-thirds from the Dabrowa field around Sosnowieco.

In view of the fact that the industry had been created very largely by inflows of foreign capital and management into the Polish lands since 1876, the favourite choices of location of Lodz, or even Bialystok, Fabianice or Zgiersz, must have

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1. Polska Narada Ekonomiczna, op.cit., p.33.  
2. Based on Ibid.  
possessed substantial attractions to offset the growing costs of the transport of fuel, raw materials and finished products. Chapter III indicated that considerable external economies were available to producers in these towns arising out of the existence of a well-developed industrial structure, merchanting facilities and ancillary trades, and that these tended to reduce the cost of production for those firms which located in the towns and especially in Lodz. However the external diseconomies of the locations in and around Lodz, though not in the Bialystok region, had been increasing as the industry had grown since 1876. Not only were the sources of raw materials and fuel in 1914 and also the product markets further away from the mills than they had been in 1876, but the cost advantages of the large centres of the industry were disappearing.

The demand for water in the watershed area of Lodz and the surrounding towns had increased rapidly with the growth of the textile industry and had threatened a shortage as early as 1884. Firms were unable to meet their needs from surface supplies, which became increasingly polluted, and were obliged to sink boreholes or to send cloth out of the area to be finished in Tomasnow on the Pilica river.¹ Wool washing had

¹ Dziennik Lódzki, 18 kwietnia 1884r.
W. Jajohrsek, Przemysł Kluczowy Tomasza Waławeckiego, p.29, Praca Magisterska KOB UL 1957, Typescript.
been established out of Lodz in Strykow by 1914 and a canal from either the Eura or Pilica rivers into Lodz had been suggested to overcome the water shortage. At the same time as new mills were being built in the existing centres, supplies of water of good quality were available in many other parts of the Empire which were closer to the chief markets for textile goods, to the coalfields and to the wool markets.¹

Labour mobility, which was the product of the rural poverty in some of the areas which were neglected by the industry, ensured that an adequate supply of workers was always available in the textile towns. The higher labour productivity and the constant supply of skilled labour in the mill towns reduced the incentive to firms to locate their mills in other parts of the Kingdom of Poland or the Empire where labour accounted for a large proportion of the costs of production. However about 1900 labour in the large industrial concentrations became politically conscious on a large scale for the first time and labour disputes and political strikes seriously affected production from time to time after that date, and the labour difficulties tended to raise the cost of production in the large textile towns.

¹ At the outbreak of the first World War and before the German invasion of Russia the possibility of moving some of the textile industry into Russia was considered. The suggested location was Odessa, a port close to supplies of wool and easily supplied with coal and imported raw materials, which was close to the markets for textiles in southern and central Russia. (I. Jakubowica in Przeglad Techniczny 1915, p.301, Warszawa 1915).
Summary.

In 1876 there was some evidence that the distribution of the industry in relation to its sources of raw materials, fuel and markets was not the optimum, but it appears that by 1914 the capitalist pattern of agglomeration and the growth of the industry had made the location of a large part of the industry even more inefficient. The growing costs of production in Lodz were not reflected in a stagnation of the industry there or in the transfer of growth to any of the other textile towns before 1914, and the industry not only continued to grow, but to account for an increasing proportion of the output of woollen textiles in the Russian Empire after 1900.¹

¹ The continued growth of the industry on the Polish lands and the continuing concentration of the woollen textile production of the Empire in the Kingdom of Poland after 1900 can only be explained by the facts that the competing centres of Moscow, Simbirsk gubernia and Tambovskaya gubernia did not occupy locations in which the costs of production were markedly lower and that those branches of the industry were less efficient in their methods of production. The proportion of the woollen textile production of the Empire which came from the Kingdom of Poland grew between 1900 and 1912 as follows (in percentages of the total) —

(Continued)
(Footnote 1 continued from previous page)

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<th></th>
<th>1900</th>
<th>1908</th>
<th>1912</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of output</td>
<td>42</td>
<td>41.5</td>
<td>42</td>
</tr>
<tr>
<td>Weight of output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woollen yarn</td>
<td>27</td>
<td>31</td>
<td>36.2</td>
</tr>
<tr>
<td>Worsted yarn</td>
<td>76</td>
<td>76</td>
<td>80.2</td>
</tr>
<tr>
<td>Heavy woollen cloth</td>
<td>21</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Semiwoollen cloth</td>
<td>40</td>
<td>65</td>
<td>62</td>
</tr>
</tbody>
</table>

1. in 1910
2. average for the years 1910, 1911 and 1912.

Sources - W. I. Czary (ed.), *Statystyczki Jezycznik*, Petersburg 1914, p. 206
S. Koszuth, in *Przeglad Techniczny* 1915, p. 260
V. Varzar, (ed.), *Statystyczeskie svedenia po obrabatvajuscoej fabrienco-zavodskoi promyshlennosti Rusakoj Imperii za 1908 god*, Petersburg 1912.

The constant proportion of the value of output reflects the increasing specialisation of the industry in the Kingdom of Poland upon the production of low quality cloth with substitutes for raw wool.

Producers in Moscow in 1911 paid almost as much to bring wool by rail from Rostov as producers in Lodz. S.A. Kempnor (Dzieje gospodarcze Polski porozbiorowej, p. 220, Warszawa 1924) gives the cost as 46.38 copeka per pud to Moscow and 48.78 to Lodz, but in 1898 L.P. Brandt (Kapital zagraniczny w przemyse, Petersburg 1898-1901) gave the figure of 57 copeka from Rostov to Lodz against 34.9 to Moscow. On the other hand Lodz lay much closer to the Dabrova and Upper Silicen coalfields than Moscow did to the Doniecki basin.
Conclusion upon the Growth of the Industry under Capitalism

Despite the considerable growth of the woollen textile industry between 1876 and 1914 on the Polish lands of the Russian Empire, important concentrations of mills and employment were fewer in 1914 than at the beginning of the period. Most of the expansion had been concentrated in a small number of towns and little had been located in other parts of the country. The specialisation of production in the few important centres which had existed in 1876 had been strengthened, and the new centres which had developed since 1876 also possessed distinctive specialist products of which the most important were semi-woollen cloth and worsted yarn. A wider variety of scales among the mills and of combinations of the processes of production existed in the chief textile towns of 1914 and many mills were dependent upon the services or products of others at some stage from the washing of wool to the finishing of cloth. The processes of agglomeration and the vertical disintegration of production, which typified the individual and private character of capitalist industrial development, had been strengthened since 1876, but the agglomeration of the industry had obliged firms to draw their supplies of raw materials and fuel from increasing distances, to bear the increased costs of selling in more distant markets,
and to incur higher costs in obtaining the necessary supplies of water and labour in the textile towns.

After forty years of growth the industry on the Polish lands was more concentrated in location, more varied in scale, structure and output, and probably more inefficiently situated than in 1876. In an environment which caused periodic excesses of demand over supply and alternating periods of depressed demand, unemployment of workers and plant and a consequent waste of resources, the capitalist organisation had contrived to concentrate the industry in towns in which the costs of production were rising while supplies of labour, water and transport in other parts of the country were permanently underemployed and underpaid. While the scale and number of mills and the level of employment grew in a limited area of the Kingdom of Poland much of the Polish lands, and of the whole Empire, remained backward, rural, poor and unindustrialised.

The distribution and structure of the industry in 1914 was the result of the search by many individuals in central Europe for private profit through the manufacture of textiles. After 1914 the economic environment deteriorated and the industry was faced with the need to preserve the profitability of existing investments in mills and plant. This study now turns to an examination of the development in the geography of the depressed industry of the 1930's.
CHAPTER V

THE WOOLLEN TEXTILE INDUSTRY IN POLAND ABOUT 1937.

Hitherto the description of the geography of woollen textile manufacturing has been undertaken in the context of a capitalist economic environment and of a long-run growth in the industry. The processes of change in the distribution and scale of the industry which occurred between 1970 and 1914 were outlined in Chapter III, and in Chapter IV the extent to which these processes had progressed by 1914 was analysed. Chapter V extends the study of the geographical pattern of the industry in a capitalist environment by describing how the variety of the scales of production among the mills of 1914 was matched in 1937 by a variety of structure and how, in addition to the growing concentration of the industry in a few important centres before the first World War, a complex pattern of specialisation by industrial structure and product had developed among the textile towns by the late 1930's. This chapter also considers the changing geographical pattern of the capitalist industry between 1927 and 1938 against the background of an unfavourable economic environment and in the context of a long-run contraction in the number of mills and of the levels of employment and output. But first it is necessary to outline the major contrasts between the area and status of the Kingdom of Poland.
of 1914 and the state of Poland after 1919 and between the economic environment of the two periods as they affected the woollen textile industry.

Contrasts before and after the First World War

The description of the woollen textile industry in previous chapters has been in the context of the Polish lands of the Russian Empire, but after the First World War an independent and enlarged Polish state was established. The location and size of the state are shown on Map 27 (on page 248), and the contracts between the Polish state of the inter-war period and the former Kingdom of Poland are shown in Maps 1, 1b, and 1c (on page 34).

The achievement of independence altered the economic environment of the woollen textile industry in two important respects. Whereas the boundary between the Kingdom of Poland and Russia before 1914 had been only a division between administrative units within the Russian Empire, the method of establishment of the Polish state and of its eastern boundary in particular after 1919 created hostile relationships between Poland and Russia throughout the inter-war years. Whereas the boundary before 1914 between Poland and Russia had been open, the inter-war frontier was firmly closed.

The closing of the Russo-Polish frontier between the wars covered the Polish industry from a large part of its
MAP 27  Poland in 1937
traditional markets. Despite the annexation of a large strip of territory from Russia in 1919-1921 probably over half of the markets of the industry had been lost, and the complementary curtailing of the imports of Russian cloth into Poland was of little immediate assistance to the Polish industry because of the wide differences in quality between the products of the two industries.\(^1\) As the result of the loss of the Russian market the Polish industry suffered from over-capitalisation during the inter-war years, which it found impossible to cure, and from old fashioned plant and buildings, which it could not afford to replace.

The second important change in the economic environment which resulted from the reunification of Poland in 1919 was the addition of not only the Bialystok region to the former Kingdom of Poland, but also of the Bielsko-Biala concentration of woollen textile mills. Maps 1a and 1b show that the Bielsko-Biala branch of the industry had developed within the Austro-Hungarian Empire, where it had specialised in the production of woollen cloth of high quality. The industry in the town and its environs had developed in an economic environment which had been similar to that in the Russian Empire. The market conditions had been favourable in the

\(^1\) See the discussion of the location of the markets for Polish cloth in Chapter IV.
late nineteenth century, encouraging the growth of the industry, and the capitalist organisation had resulted in the concentration of the industry in Bielsko-Biała and in its disappearance from many other parts of Galicia.

Notwithstanding the changes in the state of Poland and in its government the capitalist form of control and organisation in the industry, which had existed before 1914, continued throughout the inter-war period, and the industry continued to be composed of a large number of private mills. In previous chapters the influence of the capitalist environment upon the growth of the industry was discussed and particular attention was paid to the changing patterns of the distribution and scale of production. In this chapter a closer examination is made of the composition of the industry and of the variety of scales of production which were discussed in the previous chapter. This examination proceeds through a description of the characteristic scale of production among the mills which undertook each of the processes of production in the Lodz, Bialystok and Bielsko-Biała regions, and of the patterns of distribution of mills which undertook each process or group of processes in the Lodz region in 1937. Moreover the more detailed sources of information permit a more accurate description of the contrasting specialisations in production.
which had developed among the textile towns in the capitalist environment. These sources also allow a more accurate assessment of the extent of the vertical integration of production than could be attempted for the industry in 1914, and of the consequent degree of interdependence between mills and the strength of the cost factors which favoured the concentration of mills.

Despite the continuing capitalist form of organisation in the industry an important reversal of economic fortunes occurred between 1914 and the inter-war period. The years between 1876 and 1914 had formed a period of long-run growth in the industry of the Lodz and Bialystok regions and also in Bielsko-Biala, but between the wars the changing geography of the industry must be discussed in the context of a long-run depression in the demand for woollen textiles. As the entrepreneurs had reacted to the favourable economic conditions before 1914, so between 1914 and 1939 they attempted to grapple both individually and collectively with the unfavourable market environment. Between 1914 and the boom of 1928 the number of mills and the levels of employment and output fell, and they were even lower in the most prosperous years of the following trade cycle in 1937 and 1938. The influence of this environment upon the developing geographical pattern of the industry will

1. For a discussion of the available source materials for the late 1930's see Note C on page 498.
be examined in detail in the second part of this chapter, but first the distribution of the industry will be analysed for the year of 1937.

**The Distribution of the Structure and Production of the Industry about 1937**

Three major regional groupings of the woollen textile industry existed in Poland about 1937. The Lodz region was the most important according to the number of mills, employment and output. It was also the most extensive in area and the least concentrated in location, including Osorkow, Fabianice, Tomaszow and Zgierz, besides the city of Lodz, and also the group of mills in Czestochowa and Sosnowiec which were closely connected with the other towns of the region. The two other concentrations of the industry were located in the towns and environs of Bialystok and Bielsko-Biala. They were both smaller in area, more concentrated in location, and of lesser importance in terms of mills, workers and output than the Lodz region.

Each of the three groupings was characterised by a particular structure, and specialised product, a large degree of independence both in raw material supplies and in markets and by a clear spatial separation from the other two groupings. The Bialystok and Lodz regions included the same centres of the industry as the Bialystok region and the Kingdom of
The area of each open circle is proportional to the number of mills in the town or village which is indicated within each circle.

Source — Rocznik Polskiego Przemysłu i Handlu 1938, Warszawa 1939.
Poland in 1914. Only a few mills existed in other parts of the country away from the three regions, and these mills were scattered in isolated locations which were of minor importance in the overall distribution of the industry about 1937.

Contrasts in the Distribution and Structure of the Industry in the Lodz Region.

The distribution of mills on Map 28 (on page 254) shows that the dominance of Lodz among the textile towns of the Lodz region in 1937 was very similar to that in 1914. 73 per cent of the mills in the region were located in Lodz. However Map 29 (on page 257) indicates that the same degree of dominance did not extend to every section of the industry. The distribution of mills according to the number and type of processes performed in each on Map 29 reveals that some of the minor centres of the region were more important than the crude numbers of mills have indicated because these towns specialized in the production of certain types of woollen textiles and had distinctive structural patterns among the mills.

Map 29, which shows the distribution of mills and the employment in each mill in 1937 in the Lodz region, demonstrates that the largest mills were those spinning worsted yarn and

1. Another source, which is illustrated in Map 29, gives the number of mills in Lodz in 1937 as 119 and the proportion of the mills of the region in Lodz as 66 per cent. See Note C on page 498.
MAP 29  Woollen Textile Mills in 1937 - Lodz Region

The open symbols represent mills employing fifty or more workers. The area of each open symbol is proportional to the number of workers employed in each mill. Symbols representing the same number of workers in any of the four types of mill are of the same area. The mills with the largest labour forces are numbered and are as follow -

<table>
<thead>
<tr>
<th>Mill Number</th>
<th>Owner or Firm</th>
<th>Number of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Allart Rousseau</td>
<td>1,940</td>
</tr>
<tr>
<td>2</td>
<td>H. Dietel</td>
<td>1,670</td>
</tr>
<tr>
<td>3</td>
<td>Tow. Akc. Przemyslu</td>
<td>1,540</td>
</tr>
<tr>
<td>4</td>
<td>Union Textile</td>
<td>1,500</td>
</tr>
<tr>
<td>5</td>
<td>K. Eisert</td>
<td>1,195</td>
</tr>
<tr>
<td>6</td>
<td>Union Textile</td>
<td>970</td>
</tr>
<tr>
<td>7</td>
<td>Union Textile</td>
<td>900</td>
</tr>
<tr>
<td>8</td>
<td>C.G. Schon</td>
<td>860</td>
</tr>
<tr>
<td>9</td>
<td>K. Kohn</td>
<td>755</td>
</tr>
<tr>
<td>10</td>
<td>Allart Rousseau</td>
<td>560</td>
</tr>
<tr>
<td>11</td>
<td>Sp. Akc. Piotrkowskiej</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td>Kanufaktury</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>F.W. Schweikert</td>
<td>470</td>
</tr>
<tr>
<td>13</td>
<td>S. Barcinski</td>
<td>470</td>
</tr>
</tbody>
</table>

Sources – APL, Izba, No. 4-34
Izba Przemyslowo-Handlowa w Socnowcu, Sprawozdanie 1937,
pp. 258-260, Socnowiec 1938
Rocznik Polskiego Przemyslu i Handlu 1938, Warszawa 1938
those with a complete cycle of the four basic processes of textile production. Those two groups included the mills with the largest numbers of employees, spindles and looms. The average employment in the worsted spinning mills in December 1937 in the region was 844, and 324 in the full-cycle mills. Map 29 also shows that, despite the overall dominance of the region by Lodz, only six of the fourteen worsted spinning mills in the region were located in the city. Also only four of the mills with a complete cycle of production were located in Lodz while seven were in Tomaszow.

Lodz did not dominate the region in the distribution of worsted spinning mills in 1937 and the mills which were located in the city were not the largest in the worsted spinning section, with the exception of the mill belonging to Allart Rousseau, which employed 1,940 people. H. Dietel of Socnowiec employed 1,670, Tow. Ako. Przemyslu Wloknietego of Czestochowa employed 1,540, and the Czestochowa and Lubliniec mills of the Union Textile together had a labour force of approximately 2,500. Apart from Allart Rousseau none of the other worsted spinning mills in Lodz employed more than a thousand people in 1937 and four of the mills only employed between 200 and 400 people each. As the result only 4,400

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1. Based on details published in Rocznik Polskiego Przemyslu i Handlu 1938, Warszawa 1938 and from Archiwum Państwowe w Łodzi (APL), Izba Handlowa-Przemysłowa w Łodzi, No.4-34.
people, or 37 per cent of the employees in the worsted spinning section of the region, were employed in Lodz while Czestochowa and Sosnowiec shared 44 per cent of the employment. The worsted spinning mills in Fabianice, Piotrkow and Tomaszow also employed fewer workers than the average for this section, but the mills in Fabianice and Tomaszow were still among the largest in the industry in those towns. The distribution of the spindles in these mills followed the pattern of employment very closely. Only 36 per cent were to be found in Lodz while 24 per cent were installed in the mills in Czestochowa and seventeen per cent in Sosnowiec. None of the mills in the other centres accounted for more than ten per cent of the spindlesage of the region. 1

Worsted spinning was widely scattered among the textile towns of the Lodz region in 1937 and included a variety of scales of mill, although all the mills in this group tended to be large. Lodz was the most important centre according to the number of mills, workers and spindles, but the city did not dominate the section to the same extent as it dominated the industry as a whole in the region and it was only the largest of three important concentrations of worsted spinning in the region.

1. Based on Rocznik Polakiego Przemyslu i Handlu 1938, and APL, Inba, No.4-26.
Although the majority of the mills with a full cycle of production were located in Tomaszow in 1937, the largest mills in this section and 63 per cent of the employment was in Lodz. The average number of workers in the mills in Tomaszow was 190, while in Lodz it was 560, but only the mill belonging to K. Eisert in Lodz, which employed 1,200 people, had a labour force in excess of 600. Lodz also dominated this section in the distribution of spindles and looms, despite the fact that a minority of the mills were located in the city. About sixty per cent of the installed capacity was in Lodz in 1938. Each mill in the city had an average of 9,990 woollen spindles and 177 looms in contrast to the averages of 3,710 spindles and 72 looms in the mills in Tomaszow. The two largest mills in this group, which were both located in Lodz, contained about 14,000 spindles and 200 to 300 looms each.¹

The importance of the mills in those two structural groups to the distribution of the whole industry was far greater than their numbers suggest. The capacity of the mills was larger in all the processes of production on average than among the groups of woollen spinning and/or weaving mills. The average worsted spinning mill had about 20,900 spindles while the average woollen spinning mill had

¹ Based on APL, Izba, No.4-26.
only 2,560 spindles. 43 looms were installed on average in each weaving mill in 1938, but the average full-cycle mill possessed 5,990 woollen spindles, 110 looms, and also the processes of dyeing and finishing. These differences in the capacity for production were reflected in employment. The average number of employees in the single-process woollen spinning or weaving mill was only about fifty in contrast to over 300 in the full-cycle and over 800 in the worsted spinning mills.¹

It may be seen from Map 29 that the dominance of Lodz over the other towns in the region was most marked in the groups of mills which undertook either the spinning or weaving of woollens or both. Mills with both spinning and weaving processes were of intermediate scale between the groups of few, but very large mills, and the groups of small and very numerous mills. The average employment among the spinning and weaving mills in 1937 was 150 and the average capacity in 1938 was 2,400 spindles and seventy looms. All except two of the eighteen mills in the group and two per cent of the employment were located in Lodz.²

Lodz also enjoyed a dominant position among the groups of the small-scale woollen spinning mills and woollen and semiwoollen cloth weaving mills in the Lodz region.

¹ Based on Rocznik Polskiego Przemysłu i Handlu 1938, and APL, Izba, No. 4-26.
² Based on APL, Izba, No. 4-26.
87 per cent of the employment and 75 per cent of the spindles in the woollen spinning mills were in Lodz. Map 29 shows that the dominance of the city was less marked among the weaving mills and Fabianice and Zgierz also accounted for substantial numbers of the mills in this group. Over half of the employment and looms in the single-process weaving mills were located in Lodz, and 22 per cent of the workers and thirty per cent of the looms in Fabianice.¹

Thus Lodz dominated the region most completely only in those groups of mills in which the average number of employees was lowest, but Map 29 shows that every structural group of mills was represented in Lodz and that the largest labour forces in each group were to be found in the city in 1937. The industry in Lodz in that year employed 13,560 people, or 56 per cent of the total of 24,230 in the region. 95 of the 119 mills in Lodz undertook only one process of production, but Map 30 (on page 264) shows that single-process spinning and single-process weaving mills only accounted for twelve and sixteen per cent of the employment in Lodz respectively. The sixteen spinning and weaving mills, in contract, employed nineteen per cent of the workers and the six worsted spinning mills almost a third of the labour force.

None of the other towns in the region possessed such a breadth of structural variety. The industry in Czestochowa,¹

¹. Ibid.
MAP 30  Employment in 1937 in the Lodz Region

The areas of the circles are proportional to the number of workers in the woollen textile mills in each town.

Sources — APL, Izba, No. 4-34
Rocznik Polskiego Przemysłu i Handlu 1938, Warszawa 1938
EMPLOYMENT IN 1937 IN THE LODZ REGION

Proportion of the number of workers in -

- FULL-CYCLE MILLS
- SPINNING AND WEAVING MILLS
- WORSTED SPINNING MILLS
- WOOLEN SPINNING MILLS
- WEAVING MILLS

Number of workers

? Exact number unknown
• Less than 50 workers

LODZ 13,562

SCALE 1:1,000,000
Lubliniec, Piotrkow and Sośnowiec was only composed of large-scale worsted spinning mills, and in both Pabianice and Zgierz the vertically disintegrated structure of the industry only included representatives of two of the groups of mills. In Zgierz there was no worsted spinning and no multi-process mill. In Pabianice no woollen yarn was spun in 1937 and in Ozorkow and Zduńskie Wola only one of the processes of production was represented. Without exception the mills in all four of these towns only undertook one process of production each in 1937.

The structure of the industry in Tomaszów was similar to that in Lodz for a greater degree of vertical integration of production existed in some of the mills and a wider range of the processes of production in general existed in the town than in the other lesser centres of the region. Map 30 shows that almost three-quarters of the employees were attached to the full-cycle mills in the town and that the worsted spinning mill employed nineteen per cent of the workers while a few people were employed in several small-scale weaving mills. A larger proportion of the labour force in Tomaszów was employed in vertically integrated mills than in any of the other centres of the region.

In Chapter IV the description of the variety and distribution of the scales of production among the textile mills in the Lodz region was summarized in a comparison of
the average scale of production in each town. This method produced a pattern which showed that, with the exception of the specialist worsted spinning towns, the scale of production tended to be largest in the centres in which the industry had become concentrated during the late nineteenth century and also in the towns where the industry had been long established. As the result of the preceding description of the distribution of the structural groups of mills in the Lodz region in 1937 it is now possible to supplement this comparison of the average scales of production among the towns of the region by summarizing the variety of structures which existed among the mills in 1937 and relating their distribution to the average scales of production.

The average numbers of employees in the mills in each town varied from over a thousand in Czestochowa and Sosnowice to 36 in Zgierz, but it appears that towns in which worsted spinning mills existed generally had a high average number of employees in the mills, while towns in which the industry was composed largely of the other groups of single-process mills tended to have small labour forces. In Zdunyka Wola and Pabianice the average mills employed between ninety and a hundred people in 1937 and in Lodz the large number of single-process mills depressed the average to about 125 people in
each mill. In view of this pattern it is surprising that the average scale of the mills in Tomaszow, in which full-cycle mills were so numerous, was not larger than 115 in 1937.

The structural composition of the industry in the individual centres was also reflected in the differences between the general distribution of mills and employment in the region in 1937. The towns in which most of the mills undertook only the spinning and weaving of woollens accounted for a smaller proportion of the regional employment than of the mills. Ten per cent of the mills were located in Zgiers in 1937 and seven per cent in Fabianice, but less than two per cent of the workers were employed in Zgiers and only five per cent in Fabianice. Lodz accounted for two-thirds of the mills in the region, but only 56 per cent of the employment and Tomaszow also had fewer of the workers than of the mills, despite the vertically integrated structure of production in the town. In contrast to these towns the four mills in Gzentochowa and Sosnowiec employed 22 per cent of the regional labour force.

Contrasts in the Specialisation of Production among the Towns in the Lodz Region

The foregoing description of the contrasts in the structure of the industry among the centres of the Lodz region showed that all the mills in each centre produced yarn or cloth
or both products. The specialisation by industrial structure among the towns of the region was accompanied by a specialisation of production which was based upon the division between spinning and weaving towns, but which was also a specialisation among the centres in the production of a number of types of yarn and cloth of varying raw material content and quality. The description of the structure of the industry above also hinted strongly that, despite the specialisation of structure among the centres, several of the towns in the Lodz region either depended upon producers in other parts of the region for some of their supplies of raw materials or for the sale of semi-manufactured goods. The producer's freedom of entry into the industry and the variety of structure, which was associated with this freedom and also with the technical possibility of vertically disintegrating the processes of production, had failed to create an overall balance between the productive capacities of the mills in even the chief centres of the region by 1937, and a complex pattern of interdependence between the firms and towns of the region had been created.

45 per cent of the worsted yarn of the region was produced in towns in which no other section of the woollen textile industry existed.¹ The mills in Czestochowa, Lubliniec,

¹ Based on Główny Urzad Statystyczny (GUS), Statystyka Przemysłowa 1937, p.136, Warszawa 1938 (Statystyka Polski, Seria C, z.97).
Piotrkow and Sosnowice sold almost all their yarn in other centres, or in the Bielsko-Biała region, or in foreign markets, and most of the yarn from these centres was not dyed, but was sold raw, because in that state its further use was more flexible and its range of markets was wider. It has been suggested in Chapter III that the large-scale worsted spinning mills required to make sales in a large number of weaving towns in order to dispose of their output and that, as the mills could not be located close to all their markets, other cost factors affected their location to a greater extent and drew them to sites at a considerable distance from the weaving mills in Poland. However it was noted in Chapter III that a substantial part of the worsted spinning section was located in its chief market of Lodz and in 1937 another 45 per cent of the regional output of worsted yarn was spun in the town, but only about a quarter of the regional output was consumed there.¹ Production also exceeded the local demand in Tomaszow where 354 tons of worsted yarn were spun in 1937, but only 37.4 tons were consumed.² The complementary situation, in which demand exceeded the local supply, existed in Zgiers, where mills drew their entire supply of worsted yarn from other towns, and only in Fabianice were the local supply and

¹ Based on APL, Izba, No.4-26.
² Ibid.
demand for worsted yarn in balance. ¹

According to the detailed returns for each firm for 1937, the supply of worsted yarn throughout the region exceeded the demand by about 4,580 tons, but this figure is certainly too high. ² About a third of this weight of yarn was exported and some was used in the Bielsko-Biała region, where a deficit of yarn production existed. 290 tons were added to stocks in 1937 and a little was supplied to weaving mills in the woollen and other branches of the textile industry in many other parts of the country.³ Although worsted yarn was used widely among the centres of weaving in the Lodz region most of the yarn was spun in one town and subsequently consumed in another.

Complete vertical disintegration between the spinning of worsted yarn and the weaving of cloth in the region was accompanied by a frequent and considerable spatial divorce between the places of production and consumption. Moreover although worsted yarn was frequently used in conjunction with woollen yarn, thus creating a system of joint demand, it has already been shown that complete horizontal disintegration existed between worsted and woollen spinning in the Lodz region in 1937.

1. There is no indication that the worsted spinning mill in Pabianice worked primarily to supply the weaving mills in that town, or indeed that this situation was true in the case of any of the worsted spinning mills. It was, however, true of much of the woollen spinning section.

2. Based on APL, Izba, No.4-26.

3. GUS, op. cit., pp.102-103.
The description of the structure of the industry above has already shown that a considerable degree of vertical integration existed between woollen spinning and weaving in the Lodz region, but much woollen yarn was also spun in single-process mills. The woollen spinning mills were of much smaller scale than the worsted spinning mills, more numerous, and were more closely tied to their markets. This section was also potentially more flexible in its response to the distribution and quantity of the demand for its product, but surpluses of woollen yarn production above the levels of local demand were still produced in Lodz, Ozorkow, Tomaszow and Zgierz in 1937. Despite the numerical dominance of weaving over spinning mills in Lodz and Zgierz, the spinning mills in these towns appear to have worked to a large extent for other centres of the industry. Some of the surplus of production from these towns was used in the woollen and cotton weaving mills in Fabianico and the domestic weaving industry in Lodzkie wojewodztwo.

The single-process mills either spun yarn in advance of demand from their own raw materials for sale to weaving mills or spun the yarn on commission to the orders of weaving mills or merchants and with their own raw materials. In the multi-process mills the yarn was usually spun to meet the needs of the weaving section, but even here some was produced on
commission for other firms. The spinning and weaving mill of P. Birencwaig in Lodz spun fifty per cent of its yarn on commission in 1937, and eighty per cent of the output of the spinning and weaving mill of I. Drzezinski was also spun on commission.  

Several other full-cycle and spinning and weaving mills in Tomaszow and Lodz in 1937 also spun part of their yarn on commission. Twelve per cent of the yarn output of these groups of mills in Tomaszow was produced on commission and twenty per cent in Lodz. Among the worsted spinners about eight per cent of the yarn was spun on commission, but among the single-process woollen spinners the commission orders were the most usual basis for production.  

In some mills all the yarn was spun on commission, and in 1937 almost sixty per cent of the regional output of woollen yarn was produced on this basis.  

The spinning mills in their turn used a variety of raw materials and some of these were supplied by mills in other parts of the region. The diversity among the towns of the raw material consumption by the woollen spinning mills is illustrated in Diagram 31 (on page 274). All the towns in which woollen spinning mills were active, except Lask, used the same raw materials in 1937, but Diagram 31 shows that  

1. APL, Izba, No. 5.  
2. APL, Izba, No. 4-26.  
3. GUS, op. cit., pp. 139, 136, 170  
4. GUS, op. cit., p. 129.
The areas of the circles are proportional to the total weights of fibrous raw materials used in woollen spinning in each town listed in the table. The circles are divided in proportion to the weight of each raw material in the total weight of the materials consumed.

Source - APL, Izba, No. 4-26
CONSUMPTION OF RAW MATERIALS IN 1937 (1) -
by Woollen Spinners in the Lodz region.

<table>
<thead>
<tr>
<th>TONS OF RAW MATERIALS</th>
<th>Cotton and cotton waste.</th>
<th>Other raw materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lodz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zgierz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomaszow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lask</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cotton and cotton waste, Wool and tops, Wool waste, Rags
considerable contrasts existed between the importance of each raw material in each town, and these contrasts were reflected in the differences in the qualities and types of yarn which were produced in each centre.

Diagram 31 illustrates the contrasts between the quantity of wool which was used in the spinning of woollen yarn in the centres of the Lodz region. Virgin wool accounted for over half of the raw materials in Tomaszow where the yarn which was spun was of a high quality, whereas in Lodz and Zgierz very considerable use was made of inferior raw materials, such as woollen and cotton regis and of cotton and cotton waste, and much of the product was woollen-waste, rather than woollen yarn, and was of relatively low quality. It is not surprising that the woollen spinning mills in Lodz should have specialised in the production of woollen-waste yarn while cotton and cotton waste were of much less importance in the raw material base of the yarn which was spun in Tomaszow. The difference may be attributed to the absence of cotton textile mills in Tomaszow. About ten per cent of the raw materials which were used in Lodz and Zgierz were by-products of the cotton textile industry which was located almost entirely in Lodz and Fabianice.

Much of the wool which was used in woollen spinning was washed in the spinning mills, but some was washed in special works. In 1937 only one washing works was active in Lodz,
but a second existed in Zgiers.¹ Both worked on commission for other firms and dealt with small quantities of wool. The worsted spinning mills, in which wool was washed, were of greater importance to the woollen spinners. Allart Rousseau in Lodz washed 520 tons of greasy wool, which was subsequently sold to spinning mills, and a further 1,830 tons for the spinning of worsted yarn, and some of this was also on commission.² An additional 3,036 tons of greasy wool was washed prior to combing and much of the output of tops was sold to other worsted spinning mills in the region which did not comb their own wool. While much of the clean wool and tops were sold to firms in Lodz, mills in other parts of the region also relied upon Allart Rousseau for their supplies of raw materials.

A few of the consequences of the spatial imbalance between the production of woollen and worsted yarns, the supply of raw materials for spinning, and the demand for yarn in the Lodz region in 1937 have been outlined above. If the distribution of the demand for yarn is now examined, Diagram 32 (on page 178) indicates that specialisations also existed in cloth weaving among the centres of the region, but that the pattern of cloth production did not follow exactly the distribution and specialisations in spinning. It was noted above that surpluses

¹. Rocznik Polskiego Przemysłu i Handlu 1938
². APL, Izba, No.4.
DIAGRAM 32  Consumption of Raw Materials in 1937 (2)
by Woollen and Worsted Weavers in the Lodz region

The areas of the circles are proportional to the total weights of yarn used in the weaving of woollen and worsted in each town listed in the table. The circles are divided in proportion to the weight of each raw material in the total weight of the materials consumed.

Source - [PL, Izba, No. 4-26]
CONSUMPTION OF RAW MATERIALS IN 1937 (2)
by Woollen and Worsted Weavers in the Lodz region.

TONS OF YARN

<table>
<thead>
<tr>
<th>Location</th>
<th>Tons of Yarn</th>
</tr>
</thead>
<tbody>
<tr>
<td>LODZ</td>
<td>9,110</td>
</tr>
<tr>
<td>ZGIERZ</td>
<td>1,723</td>
</tr>
<tr>
<td>PABIANICE</td>
<td>1,182</td>
</tr>
<tr>
<td>TOMASZOW</td>
<td>492</td>
</tr>
<tr>
<td>ZDUNSKA WOLA</td>
<td>252</td>
</tr>
<tr>
<td>LASK</td>
<td>63</td>
</tr>
<tr>
<td>KONSTANTYNOW</td>
<td>54</td>
</tr>
</tbody>
</table>

- **Worsted yarn**
- **Woollen and waste yarn**
- **Cotton and waste yarn**
- **Other yarns**
of woollen yarn were being produced in the late 1930's in Lodz, Ozorkow, Tomaszkow and Zgierz and that the output of worsted yarn was also exceeding the local demand in Lodz and Tomaszkow.

Against this background Diagram 32 shows that the strong specialisation on woollens in the spinning section in Tomaszkow was complemented in the weaving section. Woollen yarn accounted for almost ninety per cent of the total yarn consumption of the mills in the town and three-quarters of the product was woollen cloth. In the other centres of the region in which large quantities of woollen waste and cotton yarn were produced, such as Lodz, Pabianice and Zdunyka Wola, the weaving section specialised in the production of semiwoollen cloth. Nevertheless considerable imbalances existed between the local demand for and supply of yarn. In Pabianice, where weavers were obliged to draw supplies of woollen yarn entirely from other towns in the region, chiefly Lodz, the industry specialised in the weaving of semiwoollen cloth of low wool and high cotton content. However Diagram 32 shows that woollen yarn was the most important of the raw materials which were used in the weaving mills in Pabianice, but that worsted yarn, which was spun in the town, was the second raw material. Only thirty per cent of the output was woollen cloth while a quarter was semiwoollen cloth and about 45 per cent of the cloth was woven chiefly from cotton.
and artificial fibres. Zdunska Wola and Zgiers also specialised in the weaving of semiwoollen cloth and, although a wide variety of cloth was woven in Lodz, semiwoollen cloth, which included a large proportion of cotton and woollen-waste yarn, was the chief product.¹

Unfortunately the details of cloth production for each mill were not given in a standard form of measurement in 1937. Some producers measured their cloth by weight and others by length so that it is impossible to compare the production of each type of cloth in each town quantitatively, except in the cases of Fabianice and Tomaszew. However it is possible to see from the raw material base that the best qualities of both yarn and cloth were produced in Tomaszew because they contained a higher proportion of wool than the products of other centres in the region. The products of Lodz, Fabianice and Zdunska Wola included a high proportion of the lighter and cheaper raw materials and especially cotton, spinning waste and rags. The industry in Tomaszew produced the narrowest range of cloth on the basis of yarn content, and the town specialised in the output of woollen cloth to a greater degree than any of the other centres. Only one mill wove cloth other than woollen and semiwoollen, and nine of the thirteen mills only produced

¹ Based on APL, Isba, No.4-26.
woollen cloth. In Zgiers four mills wove woollen cloth, one wove semiwoollen cloth and seven produced both types. In Fabianice all the mills wove some woollen or semiwoollen cloth, although the emphasis was on semiwoollen goods, and also substantial quantities of cotton and other cloths. In several mills almost half the output was of cotton and other cloth and it was difficult to decide whether these mills belonged more properly to the cotton or to the woollen textile industry.¹ Only fourteen mills in Lodz produced other types of cloth in addition to woollen and semiwoollen and there were 27 mills in which only woollen cloth was woven; 21 in which only semiwoollen cloth was produced; and 24 in which both types of cloth were manufactured in 1937.²

The variety of specialization in the production of cloth among the towns of the region is summarized in Map 34 (on page 191). The whole output of the Lodzkie wojewodstwo is shown and the division is made between woollen and worsted cloth and semiwoollen cloth. It appears from the map that the output of the region was almost equally balanced between the two types of cloth. Rather more semiwoollen cloth was woven than woollen and worsted, but the value of the woollen cloth was higher.

1. Mills in which half the output by weight and value was of woollen or semiwoollen cloth were included in the industry. It is probable that a number of mills which were included in the industry in the official statistics were excluded by this test.
2. APL, Isba, No. 4-26.
Lodz dominated the region in the consumption, as in the production of yarn, and in the output of cloth in 1937. Seventy per cent of the yarn which was consumed in the region was used in Lodz and about eighty per cent of the woollen and semiwoollen cloth was woven in the city. Thus the output of cloth in the Lodzkie wojewodztwo on Map 34 was very largely the output of the industry of Lodz for the woollen cloth of Tomaszwow was balanced by the semiwoollen cloth from Pabianice and Zduneka Wola. Zgierz and Tomaszwow both produced about five per cent of the regional output of cloth and Pabianice three per cent. The other cloth was woven in Zduneka Wola, but half of this was in mills which belonged to other branches of the textile industry.¹

Within the overall distribution of production clearly recognisable local specialisations occurred in the type and quality of yarn and cloth, which were reflected in the consumption of raw materials. The detailed description of the operation of the industry about 1937 shows that, in addition to the general tendency for the capitalist industry to become concentrated in one dominant centre in the region, which was noted in Chapter III, weaker and more collective agglomerative forces were at work which were creating a series

¹ Based on GUS, op. cit., p.129.
of dominant centres within the region based on particular types of product. Specialisation by product among the towns of the Lodz region, as also specialisation by industrial structure, had been developed to a substantial extent by 1937. Nevertheless the apparent flexibility of adjustment between supply and demand in the capitalist industry, arising out of the freedom and ease of entry into the industry, which had brought about the pattern of specialisation among the towns, had only brought the local supply and demand for raw materials within the industry into an approximate balance in some of the centres and some of the mills. Despite a considerable degree of vertical integration in production considerable spatial separation existed between producers in one section of the industry and producers in another.

The Industry in the Bialystok Region.

The diversity of scales among the mills and the concentration of the industry which have been noted in the Lodz region in both 1914 and 1937 were also typical of the industry in the Bialystok and Bielsko-Biała regions. In both regions almost all the mills in 1937 were located in one town, and the process of concentration had developed further in the Bialystok region since 1914. The total number of units in the Bialystok region was also far less than in 1914, and Map 28
shows that the numbers of mills in both regions were much smaller than in the Lodz region in 1937. In these circumstances the well developed specialisation among the towns of the Lodz region by industrial structure and by product could not be repeated in either of the other regions. The small areal extent and the concentrated character of the distribution of the mills in the two regions were accompanied by patterns of structure and scale among the mills and by specialisations of production which were peculiar to each of the two regions and were in contrast to those in the other two regional groupings of the industry in Poland.

The exact number of woollen textile mills in the Bialystok region in 1937 is not certain. The published lists and numbers of mills vary widely and Map 33, (on page 286), which is based on the work of E. Terebucha, includes 72 mills while Map 28, which is based on the list of mills in Rocznik Polskiego Przemyslu i Handlu 1938, contains 45 mills, but this figure is too low. The larger figure is supported by a list of mills in 1945 which states that at least 54 mills had existed in 1939, and by the official statistics which included all the

1. The author was not permitted to consult the detailed archival materials for the industry before 1939 other than for the Lodzkie wojewodztwo, and the description of the industry in the Bialystok and Bielsko-Biala regions is based on published materials.

MAP 33  Woollen Textile Mills in 1937 - Białystok Region

Each symbol represents one mill

Source - E. Terebusza, Białostockiego Przemysł Welniany,
Poznan 1939
WOOLLEN TEXTILE MILLS IN 1937 - BIALYSTOK REGION

SCALE 1:1,000,000

TYPES OF MILLS

- Mills producing woollen cloth.
- Spinning woollen yarn
- Weaving woollen and worsted yarn

National boundary
Boundaries of Wojewodzista

286
textile industry in the Białostockie województwo, but which showed that in 1937 92 mills were producing woollen textiles.¹

The variations in the number of mills, which are illustrated in Table IX, arise from differences in the definition of the industry. The small-scale workshop section of the industry, which was still numerically strong in the Białystok region in 1937 although it contributed little to the total employment and output, was omitted from the list of mills in Rocznik Polskiego Przemysłu i Handlu 1938. However, many of the mills which were included in the industry by Torebucha were small, and the official statistics included all producers, irrespective of the size of the building in which they worked or the number of workers they employed.² However, the list of mills in Rocznik Polskiego Przemysłu i Handlu 1938 differs most from that of the official statistics (Column No.3 in Table IX) precisely in those groups of mills in which the average scale of production was largest, which were the groups of multi-process and spinning mills.

Unfortunately Torebucha did not indicate the extent to which production in the 35 mills which were producing woollen cloth was vertically integrated, but the majority of the mills probably undertook both spinning and weaving, while a few may have only been single-process weaving mills.

The structure of the industry in the Bialystok region was dissimilar to that in the Lodz region in 1937. A variety of scales of production existed among the mills, and the scale of production was closely associated with the extent of the vertical integration of production. Full-cycle mills, which employed the largest numbers of workers and had the largest capacities for production, accounted for between a third and half the total number of mills in the region and it is probable that over half the output of the region was produced in multi-process mills. Map 36 (on page 313) indicates that about sixty per cent of the employment in the region was in

<table>
<thead>
<tr>
<th>Type of Mill</th>
<th>Terebucha¹</th>
<th>Roczni²k</th>
<th>Stat. Przem.³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-process Producing woollen cloth</td>
<td>-</td>
<td>16</td>
<td>30</td>
</tr>
<tr>
<td>Spinning</td>
<td>21</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>Weaving</td>
<td>10</td>
<td>19</td>
<td>27</td>
</tr>
<tr>
<td>Pulling Works</td>
<td>6</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>45</td>
<td>92</td>
</tr>
</tbody>
</table>

Sources:
1. E. Terebucha, Bialostockiego Przemysł Wilniiany, Poznan 1939, Manuscript.
3. GUS, Statystyka Przemysłowa, Warszawa 1938, Dzial 1, p.143, (Statystyka Polski, Seria C, z.97)
the spinning and weaving mills in 1931, and in 1937 the proportion varied between 54 per cent in December and 74 per cent in June.¹

The average numbers of workers in all the structural groups of mills in 1937 were less than in the Lodz region. In the multi-process mills in the wojewodztwo the average was 135, in the spinning mills about thirty, and in the weaving mills about fifteen workers.² The largest mill in the region, belonging to S.H. Cytron, was smaller than many in the Lodz region and employed 500 people, and only one other firm, Białostocka Manufactura Szpioro-Jaglom in Bielsztok, had 300 workers.³ There was an average of 5,550 spindles and sixty looms in each of the six full-cycle mills which were listed in Rocznik Polskiego Przemysłu i Handlu 1938, which was also less than the average in the Lodz region, 8,500 woollen spindles were installed in the mill belonging to S.H. Cytron and 120 looms, and the mill of A. Sokol and J. Zylberfenig had 11,400 spindles and a hundred looms. The spinning and weaving mills had smaller capacities on average with 2,550 spindles and 27 looms each, and these capacities were smaller than in the Lodz region, but larger than those of the single-process spinning and weaving mills.⁴

¹ Based on GUS, op.cit., Dział I.
² Ibid.
³ Rocznik Polskiego Przemysłu i Handlu 1938.
⁴ Numbers of spindles for only six mills, numbers of looms for only seven mills.
The areas of the circles are proportional to the weight and the value of the cloth produced.

The industry in the Bialystok region specialised in the production of low quality woollen-waste yarn and semiwoollen cloth. Woollen yarn was only spun in three mills and Map 34 (on page 291) indicates how complete was the specialisation upon semiwoollen cloth in 1937 and how cheap were the products of the region in relation to those of the Bielsko-Biala and Lodz regions. Table X shows that the average values of both the woollen-waste yarn and semiwoollen cloth which were produced in the Bialystok region in 1937 were substantially less than those of the other two regions. Bialystok was the chief centre for the pulling of rags and the use of recovered wool in Poland, and a higher proportion of these cheap and poor quality materials was embodied in the products of the region.

TABLE X

The Value of the Products of the Regions in 1937
(in złoty per kilogram)

<table>
<thead>
<tr>
<th>Product</th>
<th>Bialystok</th>
<th>Bielsko-Biala</th>
<th>Lodz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worsted yarn</td>
<td>-</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Woollen yarn</td>
<td>7.8</td>
<td>7.7</td>
<td>5.4</td>
</tr>
<tr>
<td>Woollen-waste yarn</td>
<td>1.8</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>Woollen cloth</td>
<td>-</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td>Semiwoollen cloth</td>
<td>5</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: GUS, Statystyka Przemysłowa 1937, pp. 129-130, 136, 140, 170, 177, Warszawa 1938 (Statystyka Polski, Seria C, z. 97)
than in the Lodz or Bielsko-Biala regions. In 1937 10,550 tons of rags were consumed in the region and over 9,000 tons of woollen-waste yarn was spun. Little of the yarn was sold outside the region and little yarn was imported from other centres of the industry in Poland.

The Industry in the Bielsko-Biala Region.

The distribution of the industry in the Bielsko-Biala region was very similar to that in the Bialystok region in 1937. All except six of the 72 mills which are shown on Map 35 (on page 295) were located in Bielsko-Biala. The scale of the individual mills was smaller than in the Lodz region but the correlation between the number of employees and the type of the processes of production in each mill was maintained. Map 35 shows that the largest mills in terms of employment were those in the worsted spinning and full-cycle groups. The average number of workers in the worsted spinning mills in 1937 was 370, and in the full-cycle mills the average was 250. Each full-cycle mill possessed an average of 2,500 spindles and sixty looms, but the averages among the spinning and weaving mills were 3,800 spindles and 56 looms. These figures were smaller than in the Lodz region as a whole or in Lodz, but

3. Based on Rocznik Polskiego Przemyslu i Handlu 1938.
4. Details of spindles for only five mills, details of looms for only seven mills.
MAP 35  Woollen Textile Mills in 1937 - Bielsko-Biała Region

The open symbols represent mills employing fifty or more workers, except where the number of workers is unknown. The area of each open symbol is proportional to the number of workers employed in each mill. Symbols representing the same number of workers in any of the four types of mill are of the same area. The mills with the largest labour forces are numbered and are as follow-

<table>
<thead>
<tr>
<th>Mill Number</th>
<th>Owner or Firm</th>
<th>Number of Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>K. Jankowski i Syn</td>
<td>540</td>
</tr>
<tr>
<td>2</td>
<td>Flutzar i Brull</td>
<td>530</td>
</tr>
<tr>
<td>3</td>
<td>Voslauska Sp. Ako.</td>
<td>480</td>
</tr>
<tr>
<td>4</td>
<td>G. Molenda i Syn</td>
<td>420</td>
</tr>
</tbody>
</table>

Source - Rocznik Polskiego Przemysłu i Handlu 1938, Warszawa 1938
they were similar to those for the mills in Tomaszow. None of the mills in the Bielsko-Biała region employed as many workers as the largest in the Lodz region or had a comparable plant capacity, for the four largest mills only employed between 400 and 600 people each.

As in the Bialystok and Lodz regions single-process mills formed the most numerous group in the Bielsko-Biała region, but the group was composed almost entirely of weaving mills. Map 36 (on page 313) shows that very little of the employment in the region in 1931 had been in spinning mills apart from worsted spinning. The weaving mills employed about sixty people each in 1937, and each had about 25 looms so that they were very similar in scale to those in the Lodz region.\(^1\)

Map 36 indicates that the production of the industry in 1931 was more vertically integrated than in the Lodz region. Almost all the woollen spinning was undertaken in spinning and weaving mills or in full-cycle mills, and in 1937 these two structural groups accounted for a third of the mills in the region. The extent to which the four basic processes were integrated was greater than in Lodz or the smaller centres of the Lodz region with the exception of Tomaszow, in which the structure of production was very similar to that in Bielsko-Biała.

\(^1\) Details of looms for only 21 mills.
Unfortunately the average figures for employment and capacity in 1937 are not exact for only fifty mills published details. These mills employed 6,780 workers, but the total employment of the region was probably over 7,000. Moreover Rocznik Polskiego Przemysłu i Handlu 1938 probably did not include all the mills in the region. The official statistics for 1937 state that in Krakowskie and Śląskie województwa there were 25 woollen spinning mills and 101 mills in which woollen cloth was woven. These figures are much larger than the number of mills in the directory which only included 69 mills in which woollen cloth was woven. The additional 32 mills in the official statistics were probably small for in 1936 there were at least a score of small-scale weaving workshops and in 1939 only 77 of a total of 150 woollen textile units in the region were considered to be sufficiently large to be termed mills. The other 73 units were small workshops in which woollen cloth was woven, but their contribution to the output of the region was probably small.

The scale of production was smaller in the Bielsko-Biała region than in the mills in Łódź, and the industry was characterised by a high degree of vertical integration of the

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1. GUS, op.cit., pp.170, 177.
processes which was associated with the specialisation in the production of woollen and worsted goods of high quality. As in the mills in Tomaszów, so in Bielsko-Biała the small size of the market for high quality goods did not permit long runs in production and favoured the mill of medium scale rather than the mill of very large scale. Moreover the dependence of the industry for its existence before 1914 upon the high reputation of its goods in European markets had led to a desire on the part of producers to control all the processes of production, and to the high degree of vertical integration.¹

The quality of the Bielsko-Biała goods was achieved in part by the high wool content of the yarn, and the wool content of the yarn was greater than in either of the two other regions. Very little woollen-manto yarn was spun. Yarn consumption in the region in 1937 exceeded production and the deficit was balanced by purchases of worsted and woollen yarn from the Lodz region and by imports of the best quality worsted yarn from Austria, Great Britain and other European countries.² The average wool content of the cloth was also higher than in the other two regions, and the specialised weaving of cloths of high quality was characteristic of many of the mills. Worsted cloth was woven in fifty mills and the traditional

¹. Ibid., pp. 8-10, 14-18.
Bielsko woollen cloth in 48 mills. Map 34 indicates how small was the place of semi-woollen cloth in the weight and value of the regional output in contrast to the other regions, and Table X shows that the average value of each kilogram of cloth which was woven in the region in 1937 was higher than in either of the other regions.

The small Bielsko-Biala region possessed a well defined character in which the distribution and structure of the industry followed closely the capitalist pattern which was described in the two other regions in 1914 and 1937. The structure of the industry was dominated by the groups of full-cycle and spinning and weaving mills of medium scale, and by a large number of small weaving mills. The region specialised in the production of worsted and good quality woollen cloth. The complex pattern of co-operation and interdependence among producers was only weakly developed in this region of vertically-integrated mills, and as in Bialystok the concentration of the industry in one town removed any possibility of the pattern of widely separated but interdependent centres of production, which characterised the industry in the Lodz region. In the Bielsko-Biala region commission work accounted for 26 per cent of the output of woollen yarn, but for only three per cent of the cloth.

In the Bialystok region the comparable figures were 37 and
seven per cent, whereas in the Lodz region 57 per cent of the woollen and woollen-waste yarn was spun on commission and 23 per cent of the cloth was woven on commission.¹

Summary.

The description of the three regions of the Polish woollen textile industry about 1937 shows that the variety of scale, which was noted in Chapter IV, was the product of an equally wide variety of industrial structure. The freedom of entry into the industry and the individual nature of mill ownership had combined over a period of about seventy years to produce a wide variety in the scales of production among the mills. However the scale of each mill appears, on average, to have been closely related to the number and type of processes which were performed in the mill. Moreover the examination of the structure of the industry revealed that the most important centres, such as Bialystok, Bielsko-Biala and Lodz, were characterised by a wide variety of mills, both in scale and structure, but that the type of mills in the smaller centres, such as Pabianice, Tomaszow and Zdunska Wola, tended to be more specialised. From this distributional pattern it is apparent that the average scale of the mills in each centre was closely connected to the structural pattern of the industry as a whole in each town.

¹. GUS, op. cit., pp. 129-130, 136, 143, 170, 177.
The analysis of the industry in 1937 has revealed that the wide variety of scales among the mills was related to the type of goods which were produced by each mill. It also appears that the production of certain goods had become concentrated in a few of the centres and regions and that the concentration of production as a whole in Lodz and, to a lesser extent, in Bialystok, which was noted in Chapter IV, had been accompanied by the development of a pattern of specialised production among the towns and regions.

As a result of the substantial degree of vertical disintegration in production and of the specialisation of each textile town upon the production of one type of yarn or cloth, the capitalist industry was composed of a number of varied centres. In the Bialystok and Bielsko-Biała regions the industry specialised in the production of only one type and quality of product and the mills became concentrated in only one centre, but in the Lodz region the variety of products had been accompanied by the development of a number of specialised centres of production which were each also characterised by particular industrial structures. Furthermore the vertical disintegration of production and the specialisation in production had created a complicated pattern of interdependence among the mills in each town and between the towns in each region, though this existed to a much smaller degree
between the three regions, in the supply of raw materials or for the further processing or sale of raw materials, yarn and cloth.

The Economic Environment and the Changing Geography of the Industry under Capitalism 1927-1937.

The Economic Environment.

The woollen textile industry was operating in an economic environment of depression between the wars. Whereas the years between 1876 and 1914 had formed a period of overall, if not continuous, growth in the size and output of the industry, the economic environment had deteriorated after 1914 and the period between the wars was one of long-run, but again not continuous stagnation and contraction. The cyclical pattern of movements in the Polish and world economies, which was associated with the capitalist organisation of production and distribution, had carried economic activity to new peaks with each successive boom before 1914, but after that year the trade cycle fluctuations had resulted in the long-run decline of production in Poland and the impoverishment of the nation. Among the American and European states only the U.S.S.R. which had severed itself from the world economy and was rapidly establishing a socialist form of society, escaped the depressing influence of the trade cycle during these years.
The causes of the long-run downturn in the levels of production and consumption in Poland were numerous, but the results for the woollen textile industry were clear. Between 1927 and 1937 the per capita consumption of woollen and semi-woollen cloth fell from 0.79 kilograms per annum to 0.58 kilograms, a reduction of 27 per cent. The individual entrepreneur, who had no control over the level of demand, was obliged to operate within this environment. A few firms saw opportunities for profit and began production, but the majority of those with economically submarginal mills remained outside the industry. A glance through the contemporary trade journals reveals that the most important object of producers between 1927 and 1937 was to avoid losses rather than to make profits. Despite the depression in the Polish economy in general and the acute problem of underemployment of labour and fixed capital in the woollen textile industry in particular, government interference with the processes of managerial decision continued to be negligible, and the changing geographical pattern of the industry continued to be the product of the aggregated reactions of individual entrepreneurs to the economic environment after the manner of the years between 1870 and 1914.

During the trade cycle of 1927-1937 the woollen textile industry was very depressed from 1930 until 1935. The recovery
in the demand for textiles began in 1933, but a substantial improvement in employment and output was only achieved in 1935. The upward trends of activity and sales were weak and faltering but they continued up to the end of 1938 in the Lodz region, and all sections of the industry showed increases in employment in that year above the levels of 1937, but some signs in other regions in 1937 suggested that another recession in the industry had already begun. The decline in worsted spinning and in the production of semiwoollen cloth in association with the largest increase in unsold stocks of cloth in the 1930's and a renewed decline in the prices of farm and industrial products, all indicated that a severe check to production and another slump were imminent at the end of the 1930's. 1937 was one of the most prosperous years after 1929 for the industry under capitalism, but by that year the slow and partial reflation of the Polish economy appeared to have run its full course.

The long-run patterns of change in the geography of the industry between 1927 and 1937 are less easily discerned than those which were found to be associated with the long-run growth of the industry before 1914 in Chapter III. The difficulties in the recognition and measurement of the changes arise from the brevity of the period. The reactions of the industry before 1914 were studied over a period of forty years
during four trade cycles while the period under study in this chapter is curtailed by the exclusion of the years of reconstruction and economic chaos in central Europe before 1927, and by the fact that the source materials for industrial studies in Poland during those years are unreliable and often lack any substantial degree of comparability. The detailed changes in the industry after 1927 are also difficult to establish accurately because statistics concerning the overall size of the industry were rarely published, although they were collected; because the directories of mills which were published during the period were compiled on differing bases, and because an inexplicable post-war reluctance existed to open the pre-war archives to a western visitor.

Changes in the Numbers of Mills and in the Distribution of the Industry.

The long-run decline in the demand for woollen textile goods was reflected by a fall in the number of mills between the boom of the late 1920's and the next peak of activity in 1937. The output and employment of the industry also declined, but the influence of the depression was not felt to an equal extent in all the sections, in all the structural groups of mills, or in all the textile towns.

The growth of the industry before 1914 was achieved by
the entry of new mills and the enlargement of the number of mills from one trade cycle to the next. The decline after 1914 may also be measured by the changes in the number of mills, but the effect of the two processes of growth and decline upon the industrial landscape cannot be so simply contrasted. A long-run increase in mills implies that the total stock of buildings had been increased and that the textile towns had been expanded or that the industry had been established in new locations through the construction of new mills. The long-run reduction in the mills which were in use, in contrast, does not imply that the total stock of mills was falling at the same rate. Many mills were closed in each short-run depression of demand and some subsequently stood idle as the demand for their products failed to recover fully during the next boom, but these mills continued to exist. Several woollen textile mills stood idle during many of the inter-war years in Poland including the large worsted spinning mill at Marki which was closed for twenty years, but few were demolished or turned over to other uses.¹ The long-run decline in demand for woollen textiles resulted in a slow erosion of the total number of mills between 1914 and 1937. No new mills were built during these years, but the falling demand would eventually have led to the abandonment or demolition of mills.

as they became too old or inefficient, or they would have been transferred to other forms of economic activity with superior prospects of profit.

Between the boom of 1928-1929 and the relatively prosperous year of 1937 the number of mills in the Lodz region fell from 185 to 167. In Bialystok the number increased and was probably higher in 1937 than at any time between the wars, and some of the large-scale mills in the region left the industry during the 1930's. No direct information of the number of mills in the Bielsko-Biala region is available before 1937 and it is not possible to compare exactly the regional variations in the distribution of the mills which were in production.

Some indication of the regional incidence of the decline in the demand for woollen textiles may be gained from the official statistics which record the number of mills in which each textile good was produced. This source shows that while the number of woollen and worsted spinning mills remained fairly constant between 1931 and 1937, falling only from 191 to 185, substantial reductions occurred among the mills in which woollen and semi-woollen cloth were woven. The number of mills in which woollen cloth was produced in Poland fell

from 366 in 1931 to 276 in 1937, and the semiwoollen cloth producers decreased from 368 to 306.\textsuperscript{1} These figures indicate that the decline in the activity and in the numbers of producers varied considerably between the sections of the industry, and it is probable that, in the context of the well-developed pattern of specialisation by product among the regions and the centres, these variations were reflected to differing extents among the textile towns.

In any period of impoverishment and of falling incomes and uncertainty of employment the reaction in the market for consumer durables is to substitute goods of lower for those of higher price. The variations in the numbers of mills in which each textile good was produced between 1931 and 1937 indicate that the falling prices of farm produce and the high levels of rural over-population and of urban and industrial unemployment in Poland in the 1930's were reflected not only in the substantial fall in the level of the total demand for woollen goods, but also in a substitution of the cheaper semi-woollen cloth for woollens and worsteds. Between 1927 the output of worsted yarn fell by a quarter and the output of woollen yarn by as much, while the production of woollen cloth fell to less than half of the level of 1927.\textsuperscript{2} During the

\begin{flushleft}
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sane period the output of semiwoollen cloth rose by fifty percent and the production of woollen-waste yarn also increased.¹

**TABLE XI.**

<table>
<thead>
<tr>
<th>Changes in the Output of Woollen Textiles 1927-1937 (by weight, 1928-1928 equals 100)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Woollen and waste yarn</th>
<th>1932</th>
<th>1937</th>
</tr>
</thead>
<tbody>
<tr>
<td>Białyostok region</td>
<td>47</td>
<td>135</td>
</tr>
<tr>
<td>Bielsko-Biała region</td>
<td>40</td>
<td>68</td>
</tr>
<tr>
<td>Lodz region</td>
<td>58</td>
<td>100</td>
</tr>
</tbody>
</table>

**Cloth**

| Lodz region - woollen | 36   | 55   |
| Lodz region - semiwoollen | 37  | 88   |
| Białyostok region     | 32   | 73   |
| Bielsko-Biała region  | 43   | 79   |

Sources - GUS, Rocznik Statystyczny 1928, Section VIII, Table 18, Warszawa 1929.
GUS, Statystyka Przemysłowa 1932, pp. 108-110, Warszawa 1934 (Statystyka Polski, Seria C, s.1a), Statystyka Przemysłowa 1937, pp. 129-150, 143, 170, 177.

The regional effects of the changes in production were restricted to the Białyostok and Lodz groupings of the industry. The industry in Bielsko-Biała did not recover the former levels of production or employment in the late 1930's, but this was primarily the consequence of the loss of export markets in

¹ Ibid.
Europe rather than of a fall in the domestic demand for the products of the region. The reduction in demand for woollen cloths in Poland appears to have affected only the sales of cloth of medium quality, which was produced in the Białystok and Łódź regions in 1929, and Table XI shows that by 1937 production in the Łódź region was only about half of the level of 1928, and in the Białystok region the production of woollen cloth had ceased. The output of semiwoollen cloth in the Łódź region had recovered to a larger extent than the production of woollens by 1937, but Table XII shows that this improvement failed to prevent a redistribution of cloth production between the Białystok and Łódź regions between 1932 and 1937 at the expense of producers in the Łódź region, and that this was matched by a similar and larger redistribution of the production of woollen and woollen-waste yarn in favour of the Białystok region.

The numbers of mills producing woollen and semiwoollen textiles altered in sympathy with the changes in the output of these goods between 1931 and 1937. In the Łódź region the reduction of mills in which woollen cloth was produced was greater than the decline of producers of semiwoollen cloth, and the total number of mills in which cloth was woven

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fell from 158 to 128.\(^1\) The number of mills spinning woollen yarn, in contrast, changed little.\(^2\) Between 1932 and 1937 the number of mills in which yarn was spun in the Bielsko Biała region rose from about fifty in 1932 to 57 in 1937, and the mills in which cloth was woven increased from 44 to 57, despite the cessation of the production of woollen cloth in 25 mills between 1931 and 1937.\(^3\)

**TABLE XII**

<table>
<thead>
<tr>
<th>The Regional Distribution of Output 1927-1937</th>
</tr>
</thead>
<tbody>
<tr>
<td>(by weight, totals equal 100)</td>
</tr>
<tr>
<td>Woollen and waste yarn</td>
</tr>
<tr>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Bielsko-Biała region</td>
</tr>
<tr>
<td>Lodz region</td>
</tr>
<tr>
<td>Woollen and semiwoollen cloth</td>
</tr>
<tr>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Bielsko-Biała region</td>
</tr>
<tr>
<td>Lodz region</td>
</tr>
</tbody>
</table>


2. Ibid.
The areas of the circles are proportional to the number of workers in the woollen textile industry in each town.

Source - GUS, Dznoj Powszechny Spis Ludnosci z dnia g, XII
1931 r, Białostockie Województwo (Statystyka Polski,
seria C, z. 83), Krakowskie Województwo (Statystyka Polski,
seria C, z. 82), Łódzkie Województwo (Statystyka Polski,
seria C, z. 77), Miasto Łódź (Statystyka Polski, seria C,
seria C, z. 67), Śląskie Województwo (Statystyka Polski,
seria C, z. 54), Warszawa 1937-1938
The movement of demand away from the medium quality woollen cloths of the Lodz region in favour of the semiwoollen cloths was also reflected to differing degrees among the towns within the Lodz region. No details are available of the variations in the level of output in the individual towns of the region between 1927 and 1937, but a comparison of the distribution of employment in December 1931 and in December 1937, which are illustrated in Maps 36 and 30 respectively, shows that the decline in the industry was greatest in Tomaszow, but that the towns which specialised in the weaving of semi-woollen cloth increased their proportions of the regional employment between 1931 and 1937. In Tomaszow the number of employees fell from almost 5,000 to 1,850,1 while in Lodz the level of employment rose.2 The level of employment also fell in Zgierz between the two dates by half, but it rose substantially in Fabianico.

The changes in employment among the towns of the Lodz region are not exactly followed by the distribution of the mills which left the industry between 1931 and 1937.

1. GUS, Drugi Powszechny Spis Ludnosci z dnia 9. XII 1931r., Miasto Lodz, Table 28, Warszawa 1937 (Statystyka Polski, Seria C, t.67), Wojewodztwo Lodzkie, Table 29, Warszawa 1938 (Statystyka Polski, Seria C, t.77).
A comparison of the directories, which were published biennially but which only included the larger mills, reveals that nineteen firms left the industry in Łódź, three firms left the industry in Tomaszów, and that one firm left the industry in both Zdunska Wola and Zgierz.¹ This list does not include all the firms which left the industry, but when it is compared with the distribution of the firms which entered the industry in the same period it shows that Tomaszów suffered a net loss of mills, but that the firms which left the industry between 1931 and 1937 in the other centres were probably all replaced by new firms.

In Chapter III the enlargement of mills and the replacement of units of smaller by those of larger scale were shown to have been important methods by which the industry grew, but in the period of decline the comparison of the directories of producers reveals that the larger mills appear to have suffered most from the diminution of demand. A number of multi-process mills left the industry between 1931 and 1937 in all the regions while few firms which were operating in full-cycle or spinning and weaving mills entered the industry. This pattern was most marked in the Łódź region and in Łódź and Tomaszów in

¹ Rocznik informacyjny o spółkach skomynych w Polsce 1932, Warszawa 1932.
particular, and also in the Bielsko-Biała region.\(^1\)

The selective elimination of the multi-process mills appears to have been restricted to those centres in the Łódz region which specialised in the weaving of woollen cloth in 1937 and in which the vertical integration of production was greatest. The number of multi-process mills fell steadily from 47 to 35 between 1929 and 1937, and the directories suggest that the fall was confined to Łódz and Tomaszów.\(^2\)

The firm of F. Kinderman, which had been founded in 1859 and had employed 650 people in a full-cycle mill in Łódź about 1914, leased the spinning, dyeing and finishing sections of the mill to other firms in 1935 and finally went into liquidation in 1938.\(^3\)

The firm of Leonhardt, Woelker i Girbardt, which had employed over a thousand people in worsted spinning, weaving and finishing before 1914 in Łódź, also closed its mill in 1937.\(^4\)

In Tomaszów a similar fate befell the full-cycle mill belonging to E. Bornstein. The dyeing and finishing shops were closed in 1935 and the spinning shop in 1936, thus reducing the activity to the weaving of woollen cloth only.\(^5\) The large-scale

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1. Izba Przemysłowo-Handlowa w Bielsku-Białej, Sprawozdanie 1931, p.15, Bielsko-Biała 1931.
5. APL, Izba, No. 15.
worsted spinning and dyeing mill in the town was also closed in 1934, but it was later reopened by Allart Rousseau of Lodz, but the full-cycle mill of C. Rubin & Co., remained closed for most of the period and only reopened towards the end of 1937 at the end of the recovery in demand.¹

Conclusion upon the Decline of the Industry under Capitalism.

In the years between 1927 and 1937 the woollen textile industry in Poland displayed the signs of a long-run decline. The information upon which this chapter has drawn is not adequate to permit any assessment of the decline of demand upon the scale of production in individual mills, but the total number of mills in use and the levels of employment and output were lower at the peak of the recovery in 1937 than they had been in the boom of the previous trade cycle. The reduction in the numbers of mills affected the larger, multi-process mills, in which production was potentially more efficient, to a greater extent than the single-process mills, in which production was more flexible. Despite the improvement in employment and activity after 1933 short-time working and the operation of only one shift in many mills emphasised the continuing overcapitalisation. In these circumstances new capital was not attracted into the industry and no possibility existed for the industry to branch out into new locations, as

¹ APL, Isba, No.4, 21.
it had done before 1914, or for the rebuilding and re-equipping of the mills.

The distribution of the industry was not changed by the development of new centres between the wars, but the growing poverty of the Polish population during the inter-war years led to the redistribution of the active mills and of the employment and output. Whereas firms tended to stay in the industry and even to enter it by reopening mills in the towns in which the cheaper yarn and cloth were produced, there was a net loss of firms and a closure of mills in Lodz and Tomaszow, and also perhaps in Bielsko-Biala and Zgierz.

The extent to which the number of mills and the capacity of the industry was reduced was very similar to the decline in the output of yarn and cloth between the late 1920's and 1937. The number of installed spindles was approximately the same as in 1929 and the looms had been reduced by about a quarter, but it was pointed out above that the total number of mills in existence remained unchanged and that the number of employees did not fall to the same extent as either the output or the capacity of the industry between 1927 and 1937. Many producers attempted to retain skilled and balanced labour forces by short-time working on one or two shifts, and the mills which had been under-employed in 1929 remained in that

condition throughout the whole of the period up to 1937. No attempt was made to remove the excess capacity in the industry, to concentrate production in a smaller number of the more efficient large-scale mills, or to prevent small-scale producers from entering the industry and preventing the achievement of a programme of rationalisation. The adoption of all these reforms after 1945 led to considerable changes in the distribution and structure of the industry.

In the 1930's, on the contrary, the industry resisted the necessary permanent closures of mills and the scrapping of plant, both individually and by a widespread cartelisation, thus raising the costs of production for all producers, preventing the achievement of any real prosperity during the 1930's, and preserving more securely the inefficiencies of the established structure of the industry in the 1930's. The flexibility which the industry had gained as a result of the vertical disintegration and specialisation of production among the mills had led to the fragmentation of production to an excessive degree and to the widespread development of deficiencies and surpluses in production among both the mills and the textile towns. Furthermore the multiplicity of producers which this structure had encouraged to enter the industry had resulted in the time of depression in considerable
over-capitalisation, unemployment and under-employment of labour, and a vigorous resistance to a rationalisation of the industry's structure.

The geographical consequences of the development of the woollen textile industry under capitalism in Poland will be analysed more fully in Chapter VIII, when a comparison will be drawn with the geographical pattern of the industry under the communist government. The economic environment and the form of organisation in the industry after the Second World War differed in several important particulars from those of the previous seventy years. The consequent geographical pattern of the industry after 1945 also differed considerably from that which had developed under capitalism and it is to a description of the developing geography of the industry after 1945 that it is now necessary to proceed.
The description of the geography of woollen textile manufacturing in Poland in this study has sought to emphasize the influence of the structure and aims of ownership upon the distribution and regional patterns of scale, structure and production in the industry. Prior to the Second World War the industry developed in a variety of economic conditions, but always within the capitalist framework. Some of the patterns in its distribution which arose under capitalism were described in Chapters III, IV and V, and some of the inefficiencies in the use of available resources which arose as a result of the capitalist organisation were noted.

After the Second World War the socialist, and later the communist government in Poland appropriated all except the smallest organs of the production and distribution of industrial goods and raw materials, including the majority of the woollen textile mills. The multiplicity of individual and independent owners and producers in the industry was replaced by a single

1. All businesses employing more than fifty workers have been the property of the State since 1946.
MAP 37  Poland in 1965
owner, the State, and by a unified policy for the whole economy of Poland in which the contribution of each mill was exactly defined.

The geographical pattern of the industry which developed between 1945 and 1965 differed substantially and in many respects from the patterns of 1914 and 1937 for it was the product of the socialist, rather than the capitalist form of organisation and of the attitude and policy of the government towards the industry rather than that of a large number of individuals. The most important characteristics of the economic environment under socialism are outlined in this chapter, after which the influence of government policies upon the changing geography of the industry are described, and the discussion of the geography of woollen textile manufacturing under socialism is concluded in Chapter VII by a description of the industry about 1965.

The Economic Environment.

The Role of the Woollen Textile Industry in the Policies of the Polish Government.

The existence of a state-owned monopoly since 1945 has transformed the woollen textile industry from a body which was constantly attempting to persuade the government that the interests of the State were best advanced by policies which were
favourable to the industry into an instrument of government policy. At the same time the fulfilment of the policies of the government since 1945 have required a more catholic contribution from the industry to the general welfare of the nation than merely the supplying of woollen textile goods. The industry has been used as a means of solving a series of social problems and as a result the number of factors which have been considered in decisions about the location, size and structure of the industry has been greater than in the period of development under capitalism.

As the instrument of the state industry in Poland has been relieved not only of the constant struggle with competitors at home, but also of the strict market discipline imposed under capitalism by the cost of production and the available range of prices in the product market. When the revenue of the monopoly in state ownership has not been equal to the cost of production, the government has subsidised the industry or it has planned the level of prices in order to achieve a balance between the industry's receipts and payments. The industry has been protected from the effects of short-run changes in the level of demand and as part of a state monopoly mills have not been closed or under-employed during short periods of imbalance between the supply and demand for textiles or when losses have
been incurred. The long run planning of the industry, of its scale, form and distribution, has continued without the complication of the substantial short-run fluctuations of the capitalist trade cycle.

However the socialist state is not a simple monopoly accounting revenue against payments in its industries, for the socialist government exists to plan the whole economy and to relate the activity of one branch to the needs of the others. In a socialist administration the social needs of the nation and the social costs, which cannot be measured accurately in monetary terms, are included in the calculation of the profits and losses and affect any decision to produce or to cease production both in an industry as a whole and in the case of each mill. A financial loss may be knowingly incurred in a decision to operate a mill in a particular location, and the consequent inflationary effect upon the whole economy may be justified and balanced by a reduction in concealed unemployment, the solution of a localised problem of land hunger, the maintenance of communities in areas of low employment opportunities, or the avoidance of increased urban congestion and the need to build more housing in established industrial cities or in areas where full employment already exists.

In this role of the instrument of the policies of the
state, the industry is not relieved of the necessity to operate efficiently within the limits of the physical framework of mills and employees, for inefficiency in any branch of the economy is a constant loss of material wealth to the nation. Each mill must constantly plan to improve productivity as in a capitalist environment, and the state, in the position of monopolist, must shape the structure and direct the operations of the industry as a whole in order to achieve the highest output from the available fixed capital, labour and raw materials, and thus to ensure the largest possible national income. To this end entry into the woollen textile industry has been severely restricted since 1946 and the private sector has been deliberately discouraged so that the government's plans for the distribution of the industry and for the use of the available resources may not be frustrated.

The Polish government has sought to raise the standards of living of the people since 1945 by industrialising and urbanising the peasant nation, and thus simultaneously curing the double pre-war evil of urban unemployment and rural over-population. In order to achieve substantial improvements in the material welfare of the people, industry has been used both as a growing source of employment and as a means of increasing the supply of goods. Furthermore the increase in
industrial employment has not been restricted to the pre-war centres, but has been spread throughout the country so new factories and workshops have been established on greenfield sites.\(^1\)

The woollen textile industry has contributed substantially to the increase in the level of consumption among the Polish people since 1945. By 1953 the per capita output of woollen and worsted cloth had risen to 2.7 metres per annum in contrast to 1.1 metres in 1938, and since 1953 production has kept pace with the rapidly growing population while the consumption of cloth has fluctuated between 2.4 and 2.6 metres per capita. The output of cloth in 1964, which was measured in metres, was 237 per cent of that in 1937, and the weight of woollen and

\(^{1}\) W. Buch, Przemysł w planie szesioletnim, p.60, Warszawa 1950
Ministerstwo Przemysłu Lekkiego (MPL), Biuletyn, 1956 No.3; Dziennik Urzędowy, 1965 No.3, Warszawa.
J. Struminski, Miętkie problemy polityki cech dotalicznych, in Źródła Gospodarcze, 1965 No.11, Warszawa
I. Tybor, Przemysł włókienniczy w planie szesioletnim, pp.16, 133, Warszawa 1952.
worsted yarn which had been spun in the same year was 187 per cent of the output of 1937.¹ The industry has also contributed to the industrialisation of the country. 87,600 people were employed in 1964, which was more than double the number of workers in 1937, and the proportion of the total population which was employed in the industry had risen from about 1.1 to 2.6 in every thousand between 1937 and 1964.²

The two policies of increasing industrial output and of redistributing industry have been contradictory to some extent in the context of the post-war shortage of resources for investment in Poland. The construction of new factories has proved to be almost always too expensive in the branches of industry, such as woollen textiles, which are potentially most footloose and which would be most satisfactory as new sources of employment in unindustrialised communities. The post-war increases in output, which have been largely restricted to the existing premises, have been achieved with a minimum of capital outlay in new plant and premises, but this pattern of development has created a number of problems which have inhibited the further growth of the industry in such locations as Bielsko-Biała and Łódz since the late 1950’s.

¹. Based on GUS, Rocznik Statystyczny 1965, Table 13/144, Warszawa 1965. Consumption has been calculated by deducting exports of cloth from the output of the industry and adding imports.
². Based on GUS, Rocznik Statystyczny 1965, Tables 1/21, 43/174.
Basic Problems in the Development of the Industry after
the Second World War.

The large increases in the output of woollen textiles and
in employment were achieved despite the unfavourable physical
condition of the industry in 1945. Both the plant and the
buildings were inefficient in scale and design and widespread
damage had been incurred during the war. Much of the equipment
in the mills in 1945 was in a poor state of repair, causing
frequent breakdowns. The productivity of the spindles and looms
was low and in consequence the output which could be achieved on
the available floor space in the mills was small.1 Probably
eighty per cent of the plant had been originally installed
before 1914.2 In the mills in which more than one process had
been undertaken, the capacities of the plant in the various
sections were often not in balance and so some machinery and
buildings were often underemployed.3 The industry as a whole
was also unbalanced for the capacity of the wool washing and

1. Srodki i Warunki realizacji planu rozwoju przemyslu
wlokienniczego w latach 1961-5, in Przeglad
2. R. Jozwicki, Kierunki modernizacji przedsiebiorstw
czesankowych, in Przeglad Wlokienniczy 1959, p.285
3. S. Olszak, Osiegniecia Przemyslu Welnarskiego oraz zarys
planu rozwoju, in Przeglad Wlokienniczy 1959, p.213
4. W. Staczejawicz and M. Jacklowicz, Główne problemy projektu
piecioletniego planu inwestycyjnego w przemysele lekkim,
in Inwestycje i Budownictwo 1956 No.7-8, p.13, Warszawa
5. S. Sachacki, Powstanie i Rozwoj Mazowieckich ZPW, in Przeglad
Wlokienniczy 1962, p.601.
combing sections was insufficient to balance the capacity of the spinning section. Many firms before 1939 had been operating very small and inefficient mills and workshops with unhygienic working conditions, especially in the woollen spinning and weaving sections, while mills of the multi-storey design, which were unsuitable for modern systems of production, could not be extended after the war for lack of space in the centres of the textile towns.¹

The total stock of mills had declined as the result of the war damage, despite the acquisition of some textile mills in the Western Territories, which had been transferred to Poland from Germany in 1945. 298 woollen and semiwoollen textile mills and workshops existed in Poland in July 1945, but 115 were inactive and only 93 had any means of mechanical propulsion.² Substantial damage to fixed plant had occurred throughout the country, but the most seriously affected area was Bialystok. 21 of the larger mills in the town had been destroyed completely and seventy per cent of the mills and machines of the Bialystok region had been lost.³ In the

3. GUS, Spis Zakładów Przemysłowych 1945r., Table 1, Warszawa 1947, (Statystyka Polski, Seria D, z.3).
4. WAPB, Sprawozdanie miesięczne z działalności Wydziału Przemysłowego, Listopad 1944r., p.25, Typoscript.
Western Territories mills had also been destroyed and machinery removed during the war, and in Bielsko-Biała the industry had lost 43 per cent of its fixed capital. The damage in Lodz, Tomaszów and Zgierz was not very great in comparison with the losses in other areas because the machinery had not been sufficiently modern to be of use to the Germans and because little fighting occurred in that part of the country. However the losses in the worsted spinning mills of Częstochowa, Lodz, Lublinice and Sosnowiec were very considerable and the mill in Korki was destroyed completely.

The growth of output in all sections of the industry since 1945 has been achieved despite the poor physical condition of the mills in 1945 and also in spite of a shortage of resources for investment throughout the period. The decision to give preference to the development of heavy industry in the Six Year Plan, and the increased share of investment allocated to


2. Answer to oral question to Niejska Komisja Planowania w Bielsku-Białej.

the war industries during the Korean War have aggravated this shortage. Little capital has been available for the rebuilding of the consumer-goods industries or even for textile machine production, and cotton and silk goods have been given priority in the allocation of investment funds over the woollen branch of the textile industry.¹ Several new woollen textile mills were to have been built according to the Six Year Plan, but all were postponed and damaged mills could not be reopened between 1950 and 1955. For several years during the early 1950's the woollen textile industry did not even receive adequate investment to cover the depreciation of fixed capital.² Following the changes in emphasis in industrial development after 1956 the industry received considerably more investment funds, although still less than the cotton and silk branches of the industry, and most of the available sources have been used in the worsted spinning section of the industry.³

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1. I. Tybor, The Polish Textile Industry in Figures, in Przegląd Włókienniczy 1958, p.180. Between 1949 and 1956 435,600 new cotton spindles were installed, but only 70,000 worsted spindles. No looms were installed in either branch of the industry and no woollen spindles.


3. GUS, Statystyka Inwestycji 1962, p.41, Warszawa 1964 (Statystyka Polski z.100).
Processes of Growth under Socialism and the Changing Distribution of the Industry between 1945 and 1956.

In the absence of a massive programme of investment in new plant and buildings, the output and employment of the woollen textile industry have been raised since 1945 almost completely through the more efficient use of the existing fixed capital. The growth of activity between 1945 and 1956 was entirely restricted to the mills which had survived the war and therefore to the pre-war locations of the industry. As the result production and employment became concentrated in the Lodz area and in Bieleko-Biela to a greater extent than in the development of the industry under capitalism.

Rationalisation of the Capitalist Structure of the Industry.

The structure of the industry which had been bequeathed from the capitalist era offered considerable scope for increases in production through a programme of rationalisation. The previous chapter indicated how the industry had suffered throughout the 1930's from over capitalisation and how the problem had been aggravated by the easy conditions of entry into the industry in a period when some mills and plant were always lying idle and when electrically-operated looms could be installed and operated cheaply in small buildings and even houses. The structure of the industry under capitalism had
tended to increase the excess of productive capacity insofar as it was characterised by a large majority of single-process mills and a very few full-cycle mills. Many of the independently-owned single-process mills had been less than fully occupied as a result of imperfect knowledge among producers of the level of activity in all mills at every moment, and the consequent underemployment of plant in many mills had been increased by the periodic, short-run, slack times which arose out of the seasonal nature of the demand for textiles. Moreover several multi-process mills did not possess a balanced plant and such mills also depended upon the complex system of co-eration between firms based on constant contacts through the industry in order to avoid bottlenecks in production and temporary shortages of orders.

The monopolistic control in the industry after 1945 permitted better planning of production and a rationalisation of the structure which ended the pre-war situation in which the independence of the management in every mill or workshop militated against the necessary concentration of production in a few, large-scale, efficient, full-cycle mills. After 1945 the industry was reorganised into a small number of full-cycle enterprises (przedsiebiorstwo), in each of which the overall scale of production was usually as large as in the full-cycle mills in the Lodz region of 1937. Where possible
production was to be concentrated in one mill in which the processes could be physically, as well as functionally integrated, and even where this was not possible the reform of the organisation of production was intended to remove the frustrations and checks of the capitalist structure and the periodic and accidental over-capitalisation, and so be a cheap, rapid and easy means of regulating and increasing production.

The result of the reorganisation was that every mill became part of an enterprise in which all the processes of woollen textile manufacture, except worsted spinning, were included and in which they were in an approximate balance. Mills continued to be single or multi-process units after the capitalist manner, but after 1945 they were linked in a new structure in which each enterprise controlled production from the preparation of the raw materials to the finishing of the cloth. The grouping of the surviving mills in this manner did not result in any immediate changes in the townscape of Łódź or Tomaszów, Bielsko-Biała or Zgierz, but the integration of production eliminated many of the imbalances and inefficiencies of the capitalist structure, and permitted the reorganisation of production within the mills in each enterprise and the planning of activity more in accordance with the full potentialities of the industry, and these results in turn
allowed many of the less efficient mills to be closed. The government planned to reduce the number of enterprises or undertakings in the industry from 234 in 1946 to 42 in January 1948, and the number was very rapidly reduced at first, but by 1965 the number had only reached 51.¹

The rationalised structure of the industry under socialism was composed of large-scale enterprises, but because the majority of the mills of the capitalist industry had been of small or medium scale, each enterprise usually included several separate mills which had previously been in independent ownership. The mills in most of the multi-mill enterprises were all located in the same textile town. Thirteen enterprises existed in Lodz in 1965, for example, and they were composed of 45 mills. The enterprise named ZPW Bardowskiego had been created by the union of the weaving, dyeing and finishing mill which had belonged to Bukiot Bracia in 1937 and in which nearly 400 people had been employed, with the weaving mill of Bracia Mirsky i Wasserman, in which over a hundred people had been employed, and the woollen spinning mill of J. i L. Zlotowscy.

¹ C. Babinski, in Rocznik Przemysłu Odrodzonej Polski 1946–7, p.225c, Warszawa 1948
NPL, Biuletyn, No.1 1959, No.5 1959, No.6 1959; Dziennik Urzędowy, No.2 1964, No.1 1965.
Spis Telefonów m. Katowice i Województwa Katowickiego 1965/6, Warszawa 1965
in addition to several smaller units.\textsuperscript{1} Eight separate mills in the city belonged to the enterprise in 1965.\textsuperscript{2} In Tomaszow the Mazowieckie ZFW was composed similarly of a number of mills which had previously been in independent ownership. The enterprise included the three full-cycle mills which had belonged to Allart Rousseau, D. Bornstein and H. Landauf in 1937, the worsted spinning mill of Tomaszowskie Przedzialnie Welny Czesankowej and the weaving mill of Matys i Jakubowski.\textsuperscript{3} Between 1,200 and 1,700 workers had been employed in the five mills in 1937, but no mill had accounted for more than half of the total.

The physical concentration of the production of each enterprise in one mill was only possible in a few cases and multi-mill enterprises have been more usual than single-mill undertakings. Only in a few cases were mills considered to be sufficiently large to form enterprises alone, and few mills, even in the congested textile towns, were located adjacently in the capitalist era of growth and so could be physically linked after 1945, while the general congestion of buildings in the towns prevented any extension of individual mills.

\textsuperscript{1} S. Pawlowski, ZIW im. P. Bardowskiego w Lodzi, in \textit{Przegląd Wlokienniczy} 1962, p.605
\textsuperscript{2} Rocznik Polskiego Przemysłu i Handlu 1938, Warszawa 1938
\textsuperscript{3} APL, Izba, No.5, 17.
\textsuperscript{2} MKR w Lodzi, Plan centralny według stanu na dzień 31,1.1965x Typescript.
\textsuperscript{3} W.Majchrzak, Przemysł kluczowy Tomaszowa Mazowieckiego, pp.26-30, Praca Magisterska KGE UL 1957, Typescript.
\textsuperscript{3} MPL, Dziennik Urzędowy, No.2 1964.
\textsuperscript{3} APL, Izba, No. 4, 5, 15, 17, 23.
Moreover resources were not available for large-scale extensions to existing mills or for the construction of new mills on the desired scale. Thus the first rationalisation of the industry only replaced the capitalist pattern of informal, but complex and inefficient links between mills by a more formal and rigid pattern of interdependence and cooperation between limited groups of individual units of production.

The new pattern of links between mills was considered to be more efficient than the unregulated system of the capitalist structure, but, if the cost advantages of fully integrated and large-scale production were to be realised in multi-mill enterprises, it was desirable that the mills should be located within short distances of each other. The multi-mill enterprise was a suitable form for the reorganised industry in the congested concentrations of mills in Bialystok, Bielsko-Biała, Lodz, Tomaszow and Zgierz in which the industry had been characterised by small and medium-scale mills in 1937 or by a vertically disintegrated structure. No mills in these towns was more than a short distance from the others and formerly independent, but adjacent mills could be physically united. However in the cases of individual mills in isolated locations the multi-mill enterprise was less satisfactory as the form of
organisation, except where the mills were of large scale.
The medium-scale mills in Osorkow were linked to an enterprise
in which the majority of the mills and the headquarters were
fifteen kilometres distant in Zgierz, and the enterprise in
Bialystok included a mill in Michalowo in 1965, which was
36 kilometres from Bialystok. The mill in Zdunyka Wola was
also linked with a mill at the same distance which, in this
case, was located in Robianice, but none of these amalgamations
can have reduced the cost of production very considerably.¹

Only a few single-mill enterprises were formed after 1945
and they were almost all full cycle or worsted spinning mills.
The full-cycle mills in Lodz which had belonged to S. Boroiniski,
K. Eisert and F. w. Schwoikert and which had been among the
largest mills in the industry before the war, all became
single-mill enterprises.² The single-mill enterprises of
ZFW Nowotki in Tomaszow and Rakiawskie ZFW in Rakiazu were
also full-cycle mills which had belonged to Z. Bornstein and
Rakiawskie Fabryka Wyrobów Welnianych in 1937, when they had
employed about 300 and 200 people respectively.³ Other full-
cycle, single-mill enterprises in 1965 included ZFW Plater in

² Na początku Ludzi, opr. cit.
³ Roczny Polskiego Przemysłu i Handlu 1938.

¹ Majchrzak, opr. cit.
³ Roczny Polskiego Przemysłu i Handlu 1938.
¹ PL, Izb, No. 5.
Wosilkow, which had been a woollen spinning mill in 1937,\(^1\)
Zagorewkie ZPW and Szczecinskie ZPW, which had belonged to one
of the largest, full-cycle firms in the Bielsko-Biała region
before the war, Neillpersk Braiciu.\(^2\)
ZPW Findera in Bielsko-
Biała was also a single-mill enterprise by 1965, but it was
formed by the amalgamation of three adjacent mills which had
belonged to the firms of Druckers, Kornhaber and Riesenfeld in
1937.\(^3\)
In the worsted spinning section, in which the scale of
production had been larger than in all the other structural
groups of mills in 1937, all except four mills were single-mill
enterprises,\(^4\) but the scale of operations in many of the mills
was much larger than before the war.

The rationalisation of the industry has resulted in a
sudden and substantial increase in the average scale of
production and in the transformation of a largely vertically
disintegrated structure into one composed almost entirely of
full-cycle undertakings. The grouping of the mills in this

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1. C. Grygo, Monografia Wasilkowa, p.40, Praca Magistarska
KGE UL 1963, Typescript.
2. Rocznik Polskiego Przemyslu i Handlu 1938
3. Rocznik Polskiego Przemyslu i Handlu 1938
Information collected in the mills.
4. Rocznik Polskiego Przemyslu i Handlu 1938
Zjednoczenie Przemysłu Przedzaln Czescankowych, Wykaz
przedsiębiorstw zgrupowanych w Zjednoczeniu Przemysłu
Przedzaln Czescankowych od dnia 1 stycznia 1965 roku,
Typescript, Łódź 1965.
manner has also permitted an increase in scale within each process of production by the redistribution of machinery between the mills and by the closure of many small mills, but these processes of further rationalisation have not affected all centres of the industry equally.

The grouping of mills after 1946 brought together many units which performed the same processes of production before the war. ZIW Fiedera in Bielsko-Biala was composed of a full-cycle and two weaving mills, and ZIW Dabrowskiego in Zgierz was formed by the merger of several single-process spinning, weaving, dyeing and finishing mills.\(^1\) The plant in such enterprises has been redistributed among the mills to remove the bottlenecks in production, to reduce the number of processes in each mill, and to concentrate each process of production in one mill where possible. In ZIW Fiedera all the woollen spinning had been concentrated by 1965 in the former full-cycle mill, all the weaving in one of the former single-process weaving mills, and the third mill had been transformed from a weaving to a dyeing and finishing works. Many of the mills now house different and often fewer processes of production than in 1937 and most of the mills are single-process units which are working on a larger scale than was usual in the spinning, weaving or wet process groups of mills in 1937.

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1. Rocznik Polskiego Przemyslu i Handlu 1938: Information collected in the mills.
The increases in the scale of production in each undertaking and in each process, and the elimination of the influence of the seasonal demand and of bottlenecks upon the activity of the industry have enabled the output of woollen textile goods and the employment in the existing mills to be doubled since 1945. The increased efficiency in the use of the mills of medium and large scale has also permitted the closure of many of the smaller units without loss of employment or output as a whole in the industry, although the level of employment has been reduced in some towns. Many of the single-process weaving mills in 1937 which survived the war have been closed or converted into garages, offices or stores for the other mills, and the machinery has been scrapped or transferred to other, larger mills in the same enterprises. Small spinning or weaving shops were closed in Bialystok, Zgierz and Zielona Gora during the 1950's, but the reduction in the number of mills has occurred chiefly in the centres of small-scale production in 1937 which suffered little damage during the war. The number of mills has been reduced by this method most substantially in Bielsko-Biala, Lodz, Fabianice, Tomaszow and Zgierz, but the other towns in which fewer, but larger mills existed in 1937, have been little affected.¹

The closure of the smaller mills has continued throughout the post-war period and the number of mills in the state-owned industry has declined, although the pace of closures has slackened since the end of the Three Year Plan in 1949. As the programme of closures continues the scale of the mills which are leaving the industry has been rising. Whereas some of the weaving workshops in Zgierz which were closed only had ten looms, a woollen spinning mills which was closed in Bialystok in 1962 had employed a hundred people, and between 1966 and 1970 it is planned to close two of the four mills belonging to ZFW Osowskiego in Lodz which together employed between 200 and 300 people in 1965. As the result of the continuing policy of concentrating production, the number of mills in Lodz declined from fifty in 1956 to 45 in 1965 and throughout Poland the total fell from 177 to 157 in 1961.

The grouping of the mills has not resulted in all cases in the vertical integration of production. The spinning of worsted yarn is not integrated with the weaving section of the industry and not always with the dyeing process. The washing

2. GUS, Statystyka Przemysłu 1956, Table 2, Warszawa 1958 (Statystyka Polski z.4); Statystyka Przemysłu 1961, Table 31/XII, Warszawa 1963 (Statystyka Polski z.81) MKiG w Lodzi, Plan Centralny według stany na dzień 31.1.1965r.
of wool is also concentrated in a few mills, of which the most important are the worsted spinning mills, from which the other enterprises draw their supplies of clean wool. All wool which is imported arrives in the greasy state and all the Polish wool must also be washed. Much wool is still washed in one town and spun in another, as it was in 1937. All the wool which is used in Tomaszów, for instance, is first washed in other centres of the woollen textile industry.¹

Despite the rapidly rising output there has been no movement of new firms into the industry in the pre-war fashion. In accordance with the monopolistic form of control, the shortage of investment funds and machinery, and the general discouragement of private industry by the government, the entry of firms in private ownership and the building of new mills have been strictly limited.² A few new mills have been

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¹ W. Kajchrzak, op.cit.
Izba Przemysłowo-Handlowa w Częstochowie, Sprawozdanie z sytuacji gospodarczej i w działalności za II kwartał 1947r., p.1, Częstochowa, Typescript.
Ibid., za II kwartał 1948r., p.22
Izba Przemysłowo-Handlowa w Łodzi, Sprawozdanie z sytuacji gospodarczej w I kwartale 1946r., pp.3-4, 6, 8, 20, Łódź.
Ibid., za Kwiecień 1948r., pp.1-2; za Kwiecień 1949r., p.1; za Lipiec 1948r., pp.1-3.
J. Wilk, Przemysł włókienniczy Okręgu Południowego ze szczególnym uwzględnieniem urodzi ska przemysłu welnianego w Bielsku-Białej i przemysłu bawełnianego w Andrychowie, p.50, Praca Magisterska KOŚ WSE, Katowice 1959, Typescript.
built by the state, but they have all been started since 1956, and a few very small private and rather larger co-operative workshops have been opened, but they are largely limited to the craft production of woollen goods. The private and co-operative workshops contribute less than five per cent of the total production of the industry and the private firms are usually very unstable and short-lived. Thus the full benefits of the establishment of the large-scale enterprises have been protected from a renewal of the problems of vertical disintegration or over capitalisation. 95 per cent of the products of the industry are from the declining number of mills in the ownership of the state, and almost all of these mills are working at the maximum capacity on three shifts.

The policies of rationalisation and of increasing the scale of production between 1945 and 1956 have been applied to other industries in Poland. The concentration of the production of electricity into a few large-scale generating stations has affected both the textile mills and the textile gowns directly and visibly. Between 1956 and 1961 new electricity generating stations were constructed in Bielsko-Biała and Lodz, and the high-cost boiler houses and generators,

1. GUS, Statystyka Przemysłu 1956, Table 4, Warszawa 1958 (Statystyka Polski z.7); Statystyka Przemysłu 1962, Tables 4/23, 5/24, Warszawa 1964 (Statystyka Polski z.98)
2. Based on GUS, Statystyka Przemysłu 1962, p.XXXIV.
which every large mill possessed in order to generate power and to heat water, have become redundant. All the mills in Bielsko-Biała were connected to the new stations between 1961 and 1964 and now draw their supplies of electricity, hot water and steam from it, and simultaneously the mills in Lodz were linked to the new power station there. The tall chimneys of the textile mills, which are illustrated by the frontispiece, still remain as relics of the capitalist structure of organisation and ownership, but today they are smokeless and stand out clearly against the sky for the first time while the towns below are now clean and brightly painted and in the streets young trees can flourish.

The Changing Distribution of Production about 1956.

The rationalisation of the woollen textile industry permitted the growth of production to take place entirely within the existing mills until the late 1950's. Despite the closure of mills in the important towns and the addition of new centres in the Western Territories, production and employment were still located to a large extent in the pre-war centres in 1956. Moreover the capitalist pattern of an increasing concentration of production in one or two centres continued during the late 1940's and 1950's in contradiction
DIAGRAM 38  The Changing Distribution of Yarn Production
1955 - 1962

Sources - Cus, Statystyka Przemysłu 1961, Table 3/109,
Warszawa 1963 (Statystyka Polski, z.81), Statystyka
Przemysłu 1962, Table 3/102, Warszawa 1964 (Statystyka
Polski, z. 98).

Other Wojewodztwa
Poznanskie Woj
Opolskie Woj
City of Wroclaw.
Wroclawskie Woj.
Bialostockie Woj
Zielonogorskie Woj

Katowickie Woj.

Lodzkie Woj.

City of Lodz

% Output by quantity

Years of production

DIAGRAM 39  The Changing Distribution of Cloth Production
1955 - 1964

Sources - 
Gus. Statystyka Przemyslu 1961, Table 3/109, Warszawa 1963 (Statystyka Polski, z. 81) Statystyka Przemyslu 1962, Table 3/102, Warszawa 1964 (Statystyka Polski, z. 80).

Gus - Rocznik Statystyczny 1964, Table 13/142, Warszawa 1964
Rocznik Statystyczny 1965, Table 15/146, Warszawa 1965
THE CHANGING DISTRIBUTION OF CLOTH PRODUCTION 1955 - 64

% Output by quantity

Years of production


Other Wojewodztwa
Rzeszowskie Woj
Koszalinskie Woj
Krakowskie Woj
Wroclawskie Woj
Bialostockie Woj
Zielonogorskie Woj
Katowickie Woj
Lodzkie Woj
City of Lodz
to the government's policy of distributing industry more widely, and the distribution of both production and employment in 1956, which are illustrated by Diagrams 38 and 39 and by Map 40, were dominated by Bielsko-Biała and Lodz and the Lodzkie województwo.

Diagram 38 (on page 349) shows that more than half of the output of woollen and worsted yarn in 1956 was located in Lodz and Lodzkie województwo, and that when the output of Bielsko-Biała and the mills in Częstochowa and Snośowice were included only twenty per cent of the total output of yarn was not included. Diagram 38 also shows that although the proportion of the output which was produced in both Lodzkie województwo and Lodz was falling, the decline was almost completely offset by the growth of production in the southern locations of the industry. The output of yarn in Lodz continued to rise slowly after 1956 and reached a peak in 1959, and in Katowickie województwo the output was a third larger in 1962 than it had been in 1956.¹

Diagram 39 (on page 351) illustrates the changing distribution of the production of woollen cloth. It shows that, as a result of the policy of concentrating production in existing mills up to 1956, a larger proportion of the output was located in Bielsko-Biała, Lodz and the Lodzkie województwo.

¹. GUS, Statystyka Przemysłu 1961, Table 3/109.
MAP 40  Employment in 1956

The areas of the circles are proportional to the numbers of workers in the woollen textile industry in each województwo. The circles are divided according to the proportions of the total number of workers in state-owned mills and in co-operative mills in each województwo.

Source - GUS, Statystyka Przemysłu 1956, Table 2, Warszawa 1956 (Statystyka Polski, z. 4).
województwo in 1956 than in any succeeding year. The Diagram also shows that the proportion of the output which was produced in Lodz continued to increase until 1958, and the production of cloth in the city was higher in 1959 than it had been in the preceding year. The peak year of production in Katowickie województwo was also in 1959.\footnote{Ibid.}

Unfortunately no details of production are available for the years between 1949 and 1955 and the employment statistics for each województwo have only been published for 1956. The distribution of employment in the industry in that year is illustrated in Map 40 (on page 354) when the mills in Katowickie and Łódzkie województwo and in Łódz employed 67 per cent of the labour force. Diagram 41 (on page 357) indicates that the rapid growth of activity in the industry in the Bielsko-Biała and Łódź groupings, and especially in Łódz and Łódzkie województwo, after 1945 resulted in an increasing concentration of the industry in these areas and that the extent to which the industry was concentrated in these areas had increased since 1931, when the mills in the Western Territories are omitted. Employment in the industry rose rapidly from the 1937 levels up to 1956, but it never varied by as much as one per cent from the 1956 total after that year. Employment in Łódź, in contrast, and probably also in Bielsko-Biała, continued to rise in the late 1950's until a third of the industry's employment
The figures refer to percentages of the total increase in employment for the woollen textile industry as a whole in Poland (in the stippled columns) and in Poland excluding the Western Territories (in the columns shaded by lines).

Sources - GUS, Drugi Powszechny Spis Ludnosci z dnia 9 XI 1931 r. Bialostockie Wojewodztwo (Statystyka Polski, Seria C, z. 83), Krakowskie wojewodztwo (Statystyka Polski, Seria C, z. 88), Lodzkie Wojewodztwo (Statystyka Polski, Seria C, z. 77), Misto Lodz (Statystyka Polski, Seria C, z. 67), Sileskie Wojewodztwo (Statystyka Polski, Seria C, z. 54), Statystyka Polski, Seria C, z. 94a, Warszawa 1937-1938.

GUS - Statystyka Pracy i Siatu 1956, Table 2, (Statystyka Polski z.4), Warszawa 1958

Zero is the total increase in employment in the industry 1931-1956

- Growth of employment since 1931 in relation to the total in 1956.
- Growth of employment since 1931 in relation to the total employment in 1956, excluding the western territories.
was in Lodz in 1959, when the peak of woollen textile employment in the city was reached, and almost twenty per cent was in Bielsko-Biala.¹

Problems associated with the Concentration of Production in Existing Mills and the Choices of New Locations for the Industry 1956-1965

The rationalization of the structure in the woollen textile industry and the consequent increase in output in the mills which had survived the war removed the pre-war problems of the under-employment of plant and labour and reduced the proportion of overheads in the total cost of production in the terms of the capitalist. However the concentration of the greatly enlarged production in a few centres of the industry threatened to raise the costs of production, as they were defined by a communist government, very substantially in the late 1950's. In particular the shortage of supplies of water and of labour had become acute in the Lodz area, in Czestochowa and in Bielsko-Biala, and these problems threatened increasing social impoverishment in the textile towns and for the employees of the industry who commuted daily over long distances. The problem of water supply had been aggravated by the discharge of noisome effluent in increasing quantities by the mills as the output of textiles had increased, and the shortage of labour was exacerbated in the textile towns by the government's policy of diversifying the local and very specific economies.

The Concentration of Production and the Supply of Water

The textile towns of Aleksandrow, Konstantynow, Lodz, Fabianice and Zgorz are all located on the Bzura-Pilica-Warta watershed and they all faced a severe water shortage between 1956 and 1965. The alternative to a halt in the rising level of textile production in the area and a gradual development of the industry in other parts of Poland was large-scale investment in new supplies of water for the area, and especially for Lodz.

Three-quarters of the supply of water for Lodz in 1959 was drawn from wells and boreholes in and around the city and a quarter was transported fifty kilometres by pipeline from the Pilica river. 92.5 per cent of the available supply was consumed in 1959 and the demand for water has continued to grow. The chief consumer of water in the city was industry, which used two-thirds of the supply, and the demand from the woollen textile mills accounted for eight per cent of consumption in 1959.1

The growing demand for water in Lodz in the 1950's arose as the result of government policies for the textile industry. The increasing output of cloth was accompanied by a growing consumption of textile raw materials, and the

government has sought to substitute Polish materials for imported wool and rags wherever this has been possible since 1945 in the struggle to balance the foreign payments of the country. This policy has led to the substitution not only of Polish for foreign wool, but also of imports of greasy wool for clean wool and of Polish man-made fibres for imported natural fibres. By 1959 the mills producing man-made fibres in Lodz alone used twelve per cent of the available water in the city. Furthermore, the incorporation of man-made fibres in woollen and worsted cloth has been followed by an increase in the use of water by the dyeing and finishing processes for the behaviour of man-made fibres in the wet processes is inferior to that of both wool and cotton, and satisfactory results are only obtained through larger applications of water. The government has also encouraged the industry to improve the quality of its products, and the quality of cloth depends largely upon the raw materials, but also upon careful finishing. The output of cloth containing one hundred per cent wool has


Prochowski, op.cit., z.2, p.3; z.7, pp.29-30.
been rising and the increasing use of greasy wool and improvement of the finishing process have both raised the consumption of water to a greater extent than the output of cloth.¹

Although the textile industry in the Lodz area has been increasing its demands for water of good quality, the supply has been declining. Local supplies of surface water were already too polluted to be used by the industry in the 1880's and the mills have been drawing water from boreholes and from the urban supply of soft water from the Pilica. After the mid-1950's the growing demand led to a fall in the level of the water table throughout the Lodz area and the consequent dessication of the shallower boreholes and wells after the hydrological balance in the inter-war years, while the effluent from mills has polluted the water in some of the other boreholes.

The woollen textile industry has reacted to the declining ground water supplies by substituting the softer Pilica water for the harder water from the boreholes. The largest worsted spinning mills in Lodz increased its output of washed wool by 18.5 per cent between 1960 and 1964 and also its output of yarn in dye. In the same period the

portion of the total consumption of water in the mills which was supplied from the urban network rose from 25 to 28 per cent, and the use of water from boreholes fell by seven per cent. Although the permitted maximum hardness for the washing and dyeing of wool is only one degree (German), the water from the boreholes belonging to the mill has a hardness of between nine and fourteen degrees, while the water supplied by the city is several times softer. The mills is also facing an absolute shortage of water. Although it has five boreholes, those in the surface layer of quaternary sands are both dry. Only the deepest of the three boreholes in the Upper Chalk, reaching to 220 metres below ground level, is now yielding, and the level of the water table in this hole fell fifteen metres between 1958 and July 1964.1

The mills in Pabianice and Zgierz, which are located on the same watershed as Lodz, also draw on groundwater for their supply. In Zgierz the water has a hardness of twenty degrees and only twenty per cent of the total supply in one enterprise is drawn from that source. The water table is also falling in Zgierz, but eighty per cent of the supply is still drawn from surface supplies, chiefly from

1. Information collected in ZPW Gwardii Ludowej in Lodz. MKPG w Lodz, Plan alternatywny zakladow lodzkich z Zjednoczenia Przemyslu Czesankowego, Lodz 1965, Typescript.
streams in which the water is often of ten to twelve degrees of hardness, but ninety per cent is subsequently discharged into the river Bzura, thus polluting the water for other users.  

In Bielsko-Biała the mills used the water from the rivers and from boreholes before the war for it has a hardness of only three or four degrees. The fourfold increase in the output of cloth and the introduction on an increasing scale of man-made fibres since the war have raised the demand for water and mills have been obliged to meet their increased needs from the urban supply. Not only has the demand in the town risen rapidly, but at present effluent is discharged almost entirely into the river Biała, thus making it of limited value for use in the mills downstream. 47 per cent of the supply for the woollen textile mills was drawn from the rivers in 1958, including tributaries of the Biała, and 25 per cent from boreholes, but in that year 38 per cent of the requirements of the industry were met from the urban and domestic supply.  


The problem of water shortage has become particularly acute in the areas of large and growing, but localised demand by the textile industry. The output of cloth, clean wool and yarn in dye has been raised very substantially in the congested mill towns since 1945 where the sources of water are limited. Moreover the towns have been simultaneously obliged to dispose of comparable increases of effluent from the mills. In locations where there are only a few mills or in rural areas there is no comparable problem. The single river or private borehole is adequate to meet the increasing demands of mills such as those in Torun, Wielkow, Zagan or Zary, but in the major centres the cost of the supply of water is rising. A second and larger pipe from the Pilica river to Lodz, a special conduit to collect the effluent from the mills in Bielsko-Biała, and a new supply to Bielsko-Biała from the river Sol are all in process of construction or are planned for the 1966-1970 period.

Insofar as the provision of the new supplies of water to Lodz and the Lodz area involve large investment resources it is relevant to ask whether a redistribution of the industry and the relocation of the processes of wool washing and cloth finishing away from the major concentrations of production would not solve the shortage of water more cheaply. The endemic water shortage of Bielsko-Biała and Lodz may mean that in the context of the policy of further
increasing the output of cloth in Poland and perhaps even in maintaining production at its present level a wider distribution of the industry will be required which would involve relative or absolute reductions in the status of the two major centres. The complete absence of wet processes in the mills in Ozorkow and the absence of wool washing in Tomaszow offer immediate possibilities for the decentralization of these processes in the Lodz area. Both towns have better natural water supplies than the watershed locations and the river Pilica at Tomaszow has the softest natural water in the Lodzkie wojewodztwo at a hardness of 1.5 degrees.

The Concentration of Production and the Supply of Labour

The increase in the production of woollen textiles over the pre-war levels has been achieved largely by a two-fold increase in the labour force. The importance of labour to the increase in output may be judged from the fact that while the output of yarns and cloth rose by 123 per cent and 131 per cent respectively between 1947 and 1956, employment increased by 75 per cent and labour skill was also rising. Diagram 42 (on page 367) shows that the number of workers in the industry remained stable after the establishment of three-shift working in almost all mills between 1956 and 1964, and in those years the output of
DIAGRAM 42 Changes in Employment in the Woollen Textile Industry

No details of employment were published between 1947 and 1956.

Sources - *Gus, Rocznik Statystyczny 1948*, p. 58, Warszawa 1948;
*...* 1964, Table 39/168, Warszawa 1964; *...* 1965, Table 43/174, Warszawa 1965; *Statystyka Przemysłu 1947*, Table 1, (Statystyka Polski, Seria D, z. 19) Warszawa 1949;
*Statystyka Przemysłu 1956*, Tables 8 and 9, (Statystyka Polski, z. 8), Warszawa 1958; *...* 1957, Table 7 (Statystyka Polski, z. 22), Warszawa 1959; *...* 1958, Table 25/39, (Statystyka Polski, z. 41), Warszawa 1960;
*...* 1959, Table 37/50, (Statystyka Polski, z. 50), Warszawa 1961; *...* 1960, Table 54/67 (Statystyka Polski, z. 64), Warszawa 1962; *...* 1961, Table 57/79 (Statystyka Polski, z. 81), Warszawa 1963; *...* 1962 Table 53/72, (Statystyka Polski, z. 98), Warszawa 1964
CHANGES IN EMPLOYMENT IN THE WOOLLEN TEXTILE INDUSTRY.

Number of workers (in thousands).

Date

yarns rose by only 21 per cent and the output of cloth by only eighteen per cent.¹ As the result of the shortage of investment capital the increase in employment occurred within the existing textile towns and it has already been shown above that the proportion of the industry's labour force which was located in Bielsko-Biała and Lodz was rising up to 1959. In the mid-1950's shortages of both labour and housing were appearing in both towns and further supplies of labour depended upon increases in the number of daily commuters from rural areas.

Employment in Lodz grew faster in the late 1950's than in the industry as a whole despite the fact that a shortage of all types of industrial labour had appeared in the city and that throughout the decade up to 1965 the city employed more of the female population than any other city or large town in Poland.² The number of employees in the state-owned mills rose from 21,160 in 1955 to 29,100 in 1959 and the increase between 1956 and 1959 was three times as great as the total increase in the labour force of the whole woollen textile industry. After 1959 employment in the city began to decline and by 1964 the total had fallen to 26,670, and it is expected to remain at this level until 1970.³

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1. Based on figures from GUS, Statystyka Przemysłu 1947, Table 1, Warszawa 1948 (Statystyka Polski, Seria D, Z. 15); Statystyka Przemysłu 1956, Table 1.
   Olszak, op. cit., p. 213.
   Tybor, op. cit., p. 119.

2. GUS, Statystyka Przemysłu 1962, Table 6/105

The same phenomenon has appeared in the mills belonging to the Southern Union of the industry, which is composed largely of the mills in Bielsko-Biała.¹ The labour force grew rapidly from 11,340 in 1950 to 23,440 in 1955 and had reached 25,390 by January 1959. The total was expected to rise further to 27,000 in 1962, but to be declining by 1965.² In Bielsko-Biała the number of employees declined slightly between 1959 and 1962, but in 1965 44 per cent of the people employed in industry in the town lived outside it and some travelled daily twenty kilometres from Zywic by rail.³ Similar trends in the employment in other centres have also occurred. Employment rose in the Bialystok region from 3,210 in 1956 to 3,530 in 1960, but it had been reduced to the former level again by 1964.⁴

While employment in the chief textile towns was reduced in the early 1960's in response to the shortage of labour, the labour force in the Western Territories continued to increase.⁵

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1. The Southern Union includes all mills in state ownership in the woollen textile industry in Katowice, Opolskie, Rzeszowskie, Wroclawskie and Zielonogorskie wojewodztwa and the city of Wroclaw except the worsted spinning mills. The headquarters of the Union are in Bielsko-Biała. The Northern Union and the Worsted Spinning Union are centred on Lodz.
4. Information collected in the offices of the Southern Union in Bielsko-Biała and in ZIW Pindera.
5. Information collected in ZIW Sierzana in Bialystok.
The opening of new mills and the continuing growth of production in the existing mills in the Western Territories has offset the decline in both production and employment in the Lodz area and in Bielsko-Biala, and it has assisted in relieving the pressure on the resources in those centres, while simultaneously distributing the industry more evenly over the country. As an alternative to the rising marginal cost of production in Bielsko-Biala and Lodz it has been considered desirable to develop light industry in rural communities where housing and main services, transport facilities, schools and shops are already in existence, and where water supplies and labour are not overemployed.

The Redistribution of Production between 1956 and 1965.

The emphasis of development in woollen textile manufacturing in Poland during the second post-war decade was transferred from the large textile concentrations of central and southern Poland to the Western Territories and from the concentration of the industry in a few centres to the enlargement of employment in a large number of isolated locations. The contribution of the industry to the general industrialisation of the country and to the equalising of employment opportunities for both sexes throughout Poland between 1956 and 1965 was largely restricted to the broadening
of the economies of existing communities through the development of existing mills and the construction of new mills in locations which are eccentric to the major centres of the industry.

The necessary rebuilding, extension and modernisation schemes in the mills in the Western Territories have been made possible since 1956 by a change in the direction of the whole economy from an insistence upon the importance of heavy industry to a more equal allocation of resources for the development of all branches. The planned share of investment in the woollen textile industry rose from 5.5 per cent in the Six Year Plan to eighteen per cent of a larger share of the total planned investment of the nation in textile production during the first Five Year Plan, from 1956 to 1960.1 The growth in output during the first Five Year Plan was to come entirely from existing buildings in the woollen spinning section, but a third of the increase in weaving and half of the increased output of worsted yarn, tops and washed wool was planned to be produced in new and enlarged mills.2 The emphasis in investment was again placed upon the enlargement and modernisation of mills in the second Five Year Plan, from

1. Staczewicz and Jackiewicz, op.cit., p.15.
1961 to 1965. Both Plans devoted over half of the investment to new machinery which would raise the output of existing buildings rather than to the construction of new mills, but the major schemes of modernisation and enlargement were chiefly located in the isolated locations on the Western Territories.¹

The most important methods of expanding production since 1956 has been the enlargement of existing mills and the modernisation of plant in order to reduce the labour requirements. The distribution of these two methods reflects the problems which have been outlined above and which stemmed from the enlargement of production during the first post-war decade in the congested centres of the industry. Investment in Lodz has been confined to the modernisation of equipment and to the reduction of the labour demands, rather than to the enlargement of premises. The allocation of the available resources has also been largely restricted to the worsted spinning mills in the city. The spinning section in Lodzkie ZPW has been re-equipped and the combing shop in ZPW Gwardii Ludowej rebuilt and modernised with the intention of reducing the labour force in the two mills by 860, or twelve per cent, between 1965 and 1970.²

   Krzyglod, op.cit., p.74.
   Staszewicz and Jackiewicz, op.cit., pp.14-16.
2. MKPG w Łodzi, Plan alternatywny zakładów lodzich.
In Dielako-Biała, where some of the mills are not centrally located in the congested part of the town, several schemes of rebuilding and mill enlargement have been completed since 1956. ZPW Bularza, which is located in open country on the edge of the town, has been enlarged substantially but the shortage of labour in the towns has also been reflected in the importance of re-equipment in the mills. The spinning section of ZPW Miedzielskiego and also ZPW Findera have been re-equipped and many of the other mills appear to have been modernised during the period between 1956 and 1965. However the most important and most numerous group of investment projects in these years were located in the smaller centres of the industry. The dyeing shop at Lubakie ZPW has been rebuilt, Zielonogorskie ZPW and ZPW Nowotki in Tomaszow have been enlarged by the construction of new weaving sheds and a dyeing and finishing shop has been added to the mill in Michałowo, and new mills have been built at Sulechów, Toruń, Zagan and Zielona Gora.

The location of labour-saving investment projects in Bielsko-Biała and Łódź and of labour-intensive expansion schemes in the less industrialised parts of Poland reflects

1. Information collected in MKIC in Bielsko-Biała and in ZPW Findera. Fieldwork in Bielsko-Biała.
DIAGRAM 43  Changes in Industrial Employment
1955 - 1964 (in Lodz)

Details of employment are only available for the years shown in the diagram. Values on the z axis begin at 20,000 in order that the changes of employment in the woollen textile industry should be clearly visible.

Sources - Gus, Statystyka Przemyslu 1956, Table 2, Warszawa 1958,
(Statystyka Polski, z. 4)
MKPG w Lodzi, Alternatywny projekt planu piecioletniego
Z. Prochowski, Uwagi o funkcjach i stanie zagospodarowanie
Lodzi, p. 1 , in Lodzkie Czasopismo Gospodarcze,
z. 7, Lodz 1960
CHANGES IN INDUSTRIAL EMPLOYMENT

Workers in industry.

Date

1955 1960 1965
the need to redistribute the industry. Employment could be reduced much further than the planned levels for in 1959 it was estimated that ninety per cent of the labour force would be redundant if a thorough-going programme of automation was undertaken. However, while labour remains cheap in relation to capital as a factor of production, while the population within the working age-groups continues to grow quickly, and while investment funds continue to be in short supply, there is little incentive to accelerate the rate of the substitution of capital for labour. Nor is there any evidence to suggest that a radical modernisation and automation of the industry is planned during the five years before 1970, but rather that piecemeal projects designed to yield substantial increases in output and quality in return for small outlays in carefully chosen locations will continue to be the pattern of development in the industry.

The consequences of the renewed attempt to distribute industry more widely throughout Poland after 1956 and of the desire to relieve the pressure upon the resources in Bielko-Biała and Lodz are illustrated in Diagrams 38, 39, 43 and 44. The changing distribution of cloth production in Diagram 39 (on page 399) indicates that the place of Lodz in the total output of woollen cloth declined continuously after 1958, and

Diagram 38 (on page 349) shows that the city's proportion of the national output of yarn fell with every year between 1955 and 1962. The proportion of the industry's employment in Łódź also fell from 35 per cent in 1959 to thirty per cent in 1964, after a period of relative stability.¹ The share of Bielsko-Biała in the national output of cloth decreased slightly between 1958 and 1964, but the changes in the production of yarn in the town are hidden by the growth in the output of worsted yarn in the other textile towns of Katowickie województwo. Diagrams 38 and 39 also show that the share in the output of yarn and cloth of Łodzkie województwo declined after 1955. The proportion of the output of cloth in the województwo grew again after 1959, but employment in the mills, as in Łódź, was falling. The numbers of workers in ZPW Dobrowskiego in Zgiers, which are shown in Diagram 44 (on page 379) declined in every year from 1956 to 1965, and in Łódź (on page 375) the level of employment fell absolutely after 1959 and is planned to remain at about 26,700 until 1970.²

In contrast to the slow decline of the industry in the larger centres the buoyancy of the growth of employment and production in the smaller centres between 1956 and 1964

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1. Based on Prochowski, op. cit., z. 7, p.19
   GUS, Rocznik Statystyczny 1965, Table 43/174
   EXFG w Łodzi, op. cit.
2. EXFG w Łodzi, op. cit.
Values on the x axis begin at 1,500 in order that the changes of employment in the woollen textile enterprise should be clearly visible.

Source - Information supplied from the archives of the enterprise.

Workers in industry.

Date

1955 1960 1965
indicates that, although they occupied a marginal position in relation to the production and employment of the whole industry, their importance was increasing. Diagram 39 shows that the share of the national output of cloth of Zielonogorskie wojewodztwo almost doubled between 1955 and 1964, and employment in the wojewodztwo had increased by 72.5 per cent between 1956 and 1961, while the national total in the state-owned mills rose by only 4.1 per cent.\(^1\) The other mills in the Western Territories, which were chiefly in Koszalinskie and Wroclawskie wojewodztwa, doubled their proportion of the national output of cloth between 1955 and 1964 and also raised their proportion of the national output of yarn.

The changing distribution of the output of woollen textiles, which is portrayed in Diagrams 38 and 39, does not show the growth or decline of production in individual centres of the industry, but these mark even more clearly the influence of government policy upon the distribution of production. The total output of both yarn and cloth was rising slowly after 1956 in relation to the first post-war decade and therefore in some towns the declining proportion of the national output was caused by an absolute decrease in the output of the mills. The substantial relative decline of

\(^1\) Based on GUS, Statystyka Przemysłu 1962, Table 7/101; Rocznik Statystyczny 1965, Table 43/174.
the city of Lodz in the output of cloth after 1958 was the result of an absolute fall in output of eleven per cent between 1959 and 1964, while the output of Lodzkie wojewodztwo, which fell by 26 per cent between 1955 and 1959, rose to 97\% of the output of 1955 by 1964. Not only has the proportion of the output in the two congested locations of the industry been reduced, but the total output of cloth in Lodz is now falling while in Bielsko-Biala the output is stable.

Output in the smaller centres, in contrast, was rising very substantially between 1956 and 1964. In Zielonogorskie wojewodztwo the production of cloth rose continuously and by 67 per cent between those years, the output of Koszalinskie wojewodztwo rose by 218 per cent between 1955 and 1964, and that of Wroclawskie wojewodztwo by 333 per cent in the same period. Although these increases were locally large the effect on the national total has been small for, between 1955 and 1959, the combined production of Katowickie wojewodztwo and Lodz increased by 7,908,000 metres of cloth while only 2,238,000 metres were added to the output in Koszalinskie, Wroclawskie and Zielonogorskie wojewodztwa. After 1959 the situation was reversed for the output of the three western wojewodztwa increased by 5,823,000 metres between 1959 and 1964 while the output of Katowickie wojewodztwo and Lodz fell by 1,945,000 metres. During the same period the national
DIAGRAM 45 Changes in Industrial Employment 1955 - 1964

Values on the x axis begin at 1,500 in order that the changes of employment in the woollen textile enterprise should be clearly visible.

Source - Information supplied from the archives of enterprise.

Date

Workers in industry

1955 1960 1965
Thus output was growing more in absolute terms in the problem locations of Bielsko-Biała and Łódź before 1959 and the contribution of the western locations to the increasing output and to the solution of the congestion in the two major locations of the industry was relatively small, but since 1959 the growth of the industry's output has been maintained by the western centres while the output of the major towns, and especially of Łódź, have declined.

The Choices of Location for New Mills.

Although only a few new woollen textile mills were opened between 1956 and 1965 the choices of location are all illustrative of the government's policies of diversifying rural economies, spreading industry more evenly throughout the country, and reducing where possible the costs of congestion in the larger centres of the industry. The contribution of the new mills to the achievement of these aims has been small in comparison with the cotton branch of the industry for new mills have only been opened at Sulechów, Zagan and Zielona Góra in Zielonogórskie województwo and at Toruń, and in 1965 they employed less than three per cent of

1. Based on GUS, Statystyka Przemysłu 1962, Table 2/101. Rocznik Statystyczny 1965, Table 15/146.
the industry's labour force. Furthermore the mills at Sulechow and Torun alone of the four new mills are completely new buildings on greenfield sites. In Zagórz and Zielona Gora the mills required repairs and re-equipment, but they had been operated as woollen textile mills before 1939 and neglected since 1945 as the result of the shortage of investment resources.

The mill at Sulechow was located close to the parent enterprise in Zielona Gora and also in one of the weakly industrialised towns of the województwo. Sulechow had possessed no large-scale industry in 1956 and had been dominated by agricultural employment, but in 1961 the mill employed 218 people who were working on 72 looms. The yarn was supplied by Zielonogórskie ZTW, which also finished the cloth.\(^1\) The new mill in Zielona Gora, which was opened in 1960, is also a single-process weaving unit attached to the enterprise in the town. The mill is a pre-war building which has been repaired and nearly 170 people were employed in 1961.\(^2\)

The continuous increases in the output of worsted yarn between 1945 and 1965 have required substantial additions to the capacity for the washing, as well as for the combing and

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spinning of wool. Before 1939 a third of the wool consumed was imported in the clean state and also a large quantity of wool was imported in top, but since 1945 the government has been trying to reduce the imports of raw materials and two new wool washing, combing and spinning mills have been opened for the worsted section. Both mills are on a larger scale than the new mills in Sulechow and Zielona Gora, and they have relieved the pressure upon the supplies of water and labour in Bielsko-Biala, Czestochowa, and especially in Lodz.

The existence of a mill in Zagan, although in a damaged condition and without machinery, proved to be a strong location incentive for the worsted section, and the repaired mill was opened in 1960. The mill is situated on the bank of the river Bobr with an immediate and adequate supply of water for the washing and dyeing of wool. The mill has increased the employment opportunities of the area in industry substantially and by 1961 a labour force of 550 was employed. The end-product of the mill is tops, for worsted spinning, and they are used in mills throughout the country.

1. Based on Handel Zagraniczny, for each year between 1920 and 1938, which was published by Główny Urzad Statystyczny.
The secondworsted mill has been built on a greenfield site at Torun on which a large increase in employment or in the consumption of water may also occur without giving rise to localised shortages. The mill was planned after 1956 to include all the processes ofworsted yarn production from the preparation of the raw materials, including the washing of wool and combing of tops, and it was planned to produce a surplus of clean wool for use in otherworsted spinning mills, and noils for the woollen spinning section. The chosen location for the mill of Torun had experienced a shortage of employment for unskilled women during the 1950's. Most of the employment in the town had been for men in engineering, chemicals, printing and food processing, and so the worsted spinning mill, which was opened in 1965, is planned to employ 6,000 people eventually of whom seventy per cent will be women. In the absence of any textile tradition in the area the productivity of the labour was low at first and operatives were trained while the mill was in course of construction, but these difficulties have been accepted in the short run as an inevitable part of the cost of the development of the local economy. The demands of the mill for water will also be large and the entire supply will be drawn from a borehole at a hardness of ten degrees and softened in the mill. The
affluent will also be cleaned before it is discharged into the river Wiola.¹

Torun was also considered to be a suitable location because it lies close to the sources of raw materials and because the location of the mill there would reduce the congestion which was threatening to develop on the railway between central Poland and the Baltic ports. Over half of the raw material will be greasy wool, which will be imported through Gdynia, and Torun lies only half as far from the port as Lodz and is even, more advantageously located in relation to Gdynia in comparison with the industry in Katowickie województwo. Furthermore train and river barge offer alternative methods of transporting the wool to Torun. After the wool has been washed or the yarn has been spun, the products will move further south to Lodz and Tomaszow, Czestochowa, Sosnowiec and Bielsko-Biała. Torun is also a convenient centre for the collection of wool from the most important area of wool production within Poland, Pomorze. The Polish wool will be cleaned before resuming its journey to the Lodz area and transport, time and space will be saved in addition to the reduction which will be achieved in the use of water for washing in Czestochowa and Lodz. The second

¹. Information collected in Torunska Przedzolnia Wolny Czesankowej.
raw material which is to be used in the mill is also most readily available at Torun, for 55 per cent of the tops and yarn will be composed of terylene, which is produced in the town. It is planned that eventually 6,000 tons of terylene fibre will be supplied from the artificial fibres factory in Torun to the worsted spinning mill.¹

Conclusion upon the Influence of Government
Policy upon the Distribution of the Industry 1945-1965

The severe damage to the industry in some of the important textile towns during the Second World War and the nationalisation of the mills in 1946 offered the Polish government the opportunity to relocate the industry in accordance with the long term plans for the economic development of the country. Production might have been begun in new or repaired buildings in any part of Poland, for the textile processes require no special premises, while much unskilled labour was available in the rural parts of the country and the skilled workers, who are required in small numbers in every mill, have been very mobile under the influence of government direction in the post-war period. The opportunity for the dispersal of the industry was not accepted and the government reacted to the need for a rapid

¹ Ibid.
growth in production and employment in the context of the shortage of resources with a rationalisation of the industry's structure and with an increase in the scale and vertical integration of production. Despite the closure of many of the smaller mills in the most important textile towns employment and production became increasingly concentrated in locations in which war damage had been least, and the dispersal of the industry from the towns of central and southern Poland only began when the problems of further increases in production forced a change of policy upon the government in the late 1950's.

Throughout the period between 1945 and 1965 the government sought to raise the quantity and quality of the woollen textile goods. Until 1956 the shortage of investment resources in the consumer-good industries, the attempts to economise in the use of building materials, and the policy of raising the productivity of the fixed capital which was already in existence resulted in a greater concentration of production in a limited number of existing sites, chiefly in Bielsko-Biała and the Lodz area than at any time in the industry's history under capitalism. The concentration of the industry continued until the end of the 1950's when serious imbalances appeared between the distribution of production and employment and the distribution of the
available resources of housing, transport and water. While
the resources were in increasingly short supply in the larger
centres of the industry, the use of existing mills in some
other parts of Poland was less intensive than in Bielsko-Biała
or Lodz. Since the mid-1950's the trends have been reversed
and the industry has been developed more rapidly in the Western
Territories where surpluses of labour and water have existed.
The number of woollen textile mills ceased to decline in the
early 1960's as new mills were opened, but the long-run plan
is for the decline in the major centres to continue and for the
further dispersal of activity to new and scattered single-mill
centres.

As an instrument of the policies of urbanising the
population and of industrialising the economy the woollen
textile industry has been used to increase employment in those
towns in which it had already been located before the war and
to attract labour from the surrounding rural areas into the
towns. This method of increasing the proportion of the
population in urban areas was reversed after 1956 in the
larger textile towns, and employment is now declining in
individual mills almost everywhere as production techniques
are modernised. The establishment of new mills after 1956 has
widened employment opportunities in the areas beyond the
commuter zones around the established industrial towns, and has helped to overcome the rural overpopulation without requiring the movement of people. Employment in the new mills has also offset the declining levels in the older units, but in the period when labour was making the largest contribution to the raising of output among the factors of production, the existence of undamaged buildings was of far greater importance in the location decisions of the industry than the distribution of under-employed rural labour.

The industry has been exhorted to increase the efficiency of its use of all resources throughout the post-war period in the environment of seemingly perpetual and omnipresent shortage. In this environment existing buildings have been the strongest of the location factors in the planning of the distribution of increases in production and the choices of locations for new centres of production, even when the buildings have been damaged or had poor working conditions, for in this manner the capital resources of the nation have been saved in the short run.

The availability of labour has only been of secondary importance in location decisions since the war. The government has sought to industrialise rural areas and to widen the possibilities for the employment of women, and the
textile industry would have been suitable as the instrument of these policies for it only requires semi-skilled rather than highly-skilled labour. However, the development of the industry until the late 1950's was restricted to the highly industrialised towns with very specific textile economies. The growth of employment in the Western Territories in particular was very slow in the first post-war decade when the unskilled rural labour which was transferred from east of the Bug river could have been employed profitably and more skilled labour in the industrial towns of central Poland transferred to more advanced industrial production. Moreover the contribution of the industry to a solution of employment problems in the central and eastern areas of Poland throughout the post-war period has been restricted to the mill in Torun, for in the years when the emphasis was placed upon investment and development in Bialostockie, Krakowskie, Lubelskie and Rzeszowskie wojewodztwa, from 1950 to 1955, the woollen textile industry was neglected in favour of the more essential heavy industry and basic consumer goods, such as cotton textiles. It was for these branches of industry that new factories were built in the areas of rural over-population in the east and southeast of Poland.
More attention has been paid to the wider distribution of woollen textile manufacturing during the second post-war decade, and greater efficiency has been sought in the use of labour through the substitution of capital for labour. These policies have reduced the pressure on the restricted supply of labour in the Lodz area and, to a lesser extent, in Bielsko-Biała, but a comprehensive modernisation of the mills in Bialystok or the Western Territories, where there is no comparable shortage of labour, might create unemployment in the towns and a return of workers to the land.

The concentration of increases in production in the least damaged centres of the industry after the war suddenly emphasized the problems which had been associated with the location pattern of the capitalist industry and which were noticed in Chapter IV. In particular the distributions of the wet processes and of the supply of water were unbalanced, and this problem had been noticed seventy years earlier. An active solution to the problem has been sought in the building of wet process mills in Torun and Zagan and in increased investment in water supply in Lodz and Bielsko-Biała, but the neglect of the water resources of Ozorkow and Tomaszow continued throughout the post-war period. In the same way the communist government has sought to remedy the capitalist
inefficiencies in the use of labour and in the supply of housing by diversifying specific economies, both industrial and rural, and restricting the migration of population from country to town. This policy has been pursued both passively, through the redistribution of production and employment among the existing mills to the advantage of the isolated mills in areas of predominantly rural employment, and actively by the closing of mills in the larger textile towns and the opening of new mills in the western Territories and Torun.

The communist government of Poland has considered a wider variety of location factors since 1945 and the capitalist owners of the mills before the war in deciding upon the distribution of the woollen textile industry. As the result the industry is now fulfilling more comprehensively its function in the socialist society as a means of raising the standard of living of the whole population. Some conclusions have already been drawn upon the geographical patterns and consequences of the policies of the government in the industry, but it is now necessary to turn to a fuller analysis of the industry in a socialist environment in the form of a description of the geography of woollen textile manufacturing in Poland about 1965.
CHAPTER VII

THE WOOLLEN TEXTILE INDUSTRY IN POLAND ABOUT 1965

The distribution and form of the Polish woollen textile industry changed between 1945 and 1965 in response to the policies of the Polish government. Several aims of the government and some of the changing patterns of distribution and structure in the industry which resulted from government action after the war were examined in Chapter VI. In particular the growth of the industry, the rationalisation of its structure, and the attempts to disperse production and employment more widely throughout the country were described. This chapter indicates the extent to which the former capitalist pattern of distribution and structure had survived and the government policies had created a new and distinctively socialist pattern since the war. In Chapter IV the complementary description of the capitalist industry after a period of overall growth was supplemented in Chapter V by a description of other aspects of the industry's geography in order to overcome the lack of information about the industry in 1914. However, the current chapter only examines the patterns of the distribution and specialisation of the industry by scale, structure and product under socialism in the period about 1965. Since that time output has continued to grow and the socialist patterns in the geography of the industry have continued to develop.
279 woollen textile mills and workshops existed in Poland in 1962, but this study is concerned chiefly with the 162 mills which were in the ownership and under the direction of the state. 117 mills and workshops belonged to co-operatives, but none of these employed more than a hundred workers and they contributed little to the employment or output of the industry as a whole. Three privately-owned workshops also existed in 1962, but they only employed a total of nine people. 96 per cent of the labour force of the industry was employed in the mills in state ownership in 1962 and over 97 per cent of the yarn and cloth was produced in the same sector in 1957.¹

The Distribution of the Industry

The patterns of distribution in the woollen textile industry in Poland about 1965 differed considerably from those of 1937 or 1914. Changes in the boundaries of Poland and the uneven distribution of war damage led to substantial changes in the relative importance of the centres of production, and the policies of the communist government resulted in important changes in the scale and structure of production in many of the mills and textile towns. Chapter VI has shown how the pre-war

¹. GUS: Statystyka Produkcji Wyrobów Przemysłowych 1957, Warszawa 1958, (Statystyka Polski, Seria B, z.7); Statystyka Przemysłu 1962, Table 53/72, Warszawa 1964.
pattern of co-operation and interdependence between mills was replaced by a limited number of full-cycle woollen textile enterprises, and Chapter VII indicates how the new organisation of production affected the pattern of interdependence and specialisation among the textile towns and regional groupings of the industry.

Changes in the Location of the Industry since 1937

Map 46 (on page 400) shows that the mills in state ownership in 1965 were located in 33 towns and cities. The number of locations was larger than in 1937 and less than in 1914, but a comparison of the distribution of the mills at the three dates (Maps 19, 28 and 46) suggests that the textile towns and also the mills were more widely spread over the country in 1965 than during the capitalist era. The explanation of the changes in the number and distribution of the mill locations between 1937 and 1965 lies in the alterations in the area and location of Poland itself, the uneven incidence of war damage over the country and the policies of the post-war communist government for the industry.

The increase in the number of mill locations between 1937 and 1965 and the impression of a wider dispersal of the industry in Poland in 1965 than before the war owe much to the westward movement of the Polish frontiers after the second World War. The transfer of territory resulted in a net gain of woollen textile mills by Poland. The seizure of lands
Each mill is represented by one symbol. Eight mills in Bielsko-Biała and five in Konstantynow have been omitted because no information was available concerning the processes of textile production which were performed in these mills. No mills in co-operative or private ownership are included.

Sources — Ogólnopolski Spis Tele-adresowy 1963/4, Warszawa 1963
Spis Telefonów m. Katowic i Województwa katowickiego 1965/6,
Warszawa 1965
Spis Telefonów m. Łodzi i Województwa Łódzkiego 1963/4,
Warszawa 1963
Jastrzebska, Przemysł włókienniczy województwa zielonogorskiego,
Praca Magisterska KGE ul 1963.
WKPG w Łodzi, Plan Centralny według stary na dzień 31. 1
1965 r., Łódz 1965
Z.P.W. im. Sierzana, Information collected in the mill
east of the river Bug by Russia involved the loss of only two mills in Leszczkow and Lida, in which about 300 people had been employed in 1937, but through the transfer of the Western Territories from Germany to Poland an area of small, but numerous textile towns in the Sudeten Foreland and Ziemie Lubuskie (Zielonogorskie wojewodztwo) was added to Poland, and fourteen widely scattered locations of woollen textile manufacturing existed on these lands in 1965. 919 woollen textile mills and workshops had existed in the Western Territories in May 1939 in which 7,640 people had been employed. Most of these units had been very small and almost all disappeared or were destroyed during the war. As the result only seventeen mills in state ownership were operating in the Western Territories in 1965, but the woollen textile labour force in the area had risen to over 11,000.

The number of mill locations within the pre-war area of Poland was also reduced between 1937 and 1965. Mills have been added to the industry since the war in Myszkow, through the transfer of a waste spinning mill to the woollen branch of the textile industry; and in Torun, where the largest post-war mill has been built, but the industry had disappeared from a number of towns during the period. These towns may be divided

into three groups. In some towns the whole industry had been
destroyed during the war and in others it had disappeared after
1945 as the result of the transfer of woollen textile mills
to other forms of production or the closure of small privately-
owned mills.

Many mills were destroyed on the pre-war area of
Poland, and in the post-war reorganisation of the industry
a few were transferred to other branches of textile production.
The worsted spinning mills in Lubliniec and Piotrkow, which
had employed about 900 and 550 people respectively before
the war, were attached to the cotton spinning section of the
textile industry after repairs and re-equipment in an attempt
to raise the output of essential consumer goods rapidly.
The mill in Lubliniec had been substantially damaged during
the war and similar fates had befallen most of the other
worsted spinning mills outside Bielsko-Biala and Lodz. The
mill in Marki, which had remained closed for twenty years
between the wars, but which had been reopened in 1938 and had
re-engaged a labour force of 1,500, was completely destroyed.1
Mills in Bydgoszcz, Lask and Leszno had also disappeared and
the mill belonging to the largest firm in the Bialystok
region before the war, S.H.Cytron of Supraśl, had been destroyed.

1. S. Mieczal, Przemiany w Strukturze i rozmieszczeniu
Przemysłu na terenie woj. Warszawskiego i Miasta
Warszawy, p.587 in Przegląd Geograficzny,Tom XXX, z.4,
Warsawa 1958.
Thus the industry had been destroyed completely in some locations and in others mills had been transferred to the production of other goods, but in a third group of locations the mills and workshops had been closed and the industry had ceased to exist after the war as a result of the policies of the government. Small private mills and workshops were established in many places immediately after the liberation of Poland, including areas of rural overpopulation with no textile tradition, such as Kieleckie województwo, Opoczno, and Ostrow Kazowiecka and Wegrow in Warszawskie województwo, but this type of workshop soon disappeared as the government discouraged private production and as the state found that it was desirable to regulate the use of all resources in order to balance the growth of all branches of the economy. By the closure of these units the government deliberately restricted the opportunity for the broadening of the economic bases of several small rural communities and reversed the process of dispersing production more widely over the country, although these policies have been the avowed intention of the government through most of the post-war period. Moreover while the increase in the number of locations of the woollen textile industry has been almost entirely restricted to the Western Territories, in which rural overpopulation has not been a serious problem, the small private wool-washing, rag-pulling and weaving

1. Rocznik Przemysłu Odrodzonej Polski 1946, Warszawa 1946
workshops which were closed after the war had been located in some of the areas of pre-war Poland which had experienced the problems of rural overpopulation in the most acute manner and in which little industry had existed before 1939.

**Changes in the Distribution of the Industry among the Surviving Locations.**

The destruction and disappearance of mills and workshops during the war and the post-war closures of small units in private ownership were not limited to the cases which have been discussed above. The numbers of mills were reduced as the result of both processes in towns in which many mills had been located in 1937, but in which the industry had survived until 1965. Although the numbers of mills had been reduced between 1937 and 1965 in almost all the surviving centres of production, the varying incidence of a series of factors during those years was reflected in wide contrasts in the reductions in the mills among the centres.

The distribution of mills employing fifty or more people in state and co-operative ownership, which is illustrated by Map 47 (on page 40b), and the distribution of employment in Map 40 (on page 354) indicate that the city of Lodz, the Lodz area and Bielsko-Biała were the most important groupings of the industry in 1956. No other substantial concentration
Each mill which employed fifty or more workers is represented by one symbol, including mills in co-operative ownership. 199 of the 273 mills and workshops in state and co-operative ownerships are included in the map.
of either mills or employment existed in Poland, and Map 46 shows that the pattern of distribution among the mills had changed little by 1965. However a comparison of the number of mills in the Bielsko-Biała and Łódź regions in 1937 on Maps 29 and 35 (on pages 257 and 295) with the number and distribution in 1956 reveals that in Łódź only fifty mills existed in 1956 in comparison with about 120 before the war. Estimates of the number of mills in Bielsko-Biała before the war vary between seventy and 150 according to the minimum scale of production which was adopted in the recognition of a mill, but in 1956 only forty mills in state ownership were operating in the town.¹

War damage in both towns was small and the reduction in the mills had occurred solely through the closure of those of small-scale. Cierniewski records that 77 of the small weaving mills in Bielsko-Biała which were in the hands of Jews at the outbreak of war, were closed by the Germans and a similar process probably occurred in all centres of the industry.² About seventy mills survived the war in Bielsko-Biała and the influence of the post-war government on the scale of the industry may be accurately discerned in this case. The smaller mills were closed by the government and the number

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¹ For the number of mills in 1937 see Chapter V.
² GUS, Statystyka Przemysłu 1956, Table 2, Warszawa 1958.
of mills was reduced to about forty in 1946. No comparable details of the influence of the war and of the post-war rationalisation upon the size of the industry in Lodz have been published, and therefore, it is impossible to assess the extent to which the post-war government was responsible for the contraction in the number of mills. The first published directories of mills after the war list only 47 units in Lodz, but these lists were compiled in 1946 and 1947 after the nationalisation of the industry and after many of the smaller mills had been closed.

The closure of the smaller mills in the ownership of individual Jews and the seizure of their plant during the war, and the post-war closure of small mills and workshops by the government have also been the most important causes of the reduction in the number of woollen textile mills in Fabianice and Tomaszow since 1937. The government contributed substantially to the decline in the number of mills in Tomaszow after the war, reducing the number from eleven in 1947 to four in 1956 in comparison with sixteen mills in 1938.

1. The author was not permitted to consult the archival records of the industry immediately after the war except for Bialystok.
in Fabianice, which had produced large quantities of cotton goods before the war, may have been transferred permanently to the cotton industry in state ownership after the war.

On the other hand, the contraction of the industry in Konstantynow and Zgierz, in which war damage was also light, has occurred solely through the application of the policies of the post-war government.

The comparison of the distribution of woollen textile mills in 1937 with that about 1965 shows that the number of mills declined in all of the more important towns, but that the reduction was not distributed evenly between all the centres in the former Bielsko-Biala and Lodz regions. While the numbers of mills in Bielsko-Biala, Lodz, Fabianice and Romaszow have been severely reduced, the numbers in Czestochowa, Ozorkow and Sosnowiec have remained unchanged.

Until the second World War a large number of woollen textile mills had been located in Bialystok and in 1914 the villages around Bialystok had also been the locations of many mills and workshops. Few of the workshops had survived until 1937, and the destruction of settlements throughout the area in 1944 was directed in particular at the larger mills and at the property of the Jews in Bialystok, Supraśl and Wasiłkow. A comparison of the distribution of mills in the Bialystok region in 1937 and
1964, in Maps 33 and 40 (on pages 286 and 428), illustrates the extent to which the industry in and around Białystok was destroyed, and in the post-war period Białystok has contributed no more to the general distribution and scale of the industry than Tomaszów or Zielona Góra.

The comparison of the changes in the number of mills among some of the textile towns has been confined to the years between 1937 and 1956 because comprehensive details of the location of mills in the post-war period were last published for 1956. Map 47 only includes the 200 mills in which fifty or more people were employed in 1956 out of the total of 273 mills in the state-owned and co-operative sectors of the industry, but it was noted in Chapter VI that the closure of mills has continued since 1956. Map 46, which shows the distribution of woollen textile mills in 1965, only includes the mills in the state-owned sector and is based upon mills which were listed in the telephone directory and on information supplied by Mińska Komisja Planowania Gospodarczego in Łódź. The map does not include all the mills which were in production in 1965 for no

information was available about the processes performed in eight of the mills in Bielsko-Biała or about five in
Konstantynow. Nevertheless Map 46 shows that the number
of mills was reduced further by government policy between
1956 and 1965 and that the reduction occurred chiefly
in those centres in which the smaller mills had existed in
1937 and in 1956, such as Fabianice and Zgierz, and in the
chief concentrations of the industry of Bielsko-Biała and
Lodz. It is possible that the physical linkage of
adjoining premises in Bielsko-Biała was an important factor
in the reduction of the mills and that the decrease from
54 in 1956 to twenty in 1965 is not entirely due to the
omission of co-operative workshops from Map 46 or to the
closure of mills. However the disappearance of mills from
the western territories and from such locations as Löwicz
and Olivia between the two dates is the consequence of the
omission of the co-operative units in 1965.

The preceding description of the changing distribution
of mills has been confined to the more important examples
and no attempt has been made to describe the changing
distribution of woollen textile mills over the country as
a whole in relation to the pattern of the capitalist industry.
The changes in the boundaries of Poland, the movements of
population during and after the war, and the uncertainty
about the numbers of mills in the industry in 1937 make
more exact comparisons of the extent to which the mills
were concentrated in one or other of the towns mis-leading,
if not completely inaccurate. However the distribution
on Map 47 indicates that the industry remained almost
entirely in areas which had been the location of important
groupings of the capitalist industry of pre-war Poland, and
in the Sudeten Foreland and Zielona Gora areas of pre-war
Germany. In the capitalist era the industry had become
increasingly concentrated in a few towns and the areas of
labour surplus had been rejected as locations for the
industry. However, the changing number and distribution
of mills in the post-war period suggests that the industry
was substantially reduced in scale in several of the pre-
war centres in addition to its continued neglect of the
east and south-east of the country.

A comparison of the distribution of industry as a
whole in the areas of rural overpopulation in 1937 and 1956
and a comparison of the levels of employment in the woollen
textile towns show that neither has the east and south of
the country been neglected by industry in general, nor has
woollen textile manufacturing declined in Lodz or Sosnowiec,
Bielsko-Biala or Zgierz since the war. Other industries
have been introduced to the most backward and overpopulated areas of Poland, and despite the reduction in the number of woollen textile mills between 1937 and 1965 the labour force has doubled. Nevertheless, there is some truth in the suggestion that the woollen textile industry could have been used more effectively to broaden the economy of those areas which were known as "Poland E" before the war. The increase in employment was reflected in almost all the centres. The labour force in Lodz grew from about 14,000 in 1937 to more than 29,000 in 1959, and in Bielsko-Biala from less than 8,000 to more than 17,000 in the same period, but in Bialystok the labour force at its post-war peak was smaller than in many years in the 1930's and was at about one third of the level of 1914. The industry in Bialystok alone of the major centres of the capitalist industry did not exceed the pre-war levels of employment during the post-war years, and employment in the other mill in the eastern and south-eastern areas of Poland, in Naksawawa, had only

1. T. Wissaga, Geografia Kolejowa Polski, p.206, Warszawa, 1933
2. APL, Izba, No.4-26
Rocznik Polskiego Przemyslu i Handlu 1933.
been increased to the same extent as employment in the industry as a whole. ¹

The Distribution of Differing: Scales of Production about 1965

Although the changes in the distribution of woollen textile mills and employment on the area of pre-war Poland had not been altered very substantially by government action in the post-war period, the contrary trends in the overall numbers of mills and workers during the post-war years have been accompanied by substantial changes in the scale and structure of production among the mills and by changes in the character of the industry among the textile towns. In the analysis of the capitalist industry it was found that the scale of production in the mills varied with the number of processes which were performed and that during the growth of the industry the scale of mills in towns in which the industry was becoming concentrated was larger than in the towns in which the number of mills was only growing slowly or was declining. The analysis of the industry in Chapter V also showed that the average scale of the mills in the Bialystok and Bielsko-Biala regions was less than in the Lodz region, and that the structure of production among the mills in the capitalist industry varied between the towns in

¹. GUS, op.cit.
the Lodz region and between the three regions.

The capitalist relationship between the scale and structure of production in the mills has been maintained under the socialist organisation of the industry. The worsted spinning and full-cycle mills were usually larger than those which only undertook the spinning, weaving or finishing of woollen goods about 1965. In Lodz the worsted spinning mills employed an average of 2,440 people each in 1964 and the full-cycle mills 1,665 people, and all the mills in both structural groups employed more than a thousand workers. However, the average number of workers in the other mills in the city, which undertook only one or two of the basic processes of production, was about 290\(^1\), and this pattern was repeated in other parts of the country.\(^2\)

The four full-cycle mills in Zielonogorskie wojewodztwo employed an average of 1,465 people each in 1961, but only about 400 workers were employed in the two weaving mills in the wojewodztwo.\(^3\)


The regional contrasts in the scale of mills in the
capitalist era have been maintained to a lesser extent since
the war than the relationship between the scale of employment
and the structure of production in the mills. The average
labour force among the mills in state ownership in Lodz
was 540 in 1956 and this had risen to 585 in 1964, while
the average in Bielsko-Biała had been about 400 in 1956.1
However the enlargement of mills in Bielsko-Biała has
probably raised the average scale of production in the town
substantially since 1956. A more marked and persistent
contrast existed between the scale of mills in Lodz and
in the other textile towns of Łódzkie województwo. The
average number of workers in each mill in the województwo
in 1956 was 330 in comparison with 540 in Lodz, and the
average varied widely between the towns as it had done in
1914 and 1937.2 In Tomaszów an average of between 600
and 700 workers were employed in each mill, but in Konstanty-
now and Zgierz the average was only about a third of this
level.3

1. Based on MKPO w Łodzi, op.cit.
2. Based on GUS, op.cit.

Information collected in ZAW Dabrowskiego in Zgierz and
field work in Konstantynów.
The average level of employment in the mills in the third pre-war regional group in the industry in Bialystok and environs was very similar in 1964 to that in Lodz. Before the war the average in the Bialystok region had been smaller than in the Lodz region, but in 1964 it was 530, and this was larger than the labour force in any mill in the region in 1937. However, comparisons with the pre-war situation in Bialystok are misleading in view of the destruction among the mills during the war.

Although the capitalist patterns of scales of employment among the structural groups of mills and between the individual centres of the industry persisted in several cases after 1945, the details of employment which have already been given indicate that the scale of operations in all mills was considerably larger about 1965 than it had been at any time under capitalism. The increase in scale was true not only of each section of the industry, but also of individual mills. The establishment of continuous three-shift working and the full use of all plant and all promises had permitted employment in mills to be increased above the levels of 1914. In the worsted

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1. Based on information collected in ZFW Sierszana in Bialystok, Rocznik Polskiego Przemyslu i Handlu 1938
spinning mills the average employment in 1965 was 2,100 people per mill, but in 1914 no mill in the industry had employed more workers. Among the other sections of the industry the mill in Lodz which had belonged to S. Barcinski and which had employed 600 people in 1914 and 500 in 1936, had a labour force of 1,700 in 1964, and the mills which had belonged to E. Eisert, and in which 1,200 people had been employed before the war, had a labour force which was exactly double that figure in 1964. The mill in Koty, which had been owned by E. Zajaczk in 1937 and in which 215 people had worked, employed 620 in 1959, and similar increases had occurred in the mills in Raksaawa, Mazowieckie ZW and ZW Novotki in Tomasow. Thus, despite the reduction in the number of mills, employment in all centres, except Bialystok, had been raised above the levels of 1937 and in many towns it was similar to that of 1914.

Moreover, the overall increase in the scale of operations in the industry was larger than the increases

1. Based on information supplied privately by Zjednoczenia Przemyslu Przedsiebiorczego in Lodz.
   D. P. Kandourov, Fabrikiy-e-zavodskaia predprjatiia Rosiiskoi Imperii, Petrograd 1914.
   A. R. B. Suroka, Przemysl i Handel Krolestwa Polskiego, 1914.
   Warszaw 1914.

2. IMPG w Lodzi, op.cit.
   AHL, Izba, No.5 6.
   Kandourov, op.cit.

   Wilk, op.cit., p.110
   Majchrzak, op.cit.
   CIw, op.cit.
in the individual mills which have been illustrated above. As the result of the policy of closing the smallest units since the war and as the consequence of the disappearance of most of the small-scale mills and workshops during the war, the industry in 1965 was almost entirely composed of large-scale mills. Both in 1914 and 1937 the large number of small mills had restricted the average scale to less than a hundred workers, but in 1962 the average labour force in the mills in state ownership was 525 workers.¹

Increases in the scale of production in individual mills were only one of the objects of the socialist re-organisation of the industry. The grouping of the mills in the woollen spinning, weaving and finishing and in the worsted spinning sections into large-scale enterprises reduced the number and increased the scale of undertakings to a greater extent than among the individual mills. Almost without exception in the capitalist industry each mill had been in independent ownership and under separate direction and therefore the scale of production in each mill had also been the scale of undertakings in the industry as a whole. In 1937 the average scale of undertakings had varied from about 800 workers in the worsted spinning section to less than fifty among the weaving mills. In the industry in state ownership, in contrast, the multi-mill undertaking

¹ Based on OUS, Statystyka Przemysłu 1962, Table 53/72.
was common and in 1964 enterprises employed an average of 1,600 workers each, but the enterprises in the worsted spinning section tended to employ more people than the full cycle enterprises.¹

Thus the increase in scale among the mills and between the undertakings after the war altered the pre-war pattern of contrasts between the regions. The concentrations of small-scale mills and workshops of the capitalist industry disappeared both as the result of government policy and of the war, and the scales of employment in the mills in Biskak-Biala/Bialystok were raised to that of Lodz. The increases in the scale of production among the textile towns were limited to the extent of the differing sizes of mills which survived the war. The average scale of production in Konstantynow and Zgierz was still small in relation to the industry as a whole, notwithstanding the increased intensity with which the available premises were being used, because the legacy of mills from the capitalist

industry was composed of scattered premises of small or medium scale in both towns. However, the selective closure of the smaller mills in the post-war period tended to reduce the contrasts between the average levels of employment among the mills in each of the towns.

Although the regional contrasts between the scales of production of the capitalist industry have been reduced since the war, the establishment of enterprises has created another distributional pattern of contrasts in scale in the industry. The multi-mill enterprises have tended to employ more people than enterprises which included only one mill, and so the larger enterprises have been almost entirely restricted to the towns in which many mills were located and to the centres of worsted spinning. In Bialystok, Bielsko-Biala, Lodz, Tomaszow and Zgierz, in which several mills existed within small areas and could be functionally integrated without any loss of efficiency, few enterprises employed less than 1,500 people and many employed more than 2,000 people. The worsted spinning towns of Czestochowa, Sochaczew and Torun were all the locations of enterprises which employed more than 2,000 workers each, but among the towns in the Western Territories and in the single-mill centres such as Rakowice, Skoczow and Wamilcow, few undertakings included more than one mill and only those in Wroclaw and Zielona Gora employed
a labour force as large as 1,500. However all except the enterprise in Suidnica had labour forces in excess of 500 people. 1

The Distribution of Groups of Mills According to the Structure of Production about 1965

As the effects of the war and the policies of the post-war government altered the pattern of the scale of employment among the textile towns, so the structural patterns which had existed before the war were substantially changed as the number of mills was reduced and as the organisation of the industry was rationalised. In particular the closure or disappearance of many small-scale mills had reduced the large numbers of single-process spinning and weaving units which had characterised the capitalist industry but in the previous chapter it was shown that the rationalisation of production in the surviving mills had also reduced the numbers of full-cycle mills as the number of processes which some mills had housed was reduced. A comparison of maps 29, 33 and 35 (on pages 257, 296 and 295), which show the distribution and structure of the mills in the three pre-war regions of the industry, with map 47

reveals that in 1956 the single-process woollen spinning and weaving mills accounted for less than a third of the total number of mills, while the proportion of full-cycle and worsted spinning mills had both increased since 1937.

The incidence of these general changes in the structure of production varied widely among the textile towns in accordance with the pre-war pattern of production among the mills. Despite the large proportion of single-process mills in Lodz before the war and the substantial reduction in the number of mills in the city between 1937 and 1965, the proportion of single-process mills had declined only slightly for the number of full-cycle, worsted spinning and spinning and weaving mills had also fallen during those years, and in the rationalisation of the industry the number of processes in some mills had been reduced. The spinning and weaving mills which had belonged to K. Bennich and I Birancwajz in 1937 had become single-process woollen spinning units, the spinning and weaving mill of Franciszka Tajtelbaum had been transformed into the mechanical workshop of ZPiW Struga, and the full-cycle mill of Kanzub i Krylowiccki had become the dyeing and spinning mill attached to ZPiW Wiosny Ludew.1 However both the groups of full-cycle and worsted spinning mills in Lodz

1. MMG w Lodzi, op.cit., Rocznik Polskiego Przemysłu i Handlu 1938
accounted for almost five per cent more of the employment than in 1937. 22 per cent of the labour force was employed in the three full-cycle mills and 37 per cent in the worsted spinning section. 1 The woollen spinning mills had been larger on average than the weaving mills in the city in both 1937 and 1944, and the numbers of mills in the weaving section had been larger than in the spinning section, but Map 46 shows that the numbers in each section in 1965 were equal.

The structure of the industry in Bielsko-Biała was also altered to a lesser extent than in the whole industry. It appears from Map 47 that the full-cycle and spinning and weaving mills continued to occupy a more important place in Bielsko-Biała than in Lodz, as they had in 1937, but that single-process weaving mills were still important in numbers and that in the rationalisation of the industry several woollen spinning units had been established in mills which had housed several processes of production in 1937 and 1946. 2 Thus the structural contrasts between the mills in the two major concentrations of the industry had been reduced between 1937 and 1965, and this had largely been achieved since 1945.

1. Based on MKPG w Lodzi, op.cit.
2. T. Bielski, in Zycie Gospodarcze 1946, p.226
but in the absence of more detailed employment statistics for each mill after the war, the importance of each structural group of mills cannot be exactly established.

The structural pattern of the capitalist industry also survived in the towns of Lodzkie wojewodztwo up to 1965. The relatively small-scale mills in Konstantynou, Ożorkow and Zgierz almost all housed only one process of production both before and after the war, while Map 46 shows that the larger mills in Tomaszów had retained the vertically-integrated structure of the capitalist period. The removal of the small weaving units from the industry appears to have been reflected in the substantial reduction of the mills in the pre-war weaving town of Fabianice and in the disappearance of similar mills from Tomaszów after the war, but these reductions are in contrast to the small decline in the numbers of mills in Konstantynou, Ożorkow and Zgierz between 1937 and 1965.

The structure of the industry in Lodzkie wojewodztwo differed in 1965 from the pre-war period insofar as the worsted spinning section was more restricted in its distribution. Map 30 (on page 214) shows that large-scale worsted spinning mills had accounted for a substantial proportion of the employment in Fabianice and Tomaszów.
in 1937, in addition to the single mill location of worsted spinning in Piotrkow and in Lubliniec in Slaskie wojewodztwo. In the reorganisation of production after 1945 all four mills were transferred to other sections of the textile industry so that in 1965 worsted spinning was restricted to Czestochowa, Lodz and Sosnowiec among the towns of the former Lodz region. The structural distribution of the industry in Lodzkie wojewodztwo had also been simplified by the disappearance of all except the full-cycle mills in Tarnowskow and of the single weaving mill in Pabianice, but in all the other centres the variety of structure among the mills was similar to that in 1937 and as has been shown above, this variety in structure was reflected in the differing scales of employment in the mills among the towns of the wojewodztwo.

The substantial destruction of Bialystok makes comparisons of structure in the industry there between 1937 and 1965 of little value. The structural pattern among the mills about 1965 and the scale of employment, which are illustrated in detail on Map 40 (on page 428), were typical of locations with only a few mills. The full-cycle, spinning and weaving or worsted spinning mill was the usual form of the industry in such isolated locations in 1965, as it had been also in 1937. The destruction of a large number of the mills on the Western Territories in
Each mill is represented by one symbol. The areas of the symbols are proportional to the numbers of employees in the mills, which are as follow:

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Mill</th>
<th>Number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z.P.W. im. Sierzana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mill A</td>
<td>1</td>
<td>908</td>
</tr>
<tr>
<td>Mill E</td>
<td>2</td>
<td>483</td>
</tr>
<tr>
<td>Mill D</td>
<td>3</td>
<td>480</td>
</tr>
<tr>
<td>Mill F</td>
<td>4</td>
<td>268</td>
</tr>
<tr>
<td>Z.P.W. im Flater</td>
<td>5</td>
<td>840</td>
</tr>
</tbody>
</table>

Source - Information collected in Z.P.W. Sierzana
WOOLLEN TEXTILE MILLS IN THE BIALYSTOK REGION

at 31st. December 1964

Symbols are proportional to the number of employees.

SCALE 1:1,000,000
1945 and the subsequent closure of small workshops during the programme of rationalisation had produced a pattern of isolated units by 1965 in which few of the mills employed less than 500 people and in which finished products were produced for sale rather than semi-manufactured goods for further processing in other mills in the same enterprise on the pattern of the industry in Bielsko-Biała and Łódź.

The larger scales of undertaking in the industry under socialism, which have been described above, were due in part to the inclusion of dyeing and finishing mills in each enterprise. In the capitalist structure the wet processes were usually performed in separate mills which were operated on commission, serving a large number of textile manufacturers who were attached to several branches of the textile industry. In this situation it is always difficult to decide whether dye works belonged to the woollen or cotton branch of the industry before 1939 except where they were an integral part of full-cycle or other woollen textile mills. After the war the dyeing and finishing mills were attached to enterprises and have served chiefly or entirely the mills in the enterprise. The inclusion of these mills in the post-war woollen textile industry and in Maps 46 and 47 and Diagrams 41, 50 and 51 obscures the
increase in importance of the full-cycle and Worsted spinning groups of mills, both in relation to the total number of mills and in the division of employment among the structural groups of mills about 1965. Map 46 indicates that separate wet process mills only survived in the towns in 1965 in which the structure of the industry had retained much of the variety from the capitalist period, such as Bielsko-Biała, Lodz and Zgierz, and in which the structure of production among the mills still contained a large degree of vertical disintegration.

The rationalisation of the industry throughout Poland after the war did achieve a general increase in the proportion and importance of full-cycle and spinning and weaving mills above the levels of the capitalist industry. Not only have these structural groups been increased in importance in the towns where many mills are located, such as Lodz, and also in Białystok and Tomaszow, but the increase in the number of isolated single-mill locations as the result of the addition of the Western Territories to Poland has increased the scope for and number of full-cycle, single-mill enterprises in order to avoid the difficulties involved in the functional integration of such mills with others over long distances.
The Distribution of Production about 1965

In the description of the capitalist industry it was discovered that the general concentration of the mills and employment in one or two major centres was accompanied by a pattern of specialisation both by structure and product among all the more important textile towns and between the regions. The policy of the post-war Polish government has been to disperse the industry from the major concentrations, and the foregoing discussion has shown that the patterns of structural specialisation among the towns have been weakened as a result of the changes in the organisation of the industry since the war. However, it is more difficult to assess the extent to which the capitalist patterns of specialisation by product and of interdependence between the textile towns have been preserved in the socialist industry. The establishment of full-cycle enterprises and the general rationalisation of the structure of production were intended to remove the imbalances which had developed within and between the textile towns in the capitalist era of development. However, the lack of detailed statistics of production since the war makes any assessment of the effect of these changes difficult. The description of the distribution of production therefore proceeds, like the discussion of the patterns of scale and structure in the industry, by means
of localised examples rather than by a statistical analysis of the changes in the industry as a whole. No details have been published since the war of the value of the products of each województwo and so it is necessary to rely upon a comparison of the raw material base in order to establish the differences between the type and quality of the products of each textile town.

In 1937 the production of worsted yarn had been dominated by the mills in Częstochowa, Lodz and Sosnowiec, and this pattern was preserved after the war when the four mills in Lodz alone produced 35 per cent of the total output.¹ The worsted spinning mills were more widely scattered over the country than in 1937, but the pre-war spatial separation of the production and consumption of worsted yarns had been increased. Eight of the fifteen mills were located in towns in which no other branch of the industry existed in 1965,² and little yarn was spun in the chief centre of worsted cloth weaving in Bielsko-Biała. Worsted yarn was also used in smaller quantities in Tomaszów and Zgierz and in the towns of Zielonogórskie województwo in which worsted

1. Information supplied by Zjednoczenia Przemysłu Przedziałn Czesankowych.

spinning mills were located before, but not after the war. The physical separation of the worsted spinning and woollen spinning and weaving sections was reflected in the continued horizontal disintegration between worsted spinning enterprises and weaving. As the result of the physical separation of these sections much of the yarn which was spun in one town was consumed in others, and the specialised products of washed wool from the worsted spinning mills and of other by-products were also sold to woollen spinning and weaving enterprises in Bialystok, Lodz and Tomaszow.

The woollen spinning, weaving, dyeing, and finishing sections were organised as a separate branch of the industry after the war which was distinct and independent of worsted spinning. The distribution of woollen spinning and weaving had not been well balanced in 1937, but the post-war grouping of the mills into fully-integrated enterprises had achieved a balance of production in most enterprises. Almost all centres of the woollen, as distinct from the worsted section included both spinning and weaving processes and Map 46 shows that the only exceptions in the spinning section were the isolated woollen spinning and rag-pulling mills at Syczkow, Swidnica and Zdunska Wola. Map 46 also indicates that woollen or worsted spinning was located in all except a
few of the less important centres of the weaving section in 1965, such as Lodygowice, Ozorkow and Fabianice in the former regional groupings of the capitalist industry in which specialization by product had been well developed, and in Gostynin and Sulechow in the Western Territories, but most of these mills were linked with spinning or weaving mills in other towns. Woollen spinning in the major centres of the industry in 1965, by contrast, was almost all integrated with the weaving sections of enterprises in the same town. In the capitalist industry much yarn had been spun on commission for other firms or for sale, and three of the nine full-cycle enterprises in Lodz produced some yarn for sale in 1965. ZFW 9 Maja sold a quarter of its output, but the sales from the other enterprises were smaller. The yarn was sold to other enterprises and to the co-operative sector of the industry, but in general movements of woollen yarn between enterprises were very small.

Because the spinning of woollen yarn and the weaving of woollen goods were integrated in almost all enterprises and the quality of the cloth which was woven was largely determined by the raw material base of the yarn which was spun in the same enterprise. Table XIII indicates that

considerable variations existed in the raw material base of the woollen spinning section in the major textile towns, and these contrasts were similar to the pattern of specialisation between the towns and the regions which had existed in 1937. Table XIII shows that the use of wool in Bialystok, Lodz and Zgierz was small in woollen spinning in comparison with the consumption of wool waste and rags, but in all cases man-made fibre had become the most important of the raw materials by 1964. The contrasts between the industry in these towns and in Bielsko-Biala and Zielona Gora are also similar to those of 1937, except for the addition of man-made fibres. The wool content of the yarn which was spun in both Bielsko-Biala and Zielona Gora was higher than in all the other important centres except in Tomaszow for which no exact information of the raw material base of the yarn was made available.

The increase in the use of man-made fibres in both the woollen and worsted sections obscured the pre-war contrasts between the products of the textile towns. Man-made fibres have been substituted for imported raw materials wherever possible and are produced in Gorzow Wielkopolski, Jelenia Gora, Lodz, Tomaszow and Torun. In the worsted spinning section over half of the raw materials were supplied by these mills while wool accounted for about 45 per cent
### TABLE XIII

Raw Material Consumption by the Woollen Spinning Sections in the Major Centres of the Industry

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wool</td>
<td>13</td>
<td>50</td>
<td>15</td>
<td>7</td>
<td>49</td>
</tr>
<tr>
<td>Waste</td>
<td>15</td>
<td>-</td>
<td>22</td>
<td>10</td>
<td>} 12</td>
</tr>
<tr>
<td>Rags</td>
<td>27</td>
<td>26</td>
<td>15</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Man-made fibres</td>
<td>45</td>
<td>24</td>
<td>42</td>
<td>58</td>
<td>38</td>
</tr>
</tbody>
</table>

Sources - Information collected in the mills in Bialystok and in ZPY Debrowskiego in Zgierz.

H. Jastrzebska, Przemysł wlokienniczy województwa zielonogórskiego, p.27, Praca magisterska KGE UL 1963


J. Wilk, Przemysł wlokienniczy Okręgu Południowego, pp.78-82, Praca magisterska KGG WSE Katowice 1959.
of the raw material base in comparison with about ninety per cent before the war.¹ Little attempt appears to have been made to balance the supply and demand for raw materials or for yarn even in the larger textile towns since the war. ZFW Gwardii Ludowej was supplied with man-made fibre from all the factories in Poland and 35 per cent of its output of washed wool and tops were sold to other mills.² Much of the wool was used in Tomaszow where raw materials were also purchased from the worsted spinning mills in Czestochowa and Sosnowiec and from the man-made fibre factories in Gorzow Wielkopolski and Jelenia Gora, and many similar cross-movements of raw materials and yarn occurred between mills in all parts of the country.³

In spite of these movements of materials both the bulk of the raw wool which was washed in worsted spinning mills and of the woollen yarn were subsequently consumed in the later processes of production in the same enterprise in which they had been produced. Movements of raw materials and semi-finished products between undertakings accounted for a much smaller proportion of the total consumption than in the vertically disintegrated capitalist industry. The

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¹ Information supplied by Zjednoczenia Przemysłu Przedwojn Czesankowych. 
² APL, Izba, No. 4-26. 
³ Majchrzak, op.cit., pp.31-33.
most important movements of materials between enterprises about 1965 occurred between the separate branches of industry - of worsted yarn and washed wool, man-made fibre and cotton yarn from the worsted spinning, chemical and cotton textile industries respectively - rather than between enterprises within the same branch of industry. In this situation the full-cycle enterprises in the woollen textile industry usually depended upon their own production for their supply of woollen yarn, and the contrasts in quality between the yarn which was spun in each enterprise or in each town were reflected in the type of cloth which was woven.

A wide variety of cloth and textile goods were produced in all the important centres, but in the absence of any details of the value of the products it is difficult to determine whether each town specialised in the production of one type or quality of cloth, or whether specialisation extended no further than the individual enterprise. The output of the nine enterprises in Lodz included a wide variety of styles and qualities of cloth, and the products ranged from blankets to pure wool-worsted cloth. Each enterprise appears to have specialised in a particular group of goods, but in Lodz all except ZFW Struga were
producing cloth of low wool content. These products were woven from the woollen yarn of the enterprises, which accounted for 73 per cent of the total yarn consumption, and from worsted and cotton yarn, which accounted for seventeen and seven per cent respectively, and which were supplied by other sections of the textile industry in state ownership. More than half of the cloth which was woven from these raw materials had a wool content of less than fifty per cent and only a quarter was all wool.¹

The general emphasis in production in Bielsko-Biała before the war was upon cloth of high value, and an attempt has been made to preserve the reputation of Bielsko-Biała for quality since the war. Much of the worsted and all-wool cloth and of the terylene-worsted cloth, which have carried the highest prices in post-war Poland, have been woven in Bielsko-Biała, and the specialisation in the production of coatings, suiting and uniform cloths has been continued by every enterprise in the town. The efforts to maintain a high standard of production have been rewarded by sales of cloth from Bielsko-Biała to Canada and the U.S.A.² Worsted and terylene yarn were

¹ Based on MKPG w Łodzi, op.cit.
² Information collected in ZR Pindera in Bielsko-Biała.
being used in increasing quantities in Bielsko-Biała in the early 1960's in addition to the woollen yarn of high wool content which was spun in the town. The proportion of worsted yarn in the cloth was three times as great as in cloth which was woven in Lodz. Half the worsted yarn was purchased from Lodz in 1958, thirty per cent from Częstochowa and fifteen per cent from Sosnowice.\(^1\)

Enterprises in the smaller centres of the industry tended to depend to a larger extent upon their own output of yarn than in Bielsko-Biała. The woollen yarn which was spun in ZFW Dabrowskiego in Zgierz accounted for three-quarters of the total yarn consumption of the enterprise, and worsted yarn, which was purchased from other enterprises in other towns, was 23 per cent of the yarn consumption in 1964.\(^2\) A variety of cloth was woven in Zgierz in the early 1960's from blankets to linings and suiting, but on the basis of the raw material consumption which is illustrated in Table XIII it is safe to assume that the products of the enterprise were only of medium quality in relation, for example, to those of Bielsko-Biała. It is probable that the pre-war differential between the quality of cloth which

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1. Wilk, op.cit., pp.64, 78-83
2. Information collected in ZFW Dabrowskiego in Zgierz.
was produced in Lodz and Zgierz and cloth from Tomaszow was also maintained, but in the absence of any details of the raw materials which were consumed in Tomaszow it is impossible to evaluate the quality of the cloth.

The contribution of the Bialostockie wojewodztwo to the total output of the industry about 1965 was considerably smaller than in 1937, but the products were still of a lower quality than those of Pielsko-Biala or Lodz. All the cloth which was woven in ZFW Sierzana was produced from the woollen yarn of low wool content which had been spun in the enterprise, and the chief products were heavy coatings for the uniforms of employees of the industries in state ownership and other heavy woollen and woollen-waste cloth of low quality, such as blankets. Zielonogorskie ZFW, in contrast wove cloth of high wool content from its own woollen yarn and small additional supplies of worsted yarn from Czestochowa and Wroclaw, for suitings and dresses, and the quality of the cloth which was woven by Lubaskie ZFW was also high. Thus the production of light-weight suitings and ladies' coatings of fine design in 1965 was confined to Bielsko-

1. Information collected in ZFW Sierzana in Bialystok.
Biala and probably also to Tomaszow, as it had been in 1937, and so some of the textile towns in the Western Territories. The cloth of poorer quality, in comparison, and blankets were woven in the mills of the former Bialystok and Lodz regions.

Conclusion

No details of the activity and size of the industry in each wojewodztwo are available for the whole industry in any one year after 1956, apart from the combined production of woollen and worsted yarn and the output of cloth. Therefore no overall quantitative description of the industry about 1965 can be attempted, and direct comparisons with the pre-war distribution are complicated by the destruction of mills in the Bialystok region and the addition of the Western Territories. Diagram 49, which summarizes the distribution of the industry in 1956 (on page 444), indicates that under socialism the distribution of mills and employment continued to be dominated by the large capitalist concentrations of mills and employment in Bielsko-Biala and the city of Lodz, and the importance of these two locations has been increased since the war by the location there of the administrative headquarters of
DIAGRAM 49  The Distribution of the Woollen Textile Industry
(1956)

Source - GUS, Statystyka Przemyslu 1956, Table 2, Warszawa 1958,
(Statystyka Polski z. 4)
THE DISTRIBUTION OF THE WOOLLEN TEXTILE INDUSTRY
(1956)

Mills
Workers

City of Lodz
Lodzkie Woj.
Katowickie Woj.
Zielonogorskie Woj.
Bialostockie Woj.
Koszalinskie Woj.
Wroclawskie Woj.
the Southern and Northern Unions of mills, of the offices of the Worsted Spinning Union in Lodz, and by the opening of textile schools in both centres.

However the importance of the two towns was found to have declined after 1959 in Chapter VI. The trends in the changing patterns of distribution after 1959 appear to have been directly opposite to those in the capitalist industry before 1914 and more in accordance with the post-war Polish government's policy of spreading industry more evenly over the country. The importance of the large concentrations of mills and workers declined in relation to the industry as a whole as the number of mills and the level of employment were reduced. Moreover the number of locations, other than Bielsko-Biala and Lodz, in which the industry employed more than 500 and more than a thousand people were both doubled between 1937 and 1965. In the same period, however, no large-scale development of the woollen textile industry has been permitted in areas suffering from both an absence of textile tradition and backward rural economies.

The war-time destruction and closure of mills and the post-war rationalisation by a centralised, monopolistic authority have reduced the wide variety of scales, structures
and products, which was characteristic of the industry under capitalism, and have weakened the contrasts between the scales, structures and products of the mills and of the undertakings in each town and regional grouping. Contrasts in the scale of production owed more in 1965 to the structure of production than to the location of mills. As the result of the reduction in the number of units the pre-war pattern of specialisation by structure of production among the mills in each textile town has also been replaced by a simple dichotomy between towns of many mills and wide structural variety and scale, such as Bielsko-Biała, Lodz, Zgierz and possibly Bialystok, and single-mill locations.

The pre-war pattern of specialisation by product among the textile towns has been preserved despite the reorganisation of the industry since the war. However, the significance of the vertical disintegration of production among the individual mills in the major centres and of the specialisation of production among the towns have been substantially reduced in consequence of the grouping of the mills into vertically-integrated enterprises. The pattern of organisation has reduced the extent of interdependence between undertakings in the supply of raw materials and the degree of dependence upon commission firms which undertook the processes which were not common to all
mills, such as dyeing and finishing, and also spinning and weaving, in the capitalist industry. In the vertically-integrated enterprises the products of one section have usually been consumed entirely in later processes, and the sale of semi-finished goods between enterprises within the woollen or worsted spinning sections has been very restricted. The mills in all except a few of the less important single-mill locations in 1965 possessed all the basic processes of production and were independent of enterprises in other towns, and the only substantial movements of raw materials or yarn have occurred between mills in the different sections of the industry. Although the pre-war patterns of specialisation both in product and structure had continued in a modified form among the towns, the large movements of all types of raw materials, yarn and cloth between towns in the capitalist industry have been ended by the establishment of balanced, full-cycle enterprises.

The reduction in the extent to which the industry in one town depended upon mills in another after 1945 was the product of the substantial reduction in the dependence of one undertaking upon other undertakings, even within the same town. The increasing concentration of production of the capitalist period in one or two major centres was explained in Chapter III largely in terms of the cost
advantages of agglomeration in an industry in which a high
degree of vertical disintegration existed between the processes
of production, and of the uneven distribution of the supply
of specialist auxiliary services between the larger and
smaller concentrations of the industry. The significance
of concentrations such as in Bialystok and Lodz in the
capitalist era lay not in their absolute size in terms of
mills, employment and output, but in the influence which
they exerted upon the location decisions of new firms in
the relatively footloose textile trades and in the consequent
increasingly powerful agglomerative influence which they
exercised within the industry. In the reorganised socialist
industry the vertical integration of production from the
preparation of the raw materials to the finishing of the cloth
and to the servicing and repair of machinery in each enter-
prise has reduced the agglomerative influence of large
concentrations of mills. The importance of Bielsko-
Biala and Lodz lie not in their attraction for new mills,
but only in the size of the industry in the towns in relation
to the available resources of labour and housing, transport,
amenity and water supply. The location of thirteen enter-
prises in one city is of less importance in the distribution
of production than the fact that all the mills belonging
to each enterprise are located within a short distance, and the concentration of production in one place is of less importance in explaining the trends in the developing distribution of the socialist industry than the distribution of localised surpluses or deficits in the supply of labour or of the distribution of high and increasing social costs associated with localised increases in production and its agglomeration.

The simplification of the pattern of interdependence between textile mills and towns since the war has also removed much of the justification for the recognition of regional groupings in the industry. The mills of the capitalist industry in the Lodz region were bound together by their dependence upon producers in other centres of the same region and by a common dependence in particular upon the specialised products and services which were supplied from Lodz. However, the functional interdependence of undertakings in the specialist industry has produced an uneven scatter of unconnected and independent groups of woollen textile mills or worsted spinning mills over the country. As the location of more than one undertaking in a town involves no overtowns of functional interlinkage in the socialist industry, so the concentration of the mills in a series of towns around Lodz or Bialystok since
the war does not justify the recognition of regional groupings in the industry of the pre-war type in a situation in which the functional links which exist between towns are weak and lack any consistent direction or pattern. Furthermore, the centres in each region in the capitalist industry specialised in the production of goods of one type or range of quality which was distinct from those which were produced in other regions. However, the distributional pattern of specialisation in the socialist industry, while preserving to some extent the pre-war patterns, has been confused and weakened by the uniformity of the appearance and quality of most of the products, the considerable dependence for all cloth production upon man-made fibres, and the relatively wide variations which exist between the products of enterprises within some of the major textile towns. Thus the simple pattern of original divisions and groupings in the capitalist industry has been replaced by a complex spatial pattern in which the concept of functional regions has little relevance, and the location structure or product of each mill owes little or nothing to its spatial relationship with the rest of the industry.
CHAPTER VII

ECONOMIC SYSTEM AND THE GEOGRAPHY OF WOOLLEN TEXTILE MANUFACTURING IN POLAND AFTER 1870

The developing geography of woollen textile manufacturing in Poland has been examined in this study over a period during which each of the two major economic systems that the industrial nations of the world have adopted during the last century have both existed in the country. The influence of growth under capitalism upon the geography of the industry was considered over the period between 1870 and 1914, with particular reference to the regional groupings of the mills in and around Bialystok and Lodz, and this analysis was extended to the 1930's, in which the industry was experiencing long-run decline. The growth, the changing distribution and the form of the socialist industry have been examined in the years since 1945. This final chapter now seeks to compare the influence of the two economic systems upon the distribution and character of the industry.

In both periods the relationship between the supply and demand for woollen textiles in the market and the behaviour of demand were very similar. Moreover the same methods of growth were available to the industry in the two
periods and each of the factors of production appear to have accounted for similar proportions of the total cost of production. However, the choices between the available methods of expansion and the influence of each of the factors of production upon location decisions appear to have differed between the capitalist and socialist industry. As the result of the contrasts between the attitudes to and policies for the industry in the two economic systems, the distributional patterns appear to have been developing in almost completely opposite directions.


The Relationship between the Supply and Demand for Woollen Textiles in Poland.

The conditions and behaviour of the demand for woollen textiles during the periods of capitalist and socialist control in the industry were similar. Many details of the nature of demand have been ignored, but the same important features of a sudden increase in the level of demand, of a captive market, and of a steady long-run growth in demand throughout the period after the initial increase dominated the market for woollen textiles both before the first and after the second World War.
The demand for woollen textiles was considerably larger than the capacity of the woollen textile industry both within the Russian Empire in 1877 and in Poland at the conclusion of the Second World War. The imposition of high import tariffs by the Tsarist government in 1877 reduced the supply of woollen textile goods and obliged almost a fifth of the consumers in the Empire to substitute the products of the Kingdom of Poland or Russian industries for those from western Europe. The severe shortage of clothing in Poland in 1945 was also aggravated, but in this case the supply was restricted as the result of the destruction of textile mills during the war. The possibility of tidying over the short-run imbalance in the market on both occasions with imported cloth was very limited, and producers of textiles in Poland enjoyed a seller's market. After 1877 the rent-like incomes of producers within the Russian Empire, arising out of the temporary shortage of goods, soon attracted an inflow of foreign producers and foreign capital, but the enlargement of the industry after 1945, in contrast, was achieved despite an acute shortage of capital resources.

In addition to the short-run excesses of demand for woollen textile goods above the level of supply, the long-run growth of the population in the market, which in
illustrated in Table XIV, assured the industry of a steady enlargement of demand during both periods. The population of the market in the two periods of growth increased at approximately the same rate.

**TABLE XIV**

<table>
<thead>
<tr>
<th></th>
<th>Russian Empire</th>
<th>Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876</td>
<td>100</td>
<td>1945</td>
</tr>
<tr>
<td>1914</td>
<td>170</td>
<td>1965</td>
</tr>
</tbody>
</table>

Sources - W. I. Czary (ed.), *Statistyczny Rocznik 1914*, pp. 5-6, Petersburg 1914.


The conjunction of burgeoning demand and restrictions in supply required rapid and substantial enlargements of the industry at the beginning of both periods, but the structure of the industry in both 1876 and 1945 did not permit rapid enlargements of production. Many units were small and inefficient and many were using old machinery of low productivity. The industry in both years required new plant and the adoption of more modern methods and larger scales of production.
In particular both moments were apposite for the adoption of new methods of propulsion which promised to alter the former patterns of both scale and location. The industry of 1876 was largely unmechanised, but it had begun to apply the power of steam to production and to be attracted towards the coalfields. After 1945 the substitution of electricity for steam power reduced the influence of direct supplies of coal from mines or railway terminals upon location decisions. The industry was also unable to meet the demand for textiles in either 1877 or 1945 because some sections had been neglected in the foregoing years and because the structure of production was accordingly unbalanced.

Thus the market situations, both in supply and demand, which were facing the industry in the two periods were very similar. Three methods of increasing output were available to the industry under each economic system. They were an increase in the intensity of production on existing sites through increased, but localised applications of factors of labour and capital; the rationalisation of the industry leading to a more efficient use of the existing fixed capital; and the construction of new mills on greenfield sites. The three methods were available to both the capitalist and socialist industry, but the choices which were made between the methods of expansion and the manner
in which the methods were implemented reflected the basic contrasts in the policies of management during the two periods and caused the differences between the geographical patterns of the capitalist and of the socialist industry.

Contrast in Attitudes and Policies in the Industry.

While the important elements of the economic environment of woollen textile manufacturing in Poland which have been outlined above were similar during both the periods of capitalist and socialist organisation, the attitude and policy of the entrepreneurs in the industry of the two periods differed widely. The contrasts in attitude and policy of management towards the scale and structure of the individual undertaking and its location were of particular importance for the differences between the geographical patterns of the industry in 1914 and 1965 owe much to these contrasts.

In the capitalist industry mills were owned by a large number of individuals and joint-stock companies who regarded their fixed capital as a source of income. The primary object of cash profits exerted an important influence upon the character of undertakings in the capitalist period, but the order of priorities in the industry under socialism differed from that in the earlier period with the result that the scale and structure of undertakings were also
different. The scale of production in the capitalist environment was limited by the availability of capital funds to each entrepreneur. Therefore the capitalist industry was characterised by a wide range of scales of production from the small weaving workshop employing a few workers to the large-scale mills of the joint-stock worsted spinning companies. As the choice of scale by entrepreneurs varied, so also a wide range of choice was available in structure and process, but in practice the scale of each undertaking tended to limit the range of processes which could be performed. The structure of the industry in 1937 reveals that few entrepreneurs were able to establish or were prepared to sustain the risk of the larger full-cycle or worsted spinning mills and that the majority of producers preferred the small single-process mills.

The appropriation of the mills by the state fulfilled an integral part of the programme of the post-war socialist and communist governments of Poland. The establishment of a monopoly permitted the rationalisation of the industry which was essential to the achievement of a large increase in the output of woollen textiles. Although the post-war socialist industry was composed of the legacy of the pre-war capitalist structure, the progress of rationalisation indicated that important contrasts existed between the capitalist and socialist policy for the mills and the undertaking.
DIAGRAM 50  Changes in the number of mills 1876 - 1956

The shaded columns refer to the capitalist industry. The broken lines in the columns for 1956 indicate the number of mills in state ownership only. The solid lines indicate the number of mills in state and co-operative ownership combined.

Sources - APL, Izba, No. 4-34
Gus, Statystyka Przemysłu 1956, Table 2, Warszawa 1958,
(Statystyka Polski z. 4)
Izba Przemysłowo-Handlowa w Sośnowicach, Sprawozdanie 1937,
pp. 256-260, Sośnowiec 1938.
A. Krzyzanowski and K. Kuzaniecki, Statystyka Polski, p.182,
Kraków 1915.
APL, Mag. E. Łodzi, 1983 J. Łukasiewicz, Przewrot Techniczny
w Przemysle Królestwa Polskiego 1852-1886, pp. 187, 190
Warszawa 1963
Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kieleckoj Gubernii za god 1876, Table 2, Kielce 1877
Obzor Ljublinskoj Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Łomainskoj Gubernii za 1876 god, Table 2, Łomża 1877
Obzor Lipetskoi Gubernii za 1876 god, Table 2, Piotrkow 1877
Obzor Plockoj Gubernii za 1876 god, Table 2, Płock 1877
Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzor Siedleckoj Gubernii za 1876 god, Table 2, Siedlce 1877
Obzor Suwałskoj Gubernii za 1876 god, Table 2, Suwałki 1877
Обзор Варшавской Губернии за 1876 год, Table 2, Варшава 1877
Памятная Книга Гродненской Губернии на год, 1876, Гродно
Е. Теребуха, Бялостокский промысел вольный, Poznan 1939.
CHANGES IN THE NUMBER OF MILLS 1876 - 1956.

(1) Lodz region.

(2) Bialystok region.
The scale of undertaking in the socialist industry has been increased from that which was permitted by the capital funds of each private producer to one which was closer to the optimum scale of production. The variety of scales between the undertakings has been reduced as a result of this policy as the minimum size has been raised to almost 500 employees. The pursuit of greater efficiency has also been manifested in the integration and balancing of the processes of production within each undertaking and the enlargement of the scale of production in the individual mills in each enterprise. Thus the aspiration of private producers for profit and of the socialist government for efficiency in the use of resources and for the maximisation of the national income have tended to create a wide variety of scale and structure among the mills in the capitalist industry and a contrasting pattern of uniformity and larger scale among both the mills and undertakings in the socialist industry. The contrasts in the scale of mills are illustrated in Table XV and in Diagrams 50 and 51 (on pages 460 and 472).

The different policies of the two managements also produced contrasted patterns of location. Mills in private ownership were built in locations which were potentially most profitable while mills in the state industry were
opened on sites where the input of all resources was likely to produce a greater increase not only in the output of textiles, but also in the productivity of labour and in the national income than on other available sites. In this situation mills in the capitalist industry tended to be drawn to the same optimum locations and the development of a small number of concentrations of mills and employment was favoured, but the character of the socialist location policy in the second post-war decade precluded the possibility of the growth of very large agglomerations of the industry. The post-war search for the site on which the optimum use would be made of all resources implies that the mills would become widely scattered in the long run among a series of sites at which supplies of labour, buildings, raw materials, transport or other resources or facilities were underemployed. In these conditions it is assumed that the opening of a mill in one place would make use of the surplus resources and that in subsequent location decisions other sites, in which surpluses of the factors and raw materials of production had continued to exist, would be considered.

Thus the spatial expression of a long-run economic equilibrium in the socialist industry in theory would be in complete contrast to that of the industry under capitalism.
After periods of long-run growth the distributional pattern of the industry in both environments accorded in part with the theoretical patterns which have been suggested above. However actuality diverged from theory at a number of important points. The capitalist industry, for example, did not move towards the sources of its gross raw materials, and in particular no movement of the western European type towards the coalfields occurred. Moreover the socialist industry did not develop evenly throughout the country or on a regular pattern despite the considerable degree of homogeneity in the land surface and the distribution of population. Other factors distorted the patterns of distribution in both periods.


The favourable market conditions for woollen textile manufacturing in Poland both before the first and after the second World War fostered substantial enlargements of the industry in both periods. The growth of the industry is illustrated in Table XV, which indicates that employment and the scale of employment in the mills both grew in the two periods, but that, although the number of mills increased in the capitalist environment, the number declined
during the period of growth under socialist control.

Particular attention has been paid in the description of the industry to the concentrations of mills in and around Białystok and Łódź, and the incidence of the general changes in the size of the industry over the whole period between 1870 and 1965 in each of these regional groupings are illustrated in Diagrams 50 and 51 (on pages 460 and 471).

### TABLE XV

<table>
<thead>
<tr>
<th>Area</th>
<th>Date</th>
<th>Mills</th>
<th>Workers</th>
<th>Workers per mill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingdom of Poland and Bialystok region</td>
<td>1876</td>
<td>360</td>
<td>11,200</td>
<td>31</td>
</tr>
<tr>
<td>Poland</td>
<td>1914</td>
<td>512</td>
<td>64,400</td>
<td>126</td>
</tr>
<tr>
<td>Poland</td>
<td>1937</td>
<td>340</td>
<td>37,000</td>
<td>109</td>
</tr>
<tr>
<td>Mills in state ownership</td>
<td>1962</td>
<td>276</td>
<td>63,460</td>
<td>321</td>
</tr>
<tr>
<td></td>
<td>1962</td>
<td>162</td>
<td>64,860</td>
<td>524</td>
</tr>
</tbody>
</table>

Sources - APL, Izba, No.4-32
GUS, Statystyka Przemysłu 1962, Table 53/72, Warszawa 1964
D.P.Kandourov, Fabricko-zavodskaja prodprjatiya Rossiijskoi Imperii, Petorburg 1914
Obzor...Gubernii za 1876 god, Table 2, for the ten gubernii of the Kingdom of Poland.
Pamiatnaja Knizka Grodzenskoj Gubernii za god 1876, Grodno.
E. Torobucha, Białostocki przemysł wolniany, pp.16-17, Poznan 1939.
Methods of Growth and the Distribution of the Industry.

Between 1876 and 1914 the growth of the industry was achieved largely through the construction of new mills and the enlargement of existing premises. The construction of new mills is the more important of the two in this study because it involves a choice between locations and an assessment of the advantages at each available site, whereas the enlargement of existing mills merely reflects the sagacity of the original location decision or luck.

The progress of growth through the construction of new mills varied between the capitalist and socialist periods. The addition of new mills decreased in importance as a source of growth in the capitalist industry with each successive trade cycle, and, in the absence of a sudden and substantial increase in the size of the captive market comparable with those of 1877 and 1915, an increasing proportion of the growth in output and employment was achieved through the enlargement of existing mills. Thus the steady, long-run growth of the capitalist industry contained elements which favoured an initial choice among a wide range of locations and possibly location in many towns, but which subsequently tended to restrict the further growth of the industry to the initial sites to an increasing extent. Through this
mechanism wide contrasts were created between the average scales of mill employment among the textile towns.

The growth of the socialist industry, in contrast, has only proceeded through the opening of new mills after the full possibilities of expansion in existing sites were exhausted. As a result of this policy it is likely that the growth of the socialist industry after 1965 will be achieved to an increasing extent through the construction of new mills on the largest scales which either the economies of large-scale production or the local resources of labour and raw materials will permit.

One negative aspect of the growing dependence of the capitalist industry upon expansion in situ was the unwillingness to establish branch plants closer to the growing Russian markets for textile goods. Whereas it is possible to argue that any new mill in the socialist industry is a branch plant of the monopolist industry in state ownership, the branch plant of the capitalist industry poses no problems of definition. The establishment of these mills, as distinct from warehouses and shops, at considerable distances from the headquarters of firms is only profitable if thereby some saving in the cost of production can be obtained which would permit the finished article to be sold at a lower price in the market around the branch plant than goods
produced in the parent mill. The economies in the cost of production which the establishment of branch plants afforded to the woollen textile industry in the Russian empire before 1914 were small. The addition to cost which arose from the transport of finished goods from the chief centres of production to any part of the Empire was negligible and it was offset many times by the direct economies which were available to firms located in the large concentrations of textile mills. Moreover the imperfections of competition in the product market and the variety of costs of production among firms which produced a wide selection of textiles enabled the majority of producers to accept the small costs of transporting goods to the market without making the firms financially submarginal.

Branch plants were limited in the industry before 1914 to the cases of the mills which had been established within the Empire by firms from Western Europe in order to avoid the heavy tariffs on imported yarn and cloth, and the extra mills which were bought or leased, but rarely built, by producers and were located in or near the parent mill. This second group of branch plants served as physical extensions of the original mill in cases where adjacent expansion had become impossible or where the additional cost of leasing a mill was less than the cost of enlarging
existing premises. Some of the branch plants were among
the largest mills in the industry, but the number in both
groups was small in relation to the total number of mills.

Following the post-war establishment of multi-mill
enterprises almost all mills have become branch plants,
but the formal linkage of mills in this manner is only a
replacement for the more flexible and less formal ties of
raw material supplies, the use of by-products, or commission
working, which were widespread among the independent firms
in 1937. The branch plants in 1965 were simply the mills of
1937 which had been placed in a new organisational framework,
and this did not represent an attempt to save costs by
moving production nearer to the market. The branch plant
organisation of the industry was the by-product of the
attempt to increase the scale of operations and the
efficiency of production without building many new large-
scale mills. On the other hand most of the mills which
have been built since 1945 have been true branch plants,
for although they have been attached to one of the multi-
mill enterprises, they have not been located in the same
towns as the enterprise. The exact location has often
been determined by the distribution of surpluses in the
supply of labour, of lack of employment opportunities in
industry, or of the existence of premises or water, rather than by the distribution of the market. In all cases the finished cloth was sent from the mill to the national retail organisation for distribution to shops in many places and to a wide variety of other industries including the clothing trade.

A positive aspect of the expansion of output in existing mills has been that both economic systems have fostered the dominance of the industry by large mills. Table XV shows that the average scale of production was rising throughout the capitalist period of growth up to 1914 as the result of the enlargement of existing mills, the replacement of small units by larger ones, and the gradual disappearance of the small-scale mills and workshops. The small units only persisted because of the imperfections in the market and because the marginal cost of some processes which could be easily separated from the other processes of textile production, such as pulling and twisting, declined very slowly as output increased. The removal of the small-scale mills continued, but at a more rapid pace, under the communist government so that by 1965 small units were restricted to the co-operative and private sectors of the industry. The scale of operations in each mill in the socialist industry was also raised to the maximum in order to exploit
The shaded columns refer to the capitalist industry. The broken lines in the columns for 1956 indicate the scale of the mills according to the number of employees in state ownership only. The solid lines indicate the scale of the mills in state and co-operative ownership combined.

Sources - APL, Izba, No. 4-34
Gus, Statystyka Przemysłu 1956, Table 2, Warszawa 1956
(Statystyka Polski z. 4)
APL, Mag. H. Lodzi, 3983
J. Lukasiewicz, Przewrot Techniczny w Przemysłe Krollestwa Polskiego 1852-1886, pp. 187, 190 Warszawa 1963
Obzor Kaliskoj Gubernii za 1876 god, Table 2, Kalisz 1877
Obzor Kieleckoj Gubernii za god 1876, Table 2, Kielce 1877
Obzor Ljublinskoj Gubernii za 1876 god, Table 2, Lublin 1877
Obzor Lomzinskoj Gubernii za 1876 god, Table 2, Lomza 1877
Obzor Petrokovskoj Gubernii za 1876 god, Table 2, Piotrkow 1877
Obzor Plockoj Gubernii za 1876 god, Table 2, Plock 1877
Obzor Radomskoj Gubernii za 1876 god, Table 2, Radom 1877
Obzór Siedleckiej Gubernii za 1876, Table 2, Siedlce 1877
Obzór Suwałskiej Gubernii za 1876, Table 2, Suwałki 1877
Obzór Warszawskiej Gubernii za 1876, Table 2, Warszawa 1877
Pamiątna Księga Grodno gubernii na rok 1876, Grodno
J. Terebucz, Białostocki przemysł węlniany, Poznań 1939.
CHANGES IN THE SCALE OF MILLS 1876 -1956.

(1) Lodz region.

(2) Bialystok region.
the available fixed capital to the full and to take advantage of the economies of scale, and mills were enlarged. Thus the scale of production under both types of management tended to grow, but whereas expansion of this type in the capitalist industry tended to be located very largely in the largest and most prosperous concentrations, the extension of mills under socialist control has tended to take place chiefly in the isolated locations.

The corollary of the contrasted distributional patterns of growth in the industry under capitalism and socialism in Poland has been a similar contrast in the distribution of decline. The cyclical movements of the capitalist economy tended to bear most heavily upon the units which were in high-cost locations, and in the context of the increasing dependence upon the expansion of existing units for the continued growth of the industry, this pattern of selective decline tended to weaken the industry in outlying and marginal locations to a greater extent than in the large concentrations of mills. The relative and even absolute decline of the industry in the smaller towns and villages around Bialystok and Lodz up to 1914 and of the Bialystok region in relation to the Lodz region indicated the combined effect of the selective incidence of both the distributional patterns of growth and decline in the capitalist industry.
An uneven pattern of decline also appeared in the socialist industry after the war. Since the initial period of rationalisation ended in the 1940's the smaller and less efficient mills have only been closed in towns in which such closures did not involve the complete disappearance of the industry, and the reductions in the numbers of mills have been greatest in the towns in which most mills were located in the capitalist industry. This process has tended to reduce the relative and even the absolute importance of the larger textile towns. However, the level of employment, though not of output, has tended to fall in all mills with the modernisation of production techniques. Thus the industry has been characterised by a three-fold pattern of changing distribution since the war. The reduction in output has been very restricted in distribution applying only to Lodz and the Lodz area, but the closure of mills has been more widespread, and a slow decline in employment in the second post-war decade has been almost universal among the pre-war locations.

The Incidence of some Factors in Location Decisions

The distributional patterns of growth and decline in the capitalist and socialist industry have differed widely, and in particular the choices of locations for new mills
in the two economic systems appear to have been completely opposite. Both systems permitted the entry of new mills, but it has already been suggested that the choices of location in both periods did not conform with the theoretical optimum or even, in the case of the capitalist industry, with the patterns of distribution of the more advanced textile industry in Western European countries. Entrepreneurs were obliged to choose between the available sites for mills and to calculate the probable costs and profits at each, and a variety of factors affected these decisions both before 1914 and after 1945. The reasoning behind the location decisions of the capitalist industry is now lost in almost all cases and only a little direct information of the factors influencing post-war choices of location is available. In these circumstances a comparison of the costs of production in the industry during the two periods probably offers the most satisfactory indication of the number and importance of location factors which may have been considered.

Prior to the First World War seventy per cent of the cost of production was attributed to the cost of raw materials, although this probably included the cost of transport. The other costs were relatively small, and the largest of these were for labour and fuel, which
accounted for about fifteen and five per cent respectively. These details are only based upon the costs of production in some of the larger woollen textile mills within the Russian Empire, but they give a general indication for the large part of that industry which was located on the Polish lands.

Details of the cost of production in 1962, in contrast, are only available for the whole of the textile industry in Poland. In that year raw materials accounted for 55 per cent of the total, labour and the compulsory social insurance of workers for fourteen per cent, and fuel and energy for nearly two per cent. Transport accounted for less than one per cent of total costs, but turnover taxes were eighteen per cent. Bearing in mind that the raw materials for woollen textiles are more expensive than those for cotton, and that the variable costs in 1914 did not include heavy turnover taxes, the industry in 1962 was probably dominated to a similar extent by the three elements of cost of raw materials, labour and fuel, including the cost of carrying materials and fuel to the mills, as the industry of 1914.

1. Based on Jezgodnik Rossii za rok 1906, p.130, Petersburg, 1907.

The influence of the sources of the chief raw material, wool, on the location of the industry has been small despite the loss of about half the original weight of this raw material during use. Wool was being drawn from a number of sources, including western Europe, southern Russia and the Polish wool fair in Warsaw as early as 1870, and the dependence of the industry upon a number of sources may have weakened the attraction of any single source. As the growth of the industry continued an increasing quantity of the wool was imported from the southern hemisphere or was brought from Russia, and the proportion of Polish wool in the total which was consumed became negligible. Most of the wool was also imported between 1945 and 1965, but the location of sources of wool in Poland, or even of break-of-bulk points in its carriage appear to have had little influence upon the distribution of the industry in either period. Perhaps the location of most of the mills which consumed large quantities of wool before 1914 in railway towns was partly influenced by the difficulties of transporting wool and rags, but the cost of carrying coal, other than by rail, was probably more important in attracting the industry to railway towns. Only the location of the worsted spinning mill at Torun in the early 1960's appears to have
been definitely determined in part by the proximity to the chief area of Polish wool production and to the ports, but again, other influences were of great importance than the proximity of wool supplies in the choice of Torun.

Although the sources of the basic raw materials appear to have influenced the distribution of the industry in either period but little, it is important to recall that in both periods many mills used a variety of raw materials besides imported wool and rags. The woollen spinning section has used less and less virgin wool since 1870 and consumed increasing quantities of wool waste, pulled rags and spinning waste of several kinds, the worsted spinning section has been using increasing proportions of man-made fibres since 1945, and the weaving section has used woollen, worsted and cotton yarn. Most of these materials have been produced in Poland throughout the period under study and they have been the by-products or finished goods of the other textile mills in Bielsko-Biała, Lodz, Tomaszow or Zgierz. Thus the proximity to a wide variety of raw materials was probably a more important factor in the location of the capitalist industry and in the concentration of production in a few towns than proximity to the source of a single raw material, but this factor has been of less importance in the vertically-integrated socialist industry and appears to have only
influenced the location of the Torun mill in the post-war period.

In western Europe the woollen textile industry developed in close proximity to sources of fuel. Coal was the heaviest of the industry's raw materials in the nineteenth century which was localised in its distribution and which added nothing to the weight of the yarn or cloth, but the Polish coalfields appear to have had little attraction for the industry before 1914. Water power sites were no longer important as location factors for new mills by 1870, although water power was still in use in some mills. Steam power was the only important means of motive power until after 1900, but only two mills were established on the coalfields. However proximity to supplies of coal exerted an important selective effect upon the development of those centres of the industry which were already established in 1870 through the distribution of rail connections with the coalfield. The industry in Lodz and Bialystok, which had been stagnating in the mid-nineteenth century, benefited most from the construction of the railway in the 1860's and from the local monopoly which the two towns enjoyed until 1886. The substitution of electric for steam power since 1945 has weakened any attraction which the coalfield areas possessed for the industry, and the industrial
congestion and labour shortage of the coalfields have
tended to repel rather than attract new mills in the socialist
industry.

It is probable that the influence of the coalfields
on the location of the industry before 1914 would have
proved to be too weak to attract any mills if a large supply
of suitable labour had not also existed there. In general
no shortage of labour appears to have been suffered in the
textile towns of the late nineteenth century and the mills
of small and medium scale could always be staffed easily.
The centres of mining and heavy industry, however, were
better able to satisfy the demand for relatively unskilled
labour in large quantities by the worsted and waste spinning;
mills. The skills which were generated in the textile
towns and the constant willingness of rural people to
migrate in search of industrial employment ensured an adequate
supply of labour for the other sections of the industry
in the established textile towns. Under the communist
government the relationship between labour and the location
of the industry has been reversed. Labour mobility has
been restricted despite the existence of large areal
differences in labour productivity, for increases in the
supply of labour necessitated capital investment to over-
come the shortage of accommodation and public services in
areas of full employment. However the pockets of surplus
rural and female labour have been given a high priority
in location decisions since 1935, and especially in the
cases of the mills which have been opened in Sulechow and
Torun.

Thus the influence of the chief factors in the cost
of production upon the location of the industry appears to
have been weak, but to have favoured the established textile
towns and especially those on the railway prior to 1914.
However the changes in the technology of transport and energy,
the denser network of improved transport routes, and the
vertical integration of production in the post-war period
appear to have made the industry relatively footloose and
to have increased the influence of supplies of labour in
location decisions. In fact the great attraction of the
existing textile towns for new mills and entrepreneurs in
both periods was probably caused by other factors which are
not reflected in the variable costs of production. The
existence of unemployed buildings was probably an important
factor in drawing new firms to the existing centres of the
capitalist industry, and especially after times when the
cylical periods of depression in the capitalist economy
had resulted in a series of mill closures or bankruptcies. The existence of adequate premises was also probably the most powerful of the factors which were considered in the relocation of the industry after the Second World War, and the influence of the other factors of production upon location decisions was weakened by their mobility. Firms were also attracted to the large textile towns before 1914 because a wide range of the textile industry and of auxiliary trades and services was well developed in those places. Agglomerative forces of this type were probably very important to the growth of Lodz and possibly also of Bialystok in the capitalist era, but the establishment of fully self-sufficient enterprises has largely eliminated these factors since 1945.

The Geography of Woollen Textile Manufacturing: Capitalist and Socialist

The descriptions of woollen textile manufacturing in Poland after 1970 reveal simple, but important distinctions between the geography of the capitalist and socialist industry — distinctions in the scale and structure of the individual mills, in the scale and structure of the industry as a whole, and in the patterns of distribution and functional
and spatial integration of the industry. Direct comparisons between the industry under capitalism and under socialism are difficult because of the changing area of the country and the frequent redrawing of its frontiers. Nevertheless some basic characteristics of the industry's distributional patterns under the two economic systems may be noted.

In the industry under capitalist control, which was characterised by a vertically-disintegrated structure, the growth points were the largest textile towns in each of the regional groupings, rather than the many centres of secondary importance in which the industry was usually experiencing relative, if not absolute, decline. Bialystok and Lodz were the dominant centres, both accounting for more than half of the industry in their respective regions by 1914, whereas forty years earlier other towns had been of more importance. The concentration of the industry in one centre in each region was the most important change in the distributional pattern under capitalism.

The communist government planned to disperse the industry more widely over the country, but insofar as the surviving mills in 1945 were located in Bielsko-Biala and Lodz, the larger part of the post-war regrowth of production was located in those towns. However, the policy of maximising the productivity of existing buildings, which
would have implied the maintenance of the importance of those centres in relation to other textile towns, has been abandoned in the case of Leeds because of the increasing costs of congestion in the city. In the post-war period, and especially during the second post-war decade, the emphasis of development has been placed upon the industry in the secondary centres, so that the number of important locations has been increasing. Thus many growth centres existed in the socialist industry, but very few before 1914, and the distribution of the growth points in the socialist industry, which emphasized the policy of dispersion, was in complete contrast to the distribution before 1914, when the distributional pattern was characterised by agglomeration.

The patterns of distribution among the mills, employment and output of the industry under capitalist and socialist control have diverged substantially from those which might have been expected in the environment of perfect competition under capitalism or in the perfect socialist monopoly. Although the capitalist industry was characterised by a strong tendency to concentrate in one town in each regional grouping, many mills survived and were expanded in towns in which the industry as a whole appeared to be stagnating. It is probable that several locations offered similar prospects of profit to producers for, in an industry in
which raw materials accounted for almost three-quarters of
the cost of production but where the carriage of the finished
goods added very little to costs, it is unlikely that any
one location could offer a substantial cost advantage over
all the others. However, the location and survival of firms
in many towns in the Polish lands of the Russian Empire
before 1914 among which the cost of supplying raw materials
and fuel was known to have varied suggests that a large
element of imperfection existed in the state of competition
in the market.

The distribution of the industry in 1965 and the trends
in the changing distributional pattern after 1965 suggest
that the socialist industry was also moving towards the
expected economic and spatial equilibrium position. The
weakening of the large concentrations and the strengthening
of the industry in the widely scattered smaller centres of
production indicate the success of the communist government
in its attempt to spread industry in general more evenly over
the whole country. However, it is unreasonable to expect
that an even and regular pattern of distribution of the
woollen textile industry will emerge in a country of the
small area of Poland even in the long run because, while
the proportion of freight costs in the total cost of production
remains very small, the industry will be drawn neither to
sources of raw materials nor to the markets. Moreover, many other relatively foot-loose industries, which are growing at a faster rate than the woollen textile industry, are being dispersed more widely over the country and are exploiting and removing the localised surpluses of labour and other resources.

The geographical patterns of the capitalist and socialist forms of the woollen textile industry have been outlined in this study as they existed in Poland after 1870, but the patterns which have been analysed are only a simplified reflection of the influence which the two major economic systems of the world exerts upon the cultural landscape. Moreover, it has been suggested above that the pattern of the capitalist industry in Poland was not reproduced exactly in other capitalist economies. It is also impossible to assess after so short a period to what extent the trends which have been noticed in the geography of the industry under socialism in Poland will become typical in the long run of socialist industry. The full influence of political and economic philosophy upon the cultural landscape is both brash and subtle, and a full understanding of the relationship between the two must await more comparative studies of the development of industry under both the capitalist and socialist systems in other countries.
However, the continuing modification of the economies in the industrialised countries of Europe and North America has obliged geographers to explain industrial distributions and structures against the background of an increasingly complex intermixture of government control and private initiative.

At this point and in this situation it is logical to consider the value of the construction of models of the relationship between the primary state of each of the major economic systems and the landscape in addition to further empirical studies of restricted sections of the economy of one country. Indeed it may be suggested that the construction of models is an essential pre-requisite to the understanding of the landscape, and the logical step beyond this study would be to employ models to make some contribution to that end.
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NOTE A: Statistical source materials for the study of Industry in the Russian Empire in the late nineteenth century.

The number of workers and value of output were collected for every mill and workshop by the police in each powiat from 1873 to 1914 in the Russian Empire, and the details were published annually for powiaty by gubernii under the title Obzor gubernii or Pamiatnaja Knizka gubernii or Materialy dla torcovo-promysliennoj statistiki. Other information was collected in some towns in later years, such as the weight of fuel and raw materials used, the value of wages paid to employees or the number of foreigners in the labour force, and the individual details for each mill and workshop were recorded in manuscript in Russian in the local archives. In the Lodz region most archival material is available in Lodz, but in the Bialystok region almost all was destroyed during the Second World War.

The published statistics and surviving manuscripts are not a perfect source of information. In some years only the total number of mills and workshops is given while in others the industry is divided according to the processes of production and separate details are given for spinning, weaving and other structural groups of mills. After 1904 in the Kaliska and Piotrkowska gubernii and after 1896
in Warszawskaja gubernia the details of the woollen textile mills are not separated from the textile industry as a whole and no manuscript lists of firms exist to make up the deficiency. Some of the details of mills are omitted, especially where mills were producing cloth with both woollen and cotton yarns. Between 1873 and 1888, for example, an error of classification of this type placed the woollen textile mills in Fabianice in the cotton textile industry, and the semi-woollen cloth weaving mills in Zdunska Wola were included in the cotton industry in the same years.

The basis of compilation of the statistics was not identical between the powiaty. No units employing less than four looms are included in the details for Lodz, but in other parts of Piotrkowska gubernia units with only one or two looms are included. Some account of these difficulties has been taken in the text and the very small units in other parts of the Piotrkowska gubernia have been omitted.

Another source of error in these detailed source materials arose from the fear of mill owners that the statistics were being collected for purposes of taxation. It has been suggested that some firms gave reduced details of output, and that different and often exaggerated figures
were published by these firms in the catalogues of the industrial exhibitions in St. Peters burg and Warszawa in order to impress merchants. 1

As the result of these imperfections the published figures of the size of the industry between 1870 and 1914 are of an conflicting. In 1876 W. Zaloski estimated that the official statistics for industry in 1873 were 25 per cent too low and J. Lukasiewicz gives a total number of workshops and mills in the Kingdom of Poland in 1876 of 347 or ten more than the figure in the published government statistics


Dziennik Łódzki, 15 stycznia 1884 r.

The catalogues of the industrial exhibitions which are used in the thesis are:

Katalog Wystawy Tkackiej u Warszawie, in Ekonomista, 1880, 18.
Katalog Wystawy Rolniczo-Przemysłowej w Warszawie 1885, Warszawa 1885.
F. Krajewski, Przemysł Królestwa na wszechosyjskiej przemysłowej wystawie Cesarstwa w Petersburgu 1870 r., Warszawa 1870.
for that year. Unfortunately those statistics are the most accurate that are available for the years up to


The published lists of mills based on the official sources which are used in the thesis are:

J. Banzemor, Obraz przemysłu w kraju naszym, Warszawa 1836
J. P. Bloch, Przemysł fabryczny Królestwa Polskiego w okresie dziesięcioletnim od 1871 do 1880 r., Warszawa 1884.

II. Il'in i N. Lavogov, Petersburg 1888.
I. I. Janzull, Przemysł fabryczny w Królestwie Polskim, Petersburg, 1887.

S. Koszutski, Nasze przemysł wielki na poczatku XX wieku, Warszawa 1905
S. Koszutski, Rozwój ekonomiczny Królestwa Polskiego, Warszawa 1905
S. Koszutski, Rozwój przemysł wielkiego w Królestwie Polskim, Warszawa 1901.

A. Manteuffel, Historia Gospodarczej Przemysłu Wielkiego w 19 wieku Warszawa 1934. Praca dyplomatowa S.O.P. 1 S.


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P. A. Orlov, Uказатель fabrik i zavodov Europеskой Rosii i Carstva Polskого, Petersburg 1881

P. A. Orlov, Uказатель fabrik i zavodov Europеskой Rosii i Carstva Polskого, Petersburg 1887

P. A. Orlov, Uказатель fabrik i zavodov okrains Rossii, Petersburg 1895

P. A. Orlov, and S. O. Budagov, Uказатель fabrik i zavodov Europеskой Rossii, Petersburg 1894

A. W. Pogozov, God celnennosti i sostava rabochik w Rossii, Petersburg 1906.

II. Radziszewski, Zarys rozwoju przemysłu w Królestwie Polskim, in W naszych sprawach, II, p.277, Warszawa 1900.

about 1910 and they were used in those years as the basis for lists of firms which were published privately and for statistical descriptions of the industry.

The materials for the description of the industry in the Bialystok region, which were supplied by Dr. S. Misztal of the Instytut Geografii PAN in Warsaw, were also compiled from the official details of industry in each powiat.
NOTE B. Some source materials for the study of industry in the Russian Empire in the early twentieth century.

Unfortunately the exact number of locations in which the industry was to be found about 1914 is uncertain because of the discrepancies between the available lists of mills. Both the published lists of mills include the larger mills in all centres of the industry in the Kingdom of Poland, but Sroka\(^1\) also lists a number of small mills in such places as Frampol, Nowe Miasto, Turek and Tereapol, which are omitted by Kandourov and the earlier list from the Ministry of Finance\(^2\). Moreover Sroka does not include the mills in the Bialystok region, but the available lists of mills there are also contradictory. The list of mills which was compiled from the Leningrad state archives and which was supplied by Dr. S. Misztal, includes a larger number of mills than that of Kandourov. It is doubtful whether either of the published lists of mills are accurate or comprehensive, for the totals of mills, workers and the

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2. D. P. Kandourov, Fabriken-zavodskija predprijatija Rossijskoj Imperii, Petersburg 1914
Russia, Ministerstvo Finansov, Spinok fabrik i zavodov Rossii 1910, Moskva, Petersburg, Warszawa.
value of output vary considerably from those published by Krzyzanowski and Kumaniecki or by Komitet Gieldowy Lodzki.\(^1\) One further difficulty in both regions in determining the exact number of locations of the industry in 1914 is the fact that both Bialystok and Lodz had expanded their physical and administrative boundaries between 1876 and 1914 and that in consequence a number of villages in which mills had existed in 1876 had been brought within the towns by 1914. However, in the absence of detailed archival records of the mills between the two dates these sources are the only guide to the distribution of the industry and to its scale in the individual towns and villages immediately before the First World War which are available in Poland.

The distributions of the mills according to the three major sources which have been employed are shown on Maps 19 and 20 on pages 199 and 201. Map 20 shows the distribution of mills according to Sroka, for the Kingdom of Poland, and in the Bialystok region, which Sroka does not cover, the number of mills have been taken from the list of the Leningrad

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archives. Map 19 and the map showing the distribution of employment, numbered 23, are based on the information published in Kandourov. This source covers both the Kingdom of Poland and Grozienska gubernia and it gives details of employment for more mills than Sroka. The column diagrams which show the distribution of mills and employment for both 1876 and 1914 are also based on Kandourov, but the maps of the Bialystok region alone are derived from the list of mills from the Leningrad archives.

In the compilation of maps 17 and 18, showing the distribution of the decline and growth of the industry between 1876 and 1914, Kandourov, Sroka and the Leningrad archive list have all been used. In the case of each location the list with the highest number of mills or employees has been accepted in preference to the others. Despite the inadequacies of the source materials for the Kingdom of Poland, this creates no difficulty because the substantial change in the scale of the industry in the important locations was sufficiently large to override the errors of detail in the sources. In the Bialystok region the changes in the numbers of employees and mills were less marked, but there the detailed lists of the mills for both 1876 and 1914, which were supplied by Dr. S. Hisztal, have been
used. Those lists were compiled by the same authorities at the two dates and are more comprehensive than the published lists of mills for 1914, but they are, of course, subject to the limitations which were outlined in Note A on page 431 above.
NOTE C: Source materials for the study of industry in Poland between the wars.

Between the wars and especially after 1926 much statistical information about industry was collected in Poland by government departments and private commercial bodies. Most of the information was published before 1939 in simplified forms in the annual and occasional publications of the chief statistical office (Głowny Urząd Statystyczny), and in the annual and biennial publications of chambers of commerce (Izba Przemysłowo-Handlowa) and specialised industrial and commercial organisations. Unfortunately, the archival material on which the published figures were based has, for a large part, been destroyed.

During the 1930’s all firms completed a standardised form annually which was sent to the chief statistical office in Warsaw and also to the local chamber of commerce. The annual return gave the details of the activity of the year in each of the factories or other premises belonging to the firm. The number of male and female employees each month; the number of office staff in the total; the quantity and type of raw materials consumed; the quantity, type and value of the products, and the consumption of fuels and
electricity were all given in addition to the address of the factory and the number of processes which were carried out within the factory. In the case of the textile mills the number of employees in each section was also given.

All the returns are preserved in the chief statistical office in Warsaw and copies are available in the local branches of the national or wojewodzwo archives (Archiwum Państwowe and Wojewódzkie Archiwum Państwowe respectively). The annual returns received from the mills in the Łódzkie wojewódzwo are available in the archives in Łódź, but in Białystok all archival materials were lost during the war.

For this thesis the author was permitted to examine the folios in Łódź, but this permission was not extended to other parts of Poland in which the woollen textile industry was located.

The annual publications of industrial statistics by the chief statistical office were based on the returns made by each firm, as were the annual reports of the chambers of commerce. Statystyka Przemysłowa includes the details of

1. APL, Izba, No.4-34.
2. GUS, Statystyka Przemysłowa, published from 1929 to 1937.
3. Sprawozdania of Izba Przemysłowo-Handlowa in Bielsko-Biała, Katowice, Łódź, Sosnowiec and Wilno for the textile industry, but also for many other towns.
production by wojewodztwo for each industry and also gives
the number of factories or mills in which each product
was produced. These figures are made up of factories
which specialised in the production of each good, but also
they include the factories in which the good was only
manufactured as a by-product. Some textile mills are
counted four or five times in this manner as producers of
woollen, woolen-waste, and cotton yarn, and also of woolen
and semi-woollen cloth.

The comparison of the published figures and the
individual returns from firms show that the official statistics
may not have been completely accurate or that the surviving
archival records are incomplete. Some firms may have been
included in one branch of an industry because this appeared
in the name of the firm or because the firm wished to be
considered as a member of that branch, when the bulk of the
products of the firm placed it unquestionably in another
branch of the industry. Some "woollen" textile mills were
producing chiefly cotton goods and in this study they have
been included in the cotton textile industry, although in
the published statistics of both the chamber of commerce and
the chief statistical office they may have been included in
the woollen branch of the textile industry.
Statystyka Przemysłowa also includes biannual details of the total number of mills in each structural branch of each industry for every województwo, and of the employment in each branch. Unfortunately in the case of the textile industry all branches of the industry are amalgamated and so the division by spinning or weaving is of little use for this study, including cotton, silk, linen and other branches of textile production besides wool. The scale of the mill, as measured by the employment in each, is also available for each województwo for each complete industry, such as textiles or engineering, in the annual reports of the former ministry of labour,¹ and exact details of the distribution of labour are available for all industries in the reports of the December 1931 census, though these are subject to the reservations raised by local boycotts of the census.²

The publication of directories of firms³ was undertaken by private bodies in Poland between the wars and so details

2. GUS, Drugi Powszechny Spis Ludności z dnia 9. XII 1931 r., volumes for each województwo were published in 1937 and 1930.
   Rocznik informacyjny o spółkach akcyjnych w Polsce, Tom I 1928, Tom II 1930, Tom 1932.
   Rocznik Polskiego Przemysłu i Handlu, Tom I 1934, Tom II 1936, Tom III 1930.
which are available for firms are not uniform and the proportion of the total numbers of producers which are included in the directories varies, although most of the large-scale producers were included.

Statistical details of the capacity and level of activity in industry in general were published in the annual reports of the chambers of commerce. For the textile industry in the Lodz region these details were published annually by a group of about fifty of the most important textile producers. The details only include the members of the group, but they give a good impression of the activity in the industry from week to week. This information may also be gained in a monthly form for the industry in all the regions from the trade journals, and especially from Polska Gospodarcza, in which details of production, employment and sales of textile and other industrial goods were published.

1. Związek Przemysłu Włókienniczego w Państwie Polskim, Sprawozdanie, published from 1925 to 1933 in Lodz.

2. Przemysł i Handel, published monthly and fortnightly from 1920 to 1929. After 1929 it was entitled Polska Gospodarcza.
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