

Stipendienbericht

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Der von Ihnen und von der Betreuerin/vom Betreuer unterschriebene Stipendienbericht (Tätigkeitsbericht, 1-2 Seiten) muss eingescannt und per E-Mail an das zuständige OeAD-Regionalbüro übermittelt werden, um die Auszahlung der letzten Stipendienrate zu erwirken. Bitte beachten Sie, dass bereits bezogene Stipendienraten zurückzuzahlen sind, falls der Stipendienbericht nicht vorgelegt wird!

Im Jahre 2020 mein einmonatiges Forschungsstipendium am Institut fuer Staedtebau der TU Wien habe ich dem Thema "Transformation von urbanen Identitäten in Zentraleuropa" gewidmet, womit ich meine langjaehrige Untersuchungen in diesem Bereich weiter entwickeln konnte. Besondere Aufmerksamkeit konnte ich s.g. Staedtischen, oder Urbanen Agraridentitaeten schenken, welche als folge der Expansion der Stadt in die umliegende laendliche Gebiete oder als die Folge der Zuwanderung von Laendlicher Bevoelkerung in die Staedte entsteht. Aber der Sinn von diesen Identitaeten fuer die Stadt und ihre Raeumliche Manifestation unterscheiden sich grundsaeztlich.

Wenn das Einschliessen von laendlichen Flaechen in die Urbane Strukturen von der Stadtbevoelkerung als Teil von neuen Öffentlichen Raeumen mit der Agrarpraegung betrachtet wird, interpretieren die gestriege Dorfbewohner aus unterschiedlichen Gebieten und Kulturen existierende urbane Bebauung auf ganz unterschiedliche Weise.

Als Folge von diesem OeAD_Stipendium ist der Artikel **IDENTITY OF THE RURAL AREA IN HISTORICAL CITIES** entstanden, welcher am Beispiel von solchen Staedten wie Wien, Rom, Florenz, Mailand, Krakau, Lemberg und Salzbur untersucht und verglichen wurde. Das wichtigste Ergebnis von dieser Arbeit ist die Entstehung des Konzeptes von s.g.Territorialen Pyramide der Stadt, mit der Hilfe von welcher die Phasen der staedtischen Entwicklung und der Agraridentitaeten analisiert und definiert sein koennen. Demnaechst erscheint diese Publikation im Springer_Verlag, was in Datenbanken von SCOPUS und Web of Science und indexiert sind. Aufgrund der Corona-Pandemie mußte ich meinen Forschungsaufenthalt am Forschungsbereich Städtebauder TU Wien frühzeitig abrechen und konnte meine Arbeit im Homeoffice in Lemberg fortsetzen.

Bestätigung durch

24. April 2020



(Ass.Prof.Dr. Andreas) HOFER

Datum, Unterschrift, Stempel des Instituts

Bestätigung durch

09.04.2020



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THE RURAL AREA IN HISTORICAL CITIES

Keywords:

historical cities, rural areas, territorial settlement pyramid.

Abstract.

Cities and urban structures could grow thanks to the intensive development of agriculture and the so-called agricultural revolution [Mumford 1989]. Historical cities have, therefore, always had a close relationship with agrarian areas and agrarian components of the internal structure of cities. The classification of the primary types of such urbanised agricultural areas and the investigation of the quantitative and qualitative dynamics of their growth based on cartographic sources resulted in the notion of the territorial settlement pyramid (TSP) together with a proposed method for building it. The TSP can be used to identify stages of the territorial development of cities and the relationship between urban and agricultural structures.

European historical cities and the development of cartography.

In the medieval period, urban municipalities gradually lost control over the system of dependent villages; the land is increasingly often owned by individuals; and the city is actually bound by the urban area and areas directly adjacent to it. One could venture that the city-state, perceived as a continuation of the urban traditions of the ancient classical period founded on land property, lost its import in the Middle Ages. During capitalism, the intensification of agriculture, growth of the industry, and exchanges lead to an increase in the number of non-agrarian population living mostly in cities. Analysing this process, scholars of the 19th century indicated that 'the process of urban-rural separation can also be perceived as the separation of the capital from land ownership, as the beginning of a separate functioning independent of land ownership or the growth of capital; the beginning of ownership based solely on work and exchange' [Cherkes 1992, p. 50].

Iconographic sources from the period offer insight into the location of both the city and its rural areas within a single urban entity. The structure of agricultural areas owned by residents of the city is presented in figures and marked separately from extensive farmland by graphic means. The first tome with views of European cities was published in the late 15th century (1493) as the *Nuremberg Chronicle* [Reske 2011]. The incunable by Hartmann Schedel features landscapes of 31 cities. The beginning of the practice of regular representation of European cities in iconographic and cartographic sources dates back to the 16th century. This period saw the publication of the world-famous *Cosmographia* by a Swiss humanist Sebastian Münster (1545) [Wessel 2004] containing descriptions of cities and the atlas of cities of the world *Civitates Orbis Terrarum* in six volumes by Georg Braun and Frans Hogenberg in Cologne in 1572 to 1612 [Fig. 1, Braun and Hogenberg 2011]. Apart from large tomes, albums and even single sheets with landscapes of individual cities were published. They became particularly popular in the 17th century. This centenary saw drawings of almost all historical cities in Europe.

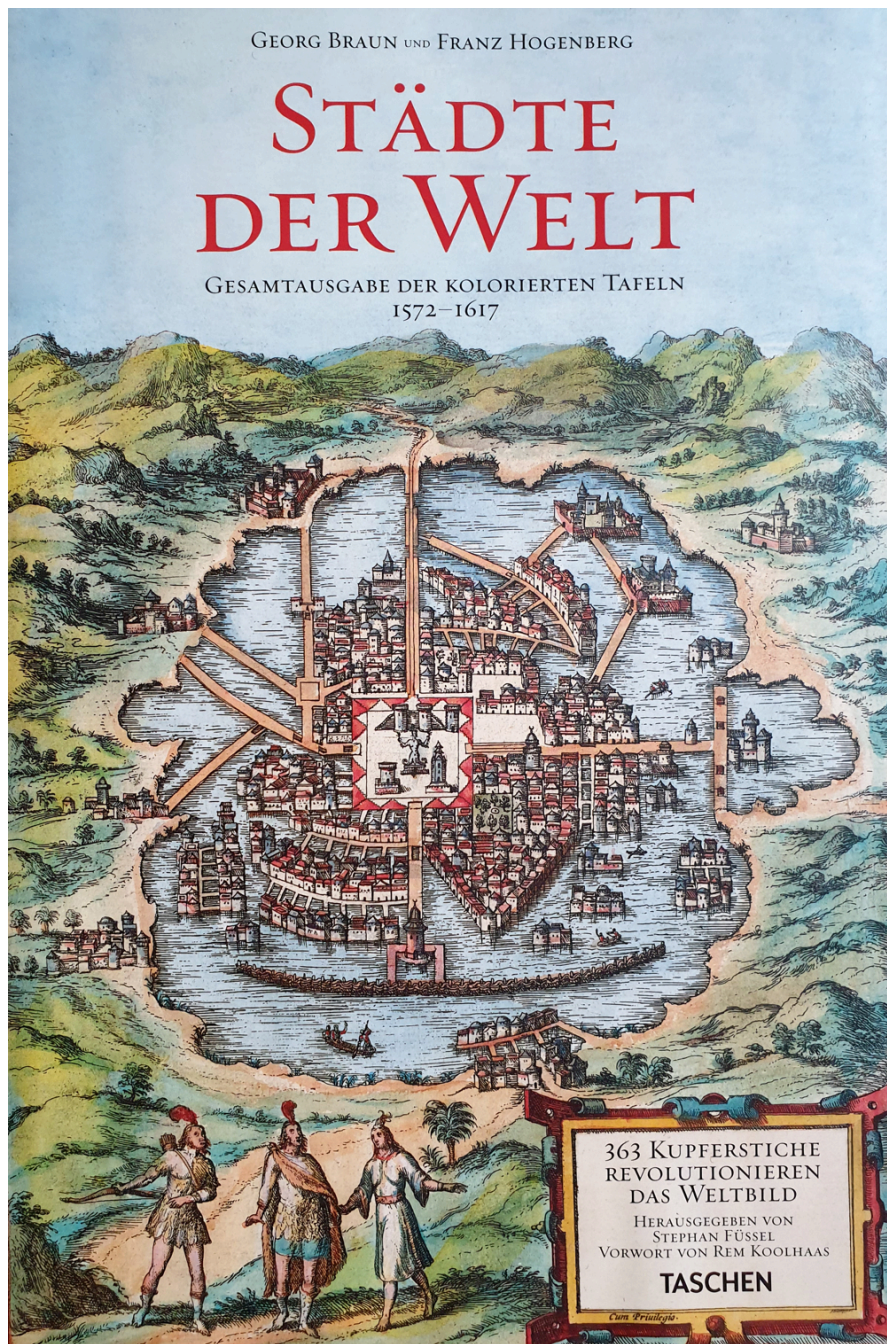


Fig. 1. The title of the first atlas of cities of the world ‘*Civitates Orbis Terrarium*’ written and edited by Georg Braun and Franz Hogenberg from 1572 to 1612 (Source: Braun and Hogenberg 2011).

Regardless of the excellency of such images of views and panoramas of 15th to 17th-century cities, it is not possible to base any quantitative measures of urban spatial structure on them. Most of these invaluable works of art reflect the personalities of their authors. In some cases, the artist strove to immortalise the urban solemnness of the core, the central part of the city. Sometimes they focused on the beauty of the natural landscape, or the abundance of fruit in gardens and orchards, always omitting some important details because of subjective character features.

The cartographic methods for producing city maps were improved at the end of the 17th century. Therefore, humanity gained numerous perfectly made, reliable, and clear maps in the 18th and 19th century [Fig. 2, Bogen and Thürleman 2009, p. 121]. An analysis of individual maps yielded detailed quantitative characteristics of agricultural areas in the urban spatial structure in the investigated time frame. The in-depth analysis involved 103 maps.



Fig. 2. The map of Rome by Giovanni Battista Falda, published by Giovanni Giacomo de Rossi in 1667. It is a perfect illustration of the presence of agricultural areas in the urban structure of Rome in the second half of the 17th century (Source: Bogen und Thürlemann 2009, p.120–128).

Urban and rural components of the city and the methods for their measuring.

The agrarian component of the spatial structure of the city was considered as a whole comprising four components: large agricultural land, allotment gardens owned by residents of the city, holiday cabin areas, and villas with allotted parcels of land. The surface area of urban zones was calculated using a 2x2 mm planimetric grid. As historical maps were made according to various scales, the square defined above is assumed the standard unit for calculations. All results are percentage values, where 100% is the total surface area of the city.

The issue of administrative and economic boundaries of the city has been discussed frequently. Some believed that economic boundaries of a locality stretch further than its administrative boundaries

(the immediate territorial and economic surroundings of the city). As the analysis in the current paper demonstrates, however, administrative boundaries of cities are always adjusted to their economic impact zones. The boundaries are constantly changing to encompass the largest possible territory of the urban community. This way, the city map produced at any moment in history reflects the best what people at the time understood as the city and its boundaries.

Analysis of maps of 17th to 19th-century cities revealed that their characteristic feature is their cyclic development. Each stage of the cycle (beginning-homoeostasis-end) has its dynamics between the city and agricultural areas. At first, the agricultural space dominates the urbanised space. During homoeostasis, the structure of agricultural and urbanised areas is balanced by large areas of housing developments with backyards. At the final stage of the cycle, developments displace agriculture so that gardens and holiday cabins of city residents are located outside the administrative boundaries of the city. Then, a next, similar cycle begins.

In the effort to determine quantitative characteristics of the agricultural component of the urban space, the authors attempted to encompass the broadest possible geographical extent of European cities. The paper focuses on the most developed cities on the continent as they are the best urban culture models in their respective countries and of their respective period. The investigated cities included Florence and Milan (Fig. 3), Rome, Berlin, Paris, Saint Petersburg, and Vienna (Fig. 4). The analysed maps of these cities were produced mostly in the 18th and the first half of the 19th century. The map of Saint Petersburg is dated to 1868. The analysed sources belong, therefore, to the period of active development of the capitalist system.

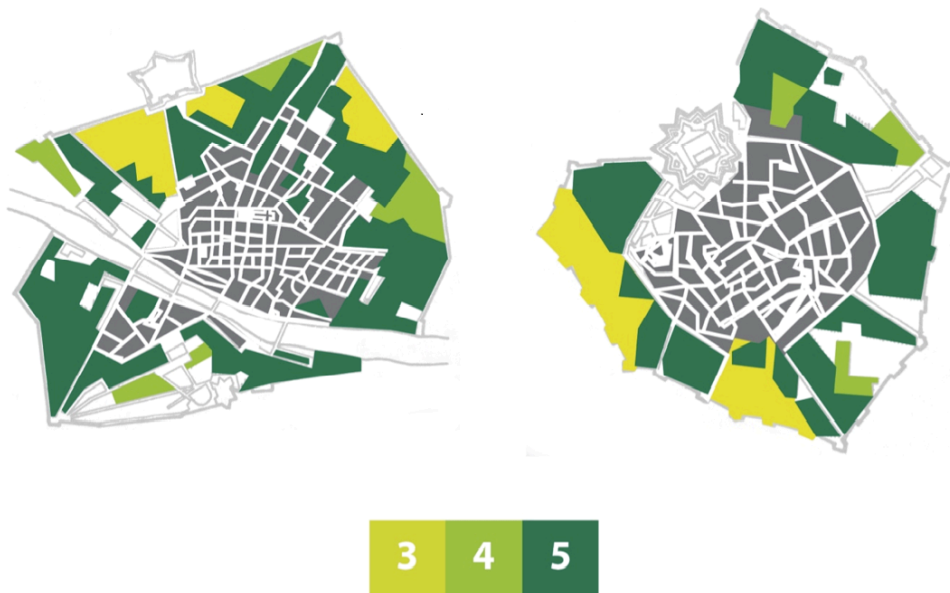


Fig. 3. The agricultural component in the urban planning structure of Florence (1) and Milan (2) in the mid-18th century: 3 – large agricultural land, 4 – garden plots, 5 – houses with adjacent gardens (Source: Own work based on *Cartes et Plans de quelques villes en Italie*. Library of the National Academy of Sciences of Ukraine in Lviv (Form. Ossolineum), Department of the Cartography, Inventory Number 7984-8000).

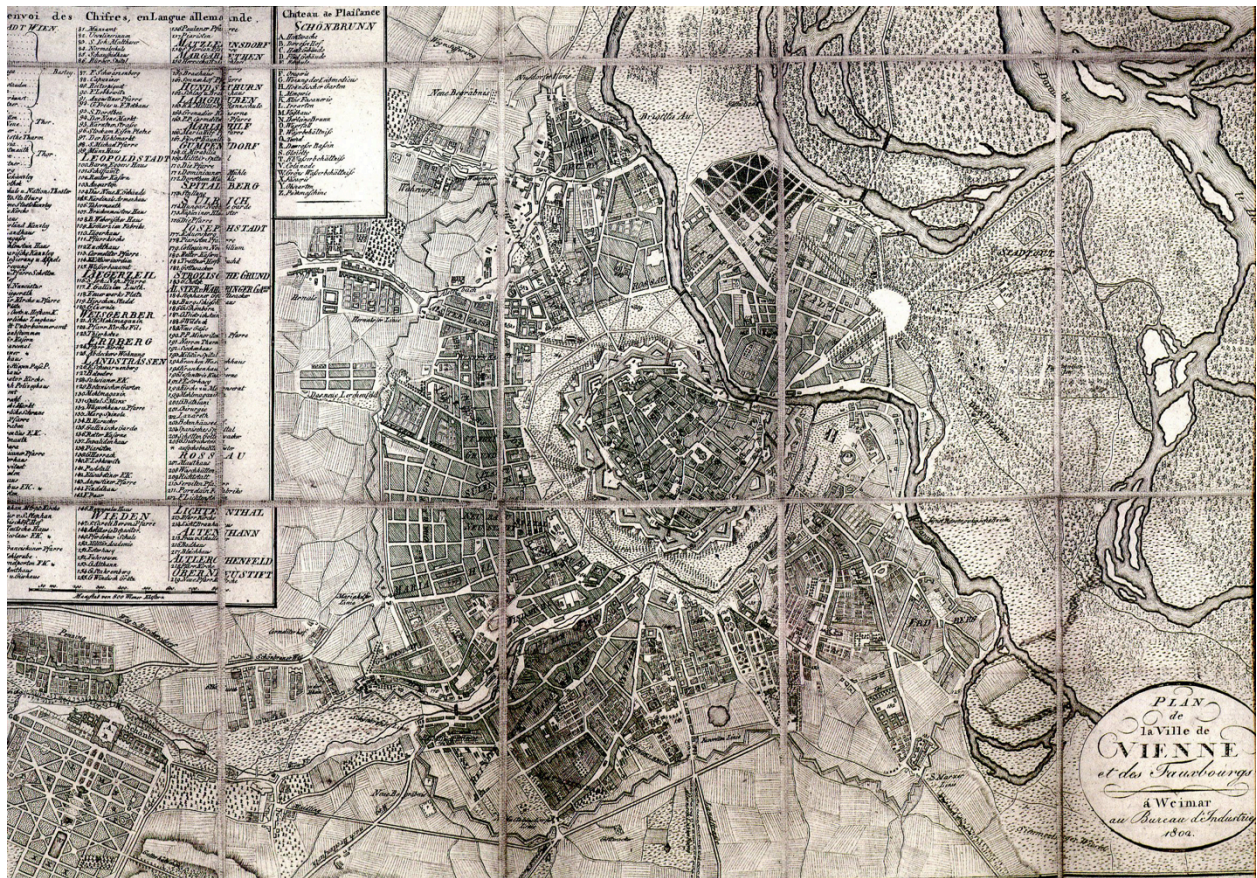


Fig. 4. The map of Vienna with its suburbs from 1802 showing a characteristic combination of urban and agricultural areas in a structure of a large European city in the early 19th century (Source: Schweizer 2010, p. 39).

The study shows that all these cities had the agricultural component regardless of their geographical location or social, economic, or national differences. The largest percentage of agricultural areas was identified within the boundaries of Berlin (55.35% of the total area of the city) and Rome (52.78%). Florence also demonstrated a high share of agricultural areas (45.27%). In none of the cities did the agricultural component occupy less than 30% of the surface area. Even in the new capital of the Russian Empire, Saint Petersburg, where the latest urban-planning ideas of the time were deployed, the share of agricultural areas was 32.41%.

The most characteristic element of the agricultural component were houses with adjacent backyard gardens (Florence, Milan, Berlin), even though it depended on the development cycle of the city and was variable. Saint Petersburg was, for example, already dominated by suburban garden plots, while Rome preferred agrarian villas, most likely in an attempt to stay true to its ancient traditions.

All this further backs the authors' understanding of the cyclical nature of city development (beginning-homoeostasis-end), where the agricultural component is a primary diagnostic. It is only its subcomponents that change, and its total value remains constant above 30% of the area of the city. Therefore, having identified the subcomponents of the agricultural component correctly, one can determine the specific stage of the city's development cycle.

Agricultural areas of cities provided not only food for their residents but aesthetic inspirations as well. When analysing historical gardens, an academic of the Russian Academy of Sciences, Dmitry Likhachov warned against 'overstating its practical importance and juxtaposing it with the aesthetic role of gardens. In the West, gardens, their "green offices", had large numbers of fruit-bearing trees and shrubs as well. Fruit-bearing was a fundamental part of garden aesthetics in every century. The fruit was considered just as beautiful as the flower with its aesthetically pleasing appearance and taste' [Likhachov 1982_1, p. 38–46].

The structure of maps of historical European cities exhibits a great diversity of garden plot organisation arrangement techniques. Apart from a general focus on the species and varieties of cultivated fruit and vegetables, the structure displays attention paid to the configuration of agricultural plots, their sizes, and planting arrangement. Urban gardening made use of various geometric drawings. They suggest that agricultural areas significantly affected the process of development of the urban environment [Cartes et Plans de quelques villes en Italie; Cherkes 1992, p. 57].

Plots surrounded by only low shrubbery made up groups. The groups were merged into larger blocks with paved paths inside. Rather often, the block had a small surface area dominated by a single tree. It was under the tree that plot owners gathered in line with the tradition of holding meetings under trees on central squares. Several blocks made up large clusters in cities with a single parcel of land as the starting point for the architectural and planning arrangement. Its configuration affected the outline of the general layout as well. Plots were of various shapes. Some were rectangular, triangular, trapezoidal or G-shaped. The actual practice of agricultural plot planning in historical cities was much broader and more varied, however.

An essential factor in shaping the aesthetically pleasing appearance of agricultural land was to determine the direction of planting as it could reinforce or demolish the composition; make parcels stand out or blur in with the background. The variety of leaves and fruit subjected to the strict geometry of the planning drawing created a particular world of urban agriculture elevating it to the level of the aesthetic domain. Such a complete love for the beauty of farm plants and perfected plant composition and arrangement architecture could be conceived only if the average resident exhibited a high level of artistic culture.

Retaining the Renaissance traditions, the working population of mid-18th century Italian cities was capable of introducing a single element into agricultural plot planning, which was a sublime sense of beauty. The harmonious atmosphere of historical cities nourished the same attitude towards items of everyday use and such objects as land parcels owned by residents of cities.

Still, the architectural organisation of agricultural land in Italian cities was not exceptional. It is present in the axonometric projection of Paris from 1734 known as the Turgot map of Paris [Plan de Paris 1734; Sarazin 2005]. It was popular in the development of 18th to 19th-century Russian cities as well. Regions, where urban agricultural areas were approached from the artistic angle, can be found in all Europe. Regrettably, this widespread embodiment of popular architectural and landscaping creativity based on agriculture has not been studied.

The rural element was a popular component of historical parks. Its detailed description can be found in a letter from Ivan Turgenev to Gustave Flaubert where he depicts his journey 'on avenues of an old rural city full of countryside smells, wild strawberries, sounds of sleepy birds, sunny light and shadow surrounded by two hundred dessiatins of cereal swaying in the wind. Marvellous! One inadvertently

halts and immerses in a kind of a state of immobility, solemnity, infinity, and stupidity that merges life, fundamental yearnings, and God' [Likhachov 1982_2, p. 40]. Landscape parks were a logical combination of the agricultural and environmental elements in a single urban whole.

We now return to the city to consider one of its most challenging problems of the interrelationship between residential developments and farmland areas owned by residents. As was mentioned before, the initial stage of historical city development was dominated by low multi-family residential buildings with adjacent gardens. Low developments were gradually displaced by multi-storey buildings, but the point of keeping gardens as close to the houses as possible was still respected. This resulted in districts with typical urban multi-storey buildings accompanied by small gardens (plots) in courtyards. Farming there was not cost-efficient. The next stage of the process of compaction of the urban structure eliminated such plots from residential districts. The result was very compact districts with mere patches of greenery left after thriving farming.

Nevertheless, residents of cities still needed agricultural products and areas. Hence spaces outside of city limits where they cultivated fruit and vegetables. This gradually led to whole zones with holiday cabins. The compact urban development induced an increase in suburban agricultural areas owned by residents of cities. There was now a gap between the agricultural and urban components that used to build a single urban whole.

The present historical analysis produced several basic types of urban interrelations between the residential development and areas farmed by residents of cities (Fig. 5). This suggests that the agricultural component is interrelated with all four basic types of residential developments. In the manor housing structure (lower level), it takes the form of a backyard of 600 to 1200 m². In the terraced housing structure, the surface of the plot is reduced to 100 to 600 m². In the low multi-storey development structure (three to five storeys), the plot surface is much smaller, from 10 to 100 m². Already for this type of development, some residents seek to compensate for the lack of agricultural area outside of their development. In the case of the three types of development, the home and plot are within the same territorial unit, but for the fourth type, with high multi-storey buildings or dense mid-rise buildings, the agricultural component is excluded from the structure. It is located outside of its boundaries (Fig. 5), which leads to allotment garden complexes. This way, the relationship between residential buildings and garden plots owned by residents of cities exists on two territorial and urban levels: 1 – within one territorial unit; 2 – when the territorial gap is created, and the agricultural and urbanised components are separated. In both cases, farming activities by residents of cities should be considered an important factor shaping the environment of not only the historical but also modern city.

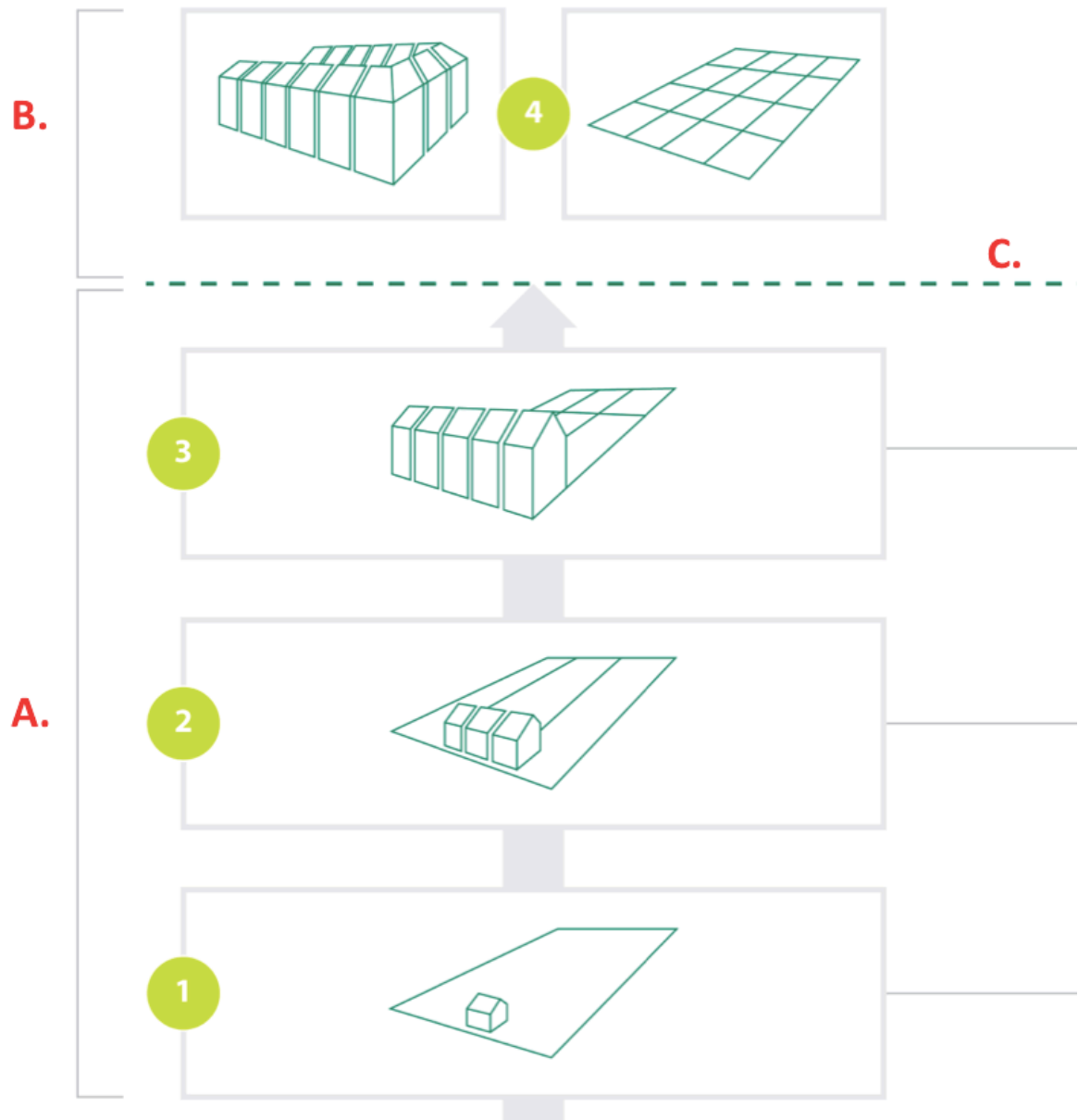


Fig. 5. The basic types of urban interrelations between the residential development and areas farmed by residents of cities: A – territorial unity, B – no territorial unity, C – urbanisation line, 1 – manor housing, 2 – block development with backyards, 3 – compact terraced development with small backyards, 4 – urbanised areas with allotment gardens outside of the area (Source: Own work).

Human settlements as the source and entry point for further development exist in specific surroundings. In their attempt to tame them, people face not an abstract space but a tangible landscape, which often sets its own rules and principles. In most cases, it is either natural areas (forest, steppe, coastal region) or agricultural land used by farmers. People come across both types of open space when creating their settlements. The development of any settlement is related to the natural or agricultural component of the landscape. This way, the general structure of the area of each settlement

can be divided into two major groups: the area related to the agricultural component and the area without the agricultural component (Fig. 6).

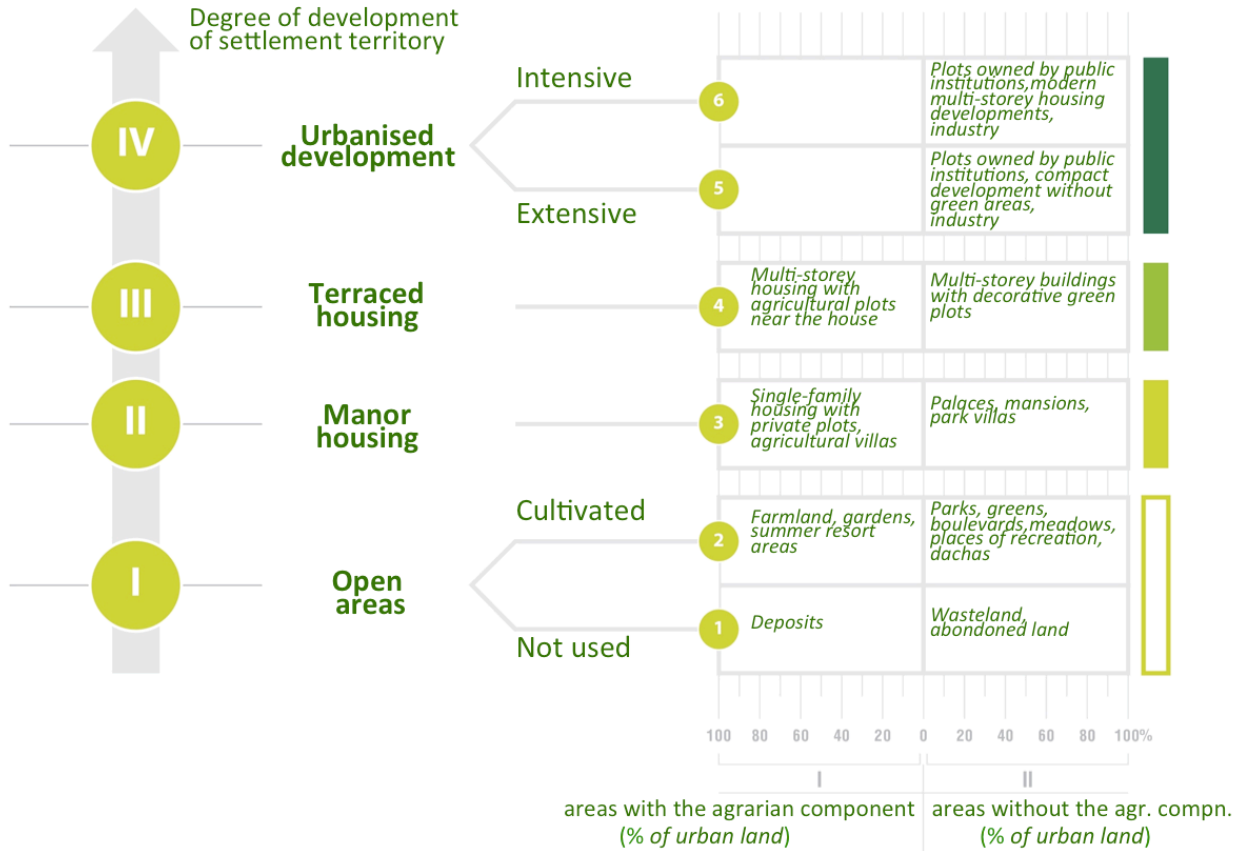


DIAGRAM OF TERRITORIAL SETTLEMENT PYRAMID

Fig. 6. The diagram of the territorial settlement pyramid (Source: Own work).

Classified according to the development intensity, the areas produce four levels of development: I — green areas; II — manor housing areas; III — low-rise development districts; IV — compact development districts (Fig. 6). This division stems from the natural, historical human activities regarding the organisation of the lifestyle and people's surroundings. It reflects the evolution of the activity from the exceptional dominance of the manor housing development in farming settlements to the multi-dimensional method of space formation found in cities. The series was based on historical analysis of the developmental stages of the residential environment as the primary form of the architectural transformation of open spaces in settlements.

One of the main properties of the proposed hierarchy of urban areas focusing on the level of urbanisation is the fact that its upper levels cannot be reduced to the lower levels. It is improbable, for example, for multi-storey housing to be demolished and replaced by neighbourhoods of single-family houses or for gardens to eliminate a historical residential district. At the same time, the upper levels of development grow at the expense of the ones below them. Single-family housing takes the place of agricultural land; multi-storey multi-family residential buildings replace single-family houses, etc. Urbanised development can use all three lower levels of the hierarchy. It can be prevented only by a

high social, cultural, religious, or environmental value of objects that would need to be demolished. This issue resembles the blood group compatibility problem in medicine; one group can be used to help all others and conversely, the fourth one can only use others. In the discussed case, all forms of development can grow at the expense of open areas, while compact (urbanised) developments grow using all others.

Another essential property of the urban area hierarchy is the binary nature of the basic types of territorial development. In other words, the simultaneous development in the park and landscape system and agricultural landscapes. For instance, at the level of open agricultural spaces, farmland and gardens in the agricultural frame of reference correspond to parks and green squares in the park and landscape frame of reference; at the level of single-family housing, single-family houses with agricultural plots correspond to houses with plots of decorative plants in the form of palaces, mansions, or park villas. The same trends can be identified for low-rise terraced housing (Fig. 6).

Areas with compact (urbanised) development are the peak of the transformation of the natural habitat. It can be broken down into two stages: a lower one with areas of extensive urbanised development and a higher one with areas of intensive urbanised development. The first stage is visible in densely populated quarters of historical cities, the other one, modern multi-storey residential districts. Note that the urbanised level of land development includes industrial premises and public buildings and structures. Can these areas be considered binary? First of all, every urbanised development, and its extensive form, in particular, strives to the maximum negation of the open space within its structure. It is reduced here to an essential existential need. Even if patches of vegetation remain, they are not enough, and a dynamic relationship with nature is replaced by passive contemplation.

The situation is improving in modern multi-storey residential districts. Park and landscape areas increase significantly, but there is still no communication with nature. Occasional farming activities by residents of cities around their homes should be considered a desired rather than an actual sign of the binarity. This way, the urbanised development excludes the agricultural component depriving the area of the binarity. It is, nevertheless, compensated for outside of its boundaries as holiday cabins and allotment gardens after it disappears from a specific urban residential unit (quarter, development). Hence, the deprivation of an area of the duality of the agricultural and park component contributes to ecological impoverishment of the urban environment.

Territorial settlement pyramid and its application in the determination of the urban development of the city.

The study resulted in the development of the territorial settlement pyramid (TSP) (Fig. 6). Its primary goal is to comprehensively determine the urban environment based on identified properties of the urban area hierarchy of coexisting agricultural and park components (depending on the degree of development and the binarity of the dualism). By putting the sizes of urban areas with the agricultural component on the left-hand side of the zero vertical line and representing sizes of areas without the component right to the line, a specific outline is created that is the territorial settlement pyramid. The sizes of areas used in the pyramid are expressed as the percentage of the total area of the city, which is 100%. The outlines of pyramids reflect a whole array of social, economic, and ecological urban

processes. An analysis of the properties of large sets of such pyramids can improve the objectivity of the assessment of the urban environment condition.

The present study analysed selected historical cities at their various stages of development using the territorial settlement pyramid method. Data regarding surface areas were obtained from city maps produced in the 18th and early 20th century. The following cities were investigated: Rome [Fig.7; Roma 1773; Roma 1862; Roma 1904], Vienna [Fig.7; Wien 1712; Wien 1797; Wien 1912], and Cracov [Fig.8; Kraków 1836; Krakau 1860; Kraków 1912]. The primary objective was to determine the nature of the change in the territorial settlement pyramid in time. The work focused particularly on the agricultural component in the cities. Let us consider the results of applying the territorial settlement pyramid to each of the cities.

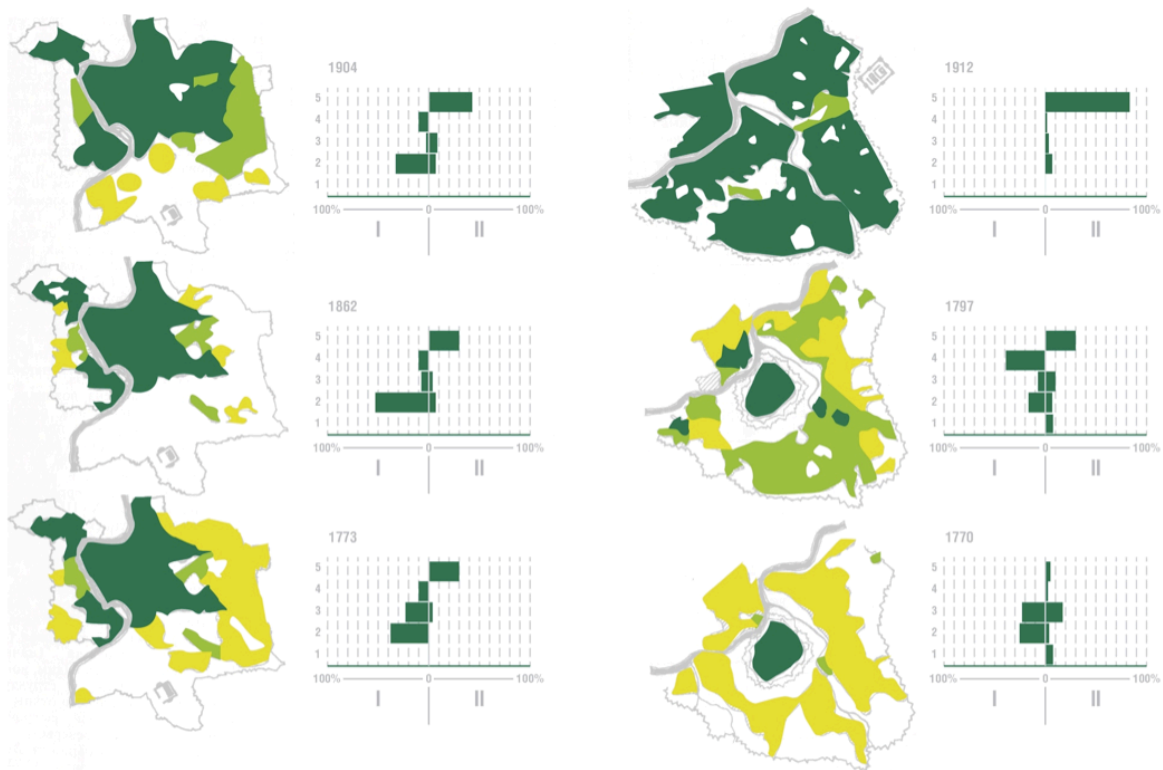


Fig. 7. The evolution of the territorial pyramid of Rome (1773–1904) and Vienna (1700–1912) during the development of their urban structures (Source: Own work based on Roma 1773; Roma 1862; Roma 1904; Wien 1712; Wien 1797; Wien 1912).

The 18th century Rome was a leading European capital. Its maps dated to that period show it within its ancient boundaries, up to the Aurelian Walls built in late third century AD. After the destruction in the 'Dark Ages', Rome's former greatness could not be restored quickly. The Coliseum was turned into gardens, fora, into pastures for goats. The medieval city of Rome developed from scratch. The Aurelian Walls contained agricultural areas of city residents that formed an urban whole with urbanised developments in the central part of the city. According to the map from 1773, the area of the agricultural component was 61.34% of the whole territory of Rome. Its size did not change after 89

years, which is demonstrated on the territorial pyramid for 1862 (Fig. 7), even though the growth of capitalistic system affected it visibly.

The number of small agricultural villas was significantly reduced in the 1862 pyramid compared to the 1773 situation, while the surface of large agricultural plots grew. It was due to the concentration of land and bankruptcy of small landowners. Rome was so great during its best ancient times that it could not grow to that size even in 1904 after 1500 years following its destruction. The Aurelian Walls easily fitted the Termini railway station with its infrastructure and new quarters of urbanised developments and still 'protected' over 40% of areas taken up by the agricultural component. All the three pyramids (from 1773, 1862, and 1904) demonstrate an uncompromising advantage of open agricultural spaces over park and landscape areas (47.55% vs 11.64%). To conclude, areas with the agricultural component were of crucial importance for the shaping of the general ecological situation of Rome in the period of the 18th to early 20th century.

The medieval Vienna was build in place of a former Roman military camp. The place grew. As the capital of the Habsburg Empire, the city became one of the primary hubs of the European culture for a long time. How did its territorial pyramid evolve from the 18th century to the early 20th century? At the beginning of the 18th century, Vienna managed to grow outside of the boundaries of its medieval cradle. It left undeveloped the esplanade often flooded by the Danube River and Wien River and began an active development within new defensive walls. This initial stage is depicted by the first territorial pyramid (the early 18th century) in Fig. 7. The fortifications added a large surface of open spaces and single-family houses into the structure of the city that became the primary reserve for future development. The agricultural component of Vienna at the time was 48.74%. Mansions, palaces, and private parks of Vienna's society occupied a significant area. They covered 16.75% of the total surface of the city. This initial stage of the new cycle of Vienna's development was, of course, prepared by the whole course of its past evolution.

The 1797 pyramid and diagram show the urbanisation process in the clearly limited space within the new city walls. The upper levels of the pyramid started to grow actively compared to the previous one. It is mainly the terraced housing that expands at the expense of agricultural land and single-family housing with agricultural plots. It remains in the agricultural landscape category for now and is similar to the quarters with small farming plots in the backyards of Paris discussed earlier. Still, the small agricultural plots are developed, and the terraced housing becomes extensively urbanised areas at the next stage of the city's development. The urban environment becomes wholly urbanised. According to the 1912 diagram, Vienna was unable to build its railway station within city walls as opposed to Rome. The agricultural component disappeared from the city, and the total number of open park and landscape spaces was about 7.85% of its territory. Even the Esplanada floodplains were drained and developed. It was the time of the cycle 'threshold' for the administrative boundaries of the cities at the time.

On the other hand, one could venture that there is no such state for the city as a whole. The territorial pyramid for Vienna in the early 18th century, restricted to its boundaries of the first defensive walls and the esplanade, is similar to the 1912 pyramid during the maximum urbanisation level. It would be a mistake to consider it explicitly as an objective and holistic description of the whole urban environment. From the ecological standpoint, the pyramid will always be balanced by a pyramid with more developed lower agricultural, park, and landscape levels that represent open spaces. At the same

time, the area of the agricultural component of the city will not be less than 25% of its total surface. This reasoning is supported by the territorial pyramid for early 18th century Vienna.

Cracov has always been a leader of the European urban culture. It assimilated the best of the urban heritage of the West and the East. Its territorial pyramids for 1836, 1860, and 1912 present the dynamics of changes in its urban environment during its another development cycle (Fig. 8).

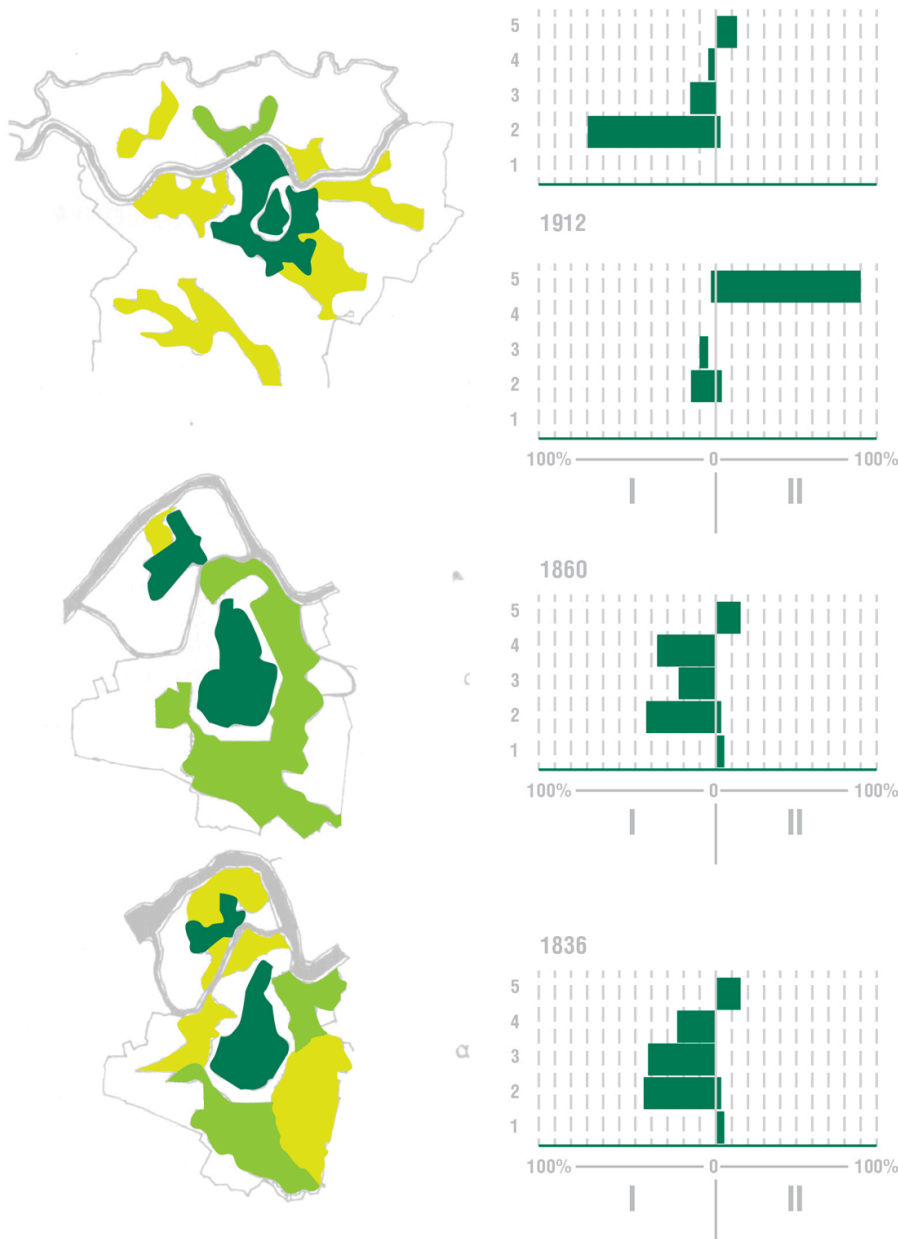


Fig. 8. The evolution of the territorial pyramid of Cracov (1836–1912) during the development of its urban structure (Source: Own work based on Kraków 1836; Krakau 1860; Kraków 1912).

The other 1912 pyramid shows Cracov in its new administrative boundaries at the beginning of its next evolutionary round. According to the figure, open spaces in the city were created mostly by agricultural land. It was also the main environmental contributor. Agrocoenoses clearly dominated biocoenoses here. There are many similarities between the territorial pyramids of Cracov and Vienna, although the former had more agricultural component than the capital of the Austro-Hungarian Empire. What is particularly interesting is the distribution of specific areas within the cities in 1912 as it was the time they both completed their developmental cycles and started new ones. The territorial pyramid of Vienna is shown only at the stage of the end of its evolutionary round when its urbanisation level was the greatest. It apparently repeats the similar pyramid of Cracov for the completed developmental cycle within its old administrative boundaries. A particular conventional nature of the structure and impossibility of objective existence of such a pyramid is conspicuous, however. A city as a whole cannot lose open spaces almost completely. In its current administrative boundaries, the city will always make up for lost space by absorbing new areas and assigning them the function of the open space missing in its internal urban structure. The growth of urban development and open space are always a kind of chain reaction the two opposite phases of which can be seen on the 1912 territorial pyramids of Cracov.

Conclusions

The study has demonstrated that the agricultural component has always occupied the fundamental role in the lives of residents and shaping of the urban structure not only in the Antiquity and Middle Ages but also in the time capitalist cities were born and grew. Modern cities exhibit similar developmental trends. The introduction and application of the territorial settlement pyramid (TSP) facilitate the identification of the stages of territorial development of cities. They demonstrate that an end of a stage of the urban evolution cycle within certain territorial boundaries and the maximum urbanisation of the areas within are always ecologically balanced by a zone where new open space is created outside of the city. When this happens, the administrative boundaries of the city are bound to change, starting a new developmental cycle. At the same time, the area of the agricultural component in the urban landscape usually does not fall below 25% of the total area of the city.

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