Industrial Growth and Entrepreneurship in the Early Stages of Industrialization in the Czech Lands

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At the end of the XVIIIth century the majority of industrial goods in these countries were still produced by craftsmen and only a small percentage by manufactories. The statistics for 1780 show that there were 24 manufactories in Bohemia, but the figure is unduly low as it did not include dyeworks, bleaching plants, furnaces and hammer-mills. The same statistics record 31,476 master craftsmen in the country,[1] but it was not the skilled craftsmen or the centralized manufactories who made the main contribution to the production of manufactured goods, but rather the domestic putting-out system. This, in fact, constituted a sort of dispersed manufactory, in which a hundred — and often as many as a thousand — spinners and weavers worked for a single contractor. So skilled craftsmen, manufactories and the domestic putting out system constituted the most important forms of production of manufactured goods in the late XVIIIth century.

Two factors prevented Czech entrepreneurs from increasing production through traditional methods: in the first place, the

1 KLÍMA ARNOŠT, *Manufakturní období v Čechách* (Pre-industrial manufacturing in Bohemia), p. 455, Prague 1955.

technical inventions emerging from the British industrial revolution of the late XVIIIth century, and secondly the increase in demand which resulted from the growth of the population of the Czech lands themselves — a population which by 1781 numbered over 4 million.[2] The Czech entrepreneurs found themselves obliged as a result to adopt machines invented in Britain in their workshops. The combination of expanding markets and opportunities to make money led to the establishment of many new enterprises, and as manufactories multipied so the demand for labour increased. In 1781 serfdom was abolished, so that the rural peasantry obtained freedom of mobility and employment.[3] As a result textile, glass, iron and paper industries were established in various parts of the Czech lands during the XVIIIth century. Of these textiles were in quantitative terms the most important, and linen and woollen goods were produced for export as well as for the domestic market, while after 1763 cotton goods were also produced.

The statistics of 1780 show that there were 173,736 spinners together with a further 57,428 workers, making 231,164 in all, employed in producing textiles in Bohemia alone.[4] By 1789, only 18 years later, there were over 400,000 spinners in Bohemia and the total work-force employed in textiles had risen to 528,870.[5] Not only had the number of textile workers in Bohemia doubled in less than twenty years, but they had also come to represent over 83% of the total number of workers employed in producing manufactured goods.[6] In Moravia and Czech Silesia there were also at least 150,000 employed in textiles[7]. The numbers employed

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2 KÁRNÍKOVÁ LUDMILA, *Vývoj obyvatelstva v českych zemích 1754-1914* (Population growth in the Czech lands 1754-1914), p. 67, Prague 1965.

3 The decree abolishing serfdom in Bohemia was promulgated on 1st November 1781 and is reprinted in the *Archiv český*, vol. 25, pp. 25-28, Prague 1910.

4 KLÍMA A., *Manufakturní období...*, pp. 460-461.

5 PURŠ JAROSLAV, *Struktur und Dynamik der industriellen Entwicklung in Böhmen im letzten Viertel des 18. Jahrhunderts*, in « Jahrbuch für Wirtschaftsgeschichte » II. Teil, p. 107, Berlin 1965.

6 PURŠ JAROSLAV, *ibid.* II, p. 114.

7 MAINUŠ FRANTIŠEK, *Plátenictvi na Moravě a ve Slezsku v XVII a XVIII století* (Linen production in Moravia and Silesia in the XVIIth and XVIIIth centuries), p. 113, Ostrova 1959, and *idem* « Vlnařství a bavlnářství na Moravě a ve Slezsku v XVIII století » (Wool and cotton production in Moravia and Silesia in the XVIII century), p. 32, Prague 1960.

in the iron, glass and paper industries, on the other hand, were comparatively small. In 1798 Bohemia's textile production was valued at 24.5 million guilders, 11 million from linens, 9.6 millions from woollens and 2 millions from cotton goods.[8] It was the linen industry which employed the largest number of workers and which was also of the greatest value in financial terms. Bohemian linen was exported to England through Silesia, to Vienna and then overseas from Trieste. But this was also the last of the industries to be affected by the advent of technical innovations and mechanization on a large scale. The figures for 1827 show that linen production was estimated at 10.1 million guilders and had reached over a million pieces,[9] half of which were consumed locally. There is, however, scarcely any change in these figures until the mid-century, and the statistics for 1846 estimate the value of linen production in Bohemia at 10.5 million guilders, and 4.5 million in Moravia and Silesia.[10]

These figures indicate that there was little appreciable growth in linen production, and this was certainly due to the comparatively late adoption of technical innovations in the sector. The first mechanized mill for spinning linen yarn was not built until 1836. Earlier the Continental Blockade had been responsible for cutting off Czech producers from overseas markets, and these were never subsequently fully regained. But, as the figures for 1847 indicate, there were nonetheless still over 350,000 people employed in linen production in Bohemia alone.[11]

The production of woollens developed in a very different way. It had traditionally been concentrated in three areas: Liberec (Reichenberg) in Bohemia; Brno (Brünn) in Moravia and Opava (Troppau) in Silesia. In 1780 there were 33,906 wool spinners in Bohemia,[12], and by the turn of the century the number had

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8 Purš Jaroslav, *ibid*, II, p. 109.

9 Schnabel G.N., *Uber die Leinenwaarenproduktion in Böhmen*, in « Jahrbuch des böhmischen Museums » Bd. I, pp. 296-297, Prague 1830.

10 Horská Pavla, *Kapitalistická industrialisace a středoevropská společnost* (Capitalistic industrialization and central European society), p. 48, Prague 1970.

11 Purš Jaroslav, *Průmyslová revoluce v českých zemích* (The industrial revolution in the Czech lands), p. 52, Prague 1960.

12 Klíma Arnošt, *Manufakturní období...*, p. 457.

doubled and risen to 70,000.[13] Up to that point the development was similar to that of linen, but the picture then changed. Mechanized spinning was introduced widely, and the number of hand-spinners fell year by year. By 1826 there were already 45 mechanized spinning mills for woollens in Liberec [14] while 12 mechanized manufactories were operating in Brno at the start of the century which employed 11,000 workers.[15] The Offermann workshop was the largest and employed some 2,000 workers.[16] In the same period the annual production of woollen goods in Moravia and Silesia ran at about 200,000 bales.[17] Whereas factory production increased in the first decades of the century at Brno, hand production remained predominant in Liberec in Bohemia, where over 1,000 craftsmen and their journeymen produced between 43,000 and 56,000 bales a year.[18] This hand-production continued throughout the first half of the XIXth century, and in 1841 accounted for the output of as many as 70,000 bales.[19] But industrialization began to predominate here as well, and by 1835 there were 53 woollen mills with over 150,000 spindles, 2/3 of which were in the Liberec region.[20] The spinning mills were equipped with stretching, carding, cleaning and roving machines, as well as jennies, mules and water-frames. In 1832 the production was about 58,000 bales, and this provided employment for 9,000 individuals — in 1796 at least 50,000 would have been needed to produce the same quantity.[21] The introduction of the new machines, then, quadrupled productivity. As the volume of production rose so new markets were found, and by 1835 over 100,000 individuals

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13 Kreutzberg K. J., *Skizzirte Übersicht des gegenwärtigen Standes und der Leistungen von Böhmens Gewerbs und Fabriksindustrie in ihren vorzüglichsten Zweigen*, p. 106, Prague 1836.

14 Purš Jaroslav, *ibid*, p. 41.

15 Mainuš František, *Vlnářství...*, p. 218.

16 *ibid*, p. 135.

17 *ibid*, p. 98.

18 Joza Jaroslav, *Z minulosti textilního průmyslu Libereckeho kraje* (The history of the textile industry in the county of Liberec), p. 99, Liberec 1958.

19 *ibid*, p. 98-99.

20 Kreutzberg K.J., *Skizzirte...*, p. 106-107.

21 Hallwich Hermann, *Reichenberg und Umgebung*, p. 520, Reichenbetg 1874.

were employed in woollen production in Bohemia alone.[22] In Moravia growth was even more rapid, and in 1840 the Soxlett mill in Brno which employed 1,000 workers was described as the biggest on the Continent.[23] The 1841 statistics indicate that the woollens produced in the Brno region reached a value of 13 million guilders, and a further 10 million in the Liberec region.[24] These two areas provided about 50% of the total output of the Austrian Empire.

There was a long tradition of linen and woollen cloth production in the Czech lands, due to the availability of home produced raw materials. The cotton industry, on the other hand, had to import its raw material. Until 1763 this had been subject to individual monopolies (*privilegia privativa*), but thereafter cotton production could be freely undertaken. It was of course in this industry that the major innovations of the Industrial Revolution had first occurred in England, and in the Czech lands it was also the cotton industry which pioneered the changeover from domestic production to factory production. The leading entrepreneur in this field, Johann Josef Leitenberger, who owned cotton mills in Verneřice, Zakupy, Kosmonosy-Josefův Důl, Mimoň and Ústěk, had as early as 1796 employed a Danish engineer named Rigo from Copenhagen to build English spinning machines.[25] In 1806 the brothers Anton and Franz Ludwig were granted permission to build English spinning machines in Liberec.[26] By 1828 there were already 69 cotton spinning mills in operation, which housed over 700 English spinning machines, and of these 357 were in 9 of the biggest mills — that is over 50% of the total number of machines.[27] This shows that production was concentrated in the largest and best equipped factories. The imports of raw cotton rose from 39,000 tons annually between 1820 and 1830, to 215,000 tons

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22 KREUTZBERG K.J., *Skizzirte...*, p. 89.

23 BRUSATTI ALOIS, *Österreich am Vorabend des industriellen Zeitalters*, in « Die Wirtschaftsgeschichte Österreichs », p. 140, Vienna 1971.

24 HORSKÁ PAVLA, *Kapitalistická...*, p. 47.

25 KLÍMA ARNOŠT, *The Beginning of the Machine Building Industry in the Czech Lands in the First Half of the XIXth Century*, in « The Journal of European Economic History », vol. 4, No. 1, p. 53, Rome 1975.

26 HALLWICH HERMANN, *Reichenberg...*, p. 502.

27 PURŠ JAROSLAV, *Průmyslová revoluce...*, p. 27.

annually between 1841 and 1850,[28] indicating growth of over 450%. In 1835 the number of hand-spinners had fallen to 10,000 from a figure of about 40,000 at the beginning of the century — the remaining quarter were employed in the new mills, but their output was now 150% greater,[29] indicating how much productivity had increased. At the same time there were 88 mechanized cotton mills in Bohemia with 350,000 spindles, producing yarn worth 7 million guilders annually. The Kastner and Richter Company of Luby (Leibitschgrund) owned a mill with 85 spinning machines and nearly 20,000 spindles, together with other machinery all driven by water power and by two steam engines, in which 400 workers were employed.[30]

While the mechanization of cotton spinning took place rapidly, this was not the case for cotton weaving. By 1835 Bohemia had 60 weaving mills equipped with power looms, but these were unable to process all the yarn supplied by the spinning mills and so there was still employment for over 100,000 domestic weavers who obtained their yarn directly from the spinning-mills or else via contractors. Domestic cotton weaving was particularly widespread in northern Bohemia, in Liberec, Frýdlant (Friedland), and Litoměřice (Leimeritz), and also in the west, in Loket (Elbogen), and in the south around Tábor.

By 1835, some 140,000 individuals were employed in cotton production in Bohemia, and the capital involved exceeded 24 million guilders.[31] Annual production ran at 3.2 million bales.[32] In the 1840s the Austrian Empire was one of the leading cotton manufacturing states on the Continent, and Bohemian cotton production provided one third of the total. In 1840 more spindles were operating in Austrian cotton mills than in all the states of the German *Zollverein,* and there were more in Bohemia than in Saxony. The large spinning mills clustered around Liberec were the

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28 *ibid,* p. 28.
29 KREUTZBERG K.J., *Skizzirte...,* p. 85.
30 *ibid.*
31 KREUTZBERG *K.J., Skizzirte...,* p. 85.
32 LANGER EDUARD, *Firma Benedict Schrolls Sohn,* p. 58, Prague 1895.

most active, and accounted for 95.8% of the total number of machines in the country, and 98.3% of its entire production.[33] In 1847 there were 209 cotton spinning mills in the Austrian Empire, more than a third of which were in Bohemia. In the 86 Bohemian mills there were 2,000 spinning machines with 460,984 spindles employing 10,000 workers.[34] In one of the largest at Malá Skalice 580 individuals were employed.[35] In Bohemia as a whole there were 150,000 people employed in cotton weaving, and thousands more in the printing factories. An indication of the relative delay of mechanization in cotton weaving, as opposed to spinning, is given by the fact that one of the largest companies, Benedict Schrolls Son of Broumov (Braunau), still employed over 1,000 domestic weavers in 1848.[36]

The first cotton printing workshop to be established in Bohemia was built in 1763 by Count Josef Kinsky at Sloup (Bürgstein.[37] This branch developed quickly, and printing workshops sprang up almost everywhere that cotton was produced, especially in Prague and nearby, in Karlin (Karolinenthal) and Smíchov. F. Herkott's company in Prague employed 174 people in their printing works in 1788 and used 61 printing tables.[38] At the time manual printing was still customary, and the printer would place a painted copper plate on the cloth which was stretched out on long tables. To cover a bale of cloth measuring 25 metres long by 76 cm wide involved laying the copper plate (which measured 23 × 12.5 cm) some 622 times.[39] This, of course, was for printing in a single colour, and where three co-

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[33] PURŠ JAROSLAV, *Struktur...*, p. 464-465.

[34] *Tafeln zur Statistik der österreichischen Monarchie 1847-1848*, II. Teil, Tafel 4, p. 5, Wien 1853.

[35] This was the firm of Löbbecke and Lindheim. See *Tafeln zur Statistik...* 1847-1848, II Teil, Tafel 4, p. 10-14.

[36] LANGER EDUARD, *Firma Benedict Schrolls...*, p. 137.

[37] PAUDLER A., *Graf Josef Kinsky, Herr auf Bürgstein und Schwoyka*, p. 22, Leipa 1885.

[38] PÁVEK M., *Textilní výroba v historickém přehledu* (A historical survey of textile production), vol. II, p. 384, Prague 1972.

[39] TOBOLKA ZDENĚK, *Textiláci první průkopníci dělnického hnutí v Čechách* (Textile Workers, the First Pioneers of the Working Class Movement in Bohemia), 2nd edition, p. 28, Praha 1950.

lours to be used, for example, the plate would have to be laid 2,016 times on the bale. Children were employed to paint and clean the copper blocks, and many children, often as young as seven years of age, were employed in the printing shops.

Thomas Bell had invented a cylinder printing machine in England which was being used in Manchester as early as 1785, and in Bohemia the first attempt to introduce such a machine was made in the Leitenberger mill in 1815. Two printers and three assistants operated the machine, which was driven first by water and later by steam. Its output was equivalent to that of 200 hand-printers so creating an enormous increase in productivity. In 1833 a panel printing machine was invented by the Frenchman Perrot, which made it possible to print with three or four different colours at once. Two printers operating the machine could equal the output of 50 hand-printers. In 1836 Eduard Leitenberger devised a similar machine which could print with 6-8 colours simultaneously.[40] The enormous increase in productivity which resulted meant that such machines were quickly adopted in Bohemian cotton printing workshops, the largest of these were the Prague works of the L. Epstein company, which employed 800 workers, the F. Leitenberger factory at Kosmonosy-Josefův Důl (725 workers), his brother Eduard's factory at Zàkupy (Reichstadt) (556 workers), and those of the Porges brothers in Prague and Smíchov (500 workers in each).[41] The printing works owned by the latter represented only a fraction of their activities, and like the Leitenbergers they also owned spinning and weaving mills which employed 4,000 people in all.[42] But the introduction of the new printing machinery in Bohemia also caused considerable unemployment and wage reductions. It was this which lay behind the wave of unrest in 1844 when printing machinery was smashed in Prague[43] in ways that were reminiscent of similar occurences in England in 1811. Similar outbreaks occurred in Liberec, in Zákupy and in Česká Lípa.

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40 *ibid*, p. 30.
41 *ibid*, p. 33-34.
42 KREUTZBERG K.J., *Skizzirte...*, p. 95.
43 TOBOLKA ZDENĚK, *Textiláci...*, p. 43-44.

During the first half of the XIXth century one can say that large scale mechanization was introduced in spinning, weaving and printing in the Bohemian and Moravian cotton and woollen industries. The installation of modern machinery (which was principally British in origin and design) brought the industrialization of the two countries. Productivity increased a hundred and even a thousand fold in many sectors, and the jobs of thousands of workers were replaced by machines. It was in the same period that the building of machinery from English designs began in the Czech countries, and under the guidance of the British and Germans a new machine-construction industry came into being.[44] This in turn began to make demands for iron and for greater supplies from the native iron-ore mines, which in their turn had also begun to adopt the new English techniques of iron production. In 1830, the Viennese professor Riepl recruited the British engineers David Evans, David Thomas and William Jones to introduce puddling techniques at the Vitkovice iron-works, and a year later a rolling-mill was built there. In 1838 the first coke blast furnace in the Austrian Empire was built, and by 1848 these furnaces were producing 64% of the Empire's pig-iron.[45] Edward Thomas, who owned a machine building factory in Karlin near Prague, also built an English style rolling mill in 1842 for the Stará Huť ironworks at Beroun in Bohemia, and this was managed by two English overseers, the Whitehouse brothers from Staffordshire.

The Bohemian and Moravian machine-construction industry played a very important part in the further industrialization of both the Czech countries, and soon most textile factories were equipped with home built machines. This was the case not only for processing machines, but also for power and drive engines, especially steam engines, which were normally built on the James Watt model. Edward Thomas's machine factory at Karlin and the H.A. Luz factory at Brno built 50% of all the steam-engines in use in Bohemia

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44 Klíma Arnošt, *The Beginning...*

45 Myška Milan, *Počátky vytváření dělnické třídy v železárnách na Ostravsku* (The Early Formation of the Working Class in the Ironworks in the Ostrava Region), p. 65, Ostrava 1962.

and Moravia in the first half of the XIXth century. But there were also smaller factories which produced various types of machinery. Although a large proportion of factories were still using water-power, the constantly growing number of steam engines indicates a general desire to be rid of the uncertainties accompaying the use of water power, especially during the winter or when the water level was low. Steam engines also meant that it was possible to build factories in places where there was no adequate water supply. The distribution of steam engines in different branches of industry also indicates that textiles were the most advanced sector. In 1846, for example, 45% of all steam engines in use were in textile factories, while 21% were used in mines, 18% in machine construction and iron-foundries, 11% in sugar mills, and the remaining 5% scattered over the other industries.[46] This shows that coal mining held second place after textiles, for 'coal was a necessary condition for economic growth'.[47] All four of the industrial sectors mentioned played a major part in the spread of industrialization in Bohemia and Moravia. There was also a regional concentration of steam-engine machinery, which was again to prove decisive for the industrialization of both countries. The most important region was that around Brno, followed in second place by Prague and its surroundings, and then thirdly the area around Ostrava. Fourth was the Liberec area, and fifth the newly industrialized coal mining and iron working district around Kladno. In fact, industrialization occurred primarily in the early XIXth century in the areas which would continue both in the later XIXth century and in the XXth century to see the major industrial developments in the two countries, and hence to play a major role in the industrialization of the both countries.

The rapid achievements of industrialization in Bohemia led the

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46 Purš Jaroslav, *Použití parních strojů v českych zemích v období nástupu imperialismu* (The Use of Steam-Engines in the Czech Lands in the Period up to the Rise of Imperialism), in « Československý časopis historický, (CSCH) », vol. II, p. 489, Praha 1954.

47 Cipolla Carlo M., *The Industrial Revolution*, in « The Fontana Economic History of Europe », vol. III, p. 12, London 1973.

advisor to the Bohemian government, Peter Josef Eichhoff, a Rhinelander, to propose in 1827 an annual exhibition of industrial products to be held in Prague. Count Karel Chotek, the Governor, accepted the proposal and commissioned Count Josef Lichtenstein, who had studied in England and was familiar with the technical and economic development which had taken place in that country, to organize the exhibition. The first exhibition of industrial products took place in Prague in 1828, and included 1,498 exhibits. Foreigners coming to Prague were astonished to discover what high standards had been attained by Bohemian industry. The success of the exhibition led to a decision to hold another in the following year. This time even more companies contributed, and from a total of 2,213 exhibits the products of the Leitenberger cotton printing factory at Zákupy (Reichstadt) were awarded the gold medal 'for their excellent quality'.[48] The criteria established by the committee for the gold medal insisted that goods should be of the highest quality, inexpensive, useful in commerce and would create employment for large numbers of workers. The silver medal went to another cotton factory — owned by Przibram and Jerusalem — which operated in Prague and Smichov It was claimed that the products of Moses Jerusalem were very advanced, that his factories were among the best, and employed between 600 and 1000 people. The awards were conferred in a ceremony in the Karolinum in Prague, and the Governor, Count Karel Chotek, took part himself. At the third exhibition in Prague in 1831 the gold medal was again won by the Leitenberger company, this time their Kosmonosy-Josefův Důl factory, while Eduard Leitenberger, the owner of the Zákupy factory, also received special honours for his technical innovations.

Other factors which were closely related to industrialization in the early XIXth century were coal-mining and transportation. It was hardly feasible continue transporting the new goods and mate-

[48] Mendl Bedřich, *Český průmysl před sto lety a počátky průmyslové Jednoty* (Czech Industry One Undred Years Ago and the Beginning of the Industrial Union), in « Sto let Jednoty k povzbuzení průmyslu v Čechách » (One Hundred Years of the Union for the Encouragement of Industry in Bohemia), p. 46-49, Praha 1934.

rials by traditional methods, the heavily laden wagons drawn by great teams of horses were much too slow to provide the new factories with the supplies of raw materials which they required. The construction of a railway network became imperative, and once again it was England which provided the model. In 1830 Professor Riepl had, as we have mentioned, brought a number of English engineers to the Vitkovice iron-works, and they there set up the production of rolled rails. Then in 1836 the Rothschild bank acquired the franchise to build the railway to connect Vienna with Poland, and the Vitkovice works proved able to supply all the track acquired. The rail connection between Vienna and Bochnia was built to carry salt, timber, cereals and iron ore, and was to be of major importance in the industrialization of both Bohemia and Moravia, because branch lines soon linked it to Brno, Olomouc and Opava. The large coal deposits near Ostrava were also of great value to the railway. In 1841 work was begun on the line from Olomouc to Prague, and this was completed in four years, and on the 20th August 1845 the first steam locomotive, the "Bohemia", drew into Prague station. The railway was of major consequence for both industry and transport, for it connected the principal industrial area of Bohemia, around Prague, with the two main industrial areas of Moravia (i, e. Brno and Ostrava), and also with Vienna. As soon as this was finished, work began on another line from Prague to Děčín which was designed to link Prague and Bohemia with Saxony and North Germany by connecting with the Saxon railway at Děčín. In 1851 this line was also completed.

Once again it was during the early XIXth century that the basis for the industrial development of Bohemia, Moravia and Silesia was laid. By the end of this period the textile industry was well advanced, a machine-construction industry of some standing existed, there were several modern ironworks, large coal deposits were accessible, an important railway network had been built, and food production was expanding. By the middle of the century, industrialization was well under way in Bohemia, Moravia and Silesia. But the reasons for this are not to be found only in the use of new

machinery, increases in productivity, and increased consumer production. It is also necessary to consider those who brought all this about — that is, the entrepreneurs, the managers, the experts and the workers who developed these new companies and worked in them. It is with these groups that we shall now be concerned.

II

Economic historians have shown that in most of the more advanced societies, the entrepreneurs of the industrial revolution were recruited from the ranks of the merchants, artisans, small manufactures, and journeymen and also from the nobility.[49] Some were even technical experts. This was also the case in both Bohemia and Moravia, In attempting to study representatives of the various groups in the industrialization of the countries, it will be necessary to go back beyond 1780.

Jakob Matthias Schmidt and L. Köfiller both provide examples of merchants who became industrialists and made a major contribution to industrialization in Bohemia and Moravia. In 1768 the Viennese merchant Jakob Matthias Schmidt obtained a contract from Count Johann Filip Stadion and his brother Franz Konrad permitting him to build a woollen manufactory on the latter's estate at Nová Kdyně in southern Bohemia.[50] By 1775 there were 297 people employed there, as well as further 1400 domestic out-workers.[51] In the early XIXth century the manufactory was converted into a proper factory — in 1825 539 workers were employed in the factory with an additional 5,913 out-workers. By 1838 the out-workers had increased to 7,000. In 1845 the enterprise was

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[49] Fritz Redlich, *Der Unternehmer,* Göttingen 1964. Idem, *Frühindustrielle Unternehmer und ihre Probleme im Lichte ihrer Selbstzeugnisse,* in « Sozialgeschichtliche Probleme der frühen Industrialisierung », Berlin 1968; Kocka Jürgen, *Unternehmer in der deutschen Industrialisierung,* Göttingen 1975; Wilson C., *The Entrepreneur in the Industrial Revolution in Britain,* in « Explorations in Entrepreneurial history », Vol. 7, 1954-5.

[50] Klíma Arnošt, *Manufakturní období...,* p. 363.

[51] *Ibid,* p. 370-371.

converted into a joint-stock company, with 29 share-holders.[52] There are few examples of an XVIIIth century manufactory being successfully converted into a mechanized factory. In Bohemia there were such cases — for example the company formed by J. J. Leitenberger at Kosmonosy-Josefův Důl in 1793, the manufactory at Horní Litvínov which was founded in 1715, J.H. Offermann's company in Brno in Moravia.

In 1763 a woollen manufactory was transferred from Klandruby in Bohemia to Brno. It was managed by a Belgian, J. Bailoux, and employed skilled workers from Verviers. The Brno manufactory was built by the Brünner Lehenbank, a state-owned institution. Later it was taken over by certain Brno merchants, and in 1781 became the property of the merchant L. Köfiller, who directed it until 1793. The years between 1781 and 1788 were the company's most prosperous, and at that time it employed about 2,000 people both in the factory and as out-workers.[53] In 1793 the company was wound up, but it had made a major contribution to the textile industry in the Brno region. Many future entrepreneurs, such as Wilhelm Mundi and J.H. Offermann, had been employed there and had learned a great deal which they were subsequently able to apply in their own enterprises.

Johann Georg Berger was another merchant who later became an entrepreneur. In 1772 he was running a shop from which he sold linen goods, purchased mainly in Northern Bohemia. In 1775 he set up a wholesale business in linen and cotton goods at Liberec, in association with the Prague banking house of Karl Balabene and his agent Peter Cerutti. With other local distributors the company bought articles produced by domestic weavers. Johann Georg Berger in 1793 purchased a bleachery and fullery in Stráž and Nisou, near Liberec. He modernized them and added a dyeing shop so that he could include the final processing in his own factory. This

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52 LEDERER P., *Zur Geschichte der Wollenzeugfabrik in Neudegein*, in « Mitteilungen des Vereines für Geschichte der Deutschen in Böhmen (MVGBD) », Jg. XLIV, p. 126, Prague 1906.

53 MAINUŠ FRANTIŠEK, *Vlnářství...*, p. 123.

embodied the transformation of a merchant into a manufacturer. In 1798 he obtained permission to establish a cloth factory in Liberec.[54]. Although it was Berger who handled the commercial side of the operation, the factory needed a manager capable of running the technical side, and such a man was found in Ferdinand Römheld, who later became his son-in-law. Römheld extended the factory and added a spinning mill, a shearing shop, a pressing shop and a weaving mill. He also took great care to ensure that only the most experienced craftsmen were employed in the factory. In the years 1800 to 1803 he purchased various spinning, shearing, and carding machines in the Netherlands, and in 1804 he installed a steam boiler in the dve-works, so becoming the first to use steam in the finishing process in Bohemia. Due to the many different kinds of machinery used in the factory, a machine repair shop was built, and spare parts were also made there. In 1806 he appointed Jan Reiff, a Würtemburger who had previously worked in a similar factory belonging to Offermann in Brno, as director of the workshop.[55] By that time the factory employed some 200 people. In 1810 Römheld purchased a Kay rapid shuttling machine for the weaving mill, and this not only doubled the speed of production but also saved two workers on every loom, and brought about a major increase in productivity. Johann Georg Berger died in 1810, leaving behind him a thriving factory and a large fortune. The business was taken over by his sons and by Römheld, until they decided to split up in 1819 when Berger's sons took over the Liberec factory while Römheld became joint-proprietor and manager of the cloth factory owned by Count F.A. Wallenstein in Horní Litvínov.[56] He at once completely transformed the old factory, equipped it with new machinery, and in 1826 installed a steam-engine built by the firm of H.A. Luz at Brno. He continued to manage the factory until his death in 1830. The history of this factory is also of particular inte-

[54] Hallwich Hermann, *Reichenberg und Umgebung*, p. 428-496.
[55] Klíma Arnošt, *The Beginning...*, p. 58.
[56] Hallwich Hermann. *Reichenberg...*, p. 509.

rest, for it had been one of the first cloth manufactories in Bohemia when it was established in 1715.[57] While this demonstrates that the nobility took part in producing manufactured goods in the XVIIIth century, it also shows that in the period of industrialization the nobles were often incapable of transforming and modernizing their enterprises, and this was the reason why so many failed. Count Wallenstein was fortunate, however, for he found in Ferdinand Römheld both a joint-owner and a manager who had the ability to create a modern entreprise, with the result that this early manufactory not only survived but became transformed into a modern factory.

The Wallensteins do not provide the only example of noble families who proved incapable of transforming their business during the period of industrialization. Count Christian Christof Clam-Gallas, a member of a noble family from Liberec, showed himself keen to participate in industrial production, and in 1806 built a dye-works near Liberec. Only two years later, however, he sold it to the Prague banker Ballabene, who turned it into a wool and cotton spinning mill which was subsequently purchased by Johann Liebieg, a leading Bohemian industrialist.

As well as the merchants and nobles, there were also many artisans and journeymen who succeeded in making their way up in the world and founded manufactories and later factories in the late XVIIIth and XIXth centuries. Some of these became large businesses, and their owners powerful entrepreneurs, including such men as J.J. Leitenberger and Johann Liebieg in Bohemia and Wilhelm Mundi and Johann Heinrich Offermann in Moravia. Johann Josef Leitenberger was born in 1730, and was the son of a weaver from Levin where he learned his father's trade. At the age of 20 he purchased his emancipation and began a career as a journeyman. He worked in Zurich, Basle, Bern, then in Mannheim, Frankfurt-am-Main, Nuremburg and then finally in Augsburg for J. J. Schülle.

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57 KLÍMA ARNOŠT, *Manufakturní období...*, p.221-240; FREUDENBERG HERMANN, *The Wallenstein Woolen Mill* - Noble Entrepreneurship in « Eighteenth Century Bohemia », Boston 1963.

After eight years absence he returned to Bohemia, and married a dyer's daughter in Verneřice, and then in 1764 he took over his father-in-law's dye-works. He immediately began to remodel it along the lines of the enterprises which he had seen during his travels in Switzerland and Germany. Not content simply with dyeing yarn and cloth he was keen to become involved in producing the goods themselves, so he purchased cotton to pass on to outworkers for spinning, then giving the yarn in turn to domestic weavers to be turned into cloth. The finishing and dyeing was then completed in his own enterprise, and the resulting cloth was sold in his own shop. Later he also set up his own weaving mill, bleaching plant, and a cotton printing workshop. By 1770 the cloth was being printed on six dyeing tables, and he directed the dyeworks himself, while a craftsmen whom he had brought from Switzerland was placed in charge of the printing shop. He employed many other foreign craftsmen, and was well aware that he could only keep pace with competition from foreign producers if his goods were as good as, if not better than, theirs. Although Leitenberger owned his own weaving mill, he was forced to obtain cotton yarn from domestic weavers through the agencies of local distributors. As a result he soon decided to establish his own mill, which he did in 1770 in the old quarter of Prague, giving employment to 527 people.[58] Within a short time this proved to be inadequate, however, and he began to engage large numbers of domestic spinners in a number of localities, including Chomutov, Bílina, Klášterec, Mnichovo Hradiště, Velvary, Rakovník and elsewhere. In the village Starost (Sorge) he went so far as to build houses for carpenters who in turn supplied him with wooden looms. Then in 1773 he purchased the former Jesuit estate at Zelená Ves near Ústěk, where he built another bleach works. In 1786 he bought an estate near Nové Zákupy (Reichstadt) and built another enterprise there. By 1791 there were 400 people employed in the cotton printing works there, which housed 40 printing tables, and some 5,000 domestic

[58] RIEGGER J.A., *Materialien zur alten und neuen Statistik von Böhmen*, Bd. IV, p. 711-712, Prag-Leipzig 1787-1794.

spinners and weavers were also employed by the same enterprise.[59] Then in 1793 Leitenberger purchased a manufactory which Count Bolza had founded in 1763 but which had ceased production in 1778 due to the war with Prussia.

By this time Leitenberger had become the greatest manufacturer of cotton goods not only in Bohemia but in the whole Habsburg Empire. Many of his achievements were major contributions to the general process of industrialization in the late XVIIIth and early XIXth centuries. He owned numerous enterprises, the largest of which were in Verneřice, Zákupy and Kosmonosy-Josefův Důl. It was impossible for him to manage all of them. Therefore he made over several to his sons, that at Kosmonosy to Franz, that at Zákupy to Ignaz. His sons-in-law were also experts and businessmen, and these he employed as well in major positions in his operations. Leitenberger knew his job extremely well. He had mastered a craft and during his travels he had visited and worked in some of the most advanced enterprises on the Continent where he had learned much that he was later able to introduce in his own enterprises. His interest did not flag when new English machines — spinning jennies, mules, water-frames and power looms — began to appear, and he sent his colleagues Richter and Mattausch to Copenhagen to obtain the new English machines for his manufactories. Richter and Mattausch came back with the Danish machine engineer Rigo, who had previously worked in England, and then worked for Leitenberger in Bohemia, and built machines for his spinning mills from as early as 1797.[60] The manufactory in Kosmonosy-Josefův Důl, which he purchased in 1793, was subsequently modernized by his son Franz and was then handed down father to son until 1903, when Dr. Friedrich Leitenberger was killed in a car accident and the factory became the property of a Vienna Bank.[61] There must be few cases in the history of industrialization in which a company founded in the late XVIIIth century survived the entire

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[59] Salz A., *Geschichte der böhmischen Industrie in der Neuzeit*, p. 335, München u. Leipzig 1913; Hallwich Hermann, *Firma Franz Leitenberger*, p. 58.

[60] Klíma Arnošt, *The Beginning...*, p. 53.

[61] Šlamborová D., *Tiba*, p. 2, unpublished manuscript, Mladá Boleslav 1975.

XIXth century and is still operating today, like Johann Leitenberger's cotton-printing workshop at Kosmonosy-Josefův-Důl. It is now a modern factory employing 800 workers, both men and women, with modern machines, modern premises, and with an output of 24 million metres of printed material every year.[62]

Wilhelm Mundi who came to Brno from Germany in 1772 as a travelling journeyman also started an important woollen cloth manufactory in the city. After working in the cloth manufactory for three years he decided to set up his own workshop with two looms, but this grew from year to year and within ten years he had already some 60 looms, and by 1791 these had grown to 120. He also built an enterprise at Tišnov and at Těšín. For his services to the production of textiles he was ennobled, and then bought two feudal estates in southern Moravia — Tišnov and Veverská. By 1800 some 530 people were employed in his enterprise at Brno.[63]

Wilhelm Mundi was also an entrepreneur who had learned a craft as a journeyman before becoming a manufacturer, and he too showed a keen awareness of the importance of the skilled craftsmen whom he employed as managers of his dye-works, as in the case of Friedrich Schöll from Würtemberg.[64] Schöll was an able craftsman and together with others he later set up his own business at Šlapanice near Brno which provided a major stimulus for the industrialization of the area. He also set up a machine-building shop in his textile factory which was come one of the most important in the country. It was run by two Würtemberg technicians, J. Reiff and H.A. Luz, who not only repaired machines and produced spare parts, but also after a while began to build machines of their own. When the machine-building workshop split away from the Friedrich Schöll textile factory, and under the guidance of H.A. Luz was set

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62 *Ibid*, p. 5-6.

63 MAINUŠ FRANTIŠEK, *Vlnářství...*, p. 129.

64 ŠINDELÁŘ BEDŘICH, *O západoevropských odbornicích v některých textilních manufakturách na Moravě koncem 18. století* (West European skilled Labourers in certain Textile Manufactories in Moravia at the End of the 18th Century), in « Časopis Matice moravské (CMM) », vol. 77, p. 70-71, Brno 1958.

up independently in Brno, the foundations of a major machine building industry in the city were laid.[65]

Mundi's manufactory closed down when he died in 1804, as his heirs showed little interest in manufacturing. It was an extremely important business, however, not only because it was amongst the largest of the textile enterprises but also because Schöll, the manager of the dye-works, was further involved in the development of the textile industry in the Brno area and was to prove an operator of great significance in the transformation from manufactory to mechanized factory production. But Wilhelm Mundi's early death prevented him achieving in Moravia what Leitenberger and Römheld had achieved in Bohemia. The task was left to Johann Heinrich Offermann whose career had begun as a master craftsmen in L. Köffiller's manufactory where he worked for ten years. In 1876 Offermann began to build his own manufactory in a small way, due to lack of capital, much like Mundi at the outset. By 1791, however, his enterprise housed 28 looms and he employed a large number of out-workers as well. He also set up a spinning mill, fullery, dye-works and finishing shop, in which some 1,000 people were employed. He died in 1793 and his sons Johann Heinrich and Karl carried on the firm and introduced many technical innovations, including the first English shearing machines in Moravia in 1803. With the aid of the shearing machines productivity improved greatly, for five workers were now able to perform the work of 44 hand shearers, and as a result the workers in both Moravia and Bohemia protested that the machines were taking work away from them. The Offermanns continued to innovate, however, and in 1806 they built a machine-shop in their textile factory. In 1817 they also purchased a steam engine for their cloth factory from the London company of Hague and Topham, and this was only the second steam engine to be used in Moravia and Bohemia. That the offermanns should have bought a steam engine in England rather than one made elsewhere gives some insight into their attitude. In 1824 a second steam engine was installed in their factory and was delivered from Brno

by H. A. Luz. Like the Leitenberger factory at Kosmonosy-Josefův Důl, the Offermann factory also passed from father to son and remained a family business until 1894 when it was converted into a limited company by the heirs of Karl Offermann [66].

Another of the great leaders of Bohemian industrialization in the early 19th century was Johann Liebieg. Born in Broumov in 1802, he became a clothier by trade [67] and in 1818 went to Liberec, the leading textile town in Bohemia, where he opened a textile shop four years later, in partnership with his brother Franz. As a merchant he travelled widely in France and Britain, and these journeys led him to decide to switch from commerce to production. In 1826 the two brothers decided to build their own factory for producing cloth of the type that had recently been developed in Britain but which was not at that time yet known in Central Europe. The venture proved a success, and in 1827 Liebieg returned to England to study the production of woollen cloth there more closely in order to emulate this at Liberec. On returning he purchased a spinning mill from the Prague banker Ballabene in the Josephinenthal near Liberec [68], where Count Clam-Gallas had begun his involvement in the textile industry years earlier. Liebieg at this time clearly did not have a large capital fortune, for he only paid Ballabene an instalment of 2,000 guilders on the purchase price of 18,500 guilders the remainder being paid by further instalments. But this paid the basis for what was to become one of the largest textile companies in Bohemia. By the early 1830s Liebieg was employing some 300 workers and many more out-workers in the villages around Liberec. Numerous buildings began to appear in the Josephinenthal, among them a worsted mill, a roving mill and a mechanical weaving mill with 200 power-looms, installed as early as 1835. He also built a

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[65] Klíma Arnošt, *The Beginning...*, p. 59.

[66] Joh. Heiner. Offermann, *Gross-Industrie Osterreichs*, Wien 1908, Teil 3, pp. 306-307.

[67] Hallwich Hermann, *Reichenberg...*, p. 515.

[68] *Ibid*, p. 515.

dye-works, a finishing shop and a cotton-printing factory. In 1836 some 850 workers were employed in this complex, as well as many more out-workers. Up to this period the machines were driven by water power, but the water-level of the river proved highly unreliable for the needs of the growing factory and in 1838 a steam-engine was installed. Soon a whole industrial town had grown up in the Josephinenthal, but this was not sufficient for Liebieg, and in 1844 he built another spinning mill at Svárov which was powered by water turbines. In 1849 work began on a large mechanized weaving factory in Liberec which employed 1,000 workers and was heated throughout by steam. Liebieg also built smaller factories at Haratice, Železny Brod, Rokytnice and Jizerou, Smiřice and elsewhere in Bohemia. The total value of the goods produced in these factories was estimated at millions of guilders, making Liebieg one of the greatest entrepreneurs in the entire Austrian Empire.

The brothers Leopold and Moses Porges, who were born in the Prague ghetto at the end of the XVIIIth century, were also among the group of leading Bohemian industrialists. One of them began as a linen merchant, the other as a dealer in brandy, but in 1808 they set up a small cotton printing shop near the Jewish quarter in old Prague.[69] Although they had only one printing table and a single printer, the business prospered and in 1815 they purchased an orchard in a suburb of Prague known as Smíchov from the Count Buquoy, and here they built a cotton printing factory. Both brothers were able merchants and understood that skilled craftsmen were indispensable for the technical supervision of the workshop. They employed capable managers for this purpose, and concentrated on the commercial side themselves. Both their printing works in Prague and Smíchov moved from hand to mechanized roller printing, and were the first Bohemian factories to adopt *Perrotinen* which printed in three different colours. They purchased cloth from weaving mills,

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[69] Ruth Kestenberg-Gladstein, *Neuere Geschichte der Juden in den böhmischen Ländern*, Bd. I, p. 111-112, Tübingen 1969.

which they then printed, moved into cotton spinning and also weaving, and in the 1840s built their own spinning and weaving mills which employed about 4,000 workers. There were over 500 workers in the two printing works, which were also the best equipped in Bohemia. In 1841 the Emperor Ferdinand I visited Prague and came with his entourage to see the Porges factories because they were the most mechanized in the city. The Emperor and his advisors clearly were impressed, for both brothers were ennobled in June 1841, and then styled themselves "von Portheim". They owned a beautiful Baroque mansion in Smíchov which had been built by the great architekt K. Dienzenhofer for his own use, and they also purchased the spacious palace belonging to Baron Wimmer in the New Town of Prague. Within a single generation, then, these two entrepreneurs succeeded in making their way from the ghetto of Prague into the ranks of the richest industrialists in the city. No longer petty merchants, as when they began, the family even employed the Czech poet Karel Sabina, who was later to write the libretto for Smetana's ' Bartered Bride ', as a tutor for their children. They had in fact become typical representatives of the class of great capitalist entrepreneurs, but they also earned themselves another niche in Bohemian history, for the printing factory which they owned in Smíchov was the scene of major unrest in 1844. In early June a number of employers decided to cut the printers' wages by half, and the Porges workers were told of this on Saturday 15th June. The following Monday the workers demonstrated to demand restitution of their wages and also the removal of the printing machines, because they were convinced that ' the machines are harmful to our labour '. They set up a delegation which negotiated first with the factory accountant and then in the evening with the entrepreneur, but their demands were refused and the authorities arrested six out of the deputation of ten. This at once caused a strike, and the strikers called on other printers in and around Prague to join them and cease work. Everywhere the demands were the same — restitution of wages and the removal

of the offending machinery. On June 18th the strike spread from Smíchov to Prague, the workers broke into factories and destroyed machinery just as they had done in England in 1811. A crowd of over a thousand demonstrated in Prague and appealed to the Regent, Arch-Duke Stephan, to receive a deputation, but this was refused. Troops were called in to quell the disturbance and 525 workers were arrested, with the result that the strike was broken and work resumed in the Prague cotton-printing factories on the 27th. Subsequently, similar unrest broke out in northern Bohemia, at Liberec, Česká Lípa and Zákupy, and was again suppressed by the army. In the following year Reclam published a short account of the risings and machine-breakings called ' The Unrest in Bohemia ' which was later referred to by Engels.

There were also a number of Englishmen who set up machine-construction factories and who hold a special place amongst the band of entrepreneurs who contributed to the industrialization of Moravia and Bohemia in the XIXth century. Edward Thomas, who emigrated to Bohemia with his brother James in 1829, was an engineer from Bristol. He had sufficient capital to build a factory and equip it with the necessary machinery. Thomas Bracegirdle was another example, and he accompanied Thomas to Bohemia, then ran a factory at Starý Harcov, and then finally built his own factory at Jablonec nad Nisou (Gablonz) and another at Brno. The English entrepreneurs enjoyed the great advantage of technical knowledge combined with possession of the necessary capital. They brought other specialists with them, remained in constant contact with England — which they frequently revisited — and so transplanted the latest types of machine-building techniques into their factories. Technical knowledge, capital and skilled workers were the criteria for successful industrialization. The other English entrepreneurs who built factories in Bohemia in the early XIXth century did not usually have as much capital as Thomas, but they too were experts. This was not the case with Heinrich Alexander Luz. He founded the machine-building industry in the Brno region, but was

by training a watch-maker who took a keen interest in machine building, and found it necessary to acquire wide first-hand knowledge of this field. Nor was he sufficiently rich to buy his own factory, and it was only as a result of marriage that he became a partner in the Friedrich Schöll enterprise.

By far the greater proportion of the entrepreneurs in the machine-building industry in Bohemia and Moravia in the early XIXth century were foreigners, especially Germans and Englishmen. Their factories employed hundreds of workers, and formed the basis of an industry which was subsequently to expand greatly. In the textile industry, however, the situation was different and in this case nearly all the founding figures of the late XVIIIth and early XIXth centuries came from either Bohemia or Moravia. Wilhelm Mundi and Friedrich Schöll who had come from Germany as journeymen were of course exceptions to the rule. But amongst the great entrepreneurs of the first half of the XIXth century there were no Czech names. Technical progress meant that the organizers of the textile and machine-building industries had to be found amongst a new breed of men. They needed to be liberated from the attitudes of the feudal period and to disregard the privileges which the owners of the great manufactories had once used. This was why the aristocratic owners of early manufactories were rarely able to effect the transition to mechanized and modern production. They lacked the technical skill and were unable to keep up with the rapid pace of industrial progress. They were then either compelled to seek bourgeois partners, as in the case of the partnership between Count Wallenstein and Ferdinand Römheld, or else to hand their business over to a bourgeois entrepreneur, as in the case of Count Clam Gallas and the banker Ballabene. Even the important Vitkovice ironworks passed out of the property of the Archbishopric of Olomouc into the hands of bourgeois entrepreneurs and subsequently into those of Salamon Rothschild.

Only in those cases where production remained closely linked with landed property, as in the case of coal or iron-ore mining, did

the nobility maintain an entrepreneurial function in the XIXth century. They were also assisted in this by the fact that there was little technical development in either of these two industries.[70] As a result the great coal mines in the mining region around Ostrava remained controlled by aristocratic entrepreneurs like Count Larisch and Baron Wilczek throughout the period of industrialization.

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[70] KOCKA JÜRGEN, *Unternehmer...*, p. 52 makes the same points.