

Geographical characteristics of Silesia

Abstract:

This article contains basic geographical information about Silesia, useful as a starting point for further historical analysis. Silesia is a region of central Europe located within the borders of several nations. At different times in its history it has been part of Austria, the Czech Republic, Germany and Poland. The rough outline of the relief of Silesia was formed in the Paleozoic Era, finally reaching its ultimate form in the Cenozoic Era. The same holds true for both the Sudetes as well as the entire tectonic foreland, which was shaped by a glacier. Silesian land has always been rich in mineral resources such as building rocks, coal and copper, although only few of these can be found in abundance. The terrain's shape results from the general structure of the hydrographical network which, with the exception of the eastern frontiers, is symmetrical, with the Odra river, flowing from the south-east to the north-west, as the axis of symmetry. Reservoirs have been built along many rivers for both energy-related and retention purposes. Due to the total absence of lakes, these reservoirs are the largest bodies of water in Silesia.

The temperate, transitory climate with an annual average rainfall of 600–700 mm and average annual temperature of 8 °C results in conditions which are favourable for vegetation. Considering the abundance of fertile land one can easily understand why the agricultural scenery dominates the landscape. This, along with the development of industry at the base of the Sudetes and in the south-eastern part of Upper Silesia, is the reason for the relatively small amount of woodland areas. Silesia is an area which has been deeply transformed by human activity. The dominant landscape is culturally harmonious, with the exception of industrial districts, which often are the sight of more long-lasting changes that are often irreversible.

Keywords:

Silesia, geography, landscape, region, conditions

Silesia, as a defined territory, can be analyzed on many levels: historical, geographical, political, administrative and cultural. Despite the fact that this essay focuses primarily on the geographical characteristics of Silesia, in my view it is simply impossible to disregard its other features. When discussing as broad a topic as the development of a region, it is by definition necessary to take into account the complexity and multidimensional character of the issue while focusing on a particular question. The interrelationships between geography and history are, above all, natural and understandable.

Geography is history in space; likewise history is geography in time. Such statements may seem to be simply truisms. However, it is still commonly believed that there is no (or no need for) interaction between those two fields: geographers, on the one hand, concentrate on the here and now, with no attention to historical conditionings whatsoever,

while historians, on the other, fail to consider the vital spatial conditioning of historical processes.¹ Unfortunately, this erratic approach produces distorted results.

By making the aforementioned remarks I wish to explain and to some extent justify my approach to the matter: in assessing the geographical characteristics of Silesia one should not limit oneself only to the sphere of (physical) geography. For a comprehensive presentation of Silesia, it is necessary to show a wider context, including sometimes the background (historical, for instance) of the discussed phenomena and processes.

Throughout its history, Silesia has been the subject of numerous historical and geographical studies; however, these have generally focused only on particular fragments of its territory. Considering that the region, being located in the very heart of Europe, has been the scene of a vast number of historical events, there are surprisingly few geographic monographs devoted to the entire region (this includes cartographic studies also). This deficiency becomes even more striking when we notice a rapid increase in the number of scholarly publications in this part of Europe after 1989. Why are there no geographic syntheses of the whole of Silesia? One objective (to some extent) reason to explain this situation is naturally the issue of the existing political boundaries, but there are certainly many others.

Taking into account only the publishing markets and academic communities of countries which are most interested in Silesia, the aforementioned deficiency of geographical syntheses proves to be most severe in the case of the publishing markets of Poland and the Czech Republic. This is perhaps caused by the general research approaches that are typically used: the German approach is characterized by treating Silesia as a region (one whole country or land), while the Polish and Czech ones are often focused on Silesian political/administrative units,² especially voivodeships. In Poland, after the period of domination of the policy of 'Silesia's Return to the Motherland', as reflected in a vast number of publications,³ geographers ceased to view the region of Silesia as a potential subject of study.⁴

¹ A good illustration of this is the fact that such a major publication as *Historia Śląska*, ed. Marek Czapliński, Wrocław 2002, contains not a single map.

² A similar stance was presented by K. Heffner at a conference concerning the deficiency of research on Silesia, cf. Krystian Heffner, *Deficyty badań śląskoznawczych w zakresie geografii społeczno-ekonomicznej* [in:] *Deficyty badań śląskoznawczych*, eds. Marek S. Szczepański, Tomasz Nawrocki, Andrzej Niesporek, Katowice 2010, p. 114.

³ Among the related monographic publications, albeit also referring only to the Polish part of Silesia, at that time the following were published: Maria Suboczowa, Antoni Wrzosek, *Śląsk: obraz geograficzno-gospodarczy*, Katowice 1948 and two volumes of the series *Ziemie Staropolskie*, issued at eleven-year intervals by Instytut Zachodni w Poznaniu – *Dolny Śląsk* in 1948 and *Górny Śląsk* in 1959.

⁴ May we view this as yet another argument for the fact that, despite the aforementioned political issue, Silesia is still (perhaps subconsciously) not regarded as a 'Polish region'? However, discussion on this matter takes place in the peripheries of the academic world, and these questions are not aptly examined by researchers. From a geopolitical perspective, too, this is a fact worth analyzing.

Location of Silesia

The meaning of the term Silesia is ambiguous. Depending on the chosen perspective – whether geographical, historical, cultural, political or administrative – it may be identified with different areas. In recent decades, confusion over this matter in Poland has increased, fanned, among other factors, by the 1999 administrative reform.⁵ For the purpose of this article I have defined the territory of Silesia as stretching as far as the Kwisia river in the west and the Liswarta, Brynica, Przemsza and Vistula rivers in the east, the Baruth-Głogów glacial valley in the north and the Sudetes and the Silesian Beskids in the south (Map 2). I pass over the discussions of the detailed outline of the Silesian boundary in the region of the Moravian Gate in the north-west and the question of it belonging to the Kłodzko Region,⁶ since in my mind these aspects are of no vital importance for the issue of geographical characteristics.

Silesia is a region located in central Europe, bordered by Greater Poland to the north, Lesser Poland to the east, Moravia and Bohemia to the south and Lusatia to the west. In the south-east it shares its border with Slovakia and in the north-west with Brandenburg.

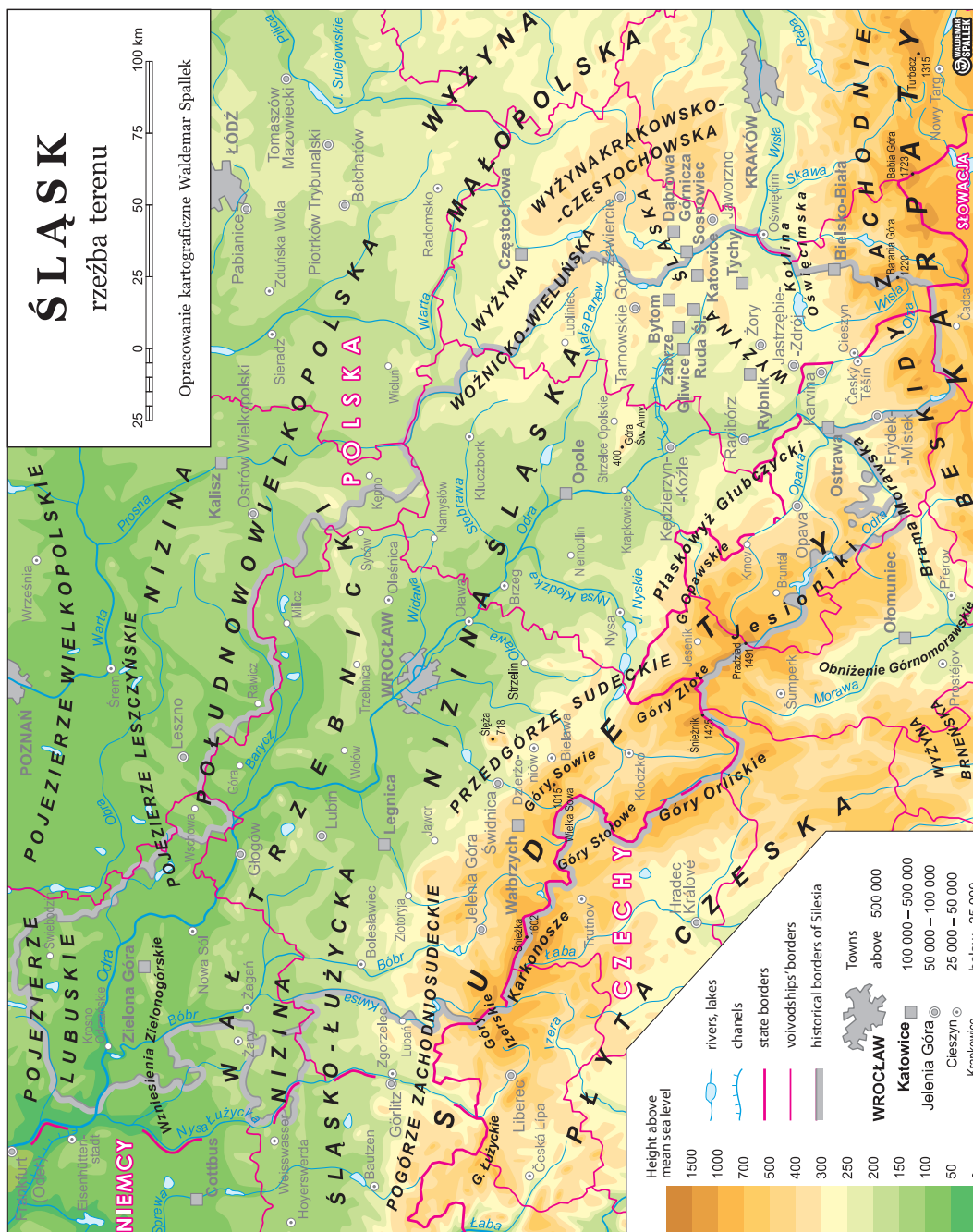
Silesia's geopolitical location is an area between Greater Poland, Lesser Poland, Hungary, Bohemia, Saxony and Brandenburg; those mostly small state organisms were often part of much larger ones and, therefore, the statement that Silesia lies between Poland, Germany and Bohemia has caught on in popular literature. Moreover, in literature and publications on natural sciences the location of Silesia is sometimes described in rather approximate terms: Silesia lies in the upper Odra river basin or, a very inaccurate description, Silesia is the land to the north of the Sudetes. These terms may also be helpful in establishing its location.

Today, historical Silesia belongs to Poland and the Czech Republic. Within the territory of these two countries the region has been divided into six administrative units of the highest rank: four in Poland (the voivodeships of Lower Silesia, Opole, Lubuskie and Silesia)⁷ and two in the Czech Republic (the voivodeships of Moravia-Silesia and Olomouc).

⁵ What I mean here are the boundaries of the newly formed voivodeships together with their names; especially controversial is the case of the Voivodeship of Silesia, cf. Gerard Kosmala, Waldemar Spallek, *Gdzie leży Śląsk?*, 'Geografia w Szkole', No. 4, 2007, p. 59. The role of the media in further enhancing the chaos is not to be underestimated, and a good example here is the frequent confusing of the Voivodeship of Silesia with the region of Silesia. Not only in this case can we talk about creating new meanings and new regions.

⁶ Renata Pysiewicz-Jędrusik has marked out the core of Silesia and its peripheral areas, varying in the degree of peripherality (i.e. understood as a period of being included in Silesia), cf. *eadem*, *Granice Śląska*, Wrocław 1998. The discussions on the outline of the borders of Silesia focus exactly on those peripheral areas whose national status was repeatedly changing throughout history.

⁷ Small parts of Silesia near Rychtal, Syców and Międzybórz are located in the voivodeship of Greater Poland.



Map 2. Region of Silesia - relief (G. Kosmala)

Landform features and landscape

The aforementioned Sudetes are part of Silesia's territory, but more importantly they are an essential component in determining and providing the richest variety of the region's landform. To put it in simple terms, the territory of Silesia resembles an amphitheatre stretching along the north-west and south-east axis, opening towards the north-west. Yet, though the Sudetes, the Silesian Beskids and the Silesian Highlands might be considered the border of this structure, the Trzebnica Embankment in the north is not a bordering unit, since the Milicz–Głogów Depression, neighbouring it to the north, is also part of Silesia. The lowest point is the Odra river valley near Krosno Odrzańskie (ca. 40 mamsl) and the highest point is Śnieżka (1602 mamsl).

Most of the area of Silesia – i.e. its central, western and northern parts – consists of lowlands with glacial landforms developed during the Mindel and Riss glacial stages. The monotony of the landscape is slightly diversified by moraine inclines and complexes of dunes. Plains are cut by wide river valleys, the widest of which – the Odra river valley – to some extent constitutes an axis of the region. Even though the rivers have a long history, we will not find many meandering riverbeds here – during the last millennium of human residence in Silesia its many rivers have been regulated and their beds have been straightened. A few remaining old river beds and fragments of former valleys show the previous course of rivers. In the northern and western part of the Silesian landscape, fragments of glacial valleys (Warsaw–Berlin, Baruth–Głogów, Wrocław–Magdeburg) can be display the pattern of the Pleistocene hydrographic network.

The Milicz–Głogów Depression consists of two valleys: the Milicz–Żmigród Valley and the Głogów glacial valley. These valleys are located along the axis of the Barycz river valley, which pours both its waters and the waters of its numerous tributaries into the Odra river to the east of Głogów. A significant part of the depression consists of marshy, wooded areas which, following land management treatment (reclamation, drainage etc.), have been brought under cultivation. The area also boasts the largest concentration of fish-breeding ponds in Poland.

The strip of post-glacial hills separating the Silesian Lowlands from the Milicz–Głogów Depression is called the Trzebnica Embankment. It comprises – looking from the west – the Żary Hills, the Dalków Hills, the Trzebnica Hills (whose highest peak is 258 mamsl), the Twardogóra Hills and the Ostrzeszów Hills.⁸ Near Ścinawa the Odra flows northwards through the Trzebnica Embankment, separating the Dalków Hills from the Trzebnica Hills. The distribution of the Trzebnica Embankment is mostly latitudinal, though in the case of some of its units this can differ slightly. It is composed mostly of loose Quaternary deposits prone to erosion and denudation, hence the characteristic features of its structure are gentle slopes and ridges, a certain degree of 'fragmentation, but also,

⁸ The highest parts of the Ostrzeszów Hills reach 280 mamsl, but they lie in the area of Greater Poland, i.e. Kobyła Góra (284 mamsl), Bałczyna (278 mamsl).

in some parts, considerable area slopes of up to ca. 12–15°, which are determined by the presence of loess deposits’.⁹

The north-west fringe of Silesia is an area with more diverse and slightly younger landforms connected with the Leszno phase of the Baltic glaciation. The hilly, moraine area of the Czerwieński Heights and the Łagów Lakelands is crossed by the Middle Odra Valley, at times up to 10 km wide. In the vicinity of Zielona Góra we find a latitudinal strip of elevations of a glacial tectonic origin (with an altitude of up to 221 m amsl) whose southern, insolated slopes provide ideal conditions for the cultivation of grape vines.

In the south, the Silesian Lowlands gently transform into the area of the Sudetes Foothills, which in turn are separated from the Sudetes by the distinctive Sudetic Marginal Fault along the line of Złoty Stok–Bielawa–Świebodzice–Złotoryja. The flat foothills rising southwards are diversified by hills, reaching, in the case of the highest, the Ślęza Massif, 718 m amsl (Photo. 1). Others, such as the Strzegom Hills or the Strzelin Hills (better known as the Niemcza–Strzelin Hills) as well as the Głubczyce Plateau, do not exceed 500 m amsl.



Photo. 1. View of the Ślęza Mount (G. Kosmala)

The southern border of Silesia is formed by the Sudetes, fault-block mountains formed in the Cenozoic era but with Palaeozoic features. Even though these are not very high mountains, their structure is very diverse and comprises mountain valleys and massifs, faults and depressions.

⁹ Piotr Migoń, Mieczysław Sobik, Marek Kasprzak, *Dorzecze górnej Odry – środowisko fizycznogeograficzne*, [in:] *Wyjątkowe zdarzenia przyrodnicze na Dolnym Śląsku i ich skutki*, ed. Piotr Migoń, Wrocław 2010 (=Rozprawy Naukowe Instytutu Geografii i Rozwoju Regionalnego, vol. 14), p. 21.

The Sudetes are divided into Western Sudetes, Central Sudetes and Eastern Sudetes. The highest mountain range in the Western Sudetes is Karkonosze, which boasts the highest peak of the whole Sudetes–Śnieżka (1602 mamsl). To the west of the Sudetes are the Iżera Mountains, consisting of four parallel ridges; the two northern ranges are separated by the Kwisa river valley, which, flowing through the Iżera Foothills, marks the border between Silesia and Lusatia. In the east, the Karkonosze Mountains neighbour the Rudawy Janowickie, mountains of longitudinal orientation, while most of the Sudetes' ranges stretch along the north-west and south-east axes, i.e. according to the so-called 'Sudetes' direction'. Between the aforementioned ranges lies the valley of Jelenia Góra. This is closed in the north by the moderately low Kaczawskie Mountains (highest point of which is Skopiec Hill, 723 mamsl). The valley opens to the north-west with a depression, where the Bóbr river escapes through a gorge from the Sudetes to the Iżera and Kaczawa Foothills.

The Central Sudetes are the lowest sub-range of the Sudetes. Their highest peak is Wielka Sowa (1015 mamsl) of the Owl Mountains. They are formed of the Precambrian gneiss, as are the Bystrzyckie and Orlickie Mountains. The geological structure of the Wałbrzyskie and Kamiennie Mountains, as well as the Bardzkie Mountains, date back to the late Paleozoic. Lying at the very heart of the Central Sudetes, the Table Mountains (Broumovská vrchovina), composed of marl and severely cracked and weathered sandstone, form characteristic and rare landscapes, the most famous of which are the rock labyrinths, frequently used as scenery for adventure movies. The diverse landscape of the Central Sudetes is further varied by numerous depressions that separate the mountain ranges, formed in less resistant Carboniferous or Permian rocks (the Kamienna Góra valley, Marciszów valley and the Nowa Ruda Depression), as well as the Kłodzko Valley of tectonic origin.

To the east of the valley stretch the Eastern Sudetes, the highest ranges of which – the Śnieżnik Mountains (Králický Sněžník) (Śnieżnik, 1425 mamsl) and the Jeseniky Mountains (Pradziad, 1491 mamsl) – form one of Silesia's most distinctive borders. The Bialskie Mountains (Czernica, 1082 mamsl) and the Golden Mountains (Rychlebské hory), constituting the eastern borderline of the Kłodzko Valley as well as the Opawskie Mountains (Zlatohorská vrchovina), are much lower; none of its peaks, except Czernica, exceeds 1000 m in absolute altitude.

The Sudetes are separated from the Carpathian Mountains by the Moravian Gate, a major communication route which for millennia was used for trading and other purposes. In its northern part, the Ostrava Valley, we find Ostrava, a large city which today belongs to both the territories of Silesia and Moravia. Ostrava was established by the Ostravice river; however, its current borders comprise an important hydrographic junction: both the Ostravice and Opava rivers flow into the Odra. In the east the Ostrava Valley connects with the Oświęcim Valley. This is where the Vistula river changes direction

to the east and flows along the wide and marshy valley. We find there numerous fish-breeding ponds whose produce were supplied to royal households as far back as the Middle Ages.

Between the Ostravice river in the west and the Biała river in the east stretch the Silesian Beskids,¹⁰ forming the south-eastern borderline of Silesia. They are characterized by young landforms and heavy fragmentation of mostly longitudinal ridges. The range's highest point is the eastern ridge which peaks at Skrzyszyn (1257 mamsl). From under the Barania Mountain (1220 mamsl) flows the Vistula, and the band of Czantoria Wielka and Stożek constitutes a watershed between the Odra and the Vistula rivers (and simultaneously marks the state border between Poland and the Czech Republic, which historically was a source of contention).

The eastern borderline of Silesia is marked by the Silesian Highlands. Its form resembles a hand with fingers spreading westwards. In the centre of this hand is the Katowice Upland (with the Upper Silesian Industrial Region), which is composed of rocks from the Carboniferous period, containing deposits of black coal. Its fingers are the *cuestas* (ridges) of Herby, Woźniki and Chelm, consisting mostly of resistant limestone, sandstone and conglomerates as well as the Rybnik Plateau, a part of the Upper Silesian Carboniferous structure. The highest peak of the Silesian Highlands is the St. Anna's Mount (400 mamsl), located furthest to the west in the ridge of Chelm, towering over the nearby



Photo. 2. Southwest view of the Mount St. Anna (G. Kosmala)

¹⁰ On the Czech side, from the Jablunkov Pass and the Olza Valley westwards, we find the Moravian-Silesian Beskids (Moravskoslezské Beskydy).

plains (Photo. 2),¹¹ a Tertiary, eroded volcanic cone. The landscape of the Silesian Highlands is hilly, owing to its alternating humps and depressions; the landscape of the central part of the Upland has been transformed, or even ruined, by economic activity, settlement and transportation networks.

The layout of landforms made it difficult to penetrate Silesia from the southern side; the Sudetes were a distinct, though not absolute, barrier, as were the Beskids. The ridges of the Silesian Highlands or the Trzebnica Embankment were not so significant and they only stood out in terms of landscape. If we, however, consider the fact that both these units, together with the mountain areas and the borderland of Silesia and Lusatia, were covered by vast forest complexes, which, in addition – as in the case of the Barycz Valley – were marshy areas, then the central part of Silesia (the lowland), the area of original settlement, was surrounded by natural barriers, which to some extent fostered its development.¹²

The most important physical macro-regions of Silesia are: the Silesian Lowland (Nizina Śląska), the Silesian Upland (Wyżyna Śląska), the eastern, central and western Sudetes (Wschodnie, Środkowe i Zachodnie Sudety) and the Sudetian Foreland (Przedgórze Sudeckie) (see Map 2). A characteristic feature of Silesia is its belt-like structure of landscapes. Looking from the south we can see medium-sized mountains which transform into a strip of foothills, which in turn changes into to the largest area of plains and lowlands in the territory. Next, a narrow strip of elevations and depressions marks the northern borderline of Silesia. This simplified picture is to a large extent disrupted by the area of highlands on the eastern periphery of Silesia, and to some extent by the Moravian Gate, which separate the mountainous areas. This belt-like landscape structure is also visible in the layout of soils and vegetation potential. This is also illustrated in the formal division of Silesia into regions of physical geography,¹³ introduced on the basis of such criteria as geological structure, landforms, climate and flora. Silesia comprises part of the physical geographical region of western Europe, a sub-region of Hercynian Europe and the Carpathian Mountains, the Prykarpattia and its inner valleys. Located within these subregions, Silesia is part of four provinces and seven sub-provinces.

¹¹ The Sanctuary of St. Anna Samorzecia, visible on the top of the mountain, is the most important pilgrimage and spiritual centre of the Upper Silesia.

¹² Do the natural borders matter in the context of a thousand-year history of Silesia? This problem still requires examination. This is not a question of geographical determinism, but rather of using the concept of natural borders in the politics of countries. The concept of natural borders and the natural development of national territories has been addressed by i.a.: Norman J.G. Pounds, *Political geography*, New York 1972; *idem*, *France and 'les limites naturelles' from the XVIIth to the XXth Centuries*, 'Annals of the Association of American Geographers', vol. 44, No. 1, 1954, pp. 51–62. Various research has shown that political borders formed on the basis of elements of landscape morphology (i.e. rivers, mountain ridges) are more durable the ones outlined without regard to such conditionings, cf: Gerard Kosmala, *Stabilność granic politycznych w Europie Środkowej i Wschodniej w XX wieku*, 'Czasopismo Geograficzne', 70 (1999), vol. 1, p. 62.

¹³ A most frequently used division was presented in: Jerzy Kondracki, *Geografia fizyczna Polski*, Warszawa 1988, pp. 240 and following.

Geology and natural resources

The diversity of landforms in Silesia is a consequence of its geological structure, which in the case of Silesia is highly complex. Several structural units of the geological bed of Silesia can be distinguished. The Sudetes were formed in the Paleozoic era as a result of the Caledonian (the Kaczawskie Mountains) and Hercynian orogenies. In the Carboniferous period granite intrusions of the Karkonosze Mountains took place there, as well as at Strzelin and Strzegom. The fault-block character of the Sudetes is the result of tectonic movements in the Tertiary period. Particular tectonic blocks, separated by fault lines, were uplifted to various points and then underwent denudation processes. Intrusions of basalt rocks near Lubań, Złotoryja, Jawor, Niemcza and – furthest to the east – St. Anna's Mount occurred during the Tertiary period.

To the north, the Sudetes are bordered by the Fore-Sudetic Monocline. The deeply deposited rocks of the Precambrian bed are covered with a thick layer of Paleozoic rocks, covered in loose Cenozoic deposits.

The Silesia–Cracow Monocline, which was formed in the Carboniferous period, is filled with deposits from the earlier Paleozoic to the Jurassic period and covered with Quaternary deposits. The smallest part of the Silesian bed is the youngest unit – the Carpathian Mountains – which, together with the Fore-Carpathian Depression, was formed in the mid-Tertiary period. The uplift of the Carpathian Mountains and the simultaneous depression of the Sudetic block gave the final shape to the attitudinal proportions of Silesia, with a terrain generally sloping to the north-west.

This complex geological structure has resulted in a diversity of mineral resources both discovered and exploited in Silesia, but whose deposits were, unfortunately, in many cases rather scarce.

More or less correctly, Silesia is associated with black coal; it has been the most important Silesian energetic resource dating back to at least the 19th century. It can be found in two basins: the Lower Silesian (near Wałbrzych and Nowa Ruda) and Upper Silesian basins (in the Ostrava–Tarnowskie Góry–Mysłowice triangle).¹⁴ Lower Silesian coal has been extracted since the 14th century and the peak of its mining was in the mid-19th century. Later, the status of the leading coal mining area was taken by the Upper Silesian basin, whose exploitation began as late as the mid-18th century. Today, coal mining has been abandoned in Lower Silesia, and in Upper Silesia it has been considerably reduced.

Miocene seams of lignite can be found near Legnica and Ścinawa, and while rather small deposits lie in many other locations (near Zielona Góra, Głogów, Żagań

¹⁴ Although the basin also stretches further to the east – to Dąbrowa Górnicza and Sosnowiec – the requirements of the current study make us focus only on the Silesian part of the Upper Silesian basin.

and Ząbkowice Śląskie), they are not exploited for economic reasons. In the region of the so-called 'sack of Żytawa' (*worek żytawski*) and further on to the west, i.e. mostly in Lusatia,¹⁵ the mining of lignite is performed on a large scale by means of an open-cut method, which brought about considerable socio-economic and landscape changes. In the northern borderland of Silesia, to the north of Syców and near Zielona Góra, the exploitation of natural gas deposits takes place.

From an economic perspective, copper ores are currently of greatest importance. These are mined in the Legnica-Głogów copper basin. The Permian cupriferous slates which are exploited there (Polkowice, Rudna) also contain other metals, including a considerable amount of silver. Moreover, cupriferous marls and slates are found in the region of Bolesławiec and Złotoryja. Copper mining had already existed – on a smaller scale – in the Middle Ages: copper deposits were exploited in the Sudetes, near Boguszów, in Złoty Stok, Miedzianka and Ciechanowice.

From the 14th century onwards silver was extracted in the mines located near Wałbrzych and Boguszów, Srebrna Góra and later near Złoty Stok, Zlaté Hory, Kamienna Góra, Świdnica and in the Izera Valley. Considerable amounts of silver were extracted, to some extent, during the exploitation of lead-zinc ores from the 12th century by the guild miners near Bytom and Tarnowskie Góry, and later, for some time, also in the Sudetes – in the Karkonosze Mountains, Boguszów or by the upper Kwis and Bobr rivers (Gierczyn, Ciechanowice).

In the Middle Ages Silesia was famous for gold mining. Gold was extracted from the alluvial deposits in the valleys of the Izera, Kaczawa, Bóbr and Kamienna rivers, including through deep underground mining methods. In the Middle Ages the most famous extraction centres were in Złotoryja, the neighbouring parts of Lwówek Śląski and in the following centuries in Złoty Stok, Zlaté Hory, Jeżów Sudecki, some parts of Tarnowskie Góry and Złotniki Lubańskie. The fame and significance of Silesian gold are emphasized by the fact that on the map of central Europe from 1464 only two Silesian urban centres were marked: the capital city of Wrocław and Złotoryja – the hub of gold exploitation and trade.¹⁶

In the 17th century Silesia was the provider of steel to the European markets, at least on a regional scale. Production was based on local, not particularly impressive deposits of iron ores. They were mined near Kowary and also in the region of the Kaczawskie Mountains. Iron was present near Stronie Śląskie and Kudowa. Turf ores were also exploited, mostly in two locations: the Lower Silesian Forests and within the strip between Kluczbork and Żory in Upper Silesia.

¹⁵ We can often come across classifications according to which the Bogatynia mines are viewed as Lower Silesian mines, which makes sense only when the term 'Lower Silesian' is used as a mental shortcut and refers to the 'Lower Silesian Voivodeship'.

¹⁶ Cf: Julian Janczak, *Człowiek i przyroda*, Wrocław 1985, p. 58.

Arsenic ore deposits near Złoty Stok were of great value. In the 19th century Złoty Stok was the most important centre of arsenic production in the world.¹⁷ The mining of tin ores in Gierczyn, cobalt in Przecznicza or nickel in Szklary near Ząbkowice Śląskie was also of great importance. However, much more vital (and remains so today) was the mining of barite from the deposits in Jedlinka and Stanisławów as well as from the most important and largest mine – in Boguszów. Big resources of rock salt were found near Żory. However, of even greater importance were various types of building materials, whose resources in Silesia are quite abundant.

The most common resource from this category are sands and gravels (natural aggregates), generally of fluvio-glacial origin, but also earlier ones. Glass sands extracted, mostly, near Strzegom and Bolesławiec were used by glassworks in Szklarska Poręba, Lasówka, Wymiarki and Brenna. Various types of clay were in demand by dozens or even hundreds of Silesian brickyards. Clays, fire clays and loamy slates were also extracted which were necessary for the production of porcelain, stoneware and faience (Bolesławiec, Tułowice). For road-building materials (breakstone), gabbro and diabase were mined mainly on the fringe of the Owl Mountains. These rocks were also present near the Ślęża Mountain, Ząbkowice Śląskie and in the Kaczawskie Mountains. Basalt, utilized in road construction among other uses, can be found in the Sudetes and the Sudetes Foothills, and its main quarries were established in Gracze near Niemodlin, Złotoryja, Lutynia near Łądek Zdrój and in Piotrowice near Jawor. Granites were extracted in the quarries near Strzelin, Sobótka and Szklarska Poręba, whereas Silesian marble, well-known during in the feudal period, came from the neighbouring parts of Lubań and Gryfów Śląski. More important marble quarries were established near Wojcieszów Górny (the Kaczawskie Mountains), Przeworno (the Strzelin Hills), Kletno, Ołdrzychowice, Stronie Śląskie (Krowiarki) and Sławniowice near Nysa. Sandstone, whose resources are abundant, was extracted for millennia mostly in the quarries in the Table Mountains (Radków, Szczytna, Słupiec) and near Lwówek Śląski and Bolesławiec. Dolomite was mined near Rędziny (Rudawy Janowickie), while limestone was extracted between Bolesławiec and Złotoryja, but mainly in the terrain between Opole, Krapkowice and Strzelce Opolskie. Gypsum can be found near Niwnica, between Lwówek Śląski and Nowogrodzic, as well as near Kietrz and Rybnik, whereas marl beds are present in an area near Opole.

An important Silesian resource, both in an economic but also social sense, is mineral water. The first records on Silesian mineral water most likely date back to the 13th century, when they were used for therapeutic purposes in Cieplice.¹⁸ Thanks to the mineral waters, a number of other Sudetes' localities transformed into health resorts (Szczawno, Łądek,

¹⁷ Włodzimierz Koszarski, *Surowce mineralne Dolnego Śląska*, Warszawa 1963, p. 46.

¹⁸ J. Janczak, *op. cit.*

Duszniki, Świeradów, Polanica, Kudowa, Jesenik, Jedlina etc.). In the 18th century the Beskid ‘waters’ (Ustroń) came into use, and the peak of the development of health resort tourism came in the 19th century. In Silesia this type of tourism is focused mainly on sorrel (e.g. in Kudowa, Duszniki, Polanica etc.) and sulphate waters (e.g. Cieplice, Łądek or Czerniawa).

Wood has always been a vital Silesian natural resource, obtained at the expense of vast forest areas, which only a thousand years before now covered almost the entire Silesian territory. Wood was used in the construction of buildings (both residential and industrial), the furniture industry, transport, for paper production, and most of all as an energy resource (for businesses, households, steam trains and recently power plants), but also for charcoal production.

Hydrography

The hydrographic network of the region of Silesia, excluding its mountainous areas, is of a relatively late, glacial and post-glacial origin. The key factors in its formation were the advent and withdrawal of the Scandinavian Ice Sheet. Waters from the melting ice sheet gathered at its front or flowed down, furrowing immense valleys. The ice-marginal valleys are latitudinal areas – the water escapes them in a westerly direction in accordance with the general inclination of the terrain, when the outflow to the south was blocked by the mountains and by the front of ice sheet to the north. Considerable fragments of ice-marginal valleys are utilized by contemporary rivers: the Warsaw–Berlin ice-marginal valley is utilized by the Odra; the Baruth–Głogów ice-marginal valley by the Barycz and Odra; and the Wrocław–Magdeburg ice-marginal valley by the Odra, Widawa and Kaczawa. In the mountains the layout of the river valleys depends on the resistance and structure of the rocks and on tectonics.

Silesia belongs to the catchment area of both the Baltic Sea (the Odra and the Vistula) and the North Sea (the Elbe – the patches of territory near Kudowa and Jakuszyce). Apart from a fragment of the south-east borderlands, the area of Silesia is located on the basin of the Odra. The springs of the Odra river are in the Oderskie Mountains in Moravia. The Odra flows through the Moravian Gate out onto the Silesian Lowlands and through them in accordance with the general inclination of the terrain – from south-east to north-west then, after crossing the strip of the moraine hills near Ścinawa, it lazily heads through the lowland and lake land areas towards the Szczecin Lagoon. The Odra is a regulated river, and along a considerably long section (Koźle–Brzeg Dolny) it has a drainage system. It is supplied by the waters of rivers flowing down from the Sudetes (left-bank inflows) and rivers which have their springs in the highlands and in the strip of moraines of the Trzebnica Embankment (right-bank inflows) (Table 1). In this context,

we can assert that the hydrographic network of Silesia is quite symmetrical in shape. The north-east fragment of the territory of Silesia belongs to the catchment area of the Odra through the river Warta.

The mountain rivers have a snow-rain regime, the lowland rivers have a snow regime, whereas the highland rivers have a rain-snow regime, which is also reflected in a characteristic periodic occurrence of low and high water levels or even freshets and floods. Low-water periods can be observed twice a year – in winter and in the period from the late summer to the beginning of autumn. Higher water levels, by contrast, are characteristic of spring thaw periods as well as of autumn falls with small evaporation. Moreover, intense rainfalls in the summer (most frequently at the turn of June and July) sometimes lead to inundations or floods (huge summer floods occurred in 1350, 1496, 1501, 1515, 1736, 1854, 1903, 1997¹⁹ and 2010).

For economic reasons the river system of Silesia has been enriched by artificial waterways. One of the best-known is the Gliwice Canal,²⁰ connecting Gliwice and thus the entire territory of the Upper Silesian Industrial Region with the Koźle harbour on the Odra river. The canal was used for transporting the resources mined in the region of Upper Silesia. Moreover, the canal network of the Wrocław water node supplements the Odra waterway.

Silesia is basically devoid of lakes, which is characteristic of old glacial and even earlier landscapes. There are a few small lakes near Legnica (the Kunickie Lakeland)²¹ and in the Karkonosze Mountains. The north-western part of the Łagów Lakeland is located within the boundaries of the areas of young glacial origin. During the last two centuries many water reservoirs have been built (Table 1), mostly for flood control and water storage purposes, but also for the purpose of entertainment or production (for energy production and to attract new settlers). There are plans to extend the number of reservoirs in Silesia; the most remarkable achievement of the last decade is the construction of the Odra flood prevention reservoir near Racibórz. This reservoir is supposed to provide adequate flood protection for the Odra neighbouring territories, so that the catastrophe of July 1997 would never again be repeated.

¹⁹ Marek Kasprzak, *Wezbrania i powódzie na rzekach Dolnego Śląska* [in:] *Wyjątkowe zdarzenia przyrodnicze na Dolnym Śląsku i ich skutki*, ed. Piotr Migoń, Wrocław 2010 (=Rozprawy Naukowe Instytutu Geografii i Rozwoju Regionalnego, vol. 14), p. 81-140.

²⁰ The canal was opened in 1939; its predecessor was the Kłodnicki Canal.

²¹ Wojciech Walczak consistently describes this lakeland as 'the lakeland near Legnica' cf. *idem, Nad Odrą*, Wrocław 1974, p. 60 and following. He notes, based on Homann's map, that only 200 years earlier there were at least several dozen lakes, and the lakeland stretched from Chojnow to the Odra river.

Table 1. The main rivers and reservoirs in the territory of Silesia

River	Length [km]	Reservoir (the year of construction)	Surface area [km ²]
Odra*	854	Racibórz (planned)	-
Bóbr	272	Pilchowskie (1912)	2.4
		Bukówka (1988)	2.0
Nysa Kłodzka	182	Otmuchowskie (1933)	20.6
		Nyskie (1971)	20.7
		Topola (2003)	3.4
Barycz*	133		
Mała Panew	132	Turawskie (1939, 1948)	20.8
Kwisa*	127	Leśniańskie (1905)	1.4
		Złotnickie (1924)	1.2
Opawa	122		
Widawa	103		
Morawica*	97.7	Slezská Harta (1997)	8.7
Bystrzyca	95	Mietkowskie (1986)	9.1
		Lubachowskie (Bystrzyckie) (1914)	0.5
Oława	91.7		
Olza	86.2		
Kaczawa	83.9		
Ślęża	78.6		
Stobrawa	77.6		
Kłodnica	75.3	Dzierżno Duże (1964)	6.2
Strzegomka	74.7	Dobromierz (1986)	1.0
Osobłoga	65		
Ostrawica*	65	Vodni nadř Šance (1969)	0.35
Ścinawka	62		
Szprotawa	57.5		
Biała Głucholańska	54.9		
Nysa Szalona	51	Słup (1978)	4.9
Ruda	50.6	Rybnickie (1972)	4.6
Liswarta*	93		
Wiśła*	1048	Goczałkowickie (1956)	32
Przemsza*	88		
Brynica*	55	Kozłowa Góra (1939)	5.5
		Żelazny Most (1977)	13.9 (water surface – 6.2)

* - a border river or river flowing through Silesia only at a certain distance.

Table made by the author on the basis of: *Mały Rocznik Statystyczny Polski 2011*, Warszawa 2011; *Przyroda Dolnego Śląska*, ed. Jerzy Fabiszewski, Wrocław 2005; *Wielka Encyklopedia PWN*, Warszawa 2004; <http://cs.wikipedia.org/wiki/Odra> (accessed 22.11.2011).

There are not many peat bogs left in Silesia. It is possible to distinguish their two main locations. In the Sudetes there are a few raised bogs, mostly ombrophilous ones (the Bystrzyckie Mountains, the Karkonosze Mountains, the Iżera Mountains and the Table Mountains). In the region of the central Odra, from the Kunickie Lakeland to the north, several dozen lowland, rheophile bogs can be found.²²

Swamps and wetlands have been dried in most cases and are now often used for farming purposes. Only a few of them have survived in the river valleys or in peripheral parts of Silesia, due to having been placed under protection. These swampy areas may have originated from the fish-breeding ponds, many of them set up as early as in the Middle Ages. The Milicz and Żmigród valleys by the Barycz river, as well as the valley of the Vistula river near Skoczów and Pszczyna, are two of the largest accumulated pond areas in Silesia. Single ponds can be found all over the territory, usually near monasteries and estates. An important role was played in this case by the Cistercians.²³

All of this suggests that human interference in the hydrographic network of Silesia was immense. The rivers have been canalized and regulated, the Odra from Koźle is navigable, and a lot of work has been done protect the population against both excessive and insufficient water levels and to supply large population centres with drinking water and recreational facilities. The size and number of artificial fish-breeding ponds in relation to lakes also clearly shows the development and transformation of the natural and socio-economic landscape of Silesia. Not all of these changes are necessarily beneficial, which is illustrated by several catastrophic events – the canalization and regulation of the rivers (the so-called ‘bank-concreting’) was one of the main causes of the flood of July 1997.

Climate

Silesia, lying in the heart of central Europe, is located directly under the spot where different air masses mix together; we can, therefore, say that the climate of Silesia is transitional. These air masses are mostly comprised of north-eastern masses of sea and North Atlantic air, and masses of continental air from the east. The former masses are humid and cause drops in temperature in summer and thaws in winter; the latter are dry and cause hot temperatures in summer and severe frosts in winter. In summer the masses of tropical air from the south and south-east, being another cause of hot temperatures, are also important to a certain degree, but only when humidity is high. In winter the masses of Arctic air from the north are responsible for low temperatures and snow. Among the aforementioned masses of air the most important ones are the sea air masses. In the east, on the Silesian Highlands, the climate has, however, more continental features

²² J. Kondracki, *op. cit.*, p. 140.

²³ One needs to acknowledge the accomplishments of the Cistercian monasteries of Lubiąż, Rudy, Henryków and Krzeszów in the areas of fish farming and land drainage systems.

than the areas between Wrocław and Zielona Góra. The dominating wind directions are west and north-west.

The local diversity of climate is influenced by the landform. The distinct orographic barrier of the Sudetes causes foehn winds: strong and dry, blowing from the mountains in spring, they make the snow cover melt rapidly, which may lead to inundations or local floods. Together, the mountains and slopes, being orographic barriers, increase the volume of rainfall on the windward slopes in comparison to the leeward slopes, which lie in a rain shadow. Therefore the Sudetes and the Beskids are the areas with the highest rainfall rates, reaching 1300 mm per year, whereas the average annual rate of rainfall for Silesia is ca. 600–700 mm.²⁴ The lowest levels of rainfall occur in the central part of the Silesian Lowlands and they reach, on average, ca. 550 mm.

The average annual air temperature is 8°C, (18°C in the hottest month and –2°C in the coldest month).²⁵ Winter usually lasts two months and the snow cover lingers from ca. 40 days on the strip of Legnica-Racibórz to 150 days in the mountains. There are about 100 days with ground frosts. Such data is not in any way unique, however – when we take all of its weather features into account, it transpires that Silesia enjoys a relatively long vegetative period, exceeding 220 days in the central part of the region on the strip of Racibórz-Zielona Góra, which is of great importance for the development of agriculture.

The aforementioned data is, unless otherwise stated, characteristic of the lowland and upland areas. In the mountains we can observe a typical altitudinal arrangement of the climate zones. We may differentiate five such zones; on average, the climate conditions change every 200 m and the highest level (over 1000 mamsl) relates only to the upper parts of a small number of mountain ridges. The climate there is the most severe: for instance the average annual temperature is little above 0°C. Generally, in the higher parts of the Sudetes and Beskids (i.e. over 600 mamsl) there is no summer and the vegetative period lasts less than 180 days.

In connection with the diversity of the climate features, different climate regions have also been identified. Depending on the regionalization of Silesia we can name

²⁴ The above data referring to Silesia (in the sense of a region we are discussing in our article) is approximate, as geographers generally do not carry out any research in the territories of historical regions. Even in the case of studies whose titles refer to a region, their scope turns out to be limited to the research of the territory of the voivodeship.

²⁵ Generally, Silesia is the warmest part of Poland and its Odra-neighbouring territories between Racibórz and Głogów are the warmest in Silesia. Besides this, we must take into account the UHI (urban heat island) effect, which, as in the case of Wrocław, causes temporary increases of temperature of ca. 1–2°C, depending on the season, cf. Mariusz Szymanowski, *Miejska wyspa ciepła we Wrocławiu*, Wrocław 2005 (=Acta Universitatis Wratislaviensis, No 2690, Studia Geograficzne, vol. 77), p. 188. Another fact is that the highest ever absolute temperature in Poland (40.2°C in 1921) was measured in Prószków, the peaks of the Izerskie and Karkonosze Mountains which are situated in the coldest and the most humid Polish locations.

between three and eight different regions.²⁶ To put it simply, for a general characterization of the region of Silesia one must take into account the climatic dissimilarity of the mountainous areas of the Sudetes and the Beskids, as well as the Silesian Highlands and lowland areas. These Silesian Lowlands that are the most convenient part of Silesia in terms of climate from both an economic and social perspective.

Soils, flora and fauna

A less distinctive but essential element of the environment is the soil – in previous centuries especially this was a key factor of economic development. Silesia, except for its mountainous areas, boasts diverse and relatively fertile soils whose potential has been exploited since the beginning of the region's history. Chernozem, formed on loess, has the greatest functional value and can be found mostly in the Głubczyce Plateau to the south of Wrocław and in the locality of the Trzebnica Hills. Slightly less fertile black soils and alluvial soils can be found near Wrocław and in river valleys. Brown soils and luvisols are present in the Sudetes Foothills and in the south of the lowlands of the Upper Silesia. Small patches of limestone soils (*reżdziny*) can be found in the region of the hump of Chełm and on the Woźniki Upland.

More than half of the entire Silesian region is covered by less fertile soils, most of which are podzols and luvisols. Taking into consideration the central position of the Odra, they dominate the right-bank part of the region as well as in the west between Środa Śląska, Bolesławiec and Zielona Góra. In small local areas we can come across marshy soils (e.g. in the Barycz Valley) or – scattered in various spots – peat soils. In the mountainous areas we can find initial or weak podzolic soils of very small agricultural value, whereas in the Upper Silesian Industrial Region and in larger cities, such as Wrocław, Wałbrzych, Opole and Ostrava we find soils devastated by human activity (industrial soils), which are basically agriculturally useless, as well as soils which to a large extent have been adjusted to human needs (e.g. garden soils of the allotment garden areas).

The process of soil formation depends on many factors, the most important of which include bedrock type, the climate and hydrographic conditions. Soil constitutes the basis for the development of flora, but flora likewise influences soil's formation and development. Thus natural vegetation (and to some extent the lack of it) may be indicative of the type of soil. This is clearly observed in the example of Silesia and the distribution of its forests. Larger areas of forests have survived mainly in places where the soil conditions did not allow for intense land cultivation – a notable exception being the area of intense industrial development on the strip of Tarnowskie Góry-Ostrava, where mining

²⁶ For a comparison of different climate regionalizations see: J. Kondracki, *op. cit.*, pp. 101–103. Studies of the authors mentioned in this publication concern only the Polish part of Silesia, however these regions also stretched to the Czech part.

and various branches of industry, transport and human settlement have contributed to the thinning of woods.²⁷

Larger forest complexes occur in the areas with podzolic and luvisolic soils, as well as initial soils (in the mountains). These include the Lower Silesian Forests and the forests near Zielona Góra and Krosno Odrzańskie in the western part of the region, the Stobrawskie and Lublinieckie Forests on the right bank of the Odra between Brzeg and Lubliniec and the (Sławięcicko-) Raciborskie Forests and the remains of the Pszczyna Forest (Puszcza Pszczyńska). Growing on the left bank of the Odra, the Forests of Niemodlin have also survived probably because their substratum consists of infertile podzolic soils. Larger forest areas may also be found in the Barycz Valley and near Wołów. The area of the Sudetes clearly reflects the range of the (previous) Sudetes primeval forest which survives today mainly on the slopes of the Karkonosze, Izera, Owl and Bystrzyckie Mountains, the Śnieżnik Massif and the Jeseniky Mountains, whereas the valleys and basins have been settled and cultivated. A similar situation can be observed in the Silesian Beskids.

In the mountains we can observe a number of vegetation zones. Both in the Sudetes and in the Silesian Beskids, the lower subalpine forest zone (400–1000 mamsl) is represented by beech forests with mixture of great maple, ash, larch, fir, pine and oak trees, which, however, in many regions have been replaced by spruce plantations. The upper subalpine forest zone (1000–1300 mamsl) is a natural spruce forest.²⁸ A subalpine zone, dominated by dwarf mountain pines (1250–1500 mamsl), is located only in the Karkonosze Mountains, the Śnieżnik Massif and on High Jesenik, whereas an alpine zone is found only in the upper parts of the Karkonosze Mountains. The cause of the degradation of the Silesian mountainous forests, aside from ‘natural’ forest thinning processes, is their human-induced conversion as a result of the harmful effects of farming activity – acid rains have been destroying the forests of the Izera Mountains and Beskids since the 1980s.

The majority of Silesian forests are coniferous. These comprise both original formations (lowland and upper subalpine forests) and later plantings, because in recent centuries the dominant forestry policy was to promote mainly pine tree monocultures (and spruce in the mountains).²⁹ Extensive oak-lime-hornbeam forests (*grądy*) have been cut down and the same process is currently underway in the riparian forests (*łęgi*).

Silesia, apart from its borderlands, belongs to the Silesian faunal region. Its northern peripheries are part of the south-Baltic region and its mountainous areas belong to the Sudetes-Carpathian region. Nevertheless, as a result of direct (hunting) and indirect

²⁷ Roughly speaking, in the Middle Ages nearly 80 percent of the territory of Silesia was covered with forests, cf. Jerzy Kostrowicki, *Środowisko geograficzne Polski*, Warszawa 1968, p. 408.

²⁸ Cf. Wojciech Walczak, *Sudety*, Warszawa 1968, pp. 190 and following.

²⁹ This process has been going on since the 18th century, cf. Wojciech Walczak, *Obszar przedsudecki*, Warszawa 1970, p. 170.

(husbandry, settlement) human interference with fauna, it is not very varied, at least in comparison to previous centuries.³⁰ The largest Silesian animal is the bison, which was brought to and began to be bred near Pszczyna in 1865. The biggest wild animals are deer, fallow deer, roe deer and wild boar. Moreover, in the Sudetes one may also come across mouflon, brought there from Sardinia at the outset of the 20th century. Apart from mouflon there are also many examples of smaller wildlife: foxes, hares, hedgehogs, squirrels and mice. Bird species are much more varied and the most common ones include titmice, woodpeckers, starlings, corvids, swallows, partridges and pheasants (brought from Asia). Pigeons are very common, especially in large cities and in Upper Silesia (domestic). The biggest reptile is the viper.

Natural shelters for wild animals include forests, stands of trees and marshy areas, hence, apart from the larger forest complexes, the richness of fauna also characterizes the basins in the Barycz river valley, partially placed under protection of the Barycz Valley Landscape Park. There are also other protected areas in Silesia. A total of two national parks and over twenty landscape parks protect the most precious elements of the terrestrial natural environment of Silesia.

Conclusions

The geographic environment of Silesia – its elements and features – is (and was) highly beneficial both for human existence and activity. What mainly fosters the development of Silesia is its mild climate and dense, water-rich river network. Its long vegetative period and fertile soils, distributed between the Odra and the foot of the Sudetes, provided the basis for the development of agriculture in this particular region. This in turn spurred the progress of human settlement, most of all in the lowland and flat areas. Farming and settlement was connected with the process of forest thinning, which constituted a serious barrier for further development of the region, but, nonetheless, forests were regarded as a precious natural resource, and wood as a basic building material. In the Middle Ages mineral resources of considerable economic (e.g. materials for the construction industry) and commercial (gold) value were discovered.

Throughout the centuries its environmental conditions have also highlighted the region's internal diversity, which was manifested for instance in its division into Higher, Upper ('upland') and Lower ('lowland') Silesia, separated throughout the centuries by the Silesian Cutting (*Przesieka Śląska*). The hearts of both parts of Silesia are populated with distinctive elevations which tower over their respective neighbouring areas: i.e.: St. Anna's Mount and the Ślęża Mount, which have performed the function of religious

³⁰ In the 18th century single bears, wildcats and lynxes lived in Silesia. The last pack of wolves was seen in 1787 near Ślęża. Similarly, at the end of the 18th century beavers were driven out of the Silesian territory cf. J. Janczak, *op. cit.*, p. 76.

centres (the latter one – in the past; the former – continually). The question of their significance is still to be answered fully.

The location of Silesia in the heart of Europe, at the intersection of the two major ancient trade routes – one on the east–west axis, the other north–south – contributed to its development to a large extent, but, at the same time, also to the changes to its natural environment. Yet, weren't the favourable environmental conditions the main reason for choosing this particular location for the trading routes? To what extent did the environmental conditions or/and its location, or, to put it simply, its geography, influence the decisions and actions which resulted in Silesia belonging to different nations at different times? What is certain is that the geographic environment of Silesia needs to be taken into account as an essential element which influenced both the development of the region and its various transformations.

