

My Trips to Baltic Countries

Volume derived from



Fathi Habashi

Department of Mining, Metallurgy, and Materials Engineering
Laval University, Quebec City, Canada

2015

The Book

The present volume is derived from *De Re Metallica. A Metallurgist on the Move*, which is a diary of the trips the author has undertaken during his professional career. He visited many industries, universities, research centres, and museums and participated in many conferences. The book therefore reflects the state of extractive metallurgy since he left his home country Egypt and went to study in Vienna. *De Re Metallica* is in seven volumes fully illustrated mainly by coloured photographs. It includes a short history of the place visited and its main sightseeing sites. Volume 1 Egypt, Volume 2 Canada, Volume 3 United States, Volume 4 Latin America, Volume 5 Asia [in two parts], Volume 6 Europe [in two parts], and Volume 7 Russia & other countries. Total number of pages was 5500.

Since these volumes could not be separated and therefore they will not be available to many readers, I decided to split the book into selected 29 small units, each representing one country or a group of countries closely related geographically. The present volume is one of these volumes.



The Author

Fathi Habashi, Professor Emeritus at Laval University in Quebec City. He holds a B.Sc. degree in Chemical Engineering from the University of Cairo, Dr. techn. degree in Inorganic Chemical Technology from the University of Technology in Vienna, Dr. Sc. *honoris causa* from the Saint Petersburg Mining Institute, Dr. *h.c.* from National Technical University in Lima, and Dr. *h.c.* from San Marcos University also in Lima. He held the Canadian Government scholarship at the Mines Branch in Ottawa, taught at Montana College of Mineral Science & Technology, then

worked at the Extractive Metallurgical Research Division of Anaconda Company in Tucson, Arizona, before joining Laval in 1970. His research was mainly directed towards organizing the unit operations in extractive metallurgy and putting them into a historical perspective.

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*To Nadia,
Hani, and Hatem
with love*

Other Books by the Author

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Technical

- F. Habashi, *Principles of Extractive Metallurgy*:
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 - Volume 2: Hydrometallurgy (468 pages), 1970 (reprinted 1980) (out of print), Gordon & Breach Science Publishers.
 - Volume 3: Pyrometallurgy (493 pages), 1986 (reprinted 1992) (out of print), Gordon & Breach Science Publishers.
 - Volume 4: Amalgam and Electrometallurgy (380 pages), 1998.
- F. Habashi (editor), *Handbook of Extractive Metallurgy*, 4 volumes, 2 500 pages, WILEY-VCH, Weinheim, Germany, Also: John Wiley, 605 Third Avenue, New York, NY 10158-0012.
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- F. Habashi, *De Re Metallica. A Metallurgist on the Move*, 7 volumes, 2015, 5523 pages.

Historical

- F. Habashi (editor), *Gellert's Metallurgic Chymistry*, 1998, 500 pages.
- F. Habashi, D. Hendrickner, C. Gignac, *Mining and Metallurgy on Postage Stamps*, 1999, 335 pages.
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Preface

De Re Metallica. A Metallurgist on the Move is a diary of the trips the author has undertaken during his professional career. He visited many industries, universities, research centres, and museums and participated in many conferences. The book therefore reflects the state of extractive metallurgy since he left his home country Egypt and went to study in Vienna. The book is in seven volumes fully illustrated mainly by coloured photographs. It includes a short history of the place visited and its main sightseeing sites. Volume 1 Egypt, Volume 2 Canada, Volume 3 United States, Volume 4 Latin America, Volume 5 Asia [in two parts], Volume 6 Europe [in two parts], and Volume 7 Russia & other countries. Total number of pages was 5500.

Since these volumes could not be separated and therefore they will not be available to many readers, I decided to split the book into selected 28 small units each representing one country or a group of countries closely related geographically as shown below.

1 Arab Countries	Jordan, Kuwait, Morocco, Syria, Tunis
2 Austria	
3 Australia & Southeast Asia	Australia, Cambodia, Indonesia, Malaysia, Philippines, Thailand, Vietnam
4 Balkans	Albania, Bosnia, Bulgaria, Croatia, Greece, Romania, Serbia, Slovenia
5 Baltic Countries	Latvia, Lithuania, Poland
6 Brazil	
7 Canada	
8 Caribbean	Cuba, Puerto Rico, Venezuela
9 Caucasus	Armenia, Azerbaijan, Georgia
10 Central Asia	Afghanistan, Kazakhstan, Mongolia, Uzbekistan
11 Central Europe	Czech Republic, Slovakia, Hungary, Switzerland
12 Chile and Argentina	
13 China	
14 Egypt	
15 England and France	
16 Germany	
17 Iberian Peninsula	
18 India	
19 Italy and Vatican	
20 Japan and Korea	
21 Low Countries	

22	Mexico	
23	Middle East	Iran, Turkey
24	Peru and Bolivia	
25	Russia	
26	Scandinavia	
27	South Africa	
28	USA	

I hope in this way the book will available to a large number of readers.

Fathi Habashi

Fathi.Habashi@arul.ulaval.ca

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Chapter 1

Introduction



Figure 1.1: The Baltic countries.

The three Baltic countries have many things in common. They have a small population of nearly the same size, ranging from 2 to 3 million each, they suffered destruction from many wars with their invading neighbours, they were oppressed under Russian rule for many centuries, many of their revolting citizens were deported to Siberia, they were under brutal German occupation during World War II, and many intellectuals had to emigrate to other countries to escape foreign occupation. While the Estonians are related to the Finns, the Latvians are associated with the Germans, and the Lithuanians with the Poles.

Christianity was imposed on the Latvians and Estonians by the Pope in the 13th century using the German monastic order known as the Brotherhood of the Sword which later fused with the Teutonic Knights from Prussia, but the Lithuanians accepted Christianity voluntarily in 1387. These

Teutonic Knights (Figure 1.4) were a constant menace to these small populations and the Lithuanians won a major battle against them on July, 15, 1410 at Grünwald (Prussia at the time, now in Northern Poland), known as Tannenberg in German culture (Figure 1.5).



Figure 1.2: The three Baltic Countries Lithuania, Latvia, and Estonia.



Figure 1.3: Flags of Lithuania, Latvia, and Estonia, respectively.

After this battle the Grand Duke Vytautas (ca. 1350–1430) (Figure 1.6) who ruled from 1392 until his death, annexed many Belorussian, Russian, and Ukrainian territories to Lithuania and extended the state border all the way to the shores of the Black Sea. Gradually Poland came to dominate Lithuania and Polish became the language of upper class Lithuanians. One of his successors, Casimir Jagiełło, Grand Duke of Lithuania, became King of Poland in 1447 and a Polish–Lithuanian Commonwealth was formed.



Figure 1.4: Teutonic Knights.

Following her successful wars with Sweden, Russia, together with Austria and Prussia engaged in the partition of the Republic of Lithuania–Poland in 1772, 1793, and 1795. Vilnius became the third largest city (after Moscow and St. Petersburg) in the Russian Empire. In 1812, Napoleon was received in Lithuania as liberator but following his down fall, Czar Nicholas I began to russify the country with increased speed. For example, by replacing the Latin-Lithuanian alphabet by Cyrillic alphabet, closing universities and other institutions of higher education, closing Catholic monasteries, declaring the Russian Orthodox Religion as state religion, and deporting rebels to Siberia.

On August 23, 1939, just prior to its attack upon Poland, Germany signed a secret agreement with the Soviet Union, on the division of the spheres of influence (Ribbentrop–Molotov Pact). Soon afterwards, the Soviet Union occupied the three Baltic countries. On June 22, 1941, Germany attacked the Soviet Union and several days later, the Wehrmacht occupied the whole territories. In accordance with the Yalta and Potsdam agreements, the Baltic States became part of the Soviet Union. Mass immigration of Russians began bringing sovietisation and russification of public life. In the mean time the diaspora of citizens started. When in the spring of 1985 perestroika was introduced in the Soviet Union, independence of the Baltic States was proclaimed.




Figure 1.5: Location of Grünwald .



Figure 1.6: Grand Duke Vytautas (ca. 1350–1430).

Chapter 2

Amber

In ancient times, amber was easily found and collected on the shores of the Baltic Sea especially after heavy storms (Figure 2.1). Amber was mentioned by Georgius Agricola in his book *De Natura Fossilium* published in 1546 and he used the Latin term *succinum*.



Figure 2.1: Fishermen picking up amber [from a book published in 1762].

Amber was intensively traded with the Roman Empire over the so-called Amber Route. During the reign of the Emperor Nero a Roman expedition was dispatched to the far North to locate the source of the so-called 'Northern Gold.' The expedition returned with about six tonnes of amber. The Teutonic Knights created a monopoly on amber production. Today, many shops in the Baltic countries are displaying large collections of amber handcrafts (Figure 2.2–2.4).



Figure 2.2: Amber Route from the Baltic Sea to Venice.



Figure 2.3: Amber shops are numerous in the Baltic countries.



Figure 2.4: Amber shops are numerous in the Baltic countries.

Chapter 3

Lithuania

Vilnius	8	Kaunas	15
Lithuanian National Museum .	11	Museum of the History of Lith-	
Baltic Conference on the His-		uanian Medicine and Phar-	
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VILNIUS

Vilnius was founded in 1320 by Gediminas (ca. 1275–1341) (Figure 3.1), Grand Duke of Lithuania who ruled from 1316 until his death. His statue stands in Cathedral Square.



Figure 3.1: Monument to Gediminas (ca. 1275–1341), Grand Duke of Lithuania founder of Vilnius, ruled from 1316 until his death.



Figure 3.2: Vilnius Cathedral.



Figure 3.3: Monument at the Theatre in Gedimino Prospect.

Adam Mickiewicz (1798–1855) (Figure 3.4) was a Polish–Lithuanian poet and political writer. He was active in the struggle to achieve independence for his homeland and was inspiration during regional uprisings. He was born near Navahrudak (Nowogródek) in what was then the Russian Empire (now Belarus). The region was a part of the Grand Duchy of Lithuania until the 1795 Partition of the Polish–Lithuanian Commonwealth.

Mickiewicz enrolled at the Imperial University of Vilnius where he spent four years.



Figure 3.4: Adam Mickiewicz monument in Vilnius.



Figure 3.5: City gate from outside.

Lithuanian National Museum

The Museum (Figure 3.7) has its origin in 1855 in the private collection of an eminent researcher of Lithuanian cultural history. On the defeat of the national liberation movement in 1863 most of the exhibits were taken away to Moscow. In 1919, based on the collections of the Museum of Antiquities and the Lithuanian Scientific Society, the Museum of History and Ethnography was founded. In 1941, the Academy of Sciences took over all collections from all the museums in Vilnius and the present museum opened in 1968.



Figure 3.6: City gate from inside.



Figure 3.7: Entrance to Lithuanian National Museum with a monument to King Mindaugas (ca. 1200–1263), the first Grand Duke of Lithuania and her only King.

Baltic Conference on the History of Science

The conference (Figures 3.8–3.11) was held in October 2006 on the occasion of the Lithuanian Academy of Sciences' 65th anniversary of its foundation. The opening ceremony took place at the Headquarters of the Academy in Vilnius but the sessions took place at the Museum of the History of Lithuanian Medicine and Pharmacy in Kaunas where I presented a paper entitled, "Medicine and the Mining Industry. A Historical Review". It was published as abstract on p. 42 in *Historiæ Scientiarum Baltica, Vilnius-Kannus '06. XXII Baltic Conference on the History of Science*. Published by the Faculty of Medicine at Vilnius University, 2006. It was originally published as a full text in *6th International Symposium on Cultural Heritage in Geosciences, Mining, and Metallurgy*, pp. 123–137, edited by T. Dizdarević and M. Peljhan, Idrija Mercury, Mine, Idrija, Slovenia 2002. Shortened version in *The Invisible Light* 15, 24–31 (2001).

Hosts: Dr. Edmundas Adomonis and Dr. Aurimas Andriusis. The Organizing Committee:

- Prof. Juozas Algimantas Krikštopaitis (Chairman), President of the Baltic Association of the History and Philosophy of Science
- Prof. Jānis Stradiņš, President of the Latvian Association of the History of Science

- Prof. Jaak Aaviksoo, President of the Estonian Union of History and Philosophy of Science
- Dr. Vaclovas Bagdonavičius, Director of the Culture, Philosophy and Arts Research Institute, Vilnius
- Prof. Zenonas Rokus Rudzikas, President of the Lithuanian Academy of Sciences
- Prof. Algirdas Gaižutis, Rector of Vilnius Pedagogical University
- Dr. Aurimas Andriušis, Head of Lithuanian Historians of Medicine
- Prof. Kęstutis Kriščiūnas, Director of KTU Europe Institute
- Dr. Juozas Marcinkevičius, Director of the Library of the Lithuanian Academy of Sciences
- Dr. Edmundas Adomonis (Secretary), Culture, Philosophy and Arts Research Institute, Vilnius

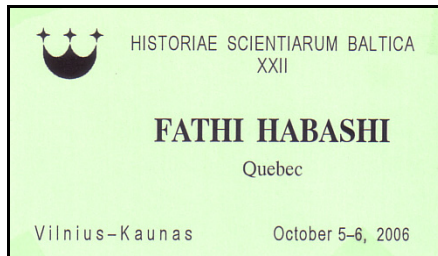


Figure 3.8: Conference badge.



Figure 3.9: Hotel Senatoriai in Vilnius.



Figure 3.10: Hotel Senatoriai in Vilnius.

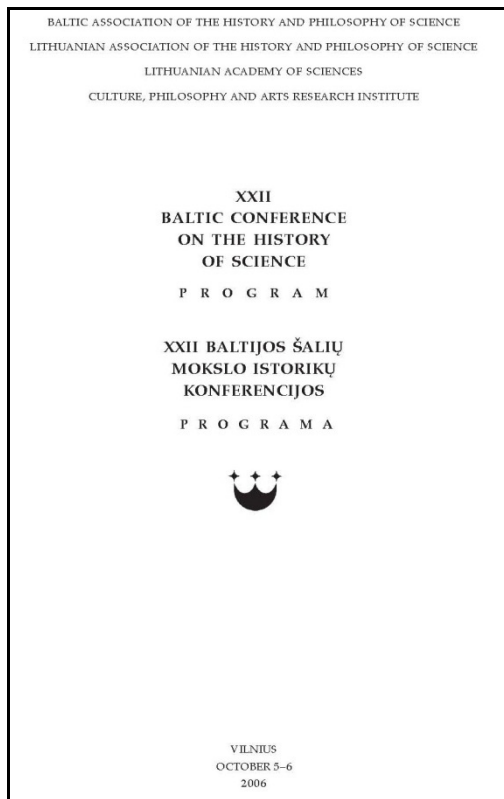


Figure 3.11: First page of program, October 2006.

KAUNAS

After World War I, during the Russian civil wars, Vilnius was occupied by Poland, and Kaunas (Figure 3.12–3.15) became the provisional capital for 11 years. It is few hours drive from Vilnius to the west.



Figure 3.12: Kaunas.

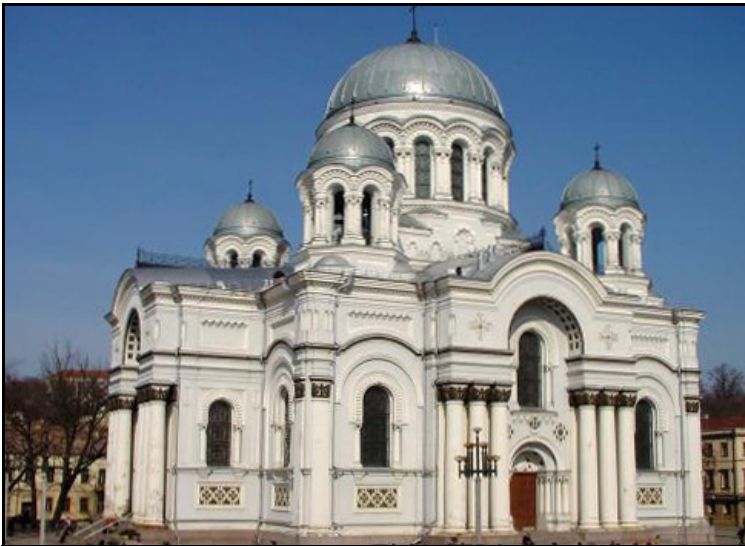


Figure 3.13: Kaunas Cathedral.



Figure 3.14: Kaunas.



Figure 3.15: Kaunas.

Museum of the History of Lithuanian Medicine and Pharmacy

The Museum (Figures 3.16–3.19) is located in a restored 16th century building at the Town Hall Square. It is sponsored by Kaunas University of Medicine.



Figure 3.16: Museum of the History of Lithuanian Medicine and Pharmacy.



Figure 3.17: Exhibits inside the Museum.



Figure 3.18: Exhibits inside the Museum.



Figure 3.19: Exhibits inside the Museum.

Chapter 4

Latvia

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RĪGA

Rīga was one of the most important Russian ports. Until the end of the 19th century, however, urban culture and large land holdings remained under the influence of the German upper-class. German remained the official language of Rīga until, in 1891, it was replaced by the Russian language. Rīga is one of the most beautiful cities in Europe.



Figure 4.1: View of Rīga showing Stalin's Tower, an apartment building.



Figure 4.2: View of Riga showing Daugava River.



Figure 4.3: Freedom monument.



Figure 4.4: Freedom monument (details).



Figure 4.5: Freedom monument (details).

Art in Latvia

There are many buildings in Rīga with artistic facades (Figures 4.6–4.30).



Figure 4.6: Art in Riga.



Figure 4.7: Art in Riga.



Figure 4.8: Art in Riga.



Figure 4.9: Art in Riga.

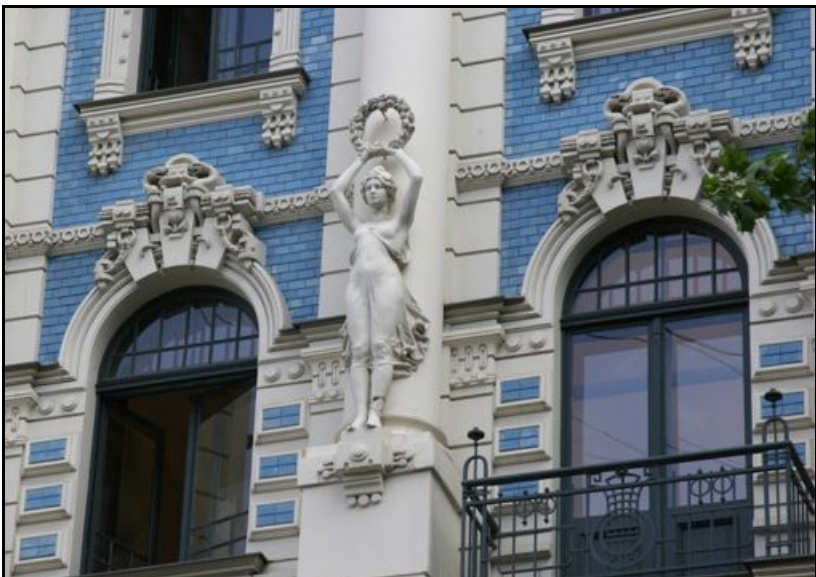


Figure 4.10: Art in Riga.



Figure 4.11: Art in Rīga.



Figure 4.12: Art in Rīga.



Figure 4.13: Art in Rīga.



Figure 4.14: Art in Rīga.



Figure 4.15: Art in Riga.



Figure 4.16: Art in Riga.



Figure 4.17: Art in Riga.



Figure 4.18: Art in Riga.



Figure 4.19: Art in Riga.



Figure 4.20: Art in Rīga.



Figure 4.21: Art in Rīga.

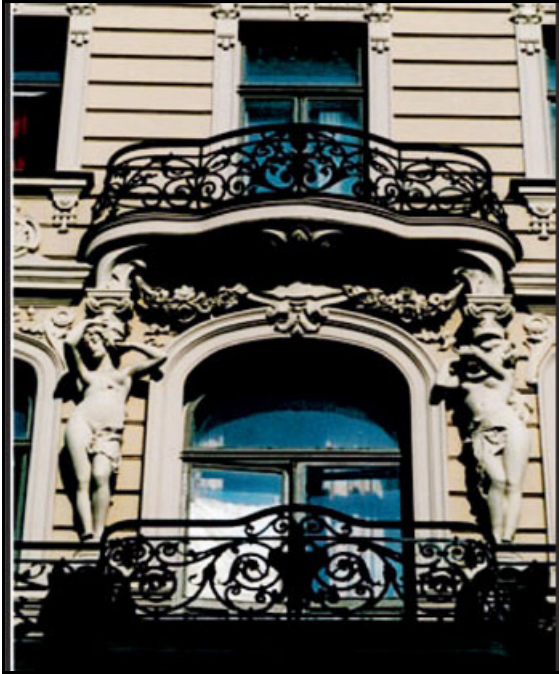


Figure 4.22: Art in Rīga.



Figure 4.23: Art in Rīga.



Figure 4.24: Art in Riga.



Figure 4.25: Art in Riga.



Figure 4.26: Art in Rīga.



Figure 4.27: Art in Rīga.



Figure 4.28: Art in Rīga.



Figure 4.29: Art in Rīga.



Figure 4.30: Art in Riga.

City Hall

The original building of the House of the Blackheads (Figures 4.31–4.32) in the old town was erected during the 14th century for the Brotherhood of Blackheads — a guild for unmarried German merchants in Riga. The structure was bombed by the Germans during World War II and the remains demolished by the Soviets in 1948. The current reconstruction was erected in 1995–1999 and serves as City Hall.



Figure 4.31: City Hall or the House of Blackheads.

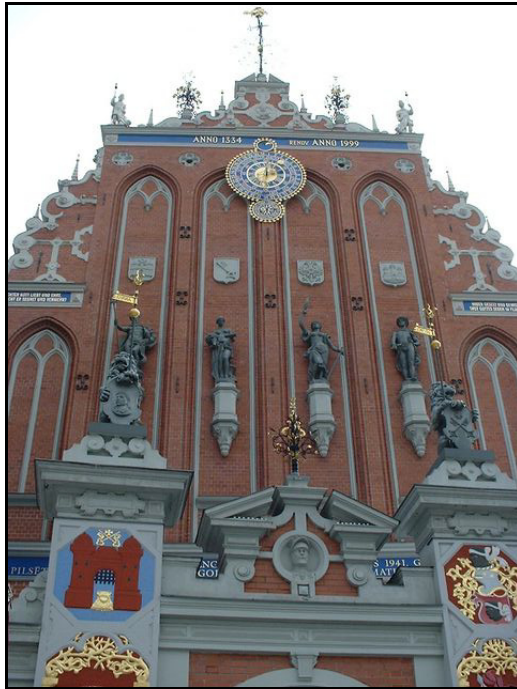


Figure 4.32: House of Blackheads, details.

Occupation Museum

The Museum (Figure 4.33) was established in 1993 to exhibit artefacts, archive documents, and educate the public about the 51-year period in the 20th century when Latvia was successively occupied by the USSR in 1940, then by Nazi Germany in 1941, and then again by the USSR in 1944. Among those who signed the Guest Book were Queen Elizabeth II and Laura Bush.



Figure 4.33: Occupation Museum.

Chapter 5

Poland

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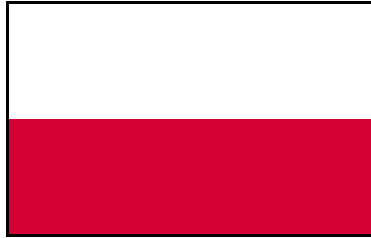


Figure 5.1: Flag of Poland.



Figure 5.2: Poland and her neighbours.

HISTORICAL INTRODUCTION

Christianity came to Poland in 966 AD and the Kingdom of Poland was formed in 1025. In 1138, it was fragmented into several smaller duchies by Bolesław III Wrymouth, who divided the country among his sons. In 1226 one of the regional dukes, invited the Teutonic Knights to help him fight the Baltic Prussian pagans. In the middle of 13th century Poland was devastated by the Mongols. In 1320, after a number of earlier unsuccessful attempts by regional rulers at uniting the dukedoms, Władysław I (1261–1333) (Figure 5.3) consolidated his power and became the first King of a re-unified Poland. His son, Casimir III (1310–1370) (Figure 5.4) extended his kingdom, occupied Lwów [capital of Ruthenia], and established Poland's first university in Kraków.

The Lithuanian Grand Duke Władysław II Jagiełło formed the Polish–Lithuanian union in 1447. The partnership proved beneficial for the Poles and Lithuanians. In the Baltic Sea region Poland's struggle with the Teutonic Knights continued and in the Battle of Grünwald (1410) a Polish–Lithuanian army defeated the Teutonic Knights, allowing territorial expansion into the far north region of Livonia [*see* Lithuania].



Figure 5.3: Władysław I (1261–1333).



Figure 5.4: Casimir III (1310–1370).

In 1466, after the Thirteen Years' War, peace was established and the Duchy of Prussia was created. The Jagiellons also established dynastic control over the kingdoms of Bohemia (1471 onwards) and Hungary. In the south, Poland confronted the Ottoman Empire and the Crimean Tatars and in the east helped Lithuania fight the Grand Duchy of Moscow.

In 1569 the Polish–Lithuanian Union became Polish–Lithuanian Commonwealth (Figure 5.5). In 1620 the Ottoman Empire under Sultan Osman II declared a war against the Commonwealth. More warfare with the Ottomans followed in 1633–1634 and vast expanses of the Commonwealth had

been subjected to Tatar incursions. War with Sweden under Gustavus Adolphus, resumed in 1621 with his attack on Riga, followed by the Swedish occupation of much of Livonia, control of Baltic Sea coast and the blockade of Danzig.

John III of Sweden married Catherine Jagiellonka, the sister of Sigismund II Augustus of Poland. When Sigismund II died without issue, the son of John III of Sweden and Catherine Jagiellonka was elected King of Poland and Grand Duke of Lithuania as Sigismund III in 1587. On John's death, Sigismund also gained the Swedish throne. However, Sigismund was Catholic, which ultimately led to his losing the throne in Sweden. His uncle Charles IX of Sweden succeeded him, thus the Catholic branch ruling in Poland and Lithuania, and the Protestant branch ruling in Sweden. This led to numerous wars between the two states. After John, the Polish Vasa died out.

The mineral-rich province of Silesia was annexed by Prussia in 1742 (Figure 5.6). The Polish–Lithuanian Commonwealth ceased to exist in 1795 when Poland was partitioned among the Kingdom of Prussia, the Russian Empire, and Austrian Empire. Stanisław August Poniatowski (1732–1798) (Figure 5.7) was the last King and Grand Duke of the Commonwealth. He was a great patron of the arts and sciences and a supporter of progressive reforms.



Figure 5.5: Polish–Lithuanian Commonwealth in 1660. The white border is that of present Poland.

When Napoleon marched in the country in 1807, he created the Grand Duchy of Warsaw, which was under French influence, but this was short-lived. After the fall of Napoleon, the Congress of Vienna (1814–1815) gave Poznań Province to Prussia, Galicia to Austria, made Kraków a separate republic, and created the Kingdom of Poland (capital Warsaw) in union with Russia but with its own constitution. The Republic of Kraków was annexed in 1846 by Austria after suppressing an uprising. In 1864, Poland no longer existed (Figure 5.8). During the Russian occupation of Poland,

there were many uprisings that were brutally suppressed and resulted in many Poles emigrating abroad.



Figure 5.6: Silesia [capital Wrocław] was annexed by Prussia in 1742.



Figure 5.7: Stanisław August Poniatowski (1732 –1798), last king of the Polish-Lithuanian Commonwealth.



Figure 5.8: In 1864, Poland no longer existed.

Lviv (Lemberg in German, Lwów in Polish) served as capital of Austrian Galicia, which was dominated by the Polish aristocracy while the eastern half of the province was mostly Ukrainian (Ruthenian), as they were known at the time. There existed also a large Jewish population.

Modern Poland

It is following the defeat of Germany and Austria and the Revolution in Russia, after World War I, that Poland got her independence in 1918, but in September 1939, World War II started with the Nazi Germany and Soviet Union invasion of Poland (Molotov–Ribbentrop Pact). The Nazi expelled millions of Poles from their homes and re-settled the country by Germans. After the war, according to the Potsdam Conference, the Soviet Union and the Allied Forces shifted Poland's boundaries westward giving a large portion of eastern Poland to the Ukraine (the Soviet Union) and then the Poles recovered a large portion of Germany's eastern frontier. In essence, Poland shifted westward (Figures 5.9–5.11). Millions of people were forced to move.

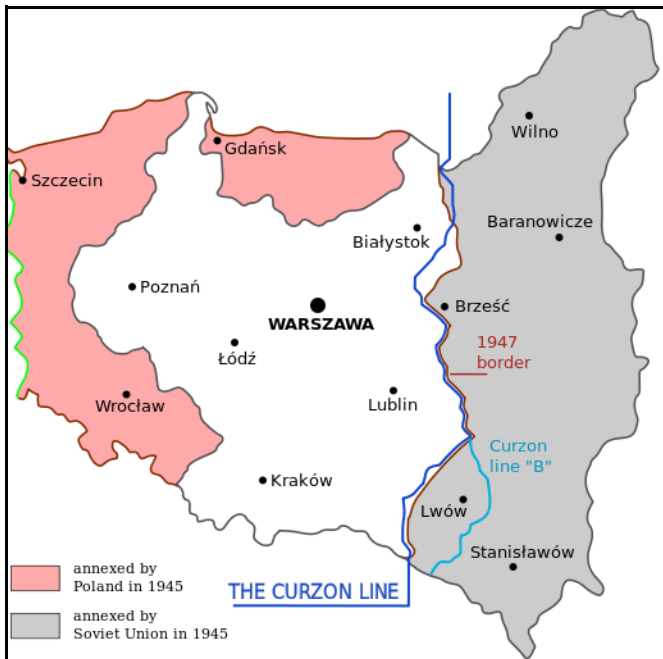


Figure 5.9: The shifting of borders. Szczecin formerly Stettin, Gdańsk formerly Danzig, Wrocław formerly Breslau. Lwów [Lviv, Lemberg in German] now in Ukraine, Wilno [Vilnius] now in Lithuania, Brześć [Brest] now in Russia.

The People’s Republic was declared in 1952 but was in the orbit of the Soviet Union. During the Revolution of 1989, the communist state was overthrown and democratic rule was re-established. Figure 5.12 shows Lech Wałęsa, the electric worker who led the revolution against General Wojciech Jaruzelski (Figure 5.13).



Figure 5.10: Map of Poland.



Figure 5.11: Administrative Regions of Poland.

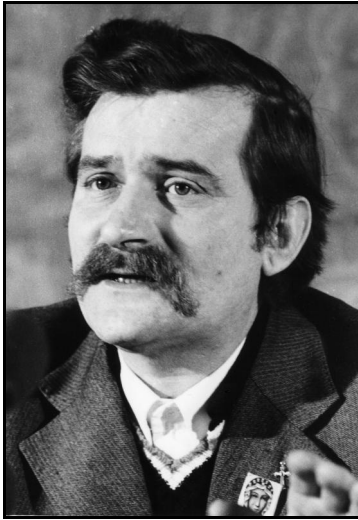


Figure 5.12: Lech Wałęsa.



Figure 5.13: General Wojciech Jaruzelski.

KHATYN AND KATYŃ

Khatyn is a small village some 50 km to the northeast of Minsk, the capital of Byelorussia, while Katyń, is about 24 km west of Smolensk, a city in Russia (Figure 5.14). After Hitler's invasion of Russia in June 1941, Katyń fell into German hands in the late summer of 1941 and, at the beginning of 1943, the German army discovered a mass grave of 4 443 Polish officers and men. The discovery precipitated a rupture of diplomatic relations between the Soviet Union and the Polish government-in-exile in London. Hoping to create a problem between the Soviet Union and its Western allies, Nazi officials publicized the grave and accused the Soviets of the massacre. Moscow denied the charge and claimed the Germans were attempting to cover up their own atrocity. Despite evidence that the Kremlin was indeed behind the massacre, Britain and the United States chose to ignore. London's wartime Prime Minister, Winston Churchill, opposed a call by the Polish government-in-exile for an investigation by the International Red Cross into the incident.

When the Polish Government-in-exile in London appealed for an international tribunal to determine how the Poles died, Stalin broke off relations. After re-taking Katyń, the Russians set up their own inquiry and said the Poles had been executed by the Germans. Later researches by Polish and independent authorities in the West, as well as wartime Foreign Office documents, leave no doubt that the Poles were executed by the Soviet secret

police. The Russians have tried to erase Katyń from maps and history books even reference to it in the 1953 edition of the Soviet Encyclopedia was dropped in the 1973 edition. No visitors are allowed to the area.



Figure 5.14: Location of Katyń.

In 1969, the Russians announced the unveiling of a memorial complex on the site of the village of Khatyn, one of the Byelorussian villages destroyed by the Germans, and one of the hundreds of which all the inhabitants were killed. The tragedy took place March 22 1943 when twenty six houses with their inhabitants were burned by the German Punishment Battalion in Belarussian village of Khatyn against guerilla troops. In addition overall 2.2 million people, including 380 000 deported to Germany as labourers. 209 cities and townships and 9 200 villages had been destroyed. The Russians appear to have chosen Khatyn because of the similarity of its name to Katyń. They hoped in this way to obscure the fact about the victims of Katyń, which was no less a crime than the one committed at Khatyn.

The Katyń massacre, was a mass execution of captured and deported Polish citizens during the Russian invasion of Poland ordered by Soviet authorities in 1940. Estimates of the number of Polish citizens executed at three mass-murder sites in the spring of 1940 range from 1 803 and over 28 000. About 8 000 reserve officers taken prisoner during the 1939 invasion of Poland were killed, as were many civilians who had been arrested for allegedly being spies, saboteurs, landowners, and factory owners. Since Poland's conscription system required every un-exempted university graduate to become a reserve officer, the Soviets were thus able to round up much of the Polish intelligentsia, as well as the Jewish, Ukrainian, Georgian and Belarussian intelligentsia of Polish citizenship.

At the Nuremberg war crime tribunals, the issue of Katyń was included on the list of crimes attributed to the Nazis. But it was later dropped, apparently out of concern that any revelations about the massacre would embarrass the Soviets. It wasn't until 1990 with the collapse of Soviet Power, that Soviet President Mikhail Gorbachev admitted Soviet involvement in the Katyń forest massacre. Gorbachev also confirmed two other burial sites similar to the site at Katyń. Stalin's order of March 1940 to execute by shooting some 25 700 Poles, including those found at the three sites, was also disclosed with the collapse of Soviet Power. Two years later, the Russian government handed over to Polish President Lech Wałęsa previously secret documents showing that Soviet leader Joseph Stalin had directly ordered the killing of the Polish army officers. There was a memorial service in Katyń Forest in 1995.

Most of the victims were Polish army reservists — lawyers, doctors, scientists and businessmen — who were called up to active service following the Nazi invasion of Poland in 1939. But instead of fighting the Germans, about 15 000 Polish officers found themselves prisoners of the Red Army, which had occupied eastern Poland under the terms of a secret Moscow-Berlin treaty. In the spring of 1940, about 4 500 of these officers were taken by their Soviet captors to the Katyń forest and shot and buried on the spot. The other Polish prisoners of war were taken to other locations, where many of them were also executed. The mass liquidation killed off much of Poland's intelligentsia and facilitated the Soviet takeover of the nation.

POLISH DIASPORA

The Russian Empire, the Kingdom of Prussia, and the Austrian Habsburg Monarchy, through a series of invasions and subsequent partitions, terminated the Commonwealth's independent existence of Poland in 1795. The Poles engaged intermittently in armed resistance until 1864. After the failure of the last uprising, the nation preserved its identity through educational initiatives. The opportunity to regain freedom appeared only after World War I, when the partitioning imperial powers were defeated by war and revolution.

The Second Polish Republic was established and existed from 1918 to 1939. It was destroyed by Nazi Germany and the Soviet Union by their invasion of Poland at the beginning of World War II. Millions of Polish citizens perished in the course of the Nazi occupation. By the late 1980s, Solidarity, a Polish reform movement, became crucial in causing a peaceful transition from a communist state to the capitalist economic system and liberal parliamentary democracy. This process resulted in the creation of the modern Polish state.

There are roughly 20 million people of Polish ancestry living outside Poland, making the Polish diaspora one of the largest in the world. Reasons

for this displacement vary from border shifts, forced expulsions and resettlement, to political and economic emigration. Great number of Poles left the country in the course of foreign Partitions of Poland due to political as well as ethnic persecution by Russia, Prussia, and Austria. A large proportion of Polish nationals who emigrated were Polish Jews, and these also make up part of the Jewish diaspora. During World War II, Poland was invaded from the west by Nazi Germany and from the East by the former USSR. Over three million Polish Jews were killed in the Holocaust by Nazi Germany during the war. Most survivors subsequently emigrated to Mandate Palestine.

Noted emigrated Poles

- Ignacio Domeyko (1802–1889) left Poland after the 1831 uprising against tsarist oppression to study at the School of Mines in Paris then he emigrated to Chile to found the University of Chile in Santiago in 1842.
- Fryderyk Chopin (1810–1849), the famous composer, grew up in Warsaw then settled in Paris in 1830 when the uprising against the Russians took place.
- Edward Jan Habich (1835–1909) was born in Warsaw, entered the Artillery School in St. Petersburg in Russia and served in the Russian army during the Crimean War (1854–1856). In 1859, he went to France to study at the School of Bridges and Highways in Paris. He returned in 1863 to take part in the uprising. In 1864 he left to Paris then in 1869 emigrated to Peru to work in the Peruvian Government. When in 1875 the School of Mines was created, Habich participated in its organization and in 1876, was named director of the School of Civil Construction and Mining.
- Joseph Obalski (1852–1915) was the son of a Polish refugee in France who also left Poland after the 1831 uprising and married a French woman. He emigrated to Quebec in 1881 and founded the provincial Bureau of Mines.
- Maria Skłodowska (1867–1934), the twice Nobel Prize winner, was born in Warsaw, emigrated to Paris in 1891, and married Professor Pierre Curie.

Table 5.1: Visits to Poland.

Dates	Cities visited	Purpose of visit
1957	Warsaw	Transit to Moscow by train
1979	Warsaw	International Mineral Processing Congress
	Żelazowa Wola	Birthplace of Chopin
	Wrocław	Technical University

Dates	Cities visited	Purpose of visit
1991	Kowary	Pilot plant
	Kraków	University of Mining and Metallurgy
	Wieliczka	Salt Mine
2000	Warsaw	Cultural visit
	Wrocław	Technical University
	Lubin-Głogów	KGHM Copper

WARSAW

Warsaw (Figures 5.15–5.28) is located on the Vistula River about 260 km from the Baltic Sea. In 1569 it became the capital of Polish–Lithuanian Commonwealth being half way between the capitals Kraków and Vilnius. The city had to be rebuilt after the extensive damage it suffered from World War II.



Figure 5.15: Warsaw coat of arms.



Figure 5.16: Monument of the symbol of Warsaw.



Figure 5.17: General view.



Figure 5.18: Palace of Culture. Photo by Nadia Habashi, 2000.

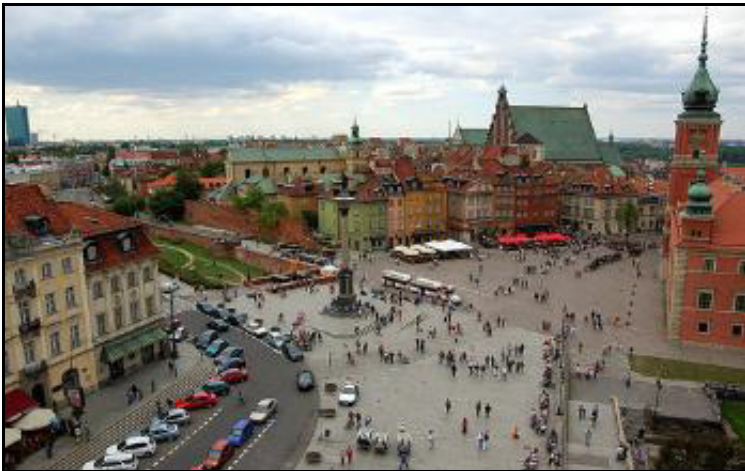


Figure 5.19: Main Square.



Figure 5.20: King Sigismund III Vasa column erected in 1644 by his son King Władysław IV Vasa, who succeeded his father to commemorate the transfer of Poland's capital from Kraków to Warsaw.



Figure 5.21: King Sigismund III Vasa (1566–1632) moved Poland's capital from Kraków to Warsaw in 1596.



Figure 5.22: Chopin monument in Łazienki Park.



Figure 5.23: Polish astronomer Nicolaus Copernicus (1473–1543) in front of Staszic Palace, the seat of the Polish Academy of Sciences.



Figure 5.24: Poland's famous poet Adam Mickiewicz (1798–1855).



Figure 5.25: War monument.



Figure 5.26: War monument. Photo by Nadia Habashi, 2000.



Figure 5.27: Warsaw, 2000. Photo by Nadia Habashi.



Figure 5.28: City wall.

Maria Skłodowska-Curie Museum

The Maria Skłodowska-Curie Museum (Figures 5.29–5.30), established in 1967, is devoted to the life and work of Madame Curie (1867–1934). The museum is sponsored by the Polish Chemical Society. The museum is located at 16 Freta Street in Warsaw apartment building in which Maria

Skłodowska was born. Maria Skłodowska left Poland to study in Paris in 1891 at the age of 24. It was there that she married Professor Pierre Curie and discovered polonium and radium, became professor in the Sorbonne, and got two Nobel Prizes (see France).



Figure 5.29: Maria Skłodowska-Curie Museum.



Figure 5.30: Maria Skłodowska-Curie Museum [inside].

During the Warsaw Uprising (1944), the building was demolished by the German forces, but was reconstructed after the war. In 1925 Maria Skłodowska-Curie initiated the construction of the Radium Institute in Warsaw. It was finished in 1932. In 1935 a monument was erected in her honour (Figure 5.31).



Figure 5.31: Curie monument.

Technical Museum

The Technical Museum is located in the Palace of Culture. It includes models of metallurgical furnaces and metallurgical plants.

WROCLAW

Wrocław (Figures 5.32–5.39), is situated on the River Oder (Polish: Odra), was known as Breslau in German, is the historical capital of Silesia was occupied by Friedrich the Great in 1742 and returned to Poland in 1945, as a result of border changes after World War II. The city was on the Amber Road, devastated in 1241 during the Mongol invasion of Europe.



Figure 5.32: General view.



Figure 5.33: Grunwaldzki suspended bridge on the Oder.



Figure 5.34: General view.



Figure 5.35: City Hall.



Figure 5.36: Wrocław, 2000. Photo by Fathi Habashi.



Figure 5.37: Wrocław, 2000. Photo by Fathi Habashi.



Figure 5.38: With Prof. Halina Mulak and son. Photo by Nadia Habashi, 2000.



Figure 5.39: Sightseeing in Wrocław.

University of Wrocław

The University of Wrocław, formerly the University of Breslau, was founded in 1811 (Figure 5.40). Johannes Brahms wrote his Academic Festival Overture to thank the university for an honorary doctorate awarded to him in 1881. The university boasts five Nobel prize winners: Fritz Haber [Chemistry, 1918], Friedrich Bergius [Chemistry, 1931], Max Born [Physics, 1954], Konrad Bloch, [Biochemistry, 1964], Reinhard Selten [Mathematics, 1994].



Figure 5.40: University of Wrocław.

Technical University

Wrocław University of Technology (Polish: Politechnika Wroclawska, 1945, founded as German: Technische Hochschule Breslau in 1910) (Figures 5.41–5.43). Host: Prof. Frank Łętowski. Meeting with Vice Rector B. Kedzia.



Figure 5.41: Wrocław University of Technology.



Figure 5.42: In front of the Technical University. From left: Frank Łętowski, Fathi Habashi, Jan Miller from University of Utah, and Janusz Laskowski [Wrocław], 1979.

Franciszek Łętowski (born 1933 in Vilnius, formerly Poland now Lithuania—died Wrocław 2012). He was Professor of hydrometallurgy at Polytechnic Institute in Wrocław. He then taught at Alaska University in Fairbanks, Alaska, USA and at the Witwatersrand University in Johannesburg, Republic of South Africa. On his return to Poland he was associated with the copper company CUPRUM in Lubin. Łętowski had many co-workers in Poland. He published the first Polish book on hydrometallurgy, “Podstawy hydrometalurgii” in 1957. His son Jarek is now in the University of Sherbrooke in Quebec, Canada.

Witold Charewicz (1939–2009) was Director of Postgraduate School (1975–1978), Associate Vice-President for Research (1979–1981), and Vice-President (1987–1990). He was Head of Radioisotope Laboratory from 1976 and founder of the Hydrometallurgy Division in 1984. He was visiting professor at University of Kentucky in Lexington and at Texas Technical University in Lubbock.



Figure 5.43: At Łętowski's home. Sitting from left: Mrs Bolton, Nicola Żebrowski [Sherritt-Gordon, Fort Saskatchewan, Canada], Dr. Barbara Kołodziej, Fathi Habashi, and Kashka Łętowski. On the floor Prof. Frank Łętowski with son Jarek. Standing Barbara's husband. Photo taken by Gerry Bolton [Sherritt-Gordon], 1979.

Institut Chemii Nieorganicznej i Metalurgii Pierwiastków Rzadkich
POLITECHNIKI WROCLAWSKIEJ

SEMINARIUM INSTYTUTOWE

11. maja 2000 (czwartek) godz. 11:15
Sala Walbrzyska (s.220) Bud. A-3

referat

**HYDROMETALLURGY: PAST,
PRESENT, AND FUTURE**

WYGŁOSI
Prof. Fathi Habashi

jeden z najbardziej znanych hydrometalurgów,
autor podstawowych podręczników i monografii z tej dziedziny

**Department of Mining and Metallurgy
Laval University, Quebec City (Canada)**


HYDRO

METALURGIA

Figure 5.44: Announcement for lecture, 2000.



Figure 5.45: After lecturing at the Technical University. Photo by Nadia Habashi, 2000.



Figure 5.46: Discussing with Prof. Witold Charewicz [centre] and Prof. Halina Mulak. Photo by Nadia Habashi, 2000.



Figure 5.47: Dinner with Dean of Engineering and Prof. Witold Charewicz, 2000.

Panorama Raławicka

Panorama Raławicka is a large painting (Figure 5.49) showing the battle that took place on April 4, 1794 at Raławice — a village about 37 km (north-east of Kraków and was led by Tadeusz Kościuszko (1746–1817) a veteran of the American Revolutionary War. It was one of the first uprisings against Russia. The Polish forces were relatively small but had been supported by peasants armed with scythes and pikes. The battle helped in

starting uprisings in other areas of Poland. After its failure, the country ceased to exist for 123 years.

The panorama is located inside a rotund building (Figure 5.50). The rotunda was constructed in 1893 and was originally located in Lwów. It was brought to Wrocław after World War II when the borders between Poland and Ukraine were re-drawn and was exposed in 1985. There is a 30-minute commentary in language of choice.



Figure 5.48: From left: Dr. Barbara, Kashka Łętowski, Fathi, and Prof. Halina. Mulak Photo by Nadia Habashi, 2000.



Figure 5.49: A view of a segment of the panorama.



Figure 5.50: Panorama Raclawicka building.

KOWARY

Kowary is an old iron mining town on the Polish–Czech border, 40 km southwest of Wrocław. There was a uranium mine and a uranium recovery plant. The facility is now called Hydro-Mech and is used by the Technical University of Wrocław as a pilot plant facility. Director of Research: Dr. M. Kuban.

KRAKÓW

Kraków (Figures 5.51–5.55), on the Vistula River, was the nation's capital in 1038. By the end of the 10th century the city was a leading centre of trade but was destroyed during the Mongol invasion of 1241 then re-built. In 1364, Casimir III founded the University of Kraków. When in 1572, King Sigismund II, the last of the Jagiellons, died childless the Polish throne passed to Henri III of France and then to other foreign-based rulers in rapid succession, causing a decline in the city's importance that was worsened by the Swedish invasion and by an outbreak of plague. In 1596, Sigismund III of the Swedish House of Vasa moved the administrative capital of the Polish–Lithuanian Commonwealth from Kraków to Warsaw.

The infamous Auschwitz concentration camp is 70 km west of the city. The village was known by its Polish name Oświęcim.



Figure 5.51: A view of Kraków.



Figure 5.52: Cathedral.



Figure 5.53: Wawel castle the seat of Polish kings.

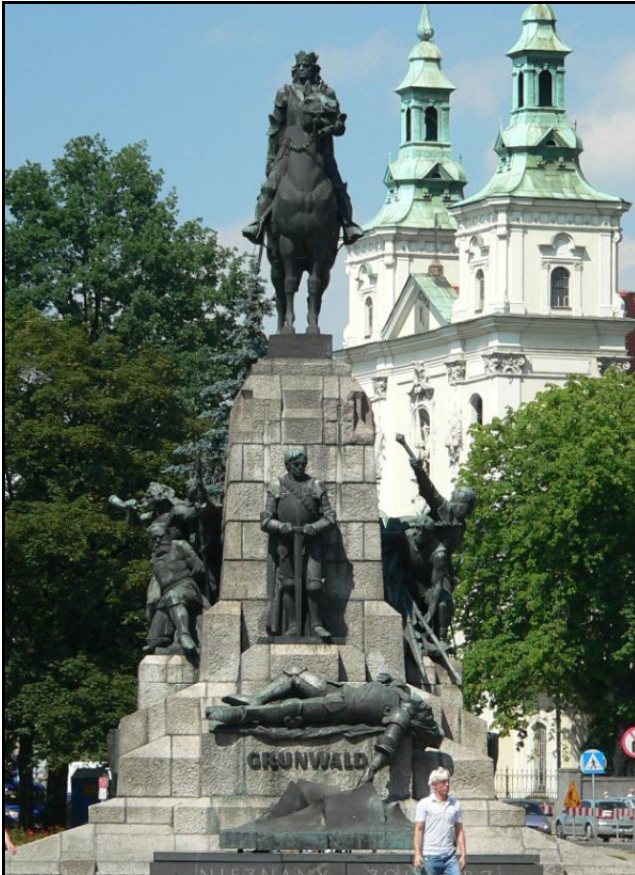


Figure 5.54: Monument to Grünwald Battle 1410.



Figure 5.55: Part of the monument to Grünwald Battle 1410. Photo by Fathi Habashi, 1991.



Figure 5.56: University of Mining and Metallurgy.

University of Mining and Metallurgy

The Faculty of Mining was established in 1919 as the first and only faculty of the University of Kraków. In 1922 the Faculty of Metallurgy was established. Other faculties followed later, but the University came to a standstill from 1940 to 1945 during the Nazi occupation. Today the University of Mining and Metallurgy is a centre of Polish education in these fields (Figures 5.56–5.59).



Figure 5.57: Details of the monuments at the entrance to the university: Mining. Photo by Fathi Habashi, 1991.



Figure 5.58: Details of the monuments at the entrance to the university: Metallurgy. Photo by Fathi Habashi, 1991.

WIELICZKA

Wieliczka is located 13 km to the southeast of Kraków. Under the town is a Salt Mine — one of the world's oldest operating salt mines which has been in operation for 900 years. The deposit of rock salt spread over nine levels, it has 300 km of galleries with works of art, altars, and statues sculpted in the salt (Figures 5.60–5.70).



Figure 5.59: At Prof. Karwan's home. From left: Mrs. Karwan, daughter and granddaughter, Prof. Tadeusz Karwan, Photo by Nadia Habashi, 1991.



Figure 5.60: Entrance to the mine.



Figure 5.61: A historic picture of the mine.

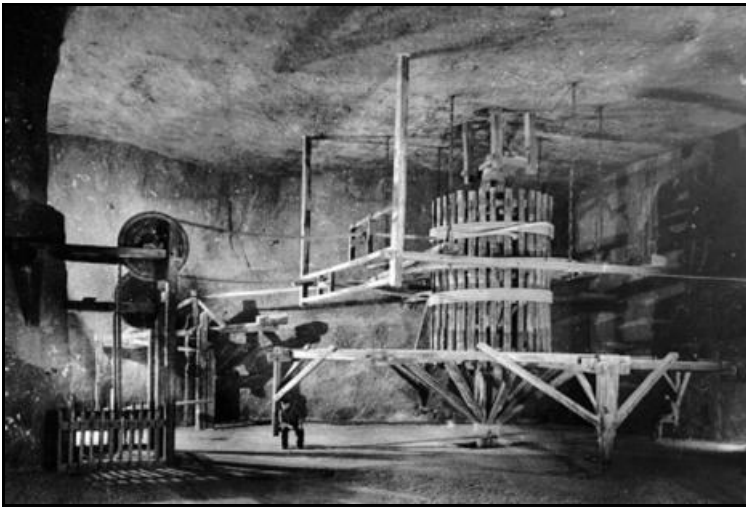


Figure 5.62: View in the mine.

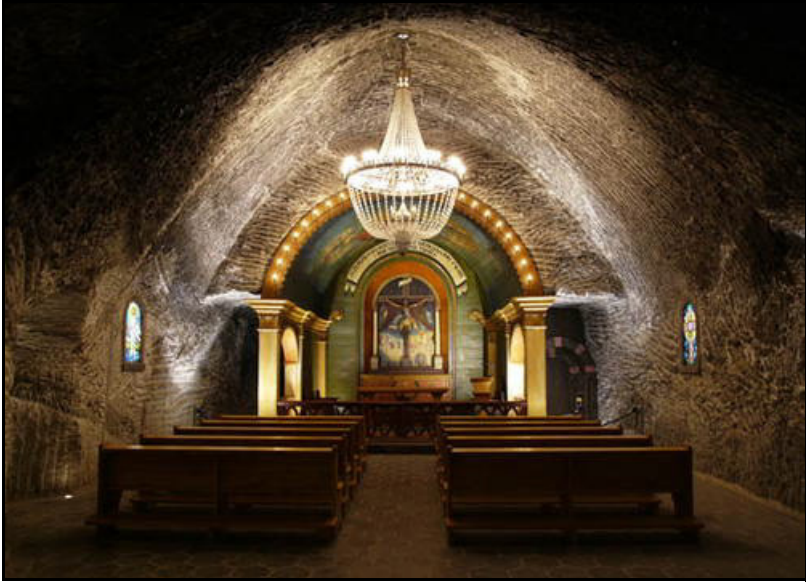


Figure 5.63: A church made of salt.



Figure 5.64: Chandeliers made of salt.



Figure 5.65: Statues made of salt in the mine.



Figure 5.66: Statue made of salt in the mine.



Figure 5.67: View in the mine.

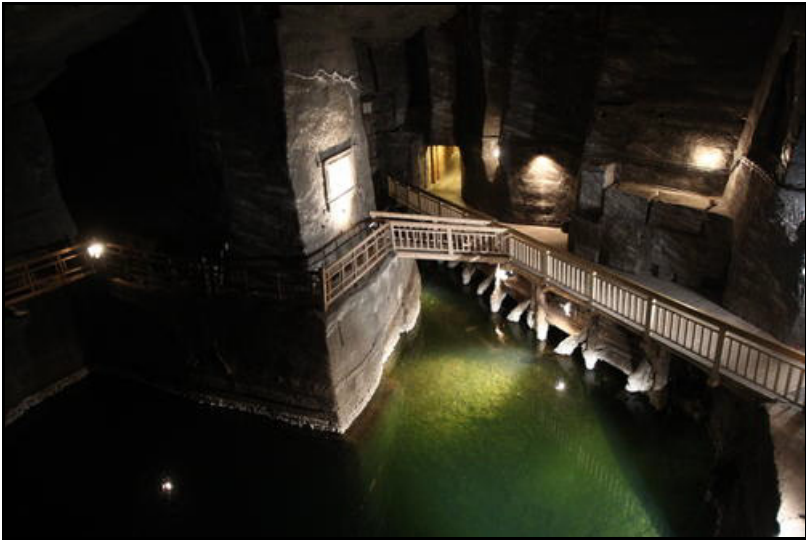


Figure 5.68: View in the mine.



Figure 5.69: View in the mine.



Figure 5.70: Two university professors guiding us to the salt mine museum. Photo by Nadia Habashi, 1991.

ŻELAZOWA WOLA

Żelazowa Wola (Figures 5.71–5.72) is 45 km west of Warsaw, the birthplace of Fryderyk Chopin (1810–1849). Chopin, however, grew up in Warsaw then settled in Paris in 1830 when the uprising against the Russians took place. He died at the young age of 39. Chopin's father, Nicolas Chopin, was a Frenchman from Lorraine who migrated to Poland in 1787 at age sixteen and married a Polish girl. The visit was organized to the participants of the International Mineral Processing Congress in 1979. There a pianist played the most famous polonaises.



Figure 5.71: Birthplace of Chopin.



Figure 5.72: Chopin monument at Żelazowa Wola.

COPPER IN POLAND

Poland has a unique copper industry (Figures 5.73–5.75). Copper sulfide concentrates are smelted in six shaft furnaces to produce matte, and in a flash furnace to directly blister copper.



Figure 5.73: Copper plant in Legnica.



Figure 5.74: Location of Głogów and Legnica near Wrocław, capital of Silesia.

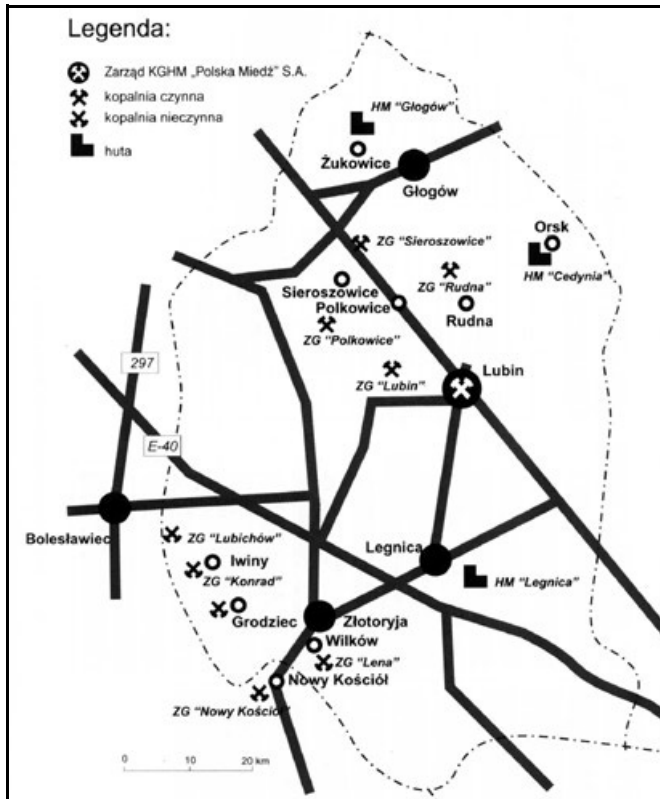


Figure 5.75: Location of mining and metallurgical operations of KGHM.

KGHM

Poland's copper industry began in 1950 when the old and relatively small mines Lena and Konrad, located in Lower Silesia, were drained and re-commenced production. In 1957, the industry entered a period of rapid development with the discovery of a rich orebody in the vicinity of Lubin and Polkowice which was the basis for the establishment of the Copper Mining and Smelting Combine (KGHM) in 1961. In 1991, the Combine was restructured into a state-owned, joint-stock company under the new name of KGHM „Polska Miedź” (KGHM „Polish Copper”). It consists of three mines, three smelting and refining plants, and one rolling mill, and produces about 4% of the world's copper and about 7% of the world's silver. Smelting and refining is centred at Legnica (pronounced Leg-nit-sa) and Głogów (pronounced Gwo-goov) near the medieval town of Wrocław (pronounced Vrots-waw), formerly known as Breslau (Figure 5.75).

Legnica Plant

The Legnica plant was started up in 1953–1959 to electrolytically refine blister copper from abroad and from the ZHPMN “Hutmen” smelting plant in Wrocław, as well as to cast wirebars. In 1959, the plant started smelting copper concentrates and other copper-bearing materials in shaft furnaces (Figure 5.76). Following blending, a sulfite lye binder is mixed with the concentrate to about 10% of its weight, and the mixture is dried to 4% to 5% H_2O in rotary kilns. Dried concentrate is then briquetted on roll presses. Briquettes, along with converter slag, are smelted in a reducing atmosphere obtained by burning coke to produce matte and slag. The converter slag, which for electrolytic refining. Part of the cathode copper is melted in an induction furnace to be cast into copper billets.

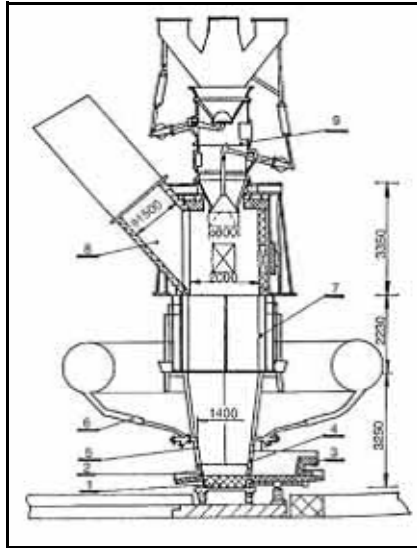


Figure 5.76: Shaft furnaces for smelting copper sulfide.

Głogów I

Głogów I was commissioned in 1971 based upon the shaft furnace technology applied in Legnica. The charge consists of 80% briquetted concentrate, 6% coke, and 14% converter slag and other recycled material. The shaft furnaces produce a 60% to 65% Cu matte, waste slag containing below 0.5% Cu, and gases at below 500 °C containing about 15% CO and 60 g/m³ of dust. Furnace gases are cleaned, by cycloning and scrubbing, then used to fire boilers at the power plant.

Five Hoboken converters, three of which are usually in operation, convert the matte to a 98.5% Cu blister. The converter gases contain 5% to 10% SO₂ and are suitable for cleaning and conversion to H₂SO₄. Converter dust reports to the lead department.

Głogów II

The Głogów II flash smelting plant was started in 1987 based on a modified licence of Outokumpu from Finland. The modification had led to the development of direct blister smelting from concentrates because the Rudna concentrate contains 28% Cu, mainly as chalcocite and bornite. Low iron (2.7%) and sulfur (9.3%) are key factors in the success of the process. The presence of 6.8% organic carbon also adds to the calorific value of the concentrate. About 70% of the copper is recovered as blister, cleaning of the slag in an electric furnace to recover the remaining copper as Cu-Pb-Fe alloy, converting the copper in the alloy to blister, cooling, cleaning and conversion of flash furnace gases to sulfuric acid, cooling and cleaning of electric furnace and converter gases to recover lead dusts, and fire-refining and casting of blister copper anodes for electrolytic refining.

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