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SMELTING INDUSTRY IN THE SECOND REPUBLIC

The first blast furnaces in Poland appeared in the 17th c. (with traditional smelting dating back to ancient times). Up to the first half of the 19th c., the largest iron smelting works region in Poland was located in so-called the Old Poland Basin, which enjoyed its greatest period of splendour in the first half of the century. At the time, under the direction of Stanisław Staszic, the realization of the project assuming the creation of a cluster of metallurgy works on the banks of the Kamienna river commenced. The plants in the cluster located on the upper course of the river were to supply raw materials, mid-course – semi-finished products, and in the lower course, finished products. In the second half of the 19th c. as coking coal was used to melt the iron, Upper Silesia became the largest smelting works region. The development of smelting works in this region began with the launch of a blast furnace in 1796 built by J. Baildon in Gliwice.[1].

At the beginning of the 19th c. the smelting industry in Poland started to evolve from a primitive industry into a modern one with advanced technology, geared for mass production. In 1802 the first blast furnace was built to smelt the raw material on coking coal in the Royal Steelworks; in 1833 the puddling of iron came into practice; in 1865 the Bessemer process was introduced into steel smelting; in 1884 the production of Thomas' steel began, around 1900 the open hearth system came into use, and around 1912 electric furnaces were introduced in steelworks in Poland[2].

* Kolegium Ekonomiczno-Społeczne, Szkoła Główna Handlowa w Warszawie.

1 *Hutnictwo*, [in:] *Wielka Encyklopedia PWN*, vol. 11, Warszawa 2002, pp. 525–526; W. Długoborski, *Górnictwo i hutnictwo do 1918 r.*, [in:] *Uprzemysłowienia ziem polskich w XIX i XX w.*, *Studia i materiały*, I. Pietrzak-Pawłowska (Ed.), Wrocław 1970, pp. 109–176.

2 *10-lecie hutnictwa żelaznego w Polsce Niepodległej*, Warszawa 1929, p. 5; J. Ignaszewski, *O hutnictwie żelaznym w Polsce. Szkic*, Warszawa 1937, pp. 16–17.

The First Post-War Years

The First World War proved to be disaster for the smelting industry in Poland. Once the warzone encompassed the Kingdom of Poland, production in steelworks was suspended. In 1914 there was not a single active steelwork in the Kingdom of Poland. The Russian army, when retreating from the country, destroyed all the smelting works equipment so that the Germans would not be able to use it. The Germans and Austrians were not particularly interested in recommencing production, and therefore took with them all stocks of raw materials, and above all, ores[3].

In the period immediately after regaining independence, the Polish nation had only smelting works from the former Congress Kingdom of Poland (Upper Silesia remained part of Germany). At that time there were 10 steelwork plants in Poland (in the Kieleckie and Krakowskie voivodships):

1. Towarzystwo Akcyjne Zakładów Hutniczych "Huta Bankowa" in Dąbrowa Górnicza;
2. Towarzystwo Zakładów Metalowych "B. Handke" (smelting works in Częstochowa);
3. Zakłady Górniczo-Hutnicze "Chlewiska";
4. Huta Żelazna "Kraków" (a mill in Borek Falęcki);
5. Modrzejowskie Zakłady Górniczo-Hutnicze ("Katarzyna" steelworks in Będzin, "Milowice" steelworks in Sosnowiec and the "Staszic" smelting works in Sosnowiec);
6. Spółka Akcyjna Wielkich Pieców i Zakładów Ostrowieckich (smelting works in Ostrowiec);
7. Gwarectwo "Hrabia Renard" (a rolling mill for pipes and steel in Sosnowiec);
8. Towarzystwo Akcyjne Zakładów Górniczo-Hutniczych i Fabryk "Stąporków" in Stąporków;
9. Towarzystwo Sosnowieckich Fabryk Rur i Żelaza (smelting works in Sosnowiec and Zawiercie);
10. Towarzystwo Starachowickich Zakładów Górniczych (smelting works in Starachowice)[4].

When Poland regained independence, actually there were no Polish smelting works functioning. In the years 1915–1918, 177 802 tonnes of various ores were transported to Upper Silesia from the smelting works in the Kieleckie voivodeship. All the furnaces (including open hearth furnaces) were standing inactive. Financial losses

[3] F. Popiołek, *Dzieje hutnictwa żelaznego na ziemiach polskich*, Katowice-Wrocław 1947, p. 95.
[4] A. Dzik, *Hutnictwo żelazne w Polsce*, Warszawa 1931, p. 31.

and destruction, caused by warfare in the Kingdom of Poland, were so extensive that the first blast furnace was not launched until 1919 in Częstochowa. A lack of capital, a fall in the value of the currency, exhaustion of all the resources and destruction of the means of locomotion meant that in the first post-war years the Old Poland smelting works were unable to make large investments. Despite this, the smelting works of the former Polish Kingdom were gradually rebuilt in later years as the state came to their aid with loans, railway relief and aid with supplies. Before they were started up, the steelwork plants were modernized, usually to a modest extent, as this was all the financial resources permitted[5].

In 1922, as Upper Silesia became part of Poland, the country then had seven more steelworks plants in the Silesian voivodeship:

1. "Baildonstal" (smelting works in Dąb – Katowice);
2. "Bismarckhütte" ("Bismarck" smelting works in Hajduki Wielkie and "Bethlen-Falva" smelting works in Świętochłowice);
3. "Friedenshütte" (smelting works in Nowy Bytom);
4. Katowicka Spółka Akcyjna dla Górnictwa i Hutnictwa ("Hubertus" smelting works in Łagiewniki and "Marta" smelting works in Katowice);
5. Górnośląskie Zjednoczone Huty "Królewska i Laura" Towarzystwo Górniczo-Hutnicze ("Królewska" smelting works in Królewska Huta, "Laura" in Siemianowice, "Zgoda" smelting works in Zgoda);
6. "Silesia" smelting works in Paruszowiec;
7. "Ferrum" in Katowice-Zawodzie[6].

In 1922 there were 17 smelting works plants in Poland, including 10 in the Kieleckie voivodeship and 7 in the Silesian voivodeship.[7] In Silesia there were also nine coking plants, five of which were associated with smelting works plants. The following smelting works had their own coking plants: "Hubertus", "Pokój", "Falva", "Dębieńsko nad Czerwionką", "Królewska". Also four coking plants were unconnected to the mines: "Emma" coking plant, Rybnickie Gwarectwo Węglowe, "Gotthard" coking plant in Orzegów, "Knurów" coking plant, Polskie Kopalnie Skarbowe and the coking plant close to the "Wolfang" mine near Ruda Śląska[8].

When Upper Silesia became part of Poland a new chapter began in the development of Polish smelting works. There were so many steelworks located in Poland that

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[5] M. Radwan, *Rudy, kuźnice i huty żelaza w Polsce*, Warszawa 1963, p. 218; J. Buzek, *Rozbudowa techniczna żelazo-hutnictwa polskiego w ostatnich 10 latach na tle rozwoju hutnictwa w ogóle*, Sosnowiec 1933, p. 53; F. Popiołek, op. cit., p. 95.

[6] A. Dzik, op. cit., p. 2.

[7] J. Buzek, *Rozbudowa techniczna żelazo-hutnictwa polskiego w ostatnich 10 latach na tle rozwoju hutnictwa w ogóle*, Sosnowiec 1933, pp. 56–59.

[8] Ibidem, pp. 59–60.

production was able not only to satisfy the entire national demand but the surplus could be exported. The smelting industry obtained new sources of hard coal, some of which was suitable for processing into coke, playing a key role in the blast furnace process – it was no longer absolutely necessary to import coke from Czechoslovakia to Polish smelting works, which, because of adequate iron ore resources in the country, created the optimum basis for the development of the iron and steel industry in Poland[9].

The Silesian smelting works were in a much better position than the smelting works of the former Polish Kingdom – they suffered no detriment as a result of wartime activities. Geared almost exclusively to the armaments industry, they had at their disposal buildings and technical appliances maintained in a good condition. The Old Poland steelworks, whose machinery and appliances were requisitioned by the army, stood idle for a long time, and their buildings were often neglected or damaged. In 1919 the output capacity of the Silesian blast furnaces was 317 240 tonnes, constituting 51% of the output capacity in 1913. The processing output of the Old Poland furnaces during this time was 15 214 tonnes, i.e. only approx. 3.7% of the output capacity in 1913. The Silesian steelworks could set up new processing departments if necessary whilst the Old Poland smelting works had to undergo a reconstruction process, which was only possible with government assistance[10].

The Silesian smelting works had strong connections with Germany, therefore initially only slight attention was paid to the Polish market (under the provisions of the Geneva Convention, which was binding for three years, the Silesian smelting works could export their products to Germany duty-free and in any amounts or in limited licensed quotas up to 15 June 1925). The occupation of the Ruhr Basin by the French army opened up more or less the entire German market for the Silesian smelting works[11].

Smelting works of the former Russian occupation found themselves in an entirely different situation – after the Russian border was closed they could support themselves only because they were able to satisfy the demands of the domestic market, in effect there was a visible parallel track in the development of the smelting works in the initial years: the Silesian smelting works focused on the German market, and the Old Poland on the domestic market, which in turn had an impact on the organizational life of Polish smelting works. On 25 March 1920 the steelworks of the Old Poland merged into Związek Polskich Hut Żelaznych (the Association of Polish Ironworks) however, the Silesian steelworks grouped together into Gornośląski

[9] A. Dzik, op. cit., p. 35.
[10] J. Buzek, op. cit., p.54.
[11] Ibidem, p. 51.

Związek Przemysłowców Górniczo-Hutniczych (the Upper-Silesian Association of Mining-Smelting Industrialists).[12]

Raw Materials

The smelting works industry was established and functioning because of the rich mineral resources in the country, found in considerable quantities in Poland, in particular, hard coal seams (which could also be processed into coking coal for blast furnaces), iron ore and limestone and dolomite[13].

Hard coal is present in Poland in the so-called Polish Coal Basin, situated on the south-eastern border of the country. During the period 1922–1939 the basin, with the surface area of 6400 km², was divided between three countries: Poland (5180 km², that is 81% of the entirety), Czechoslovakia (650 km² or 10.1%) and Germany (570 km² or 8.9%).[14] In Poland hard coal was the fundamental energy-generating raw material. In 1938 80–90% of energy in the country came from coal. The main customers were industry (especially steelworks) and the railway.

Coal was of particular importance to the Polish economy, moreover, it constituted Poland's largest mineral wealth. Poland was in the third place in Europe, after Great Britain and Germany, as regards hard coal resources[15].

However, not all hard coal beds in Poland were suitable for processing into coking coal for blast furnaces. Coal from the Cracow Basin was not suitable nor from the Dąbrowa Basin (not greasy enough and lacked the characteristics to sinter). The coal from the Silesian Basin (in particular from the Rybnik area) was suitable for coking, however, the coke produced from it was of inferior quality to the coke produced from coal from other European basins (it had less calories, a greater ash content, moisture and greater abrasion). Because of this, Polish smelting works, in addition to Polish coke, used the coke imported from abroad as an additive to Polish coke. When compared to the general use of coke in Polish coke-works, the use of foreign coke in Polish smelting works in 1925 was 7.9%, in 1926 was 0.99%, in 1927 was 11%. Some of the coke-works in the Silesian voivodeship obtained coke from their own

[12] Ibidem, p. 52; N. Gąsiorowska, *Górnictwo i hutnictwo w Polsce*, 2nd ed., Warszawa 1949, p. 104.

[13] A. Dzik, op. cit., p. 58; A. Balzer, *Hutnictwo żelazne*, [in:] *Dziesięciolecie Polski Odrodzonej. Księga Pamiątkowa 1918–1928*, M. Dąbrowski (Ed.), Kraków-Warszawa 1928, p. 21; *10-lecie hutnictwa żelaznego w Polsce niepodległej*, op. cit., p. 6.

[14] *Górnictwo i hutnictwo w Polsce*, W. Breuer, Z. Rudowski (Eds.), Matzingen Szwajcaria 1944, p. 2.

[15] Ł. Zamęcki, *Polityka surowcowa II Rzeczypospolitej w latach 1935–1939*, Warszawa 2010, p. 75.

coking plant, however, the production of coking plants located at smelting works plants proved to be insufficient for the entire demand of steelworks.[16]

Once Upper Silesia became part of Poland there was an improvement in the supply of the required quantity of coke to Polish smelting works. Coking plants owned by smelting works and other coking plants in Upper Silesia, despite the continuous increase in output, constantly worked to improve the quality of coke. In 1927 the output of the domestic coking plants was able to cater for 90% of the demand by smelting works[17].

Poland had extensive deposits of iron ore. Extraction of iron ore was typified by a tendency to rise, particularly in the second half of the 1930 s. In 1937 approx. 780 000 tonnes of ore were extracted in Poland. Three areas were mined: Częstochowa-Wieluń (72% of domestic extraction), Radom-Kielce (19%), Silesia-Olkusz (3%). Resources in the first area were estimated at 55 million tonnes with an iron content in the region of approx. 33%, the second at 23.8 million tonnes of an average iron content between 31% and 40% (the area is important because of its location in the central part of the country), the third at 7.2 million tonnes[18].

Iron ores extracted in Poland had a lower iron content than those from abroad. This was very significant for production as it required a greater use of the fusing agent and coal and generated higher production costs. The cost of the raw materials in Poland was twice as high as in western European countries.[19] Poland was not a self-sufficient country as regards iron ore – it had to import high percentage iron ores. Import was growing dynamically throughout the inter-war period. In 1928 389 216 tonnes of iron ore and 43 835 tonnes of manganese ore[20] were imported from abroad to steelwork plants in Poland. The majority of ores were imported from the USSR, Sweden and Morocco.[21] Cutting off the import of foreign high-percentage ores led to the collapse of the smelting works industry, which was not adapted to function exclusively on low-percentage domestic ores[22].

In addition to iron ores, the steelwork industry used a considerable quantity of iron and steelworks waste containing iron (such as cinders, scale, pyrite cinders)

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16 A. Dzik, op. cit., p. 55; Coke, which western European mining works had at their disposal was harder, which meant that more spacious blast furnaces could be constructed with a production capacity of up to 1200 tonnes daily. In Poland the average daily production of a blast furnace was just under 200 tonnes.

17 A. Dzik, op. cit., p. 57.

18 Ł. Zamęcki, op. cit., p. 81; *Górnictwo i hutnictwo w Polsce*, W. Breuer, Z. Rudowski (Eds.), op. cit., pp. 17–18.

19 M. Przybylski, *Sytuacja hutnictwa żelaznego w Polsce*, Katowice 1936, p. 9.

20 *10-lecie hutnictwa żelaznego w Polsce Niepodległej*, op. cit., p. 6.

21 A. Dzik, op. cit., p. 58.; A. Balzer, op. cit., p. 21.

22 Ł. Zamęcki, op. cit., p. 82; *Górnictwo i hutnictwo*, op. cit., p. 18.

and fusing agents, (limestone, dolomites), which accelerate the melting process of the ores. The fusing agents were to be found in abundant deposits of limestone and dolomites in the areas of Kielce, Częstochowa, Dąbrowa, Olkusz, Chrzanów, Sławków and Tarnowskie Góry[23].

Pyrites were also important in the development of the smelting industry. Pyrites are an essential raw material for obtaining sulphurous acid. The most extensively investigated deposits of pyrites in Poland were found in the Coal Basin together with zinc-leaden ores. Pyrites were also found near Inowrocław and in the Świętokrzyskie area, however, they were of no industrial value. Minor deposits of resources estimated at approx. 100 000 tonnes were located in Jaszowiec near Klucze. The situation changed when in 1933 deposits of pyrites were discovered in Ruda near Nowa Słupia, estimated at 2–3 million tonnes. Launching the "Staszic" mine near Nowa Słupia ensured that the demand of the domestic industry would be covered. In 1937 73 500 tonnes of the raw material had already been produced, and in 1938 the figure was 90 000 tonnes. In 1937 the use of pyrite totalled 94 638 tonnes, and consequently up to the outbreak of the Second World War the Polish industry backed itself up to a moderate extent with import (the fact had to be faced that Poland would become self-sufficient as regards pyrites)[24].

Manganese was used in steelworks to produce alloys of a high melting temperature. Manganese ores were found in Poland only in the Carpathian Mountains, however, these deposits could not be of any use to industry. The demand for manganese ore in the second half of the 1930 s, was approx. 60 000–70 000 tonnes, and was covered in its entirety by import from the USSR. "Huta Pokój" iron and steel works imported the most manganese, small quantities were also imported by "Huta Bankowa" steelworks and "Huta Starachowice" steelworks[25].

Due to the progress made in drilling work in the final years before the war, it was possible to use natural gas in metallurgical processes, especially in smelting works located near the extraction source: Ostrowiec, Starachowice and Stalowa Wola smelting works which were being built. Natural gas, whose main component (after extracting raw butane and propane) is 97% methane, is an ideal fuel in smelting works. Initially, it was used only to heat the furnaces in the rolling mills and smithies, and later also used in tilting open hearth furnaces in Stalowa Wola and Ostrowiec[26].

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[23] A. Dzik, op. cit., p. 61.

[24] Ł. Zamęcki, op. cit., p. 89; J. Kostecki, *Poznanie zasobów mineralnych w Polsce w latach 1919–1983* (*Materiały*), Warszawa 1983, p. 59; M. Jabłonowski, *Wobec zagrożenia wojną. Wojsko a gospodarka Drugiej Rzeczypospolitej w latach 1935–1939*, Warszawa 2001, p. 58.

[25] Ł. Zamęcki, op. cit., p. 88.

[26] M. Radwan, op. cit., p. 237.

The smelting works used large quantities of scrap metal in the production process. In the initial period after independence was regained, when the influx of ores from Russia ceased, the Polish iron and steel works industry transferred to the "scrap metal process" mainly because of the difficult situation of Polish furnaces, so that the open hearth furnaces mostly used scrap iron. The pig iron content did not exceed 30–35%, whilst the scrap metal content was almost 70%. Once Upper Silesia had become part of Poland, the Polish iron and steel works from this area also had to adapt to new sales markets and new supply conditions. Up to 15 June 1927 the steelworks in the Silesian voivodeship, according to the Geneva Convention, were to receive up to 235 000 tonnes of scrap metal annually from the German area. After this date Poland was faced with the task of obtaining an appropriate amount of scrap metal in order to maintain production in Polish steelworks. In 1927 Polish steelworks had already used a million tonnes of scrap metal, of which over 400 000 tonnes had come from abroad, mainly from England, France, and the United States. The transfer to the scrap metal process required additional investment in steel, and at the same time some of the blast furnaces had to be scrapped.[27] Three enterprises were involved in the purchase of scrap metal for Polish steelworks:

- Centrala Zakupu Złomu Polskich Hut Żelaznych Sp. z o.o. in Warsaw (which was founded in 1926 and supplied the Polish and foreign scrap with the exception of German one);
- "Złom" Sp. z o.o. in Katowice (which purchased the German scrap);
- "Żelazohurt" (which supplied the foreign scrap to the "Królewska" and "Laura" steelworks)[28].

In some plants the pig iron content in the production did not exceed 30–35%, whilst the scrap metal content was in the region of 70%.

Raw Material Policy

A considerable problem regarding deficiencies in raw materials was noted not only by military specialists but also by scientists involved in the issues of the economy and its associations with national defence. The smelting works industry did not have stocks of raw materials, such as coke or iron ore, which was a potential danger, as in the event that production had to be started up for the purposes of an

[27] Ibidem, p. 22; A. Dzik, op. cit., p. 64.
[28] Ibidem, p. 64.

armed conflict, the industry would be unable to intensify its output for the purposes of military production[29].

The National Geological Institute was founded in 1919. Its main tasks were to examine the geological composition of Poland and to resolve the problems arising against this background connected with mineral resources, creating and complementing geological collections and publishing scientific research results. Research conducted by the National Geological Institute in cooperation with private steelwork plants succeeded in identifying iron ore deposits in the Częstochowskie, Kielecko-Radomskie, Śląsko-Olkuskie and Carpathian regions. In 1922 deposits of pyrite[30] were also discovered.

In the first fifteen years after Poland regained independence the problem of raw materials was not investigated in depth: this was largely due to the Great Depression; the policy of foreign owners of individual plants was often at variance with Polish economic interests, also a full examination and identification of the geological resources was missing. Despite the fact that in this situation efforts were made mainly to satisfy on-going requirements, the issue of metal ore supplies, and in particular iron ore, and maintaining the efficiency of the metallurgy industry, were amongst the basic tasks of the policy which was to prepare the country's defence capacity. The situation changed after 1935[31].

In 1937 Antoni Roman, the Minister for Industry and Trade, appointed the Iron and Steelworks Committee, whose task was to prepare guidelines for the further development of the steelworks industry. The committee appointed the Principal Ironworks Organization, incorporating all the iron and steel plants. Apart from the earlier functions of the Association of Polish Ironworks, the organization, under the management of the Deputy Minister of the State Treasury, Józef Kożuchowski, was to implement a comprehensive program incorporating the entire steelworks policy. The official guidelines of the Ministry of Industry and Trade were:

1. reduction in the share of foreign materials (ore and scrap metal) in the production process of the Polish steelworks industry;
2. covering the demand of the iron and steel industry for national ore and coking coal of an appropriate quality;
3. organizing joint purchase of all foreign materials;
4. organizing a division of work between smelting works to achieve a greater degree of specialization;

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29 M. Jabłonowski, op. cit., p. 60.

30 J. Kostecki, *Poznania zasobów mineralnych w Polsce w latach 1918–1983*, op. cit., pp. 46–47, 59–60.

31 S. Gryziewicz, *Problem zaopatrzenia surowcowego Polski ze stanowiska interesów obrony państwa*, Warszawa 1936, p. 22; M. Jabłonowski, op. cit., p. 48.

5. reorganizing the distribution of iron in order to minimize the distance between the producer and consumer;
6. preparing a rational investment plan, which, when implemented, would enable reduction in demand for foreign materials and determine prices of iron at as low a level as possible[32].

In 1938 the smelting conglomerates began to devote a great deal of attention to the problem of rationalizing raw materials management. On 10 April and 25 May 1938 raw materials conferences were held, organized by the Association of Polish Iron and Steel Workers. In the same year, on 1 April 1938, the President of the Republic of Poland issued an ordinance on the reorganization of the State Geological Institute. Substantial resources were designated for prospecting work. On 1 September 1938 a special Raw Materials Bureau was established at the Ministry of Industry and Trade to oversee the overall policy for the supply of the national industry with the required raw materials, and in particular those originating from abroad[33].

The Iron and Steelworks Committee established that the varieties of coke to be found in Poland had material defects, such as softness and abrasion, which increased the costs of pig iron-smelting, and proposed therefore: deepening the shafts to the levels containing coal which is more appropriate for coke production, maintaining and securing the deposits of coking coal solely for the needs of coking plants, continuing research conducted by the Chemical Research Institute on the issue of the coke production industry, considering the construction of new coking plants and development of a production program for carbon-derivative semi-finished products and chemical products[34].

Based on the work of the Iron and Steelworks Committee completed in 1937, a year later a series of changes was introduced in the organization of the smelting industry. The Supreme Organization for Iron Smelting which had received a wide-ranging competence from the government replaced the Association of Polish Smelting Works and the most important organization of sales was Syndykat Polskich Hut Żelaznych (the Syndicate of Polish Ironworks)[35].

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[32] J. Ignaszewski, *Polski rynek żelaza w roku 1938*, Katowice 1939, pp. 9–11.
[33] Ibidem, pp. 12–13.
[34] *Hutnictwo żelazne w Polsce. Sprawozdanie Komisji Hutniczej przedstawione Panu Ministrowi Przemysłu i Handlu Antonneiemu Romanowi w grudniu 1937 r.*, Warszawa 1937, pp. 99–100.
[35] J. Ignaszewski, *Górnośląskie koncerny hutnicze w roku 1937*, Katowice 1938, p. 36.

Geographical Location and Transport

The geographic location of the steelworks and transport conditions both of raw materials and finished products is of primary importance for the smelting industry and its development. Deliveries of large quantities of raw materials used by the smelting industry (such as coal, ore, coke, old scrap iron), and then the sale and delivery of finished products require considerable outlays on transportation in comparison with the production itself. Transport charges were an important issue for smelting works plants, on which the competitiveness of Polish products was largely dependent. The areas in which the smelting industry was concentrated in Poland differed from each other as to geographic location.

The Silesian smelting works were situated near the coal and coke deposits (approx. 10–20 km) from the Polish ores at a distance of 100–250 km. The overseas ores were transported through Gdańsk (635 km by rail), the Russian ores by rail 615 km from the border. Although the smelting works from the Radom and Częstochowa areas had their own low-percentage ores deposits (within a distance of 50–70 km), they were a long distance away from the coal and coke deposits (from 70 to 300 km), and the overseas ore was imported from the same places as the Silesian smelting works (the distance of transport by rail was shorter: from Gdańsk – 580 km, from the Russian border– 530 km). Poland did not have navigable rivers and canals, and therefore the only transporter of products from the iron and steel works was the railway.

Poland imported the largest amounts of high percentage ores from the USSR, and next from Switzerland, however, overseas supplies came from Morocco. Swedish and Moroccan ores were shipped through Gdańsk or Gdynia, Russian ores were transported through the border stations of Zdołbunów and Podwołczysko. Ores supplied through Gdańsk and Gdynia received the largest discounts from the railways, as it wanted to gain an advantage over its competitor, Szczecin, and direct its transportation through Polish ports and Polish land (ore imported from the USSR did not benefit from reliefs in the carriage charge; the railway did not have to apply reliefs as ore from the USSR was much cheaper; the stations only organized simplification in reloading)[36].

[36] M. Drozdowski, *Hutnictwo w Polsce. Gospodarcze bogactwa Polski*, Katowice 1928, op. cit., p. 9.

The Iron and Steel Industry in the Second Half of the 1920s.

In June 1925 when the provisions of the Geneva Convention ceased to be binding, the Polish-German tariff war broke out.[37] The German market was almost entirely closed to Silesian smelting works, with the exception of minor licensed quotas granted to select smelting works. From that time interest increased in the internal market and rivalry commenced with the Old Poland smelting works. This situation lasted until 1927, when all the Polish steelworks were merged in Związek Polskich Hut Żelaznych, representing the interests of the entire Polish smelting works industry, both as regards the government and on the international arena[38].

In this period some of the smelting works existing from before the First World War were closed as they had not adapted to the new conditions and because it was not feasible to modernise them. In 1924 "Huta Marta" steelworks in Katowice closed down, "Huta Stąporków" was operating exclusively as an iron foundry, "Huta Staszic" smelting works in Niwka became a finishing-off workshop for pipe elbows, and "Huta Kraków" smelting works, after production shut down, was dismantled after 1929.

There was no marked improvement in the situation of the Polish smelting works until 1926. The government, deciding to place substantial public orders and to adopt instructions to facilitate export of rolled products, improved the favourable economic situation for the smelting works which the English miners' strike had created. Lowering the exchange rate of the złoty increased the opportunity of competition with other countries on foreign markets[39]. Regulation of organizational issues and a good state of the economy meant that Polish smelting works joined the investment program on a wide scale[40]. Polish smelting works made investments mainly in the years 1927–1930, when production proved to be profitable. Designated sums for investment during this period totalled approx. 150 million zł, and the investments themselves were made both with the intention of expanding the range of production and modernizing and replacing smelting work appliances, which would reduce the costs of the manufacturing process[41].

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[37] When the Germans closed the borders, export of Polish iron and steel goods to the Reich proved impossible. Export of steel itself and rolled manufactured products decreased in 1925 by almost a half in comparison with 1924 (from 32.1 million zł to 17.7 million zł). [W. Drozdowski, *Hutnictwo w Polsce. Gospodarcze bogactwa Polski*, Katowice 1928, p. 5].

[38] J. Buzek, op. cit., p. 52.

[39] W. Drozdowski, op. cit., p. 5.

[40] J. Buzek, op. cit., p. 54.

[41] M. Przybylski, *W XX-lecie hutnictwa żelaznego w odrodzonej Polsce*, Warszawa 1938, p. 6; A. Dzik, op. cit., p. 73.

In the years 1927–1929, when the Polish steelworks industry flourished, the demand for iron grew to such an extent that in the Silesian steelworks production was almost exclusively channelled into the internal market. The Ministry of Transport was the main customer of the goods produced in smelting works for the domestic market. In 1928, in the post-war period, smelting works achieved record results – 86% of the pre-war manufacture[42]. Poland exported mainly raw materials, rolled products abroad (casings, tin sheeting, iron for trade and die-cut etc.) and cast iron and welded pipes. In 1928 the combined export of articles made in iron works was 183 323 tonnes. Customers of Polish manufactured products were Yugoslavia (20.72% – mainly rolled products), Russia (17.18%), Romania (7.10%), Dutch East Indies (7%) – the main customer of Polish pipes, and Japan (5.3%)[43]. In March and April 1929 the smelting works industry collapsed, and November of that year saw the beginning of a crisis.

The Great Crisis

The great economic crisis of 1929–1933 left a deep scar on Polish smelting works. Many production departments closed down, and in some cases, even entire plants. Outdated equipment which was no longer in general use could not be replaced with more modern installations due to a lack of capital. Production in most of the smelting works in the Old Poland Basin (only the plants in Ostrowiec and Starachowice survived) was brought to a stand-still[44].

With the deterioration of the Silesian smelting work situation, significantly worsened by the crisis, it had no alternative but to sell its iron abroad at low, unprofitable prices (often 66% of production). Difficulties due to the economic situation became more serious as the value of the English pound fell – the main currency in which goods were paid for. Within a few days Polish smelting works suffered enormous losses, totalling approx. 20 million zł.[45] for the Silesian smelting works alone.

When Upper Silesia became part of Poland a considerable share of the Polish smelting works industry remained in German hands. Two great conglomerates were established in Silesia, which also controlled many plants throughout Poland. Both

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42 M. Przybylski, *Sytuacja hutnictwa żelaznego w Polsce*, Warszawa 1931, p. 10.

43 *10-lecie hutnictwa żelaznego w Polsce niepodległej*, op. cit., p. 34.

44 J. Jaros, *Koncentracja przemysłu górniczo-hutniczego 1918–1939*, [in:] *Uprzemysłowienia ziem polskich w XIX i XX w., Studia i materiały*, I. Pietrzak-Pawłowska (Ed.), Wrocław 1970, p. 350.

45 M. Przybylski, *W XX lecie …*, op. cit., p. 6.

conglomerates came under the State Treasury control in the 1930 s. In 1931 "Huta Pokój" smelting works filed an application at the Municipal Court to "defer payments out", which was synonymous with bankruptcy. At the same time, the smelting works in Nowy Bytom were closed down. After lengthy negotiations held by state authorities with creditors a new company was founded, in which the State Treasury held 52% of the shares in the enterprise, thereby assuring the total control for itself. Three years later the State Treasury became the owner of the enterprise belonging previously to Wspólnota Interesów dla Katowickiej S.A. i Zjednoczonych Hut Królewskiej i Laura[46]. The inclusion of state capital in the smelting works enterprises in Silesia was the beginning of a process introducing a Polish national element in the smelting works industry (until then the administration and direct management of the steelworks had remained in German hands)[47].

From the Great Depression to the Second World War

1933 saw a slow but systematic revival of almost all branches of the national economy, which in the case of the smelting industry was visible by an increase in export (the initial increase in national demand had slowed down somewhat)[48]. The development of the smelting industry in 1934–1938 was at different stages in all centres. From 1934 a systematic growth in production was noticeable in the Upper Silesian smelting works in absolute numbers, and a simultaneous fall of the share in the production nationwide. The share in the Upper Silesian region fell because of the development of the Central Industrial Area (Centralny Okręg Przemysłowy, COP)[49].

Production capacity of Polish smelting works in 1936 in the production of raw materials was 1 112 000 tonnes but due to the stand-stills in the blast furnaces this volume was never achieved. In 1936 out of 81 smelting furnaces 39 were inactive. Although after 1936 the situation improved, the smelting industry only used 50% of its production capacity. In 1937 Poland produced over 700 000 tonnes of pig iron and almost 1.5 million tonnes of steel[50].

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[46] M. Radwan, op. cit., p. 225; More detail: J. Popkiewicz, F. Ryszka, *Przemysł ciężki Górnego Śląska w gospodarce Polski międzywojennej* (*1922–1939*). *Studium historyczno-gospodarcze*, Opole 1959, p. 352–356.
[47] M. Radwan, op. cit., p. 225.
[48] Ibidem, p. 223.
[49] Ibidem, s. 224–225; J. Jaros, op. cit., p. 351.
[50] Ł. Zamęcki, op. cit., p. 82.

There was a marked progress in research conducted on the technology of smelting production. The basic raw material used in blast furnaces was coke. Research which was conducted simultaneously in the Chemical Research Institute in Warsaw and the Mining Academy in Cracow, determined certain coking conditions for Silesian coal: the optimum width of chambers was defined, milling of coal, use of blends and adding fine dust from blast furnaces, and consequently achieving a marked improvement in the quality of the coke[51].

The progress in the field of electric machinery meant that steam-driven engines were replaced with electric ones, and therefore, an electricity supply was essential. Initially, each of the smelting works built its own electricity power station; the earliest just after the war, the plants in Starachowice and Ostrowiec, and in Silesia the "Flava Huta" began to expand into the electricity power station. Quite early on the principle of cooperation between the electrical power stations connected with smelting works and regional ones began to be introduced (e.g. in the Old Poland Basin the United Electricity Power Stations of the Radom-Kielce Region were founded)[52].

In government circles more notice was being taken of disadvantageous locations of smelting works. Too many were situated in a close proximity to the German border, so that in the event that war broke out the smelting industry would be on the front line.[53] 1936 brought several serious investment decisions which related to smelting works with a dominant state participation: it was decided to build a smelting plant in Stalowa Wola, blast furnaces in "Huta Piłsudski" and "Huta Pokój" smelting works and to expand the smelting works in "Huta Baildon".

The investment in the COP area was primarily to serve military purposes. The construction of 12 plants manufacturing armaments was assumed, of which the majority were to achieve full production capacity in 1939. The main investor was the army in cooperation with domestic and foreign capital.[54] The construction of smelting works in Stalowa Wola was to be one of the most important COP investments.

On 19 January 1937 representatives of three great industrial metallurgical closters – Huta Pokój, Śląskie Zakłady Górniczo-Hutnicze and Towarzystwo Starachowickich Zakładów Górniczo-Hutniczych – founded a company trading under the business name Zakłady Południowe Sp. z o.o. in Nisko. The share capital was 30 000 zł. The Ministry for Military Affairs guaranteed a loan of 100 million zł. Czesław Klarner became the President of the company. The construction of the steelworks and

[51] M. Radwan, op. cit., p. 229.
[52] Ibidem, pp. 246–247.
[53] Ł. Zamęcki, op. cit., p. 82.
[54] J. Klusek, *Centralny Okręg Przemysłowy w gospodarce i obronności II Rzeczpospolitej*, Warszawa 1992, p. 29.

production plants manufacturing artillery equipment took place at the same time as the construction of the town of Stalowa Wola, planned for 50 000. residents. The plants were to be situated within an area of 50 ha.

The construction of the Southern Plants in Stalowa Wola commenced in March 1937 with the construction of infrastructure, that is, construction of a main line railway, arterial road, water and sewage system and energy supply. The town and plants were rapidly constructed. In the same year 18 factory halls were built, in January 1938 the first machines became operational, warehouses were also handed over for use. In August the steel plant became operational. In summer 1937 the construction of residential housing estates and buildings providing services was commenced; the "Ozet", electricity power station was built for the purposes of supplying the smelting works and the town. On 14 June 1939 the official opening of the Southern Plants and the town of Stalowa Wola took place – the President of the Republic of Poland, Ignacy Mościcki, Vice President Eugeniusz Kwiatkowski and gen. Tadeusz Kasprzycki[55], a minister, took part in the ceremony.

The Southern Plants comprised two parts, smelting and mechanical. The Smelting Plant included a steel plant, rolling mill, smithy, press workshop, hardening plant and research and experiment laboratory. The total steel production in the smelting plants was 80 000 tonnes annually. The Smelting Plant could produce all types of high-grade stainless steel. The Mechanical Plant manufactured both artillery equipment and was also adapted for the production of steam turbines, steam and pneumatic hammers and heavy machines used in smelting[56]. In the plants and the electric power station in Stalowa Wola furnaces were coal-fired, however, in the event of war the equipment could be adapted for firing with natural gas[57].

In the second half of the 1930 s the Ostrowiec Plants and Plants in Starachowice were also modernized. "Huta Pokój" also commenced an investment program, as a result of which in 1939 another blast furnace was launched[58].

In effect, just before the outbreak of the Second World War there were four conglomerates:

1. Wspólnota Interesów dla Katowickiej S.A. i Zjednoczonych Hut Królewska i Laura comprised: Huta Piłsudski (formerly Huta Królewska), Huta Laura, Huta Zgoda, Mechanical Workshops at the Huta Królewska. Factories manufacturing

[55] Ibidem, p. 34.
[56] Ibidem, p. 33; M. Jabłonowski, op. cit., pp. 139–141; A. Balzer, op. cit., p. 317.
[57] M. Jabłonowski, op. cit., p. 140.
[58] J. Główka, *Hutnictwo i przemysł metalowy w Zagłębiu Staropolskim w okresie międzywojennym 1918–1939,* Kielce 2012, pp. 224–225.

Fitzner screws and rivets in Siemianowice, Huty Bismarck, Huta Falva, Huta Silesia and Huta Hubertus;
2. The Huta Pokój conglomerate encompassed Huta Pokój in Nowy Bytom, Huta Baildon, Huta Ferrum, and also Zjednoczone Fabryki Zieleniewski, Fitzner & Gamper in Sosnowiec, Babcock-Zieleniewski "Gótobur" (the Upper Silesian Association of Pipeline Construction), Suchedniowska Fabryka Odlewów and Huta Ludwików in Kielce;
3. The Modrzejowski conglomerate included smelting works: Częstochowa, Staszic, Milowice, Katarzyna, Światowid and Warszawska Fabryka Drutu;
4. The Huta Bankowa conglomerate managed Huta Bankowa, "Hr. Renard" Guild and the plant in Radomsko.

Apart from the conglomerates the following separate companies functioned:
1. Towarzystwo Starachowickich Zakładów Górniczych;
2. Towarzystwo Sosnowieckich Fabryk Rur i Żelaza, incorporating the smelting works in Sosnowiec and Huta Zawiercie;
3. Spółka Akcyjna Wielkich Pieców i Zakładów Ostrowieckich, incorporating plants in Ostrowiec and in Warsaw.

Each of the conglomerates and each company also included other enterprises – coal mines, iron ore mines, factories manufacturing rolling stock, industrial foundries, factories producing machinery, bridges and steel constructions etc.[59] According to figures, from 1936 the maximum production capacity of Polish smelting works in manufacturing pig iron was 1.12 million tonnes; this amount was never achieved as some of the blast furnaces were at a stand-still periodically. In 1936 out of 81 of the great smelting furnaces 39 were not operational[60].

When Poland annexed Zaolzie in 1938, this increased the Polish possessions in the smelting industry. Zaolzie had varied natural resources, one of the richest of them being the coking coal deposits near Karwina, Łazy and Orłów. There were 19 mines in the Basin, out of which sixteen were active in 1937[61].

With the added output of Zaolzie, the output capacity of the Polish smelting industry suddenly increased. The smelting works in Zaolzie were more modern in comparison to the Polish ones, mainly as they were adapted for smelting iron using high-percentage ores. Now the Polish economy also included the possession of a series of mines supplying excellent coking coal, and therefore there was no longer

[59] M. Radwan, op. cit., pp. 227–228.
[60] M. Jabłonowski, op. cit., p. 104.
[61] Ibidem, p. 123.

any need to import coke from Czechoslovakia. However, the need for import of foreign ores increased[62].

Amongst the industrial conglomerates the most important industrial location on the annexed Zaolzie terrain were the plants in Trzyniec, belonging to Towarzystwo Górniczo-Hutnicze S.A. ("Bànska a hutni spolecnost"), with the board's registered office in Prague. The smelting works in Trzyniec were established in 1828 and initially based their production on local ores, only to transfer later to Slovakian ore and imported ore. The production process in their case was simpler as they had their own coal and coke facility. In 1938 they had 4 blast furnaces, 13 open cast furnaces, a rolling mill, a coking plant, a plant for processing cinders, a benzol factory, plants extracting copper and an electricity power station and used their own rolling stock of 55 km of rail, 10 locomotives and 13 km narrow gauge tracks and 7 locomotives for narrow gauge rail. The plants in Tryniec used coal supplies from their own mine in Karwin, and supplies of coking coal in the "Hohenegger" conglomerate mine and some from the "Ignacy" mine on the left bank of the Ostrawnica. In 1937 the plants produced 485 000 tonnes of pig iron, 552 000 tonnes of steel, 468 000 tonnes of rolled products and 120 000 tonnes of manufactured goods still to be worked[63]. However, a large part of the assets of Towarzystwo Górniczo-Hutnicze S.A. remained outside Poland, including coal mines, iron ores and manganese mines, rolled tin sheeting, factories specializing in bridge construction, chains, screws and rivets and an electric power station[64].

Out of the smelting enterprises which were located in the areas occupied by Poland in 1938, Albert Hahn's plant in Bogumin is worth mentioning, which had a blast furnace (however, inactive for a long time), steelworks fitted out with three open hearth furnaces with a production capacity of up to 150 000 tonnes annually and manufactured (solid) drawn tubes, iron in slabs, angle sections and various types of sheet metal (including galvanized one). The wire manufacturing plant in Bogumin produced 58 000 tonnes of wire and 9 000 tonnes of nails in 1936. The Hahn firm belonged to the International Pipe Cartel[65].

Three large smelting enterprises operated in Frysztat:

1. Jaekiel S.A., a factory manufacturing soldered pipes for water, steam, and gas pipes, axles for cars and horseshoes (the total manufacture was 10–15 000 tonnes annually);

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[62] J. Ignaszewski, *Górnośląskie…*, op. cit., p. 33; *W XX-lecie hutnictwa żelaznego w Odrodzonej Polsce*, Warszawa 1938, p. 28.

[63] J. Ignaszewski, *Śląsk Zaolziański w życiu gospodarczym Polski*, Katowice 1938, pp. 19–20.

[64] Ibidem, p. 25.

[65] A. Balzer, op. cit., p. 35.

2. Mücke-Melder S.A., which manufactured perforated sheet metal, portals and metal furniture and car seats;
3. Sam Blumenthal i Syn, a factory which produced screws, rivets, nuts and hooks for rail tracks of 3000 tonnes annually.

Cieszyn, Poręba and Orłowa had smaller iron-processing plants, such as iron foundries, factories producing machinery and boiler forges[66]. On taking over Zaolzie Poland also gained new coking plants – two of them belonged to the Górniczo-Hutnicze Towarzystwo (the Mining-Smelting Association in Brno: Hohenegger (Karwin) and Trzyniec (Trzyniec), one to Hr. Larisch-Mönnich in Karwin: Jan (Karwin) coking plant, one to the Directorate of State Mines in Poręba – "Wacław" (Poręba), and one to the Orla-Lazy Coal Mining in Dąbrów "Łazy" (Łazy)[67].

The takeover of Zaolzie not only increased the manufacture of iron and steel products in Poland, but also the possibility of export on foreign markets. However, with the outbreak of the Second World, which started a new period in the history of the Polish smelting industry, it became difficult to take advantage of these possibilities.

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[66] J. Ignaszewski, *Śląsk Zaolziański…*, op. cit., p. 26.
[67] A. Balzer, op. cit., s. 33; J. Ignaszewski, *Śląsk Zaolziański…*, op. cit., pp. 12, 37.

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Smelting Industry in the Second Republic

The article discusses the iron and steel industry of the Second Polish Republic. It starts with an assessment of the state of the sector at the beginning of independence, and the impact of incorporating parts of Silesia into the country, in particular in terms of available resources. While local coal was fit for processing into coke, special types of coal needed to be imported. The situation improved after the occupation of Zaolzie. Apart from prospecting works, the article explores investment processes in the sector, and the creation of conglomerates.

Keywords: Poland 1918–1939, metallurgy, iron and steel industry.

Industrie sidérurgique de Pologne dans l'entre-deux-guerres

L'article traite de l'industrie sidérurgique de la Deuxième République de Pologne. L'auteur commence par une évaluation de l'état du secteur au début de l'indépendance de la Pologne et l'impact de l'intégration de parties de Silésie dans le pays, en particulier en termes de ressources disponibles. Alors que le charbon local était apte à être transformé en coke, il fallait importer des types spéciaux de charbon. La situation s'est améliorée après l'occupation de Zaolzie. Outre les travaux de prospection, l'article explore les processus d'investissement dans le secteur ainsi que la création de préoccupations.

Mots-clés: Pologne 1918–1939, métallurgie, industrie sidérurgique.

Металлургическая промышленность в межвоенной Польше

В статье обсуждается металлургическая промышленность Польши в межвоенный период. Анализу подвергается состояние сектора в начале независимости и значение включения части Силезии, в особенности с точки зрения имеющихся ресурсов. Хотя местный уголь подходил для переработки в кокс, необходимо было импортировать специальные виды угля. Ситуация улучшилась после оккупации Заользья. В статье рассматриваются проводимые поисково-разведочные работы, инвестиционные процессы в секторе и возникшие проблемы.

Ключевые слова: Польша 1918–1939, металлургия, черная металлургия.