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## CONZENIAN TRADITION IN POLISH URBAN HISTORICAL MORPHOLOGY

**Abstract.** The scientific heritage of M. R. G. Conzen, who is considered one of the most outstanding historical geographers and urban morphologists in the world, has made a huge impact on the contemporary urban historic morphology. Nowadays it would be very hard to imagine this scientific discipline without his achievements. He created a new point of view on the city, first within the Anglo-Saxon, and afterwards within European and world geography. Morphogenetic methods, the conceptualisation of historic development, terminological precision as well as cartographic analysis that were typical of his approach, more and more often were considered essential for the development and the role of research on historic urban landscape. This resulted in the increasing interest in morphological studies on an international scale. In Poland, M. R. G. Conzen's opinions have become recognizable since 1960, finding permanent place in urban historic morphology and providing stimuli for its significant development in the following decades.

**Key words:** M. R. G. Conzen, urban morphology.

### 1. INTRODUCTION

The scientific heritage of one of the greatest historical geographers and urban morphologists of the second half of the 20th century known for his novel morphological studies – German-born British scholar M. R. G. Conzen – has undoubtedly had a huge impact on the modern historical urban morphology. Without his contribution it is difficult to imagine the current shape of this discipline worldwide (Conzen, 1960a, b, 1968). It opened up a new perspective on the city, first in the Anglo-Saxon, then European and world geography. J. W. R. Whitehand recognizes it explicitly, noting that, in the last quarter of the 20th century, morphogenetic methods, conceptualisation of historical development, terminological accuracy and cartographic analysis typical of his work have been increasingly recognised as essential for the development and the importance of research into the historic urban landscape. This has resulted in increased interest in morphological research on an international

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scale, such as the creation of International Seminar on Urban Form (ISUF), an international, interdisciplinary group of researchers, centred around their own magazine (*Urban Morphology*) and meeting in regular conferences (Whitehand, 2007). In Poland, the views of Conzen became known in 1960 when he presented his work entitled 'The Plan Analysis of an English City Centre' at the International Geographical Union Symposium in Lund, Sweden. From that moment on, they found a permanent place in Polish historical urban morphology, giving a significant boost to its development in the coming decades. This paper describes development and characteristics of the Conzenian schools and gives examples of recent and current Polish research into this tradition (Whitehand, 2001, p. 103).

## 2. THE DEVELOPMENT OF MORPHOLOGICAL RESEARCH

Urban morphology is one of the oldest research directions in historical geography, dating back to the end of the 19th century. It was then when first interesting attempts at systematic recognition of different types of descriptions emerged, concerning mainly the external construction of cities, conducted by researchers associated with the German school of geography (Dziewoński, 1956). But it was the work of F. Ratzel *Anthropogeographie* (1882) and O. Schlütter *Bemerkungen zur Siedlungsgeographie* (1899a) and *Über die Grundrisse der Städte* (1899b) that helped to popularise morphology, not only among German geographers. Ratzel focused, among other things, on the analysis of settlements and their physiognomy. Schlütter (1899a) formulated its subject matter, methodological assumptions and research programme. In the foreground was the physiognomic study of the urban landscape (Schlütter, 1899b), which should cover three groups of research questions: (a) geographical and topographical location of settlements, (b) their spatial organisation, i.e. their layout, and (c) physiognomy of settlements. His analysis of the genesis and functions of settlements was based on these factors (Koter, 1974a). K. Hassert is considered the father of contemporary urban geography. In his study of cities, he devoted much attention to urban morphology. His work of 1907, *Die Städte geographische betrachtet* played a significant role in the development of this field since, as rightly observed by Maik (1992), 'it presented in a concise and systematic way the then state of geographic knowledge concerning cities and a set of research problems – ranging from issues of origin and location of cities, the role of communication in their development, to the problems of spatial structure, physiognomy and urban functions'.

In Poland, the geographical and historical studies of cities have an equally long tradition and were initiated in the late 19th and early 20th century by historians: F. Bujak, J. Bystron and K. Potkański. They focused on the development

of settlement – both urban and rural – in a historical perspective, as well as the issues of spatial structures of settlements which came close to settlement morphology, e.g. the study of Limanowa by Bujak (1902) and the study of Cracow by Bystróż (1915).

However, strictly speaking, the first geographical and urban works based on solid empirical studies appeared in the 1920s under the influence of the then fashionable French landscape school and focused mainly on issues of physiognomy, especially the types of landscapes in Polish cities. Contemporary Polish urban geography was dominated by two research trends. The first one focused on the urban landscape and the broader urban physiognomy. Some studies of this period were statistical and spatial in nature (S. Gorzuchowski, S. Leszczycki), others focused on drawing up physiognomic and functional plans of cities (W. Rewieńska, T. Kubijowicz, O. Kossmann). One important figure of this period was Z. Simche, who created a methodological basis for urban physiognomy. The second trend concerned the relationships with the closer and further environment, which practically manifested itself in works devoted to topographic and geographic location of cities, without going into the rules governing the formation of urban landscape and its development (M. Kielczewska, A. Malicki, W. Rewieńska, J. Dylík). The physiognomic approach, as too conservative, was criticized in 1929 by O. Sosnowski, who stated that the development of the city is the result of the impact of a whole range of factors, including natural, historical, political, economic and social ones, and therefore a comprehensive analysis of the structure of cities requires not only critical observation of the current state but also learning about the development of cities using methodological geographical and historical researches based on cartographic material accumulated over the centuries. The response to modern postulates by Sosnowski appeared only in the late 1930s and was expressed most fully in the work of O. Kossmann entitled ‘Geographic Outline of the City of Łódź’ (‘Rys geograficzny planu miasta Łodzi’) in which he presented, among others, a plan for the division of the city into morphogenetic units, even though he did not use that exact term then. On a broader scale, the new approach was reflected in the work of Rewieńska from 1938 and 1939, dedicated to the typology of cities and towns in north-eastern Poland (Koter and Kulesza, 1994).

This promising trend, ultimately morphological in the full sense of the word, was cut short by the outbreak of World War II. After it ended, in the new political and social circumstances in Poland, settlement studies, especially geographical and historical studies, were marginalized. We owe their gradual revival to K. Dziewoński, who not only transferred the research achievements of historical and urban studies to geography but, above all, created the scientific foundation for the development of historical urban geography in Poland. He developed the methodological bases of modern urban morphology in Poland, presenting them in the work entitled ‘Issues of Morphological Typology of Cities in Poland’ (‘Zagad-

nienia typologii morfologicznej miast w Polsce'), in which he introduced a classification of terms used in this discipline and presented research postulates for the new generation of urban morphologists (Dziewoński, 1962). The existing classifications and typologies of cities – morphological and functional – were developed independently of each other, although their mutual relationship should be obvious. Moreover, the former was not fully homogeneous. Two trends have been visible for a long time: one strictly morphological, which focused on the historical genesis of forms in classification and typology of cities, the other more formal, physiognomic, stemming exclusively from visible characteristics observable in the field. Dziewoński was explicitly in favour of the first approach (Kulesza, 2001). He revealed his functional approach to morphological research even earlier, in his work entitled 'The Issue of Development of Early Medieval City in Poland' (1957) ('Zagadnienie rozwoju miasta wczesnośredniowiecznego w Polsce') (Dziewoński, 1957). He believed that at the core of the early medieval settlement in Poland was the differentiation of settlements into functional types, related to the growing territorial division of work. From a morphological point of view, Dziewoński's statement that the characteristic feature of all settlements beyond city walls was their lack of division into plots (which applied to a lesser extent to merchant settlements), was extremely important. The absence of this element of spatial organisation was the most striking distinguishing factor of early medieval Polish walled towns, whose spatial arrangement was based on the concept of a separate, private urban plot of land (Koter and Kulesza, 2010).

Dziewoński also made an attempt to define the methodological basis of morphological classification. He stated that the classification has to begin with a ranking of the analyzed systems according to their scale and complexity, since size and complexity usually go hand in hand. He distinguished three basic classes of size and complexity of forms and spatial arrangements of cities: *simple*, *complex* and *compound-complex*. He also called for the identification of the most important components of the systems and determining the dominant elements, which would allow for determining the spatial relationship between these elements. He emphasized that the nature of this relationship cannot be determined without general knowledge of the history of a given city. The next step in classification should be to determine the level of compliance of morphological forms and their geographical environment, before determining the dynamics of the spatial arrangement in the context of its historical development. According to him, it is the stage of determining the succession of forms and spatial arrangements of a given city over time (Koter and Kulesza, 1994).

The methodical foundations proposed by Dziewoński coincided in time with the works from the aforementioned British scholar of German origin, Conzen.

Michael Robert Gunther Conzen was born in 1907 in Germany. In 1926–1933, he studied geography, history and philosophy in Berlin. As an anti-fascist, he emigrated to Great Britain in 1933. He continued his studies at the Victoria Uni-

versity in Manchester between 1934 and 1936. He taught at British universities, and as a visiting professor abroad (Norway, New Zealand and Japan). He spent his longest tenure at the university of Newcastle upon Tyne. He conducted research in the field of urban geography, historical geography, human geography, regional geography and geographical methodology. He died in 2000. His most important theoretical and methodological achievement is the concept of the cycle of morphological transformations of urban land (and the urban block), developed on the example of the historic English cities (Koter and Kulesza, 2008). We owe a strict scientific study of the method of analysis of historical city plan. The most important and basic elements of the plan are – according to him – lots, streets, roads and buildings. By studying the morphological development of the two English cities of Alnwick and Newcastle, he also introduced the cycle of morphological urban development to the study of settlements by analyzing the processes occurring on urban lots and dividing them into four stages: initial (introduction of buildings), filling (gradual thickening of building), saturation (maximum filling) and reduction (reducing the area of a developed lot). By considering lots and streets as basic morphological elements of the city, we can explore various systems of components: a network of streets, urban blocks and building complexes in different periods. He noted that the periods (cycles) of urban development vary as to how they operate morphological elements, in other words, the conditions for the formation of settlement. It is therefore possible to accurately identify the basic settlement and morphological stages and, consequently, to determine morphogenetic (morphological) units. He was also probably the first one to develop a map of morphogenetic units of a city, based on downtown Newcastle (Koter, 1974).

Especially important for the development of morphological trend were Conzen's views concerning the mutual relationship between morphological and functional studies. He believed – as did Dziewoński – that both of these aspects of the settlement studies are equally important, interdependent and interrelated, thus contributing in a basic way to the determination of the character of a city. He therefore proposed the need to look at the city anew and interpret the phenomena spatially, genetically and based on the knowledge of functional structure. This interpretation can be carried out by analyzing the directly observable elements of urban landscape in close connection with the written sources. Conzen considered the former to be the most important. Of the three directly observable elements of urban landscape, i.e. (a) the city plan, (b) the types of development, and (c) the forms of urban land use, he considered the first one to be of key importance for his research. Due to the fact that each historical period leaves some material traces in the city plan, he calls for detailed analysis of individual elements of the plan using an evolutionary approach, from initial to modern form. As a result of this study, we can explain the genesis of various forms as well as the whole layout of the city and, at the same time, distinguish genetically different components of the plan (pre-location nucleus, walled area, medieval suburbs, 19<sup>th</sup>-century neigh-

bourhoods etc.), which, according to Polish terminology, can be called morphogenetic units (Koter, 1969).

J. W. R. Whitehand called the contemporary urban landscape a reflection of accumulated past generations, while M. Koter called it the result of overlap and mutual blurring of the various settlement layers in a long process of city formation. The key to understanding the landscape at any stage of its development is to understand what kind of evolution the landscape underwent. That is why archaeological, historical and historical/cartographic sources are so important in morphogenetic studies. Simple understanding of the urban landscape, as stated by M. R. G. Conzen, and emphasized by M. Pirveli, is not only theoretical, but most of all educational. Conzen has reduced the morphological transformations of urban forms to three following processes: *filling* – involving of filling the formerly created morphological units or layouts with additional elements. In this stage the horizontal and vertical intensity of development changes and the spatial subdivisions in the city plan emerge, but the primary system remains legible; *completion* – mainly involving the creation of new units, which may result in decreasing of intensity of internal changes in the old units. These changes are therefore of extensive and additive character; and *transformation* – entailing, sometimes radical, reconstruction of existing spatial structures in order to create new, more functionally efficient and aesthetically trendier forms. It usually takes place when the two former processes – quantitative in their nature – reach a threshold value, making the current direction of change impossible or ineffective. The transformation is therefore qualitative (Pirveli, 2011).

### 3. URBAN MORPHOLOGICAL RESEARCH IN POLAND

Urban morphological research<sup>1</sup> can thus focus mainly on the structural components of a city or village – elements, units, simple or complex systems, both by themselves and in mutual relations. Morphological studies encompass settlement forms on a higher hierarchical level than the city, i.e. groups of cities and city networks at different scales (Koter and Kulesza, 2010; Miszewska, 2010; Kulesza,

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<sup>1</sup> The methodological foundations created by Conzen were transferred to Poland by Koter, who also introduced the term urban morphology in Polish literature, relating to the study of external (i.e. the shape and physiognomy) and internal (i.e. planning) aspects of an urban or rural organism, as well as the origin and evolution of different components of this organism, i.e. their genesis (Koter, 1974a). In its strict sense, urban morphology deals with the issues of physiognomy and shapes in settlement networks. In the broader sense, it encompasses: (a) different aspects of morphogenesis (settlement stratigraphy, developmental morphology, evolutionary morphology) and (b) comparative morphology (classification and typology). In the strict sense, morphology is analytical, while in the broader sense, it is a more synthetic science (Koter, 1974a, 1994).

2011; Pirveli, 2011 ). Individual layers building settlement forms are created and then destroyed by different internal and external forces. This is done as a result of different processes, which may be constructive or destructive in nature. The identification of forces and processes that create, and at the same time transform the forms of natural and cultural landscape is the essence of fully scientific morphogenetic research, which focuses not only on time, but also on the method of creation, development and evolution of given forms (Pirveli, 2011).

The method of analyzing a city plan was first used by a team of researchers from the University of Wrocław under S. Golachowski. They were inspired to undertake this type of research by high genetic homogeneity of Silesian towns, well-preserved historical cartographic resources of city plans, the investigations undertaken in this area in England and the introduction of the concept of 'urban cycle' to determine the phases of urban development, as well as the concurrent formulation of the foundations of research approach in historical urban analysis by Dziewoński (Miszevska, 2005). These studies mainly focused on the origins and spatial development of Silesian cities. Conzen's method found fertile ground here, as Silesian cities had interesting, medieval spatial arrangement and numerous valuable architectural monuments from this period. Additionally, unlike cities in other Polish regions, there were many well-preserved archival plans of those cities from the 18th and 19th centuries, as well as rich iconographic resources from earlier centuries, which allowed for the study of the origin of their layout and their spatial evolution in the pre-industrial period. Golachowski's team focused on such morphological issues as descriptions of cities, including their topographic locations, shapes and planning, as well as land use and division of urban land according to their ownership, which was a novelty. Golachowski (1947, 1952, 1956a, b, c, 1967), alone or with co-authors (Golachowski and Pudelko, 1963), published a series of monographs relating to: Trzebnica, Opole, Bytom, Racibórz, Brzeg and Wrocław. Among other things, they discussed plans of those cities, land use and division of urban areas according to their ownership. Based on preserved registers and fire cadastres, the author recreated the size and number of houses, as well as their type of use and differentiation according to their beer privilege. He also analyzed the size and structure of households (Miszevska, 2005). Later works by Golachowski were generally devoted to morphogenetic issues and were related to the origin of the spatial layout of cities and their selected areas, hypothetical modular assumptions governing the layout of medieval towns in Silesia, detailed metrological analysis etc. Together with H. Szulc, he published a paper on urban greens (Golachowski and Szulc, 1963), which became the basis for more detailed analyzes by Tkocz (1966b) on the origins of the plot layouts in cities in Opole region. Szulc (1957) was also the author of valuable works on the typology and planning of settlements near Wrocław in the early 19th century. This work enabled the interpretation of the modern spatial arrangement of Wrocław.

Urban morphology studies are continued in Wrocław by B. Miszewska. In her analyzes of Opole and Wrocław, she used a grid of squares by J. Pudelko to define the rules of spatial arrangement and the Conzenian method of urban cycle to present the phases in the transformation of the market square block (Miszewska, 1971, 1979). In her subsequent works in the field of urban morphology, Miszewska analyzed urban blocks from different morphological periods, the way they are filled with buildings, as well as the layout of the street network. All these elements led to the division of urban built-up areas into morphogenetic units. The spatial development of the city and the complexity of its spatial structure made it possible to study the succession of forms of land use, as well as the succession of types of development (Miszewska, 1979, 1994a, b, 1996). In her study of the spatial structure of cities with particular emphasis on morphological studies in Silesia, Miszewska distinguishes several phases. The first post-war period of research was dominated by works with strong links to history. This was facilitated by the abundance of cartographic resources and historical documents, as well as the strive for better knowledge of the lands annexed to Poland. These works dealt primarily with functional and social diversity within walled cities. The theoretical works by Dziewoński in Poland and Conzen in England provoked, in various centres, morphometric studies, whose aim was to recreate the original layout of cities, as well as the principles that ruled their establishment and the influence of surviving forms of city greens on their current structure. These analyzes resulted in the determination of morphological periods in the development of Silesian cities and the creation of a catalogue of typical morphological units in each period. This general outline of research was supplemented with more detailed analyzes of individual neighbourhoods in the city, the streets and even the urban blocks (Miszewska, 2005).

Although most Polish cities have pre-charter roots, there is no doubt that the core part of their spatial arrangements was formed between the 13th and 15th centuries as a result of the so-called charter according to German law, i.e. according to model patterns that reached Poland from the West through the German states. The Central European model of charter city differed significantly from the English model, so the Polish urban morphologists could not fully benefit from the methodological model by Conzen. One of the most intriguing aspects for Polish geographers and urban planners back then was the determination of measurement bases for Medieval chartered towns – model measurements for urban development lots (within the town walls), the shape and size of the town square etc. Polish researchers mainly focused on reading initial modules of individual elements of Medieval cities from old plans – modules of width and length of charter lots, urban blocks, streets, squares etc. Pudelko was the most successful researcher in the field. Not only did he recreate most of the modules, but also created, based on Silesian cities, a pattern of the most pervasive city plans, as well as shapes and sizes of town squares.

It is worth noting, as emphasized by M. Koter and M. Kulesza, that although the idea of a planned, regular Medieval chartered town was born in Western countries, paradoxically the cleanest model plans of such towns are most numerous in Poland and neighbouring countries. This is due to the fact that there were already a lot of cities with established arrangements in the West, so the new models could only be used to a limited extent. In Poland the network of old cities was less dense and could be supplemented with new cities, established *in cruda radice*, closely following the model concept of Gothic cities, distorted only by topographic circumstances. The new models could also be used in formerly existing early Medieval cities, as those cities underwent massive destruction during the Tartar raids in the first half of 13th century. Moreover, their wooden buildings did not limit new regulatory endeavours. Despite that, the pre-charter elements in those plans remained mostly legible, distorting to a lesser or bigger extent the secondary Gothic model (Koter and Kulesza, 2010).

Accordingly, the basic problem in spatial studies of urban arrangements is the determination of the rules for their measurement (the units of length and surface area). A review of Polish and foreign literature on the subject was presented by such authors as Dunin-Wąsowicz (1992a, b), who indicated the relationship between the various systems of measurement, as well as between the units of measure and dimensions of squares and lots and showing further research directions in this regard (Krasnowolski, 2004, p. 25). Detailed studies of urban modular systems in Poland were started by Golachowski (1956c), who attempted to present the plan of Medieval Wrocław. At the same time Zagrodzki (1956) analyzed the plan of the Old Town in Warsaw. Soon Kozaczewski (1972a, b, 1973, 1975, 1980) undertook an analysis of the principles establishing a chartered city on the example of Old Towns in Warsaw and Toruń, as well as presented the programme, size and spatial arrangement of a small Medieval Silesian town, emphasized the role of hereditary plot in the structure of a chartered town, which distinguished it from pre-charter arrangements. Great contributions to metrological research were made by Pudełko, who used detailed metrological measurements and his own modular square network of a city plan to study the shapes, size and proportions of squares and plots, as well as urban blocks in Silesian cities. He later tackled the issues of size and proportions of the whole city area, creating modular outlines of many Medieval cities in Silesia (Pudełko, 1959a, b, 1960, 1963a, b, 1964a, b, c, 1965, 1967, 1970, 1971).

Based on empirical research, Pudełko recreated the initial dimensions of urban lots and used them to determine the most widely used measuring modules. Next, he used the scale of those modules to create a network of squares imposed on the Medieval part of the city to reconstruct the chartered, model dimensions of urban blocks and whole cities, sometimes blurred by later distortions. In a similar way, he reconstructed the size and proportions of market squares in Silesian towns and

presented their typologies. This is a very important contribution to the theory of research methodology of Medieval chartered towns.

One of the basic metrological methods allowing the reconstruction of the original concept of planned urban arrangement is the measurement analysis of a city plan. This method allows the researcher to determine if the current city plan includes the chartered city's elements or not. Using this method, one can go more deeply into the plan to try and find the measuring module used when establishing the town. The first task of the measurement analysis of a city plan is to find measurement units of length and surface area used when establishing a given settlement. Determining the measurement pattern is of great importance to the correct analysis of a plan, while allowing the study of such details as the surface area occupied by the city, the dimensions of its town square, a building lot, residential blocks, the width and length of streets, interrelations between individual elements of the systems, their proportions etc. The next stage in the metrological analysis is the search for the modular structure of urban lots, squares and other components of the arrangement. One auxiliary operation when seeking modular divisions is the development of the so called grid of squares of the arrangement under consideration, with dimensions cohesive with the assumed module of surface (Pudelko, 1959a, 1962, 1963b, 1964c; Kubiak, 1983). Such grid allows for investigating the hypothetical surface area of a Medieval city. The metrological method was used not only in the case of cities, but also for villages established in Middle Ages (Golachowski and Szulc, 1963; Szulc, 1957, 1963). Using original units of measurement (used when Medieval cities were established) in the studies allowed the researchers to clarify many elements of the contemporary plan.

The retroverse method is also used in studies on spatial urban development. In more specific terms, this method involves dividing gathered information into two groups. The first combines information derived mainly from the analysis of city-forming factors dependent on the laws governing the economic and social sphere, as well as its influence on the development of a given settlement. The second one collects direct information (i.e. research concerning the settlement), which are gathered in separate sets of messages such as: historical data, archaeological, architectural, cartographic and iconographic, metrological and field studies (Książek, 1988). Research conducted using retrogressive method, integrating the results of other, related disciplines allows for relatively full recreation of former spatial arrangement of the studied cities.

As indicated above, one innovative element of Polish morphological research was the study of urban leas – an agricultural unit of spatial structure of a city that is usually omitted in British works. In contrast to western cities, Polish Medieval cities were mostly agricultural, so they had the so called urban leas, such as fields, meadows, gardens, pastures and forests. The arrangement of fields in these leas was immensely complex as, due to the three-field system of farming used back

then, each burgher owned their land in at least three main field complexes (used cyclically for winter crops, spring crops and for fallowing), as well as in other, less agriculturally developed areas. The leas were usually built-up in the last two centuries. Paradoxically, the old, Medieval farming arrangements were petrified in the grids of streets and plots of even the biggest cities in Poland. Their reconstruction, the recreation of measurement modules, etc. was also undertaken mainly by geographers from Wrocław. A work by Golachowski and Szulc (1963) concerning urban leas as a subject for historical and geographical research served as an introduction to this issue. This research was later further developed by Tkocz (1966a), both as detailed studies concerning the origins of plot arrangements in the leas of a chosen city and in broader regional studies concerning the leas around cities in Opole region.

In Poland, morphological studies were conducted by Koter. He was the first one in Polish morphology to introduce not only the Conzenian approaches but, above all, the new theoretical and methodological terms (such as *urbomorfologia* – urban morphology). The main object of his analyzes was Łódź. A series of morphological works was started in 1969 with a study entitled ‘The Origin of the Spatial Arrangement in Industrial Łódź’, in which he used archival sources to make a detailed reconstruction of the area of the so-called Łódź estate at the decline of the feudal era. By subsequent imposing of the regulatory plans from 1823–1840 on this image, he was able to clarify the origin of planning in industrial Łódź. By investigating further stages of urban development in Łódź, he drew an original map of the contemporary morphogenetic structure of this area (Koter, 1969). Later works by Koter (1974b, 1976, 1979, 1984) form a series of studies devoted to the origins of individual morphological units and the transformations in spatial development of Łódź from the Middle Ages up to the present: a reconstruction of the environment of Łódź at the turn of the 18th century with references to Medieval times, the development of settlement in pre-industrial times, the genesis of spatial organisation in agricultural Łódź, the development of urban arrangement of industrial Łódź, and spatial development and buildings in Łódź before 1918.

The second series of geographical and historical works by Koter includes more detailed morphogenetic works based on more detailed research methods. Despite the seemingly different subject matter, they share a common goal – to show how and to what extent the old forms survived in the existing urban structure. He also proposes the application of the concept of index historic monuments, claiming that, like index fossils in historical geology, they can be used to divide history into periods in the case of settlement studies. At the core of the study is a detailed map of the morphogenetic structure of the city, showing the results of aggregation, overlapping and mutual permeation or displacement of listed settlement units (Koter, 1979). Urban historical geography benefited greatly from Koter’s formulation of theoretical and methodological assumptions

of urban morphology as a stand-alone sub-discipline within urban geography, as well as from his own definition of the sub-discipline. Koter (1974a) also introduces the division of research in urban morphology into strict morphology and morphogenesis. Strict morphology means physiognomy and morphometrics, while morphogenesis is a study of the structure of a city at various stages in its history (Miszewska, 2005).

It is worth emphasizing that Koter's studies also showed that one of the most well-known research methods of Conzen, the urban cycle method, can be applied to an industrial city formed in the 19th century. It was used in Poland to illustrate the process of evolution of plots in a 19th-century industrial city of Łódź. In his paper entitled 'The Morphological Evolution of a Nineteenth-century City Centre: Łódź, Poland, 1825–1973' (Koter, 1990) he showed that the Conzenian method of development cycle of urban plots, formerly used only in the case of Medieval cities, is universal and can be used in studies of any type of city.

In Łódź, morphological research is conducted by Kulesza (1994b, 1999a, b), interested mainly in the origin of spatial arrangement of early Medieval cities and their influence on the planning of Medieval chartered cities. In his works, he tackles such issues as the spatial arrangement of merchant settlements in Central Poland (Kulesza, 1999c) and their traces in some city plans (Kulesza, 1994b), as well as historic urban arrangements. Most notable, however, are two of his studies: one devoted to the morphogenesis of cities in Central Poland in the pre-partition period, i.e. until the end of 18th century (Kulesza, 2001), the other to the morphogenesis and planning of Medieval cities in Poland (Kulesza, 2011).

In the first one, he proved that only one city out of a hundred established in this area was created in *cruda radice*, i.e. from scratch, according to a model, regular arrangement of a Gothic city. All other originated either from early Medieval fortified settlement complexes or from former merchant settlements, or were created in the place of old villages, whose relics survived in the arrangements of chartered cities. It is an extremely important statement from the point of view of Polish historical geography. The idea of a chartered city, which reached Poland through Germany, gave some German researchers, especially in Nazi times, reason to claim, that the establishment of Polish cities was a result of German settlement. This was true, especially when first chartered cities were established in Silesia, but was never a widespread rule. Kulesza's study proved this beyond doubt. Besides, as Golachowski and Pudełko showed, most cities in Silesia have pre-charter origins. Similar conclusions can be seen, among others, in works edited by Kaczmarczyk and Wędzki (1967), which studies the planning of all bigger urban centres created in the Middle Ages and located on lower Oder and lower Warta rivers, in Rogalanka's works (1977) concerning Poznań, Sowina's work (1991, 1995) analyzing the Medieval urban plot in the context of written sources and the development of the chartered town of Sieradz in the 15th and 16th cen-

turies, as well in Bettlejewska's work (2004) studying the measurements of towns established in the 14th century by the Teutonic Knights.

In his second paper, Kulesza tries to answer the questions of the formation and origin of the first Polish cities (or proto-cities) in the early Middle Ages, how their oldest spatial arrangements developed and how they later transformed into chartered cities. He also considers which plans of chartered cities became popular in later Medieval times in different regions of Poland, and how they were adapted to different geographic circumstances where the city was established, as well as how, if at all, they referred back to the existing older settlement forms. The study confirmed that the origin of spatial arrangements of urban centres established in Poland in the Middle Ages was not homogeneous. Some of them developed on the basis of earlier, pre-charter structures (from a multifunctional fortified settlement complex or a stand-alone merchant or craftsmen settlement), while other were urban in origin. Relatively few were established *in cruda radice*. Much attention has been given to showing a more frequent phenomenon of adapting the older pre-charter forms by the new charter arrangements, proving that their origin was in fact domestic, and only parts of the charter planning were brand new. An important part of the work involves a study of Medieval metrology used in the charter period, which is an issue rarely tackled in Polish literature on the subject. It discusses the measures used in Middle Ages in various regions of Poland and at different times, quoting numerous examples of urban metrics and verifying earlier calculations from different researchers. The paper also presents the dynamics and diffusion patterns of the models of various types of charter law, from Silesia, which took inspiration from German countries and the Czech Republic, to Wielkopolska, parts of Pomerania, Małopolska and further eastward to the Teutonic lands, from where the Chełm type of the law spread to Gdańsk Pomerania, Kujawy and parts of Masovia. It also mentions the Brandenburg variety, which was most prevalent in Western Pomerania, and the Lubeck variety used mostly in ports.

The other Polish researcher who studied various types of Medieval urban plans in Poland was Książek (1996). The development of towns in Małopolska chartered in the 14th century was presented by Berdecka (1974, 1976, 1982, 1983), who confronted information included in archival sources with a critical analysis of historical and contemporary city plans, combining them with the results of archaeological studies and on-site analyses. The rules for measures, sizes and arrangement of plots in Cracow was studied by Jamroz (1967), Grabski (1968) and Krasnowolski (2004), who put special emphasis on the reconstructions of planning based on modular analysis (juxtaposed with written, archaeological, architectural and planning sources) with hypothetical identification of measurement units for the mid-town and rural areas, as well as the typology of urban arrangements. A similar work is the one by R. Eysymontt (2009), entitled 'The Genetic Code of the City. The Medieval Chartered Cities of Lower Silesia as Compared to Eu-

ropean Urban Planning', where Medieval cities, perceived as works of art, were characterized by analyzing their plans and development. As a background for this comparison of Silesian towns, the author chose planned towns in south-western Germany, Switzerland, Italy, Dalmatia, France, Hesse, Altmark, Lower March, Western Pomerania, Czech Republic and Austria, constituting the counterparts for 78 chosen examples of chartered cities in Lower Silesia. Considering the basic functional and spatial models of Silesian urban centres, he presents several models. Another important work presenting the changes in the topographical structure of a certain group of Medieval cities established as a result of a multi-stage development started before the wave of intense urbanisation of Central Europe in 12th–13th centuries is a study by Piekalski (1999), who analyzes settlement complexes described as early cities, traces their transformation into typical Medieval cities and characterizes their structure. A study by Łosiński (2004) and Malczewski (2006) is similar in nature, though it concerns just one urban centre – Szczecin. Based on cadastral maps from the 19th century, as well as written and archaeological sources, it presents the origins of Prykarpattian towns, reconstructions of their spatial arrangements, changes in the shapes of market squares and street layouts, locations of buildings and their fortifications. Kalinowski (1971, 1986) has published an article about cross-shaped urban arrangements, as well as a brief outline of the history of urban planning in Poland. Z. Morawski's article concerning the urban arrangements of chartered towns in Poland and the relationships between a town and a castle is similar in subject matter, but less controversial.

Cities, especially large ones, absorb the neighbouring rural settlements during their spatial development. These settlements sometimes undergo significant alterations, yet their former rural spatial arrangements remain petrified in the city plan. The genesis and initial forms of planning of these settlements were most widely discussed by Szulc (1957, 1963), Koter (1994), Miszewska (1996) and Kulesza (2001). Koter (1979) first introduced the concept of the settlement stratigraphy and presented, using the example of Łódź, a stratigraphic table and a detailed map of the morphogenetic structure of the city, distinguishing approx. 200 morphogenetic units of both urban and rural origin. This method is now widely used in Polish morphological research, mainly by the aforementioned Kulesza (2001). Miszewska (1971, 1979, 1996, 1997) first studied the structure and morphological transformations of peripheral settlements in the zone around Wrocław.

As already mentioned, most Polish cities have pre-charter origins. Thus, after a period of fascination with studying the plans of chartered cities, researchers naturally turned towards the genesis and spatial forms of those primitive settlements retained in the plans of Medieval cities. Such studies were performed by Zagrodzki (1962, 1991, 1992), Kalinowski (1971), Kozaczewski (1972a, 1973), Rogalanka (1977), Kulesza (1994a, b, 1999a, b, c, 2001). One challenge is the lack of sufficient knowledge, especially plans. Therefore, these studies make it

hard to fully utilise the Conzenian method of analyzing city plans in historical perspective, giving an opportunity to extensively identify the basic settlement and morphological stages and, consequently, to define morpho-genetic units. That is why these studies have to be supplemented by the results of archaeological and historical studies allowing the reconstruction of a hypothetical pre-charter or genetic arrangement of a given settlement unit (Kulesza, 2001).

It was pointed out that just a few Polish cities have a longer sequence of archival plans. In most cases, the first plans were made as late as the end of the 18th century, mostly in the 19th century, usually only when a city underwent a regulation, e.g. after a fire or wartime destruction. For these reasons, in their study of the genesis and early urban layout, Polish researchers are forced to reconstruct city plans.

This method, also called the retrospective method, was most extensively developed by Koter. By analogy to the covert geological map, he introduced the concept of covert city map, which he equates with the contemporary city plan. Then, as in a geological procedure, he 'removes' the latest settlement layer, i.e. elements proven by other sources (cartography, iconography and written documents) to have been created in the latest period (e.g. in the 20th or 19th century). At the same time, we complement the image we discover with elements we know existed but got covered up by later regulations. This way, after removing this urban 'Cenozoic', we reveal an overt urban map, e.g. for the 18th century. In a similar manner, by removing subsequent settlement layers, we can approximately reconstruct the urban 'Archean', i.e. the plan dating back to the charter, or even pre-charter times. Similarly to index fossils which play a significant role in dating the layers in historical geology, index monuments are important in urban morphology.

#### 4. CONCLUSIONS

Unfortunately, such well-developing disciplines as historical geography of urban and rural settlement, as well as historical morphology in the strict sense, have stagnated in recent years. The studies in settlement history and urban morphology for different regions of Poland have been incomplete and their scientific value is varied (cf. Kulesza, 2011). This translates to, *nolens volens*, a certain asymmetry of the subject matter, which is surely influenced by the uneven distribution of research interests in different regions of Poland. The same applies to the synthetic works concerning cities in individual regions. Various studies emphasize that some of them have not been discussed in more comprehensive studies on the subject, especially those tackling individual aspects of the development of Medieval cities, including such important ones as the analysis of their morphogen-

esis, spatial arrangements or development in various historical periods. This was, and probably still is, influenced (though to a lesser extent now) by the hardships stemming from the multidimensional character of research. The deficiencies in the source material, both written and cartographic, make many detailed analyzes hypothetical in nature. Hence the importance of retrogressive studies of spatial arrangements based on cartographic sources, confronted with the results of historical, archaeological and architectural-urban studies, that can facilitate finding the answers to the question concerning the oldest spatial form of Polish Medieval city and the conditions of its development, even though the problems of interest to us are often a very complex challenge, due to their interdisciplinary character.

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