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THE STUDY OF THE NATURAL ENVIRONMENT AND THE SOCIO-ECONOMIC RELATIONS OF THE SURROUNDINGS OF PIŃCZÓW (1959–2000)

In the years 1959 and 1960 a comprehensive study of the natural environment in the district of Pińczów was undertaken upon the initiative and under the guidance of Jerzy Kondracki (see Fig. 1).¹ The representatives of various geographical disciplines conducted mapping simultaneously, being in touch and paying a special attention to the relations and dependencies of the elements considered with the remaining components of landscape. Both the employees of the Warsaw University and of the Institute of Geography of the Polish Academy of Sciences, took part in the study.

The detailed studies carried out on the scale of 1:25,000 concerned the selected fragments of the area, and with respect to the entire district, of the surface area of 547 sq. km, hydrography, types of abiotic environment and biogeographical maps were elaborated on the scale of 1:100,000. At the same time the team representing the Institute of Geography of the Polish Academy of Sciences elaborated a detailed map of land use in the district of Pińczów.

The objective of the studies conducted in the district of Pińczów was to develop the methodology of an integrated mapping of the natural environment in the upland landscape. In carrying out the work the experience was used gathered in the Masurian Lakeland, where three years before — also upon the initiative of Jerzy Kondracki — the very first comprehensive landscape-typological study in Poland had been carried out.²

The interest in the area surrounding Pińczów, motivated additionally by the exceptional differentiation of nature there and the beauty of the landscape, resulted in the study concerning, first of all, the differentiation of the plant cover and the surface relief. In the years 1960–1961 a detailed biogeographical research was carried out in the vicinity of the village of Młodzawy, to the South of Pińczów. Ten years later the potential natural vegetation

¹ Studia geograficzne w powiecie pińczowskim [Geographical studies on the Pińczów district; in Polish], 1966, *Prace Geogr. Inst. Geogr. PAN*, no. 47, Warszawa.

² Z badań środowiska geograficznego w powiecie mragowskim [On the studies of geographical environment in the district of Mragowo; in Polish], 1959, *Prace Geogr. Inst. Geogr. PAN*, no. 19, Warszawa.

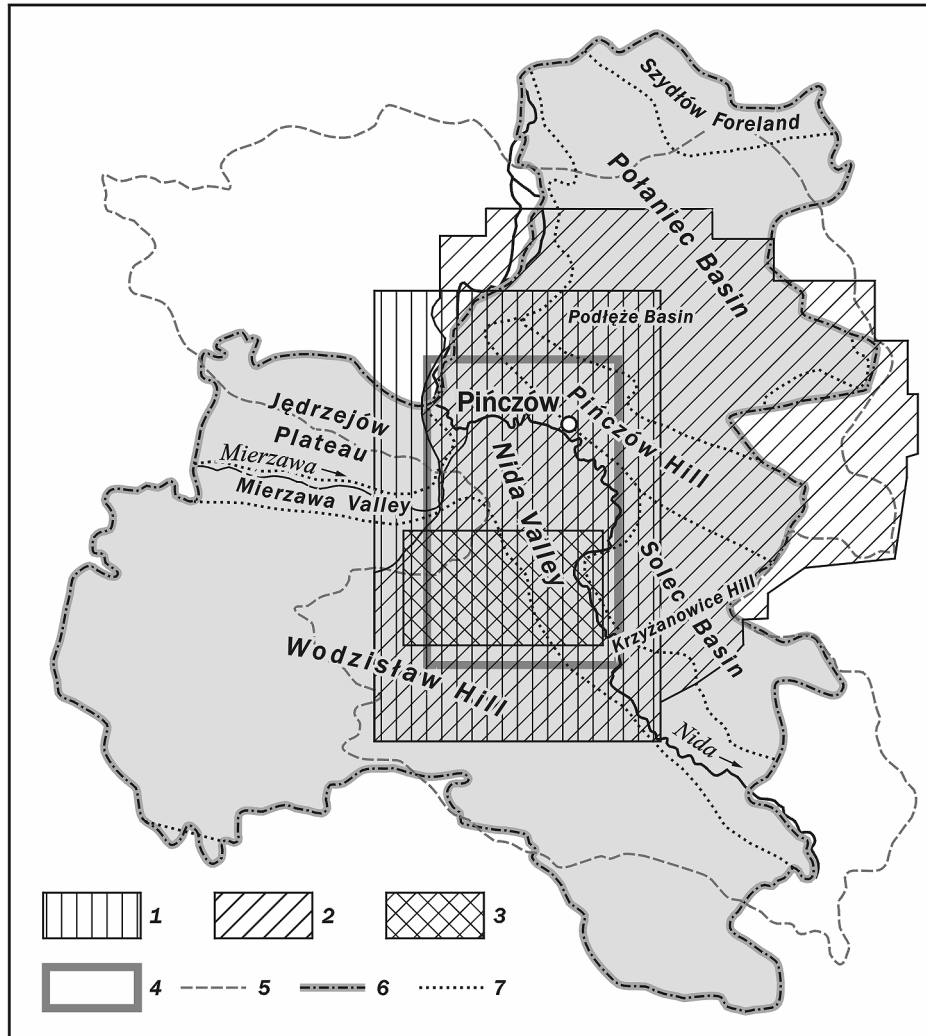


Fig. 1. Area of detailed study against the background of regional units of the Pińczów district: 1 — geomorphological mapping, 2 — hydrographic mapping, 3 — soil mapping, 4 — topo-climatic mapping, 5 — boundaries of the differential drainage basin for elaboration of water balance, 6 — boundaries of the district, 7 — boundaries of the morphological units.

in the surroundings of Pińczów was mapped. In 1983 the Institute of Geography of the Polish Academy of Sciences started the realisation of the team studies oriented at the cognition of the reaction of the plant cover to the anthropopressure. The results of these studies were published in 1994.³ The

³ Studium geobotaniczno-krajobrazowe okolic Pińczowa [Geo-botanical and landscape case-study in Pińczów areas; in Polish], 1994, *Dokumentacja Geograficzna IGiPZ PAN*, 1–2, Warszawa.

geomorphological studies concerned the dynamics of the Pińczów Hummock and the anthropogenic transformations of the relief. We should also mention the study of water conditions, soils, and the circulation of selected chemical elements in the waters and soils, as well as the inquiries into the geography of agriculture of the area. Moreover, the vicinity of Pińczów became the object of several M.A. diploma works, carried out at the Institute of Physico-Geographical Sciences of the Warsaw University.

The diversity of landscape and the variability of land use were the main reason of organisation of the field exercises for the geography students of the Warsaw University, in Pińczów and in the area around it. Initially, these exercises were carried out in the domain of hydrography and geomorphology. With time, they were expanded and turned into the practical exercises in general physical geography, encompassing the elements of geomorphology, hydrology, climatology, soil geography, and landscape geography. In the recent years this curriculum was broadened with the module of the socio-economic geography. The field exercises for the students were organised altogether 21 times, namely in the years 1959, 1960, 1966, 1982–1985, and 1988–2001. Side by side with the practical exercises within the basic course in geography, the area surrounding Pińczów was used for the training of the M.A. students coming from a variety of specialisation directions. This training would sometimes have the character of courses for small groups, but was most often conducted with single persons, preparing themselves to the M.A. diploma.

There were several cases, in which the field exercises in Pińczów included also the university staff and the students from the collaborating universities in Germany, Bulgaria, Russia, and Switzerland. The stays of the student groups from the University of Basel in Switzerland in the years 1996 and 1997 had the character of specially organised field exercises.

Thus, it can be concluded from the above that for more than 40 years — with small breaks — the studies have been conducted concerning the state and the dynamics of changes in the system of natural environment in the surroundings of Pińczów. A summary of the studies conducted recently in this area is contained in the volume entitled *Studia geograficzne Poniżnia Pińczowskiego* [Geographical studies in the vicinity of Pińczów; in Polish], published by our Faculty in 2000 in the framework of the series *Prace i Studia Geograficzne*, as its no. 27.

The volume starts with a broad report by I. Tsermegas, P. Szwarczewski, B. Woronko, K. Rociński and E. Rojan, devoted to the evolution and dynamics of relief of the surroundings of Pińczów. The paper describes the geological structure of the area, presents the spatial setting and the origins of the surface relief forms, and then characterises in a more detailed manner the relief of, consecutively, the pre-Quaternary, karst, glacial and fluvioglacial, fluvial, aeolic, and anthropogenic origin. Finally, the contemporary morphogenetic processes are presented, attention being paid to their intensity and significance in the formation of relief. The paper is illustrated by a map of geomorphology of the area (Fig. 2).

Explanations to the map of topoclimates (after J. Paszyński, modified)

Group of areas under agricultural use

Convex relief forms

- 1 . 1 southern slopes with gradients of more than 5 degrees
- 1 . 2 all the western and eastern slopes, as well as southern and northern slopes with gradients of less than 5 degrees
- 1 . 3 northern slopes with gradients of more than 5 degrees

Flat surfaces, elevated above the valley bottoms

- 2 . 1 areas with high thermal conductivity of the ground
- 2 . 2 areas with medium thermal conductivity of the ground
- 2 . 3 areas with low thermal conductivity of the ground

Concave relief forms

- 3 . 1 vast well aerated parts of valleys with meadow vegetation
- 3 . 2 higher parts of vast valleys with deeper groundwater table level
- 3 . 3 smaller valleys, ravines, forest clearings

Group of wooded areas

- 4 . 1 southern slopes with gradients of more than 5 degrees
- 4 . 2 flat areas, all the western and eastern slopes, as well as southern and northern slopes with gradients of less than 5 degrees
- 4 . 3 northern slopes with gradients of more than 5 degrees
- 4 . 4 valleys, depressions
- 4 . 5 forests on wet areas

Group of built-up areas

- 5 built-up areas

Group of areas associated with water bodies

- 6 surfaces of water reservoirs and adjacent areas

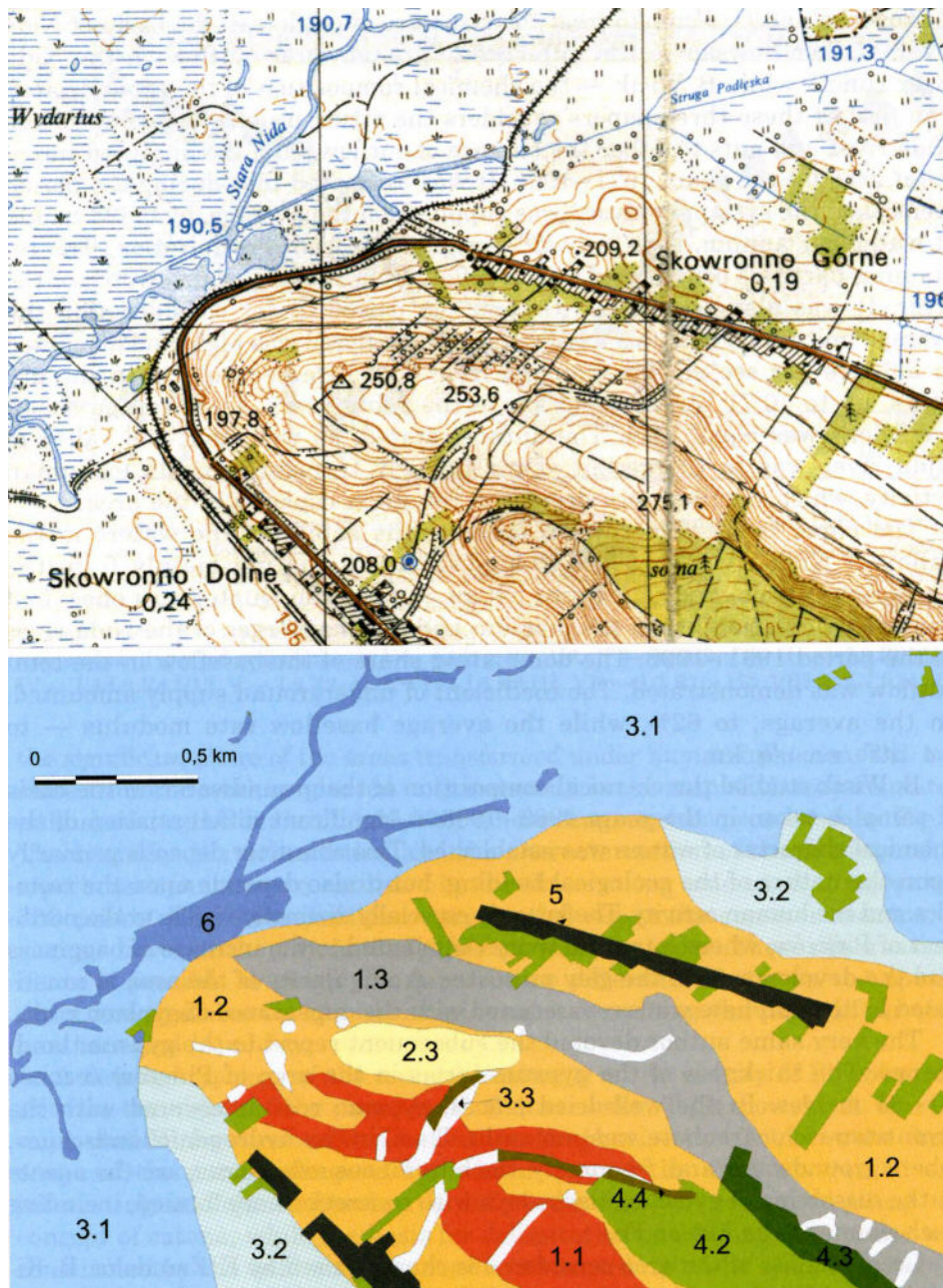


Fig. 3. Topoclimatic conditions of the north-western part of the Pińczów Hill (surroundings of the villages of Skowronno Dolne and Skowronno Górne).

The subsequent three reports are devoted to the hydrology of the region: B. Nowicka and D. Woronko treat the structure of outflow in the basin of Nida river, U. Somorowska — the influence of groundwater outflow on the Nida river runoff, while B. Wicik — the chemical composition of the groundwater. The first of these three papers considers the structure of the outflow of the Nida river and puts together the balance of outflow from the analysed catchment area for the years 1971–1998. It was estimated that during the period mentioned the system analysed was supplied, on the average, by 0.698 cu. km of water per annum, with only 22% originating from precipitation. The remaining part was constituted by the inflow from the upstream stretch of the river. It was also established that in the period under consideration the average unit runoff modulus from the system analysed was high, and amounted to 5.6 litre per sec.-sq. km, ranging from 3.22 litre/sec.-sq. km in the dry years, up to 10.71 litre/sec.-sq. km in the rainy years. The average runoff coefficient was equal 32%. The authors stated, as well, that the valley of Nida river was in the recent years strongly transformed due to human activity, which resulted in a decreased retention capacity of the area.

The paper by U. Somorowska presents the supply of the waters in the valley of Nida river with the groundwater, originating mainly from the Cretaceous levels, and to a lesser extent — from the Quaternary ones, and analyses the variability of the medium and low discharges of the Nida river in the period 1951–1998. The dominating share of the baseflow in the total outflow was demonstrated. The coefficient of underground supply amounted, on the average, to 62%, while the average baseflow rate modulus — to 3.4 litre/sec.-sq. km.

B. Wicik studied the chemical composition of the groundwater on the basis of samples taken in the years 1983–1993. A significant differentiation of the chemical character of waters was established. This character depends primarily upon the nature of the geological bedding, but it also depends upon the tectonics and the human activity. The latter is especially distinctly visible to the north-east of Pińczów, where human activity contributed to the increase of bogginess and the development of the gley processes. A singularity of the area is constituted by the sulphate waters, associated with the appearance of gypsum rocks.

The very same author devoted the subsequent report to the gypsum landscapes. The thickness of the gypsum series in the area of Pińczów reaches 30–35 metres. In the well-dried places, gypsum rock is covered with the strontium-rich carbonate waste mantle. Then, in the hydrogenic landscapes, where groundwater and, frequently, the bituminous substances, are the agents in the dissolving of gypsum, black clays with concretions are formed, including such elements as Mn or Fe.

Local climate of the area considered is characterised by E. Żmudzka, B. Kiścińska, and K. Olszewski. It was established that this area stands out in terms of differentiation of climatic conditions on a local scale. This results from the differentiated surface relief, the differentiation of geological bedding, the presence of important forest complexes and water surfaces, as well as from

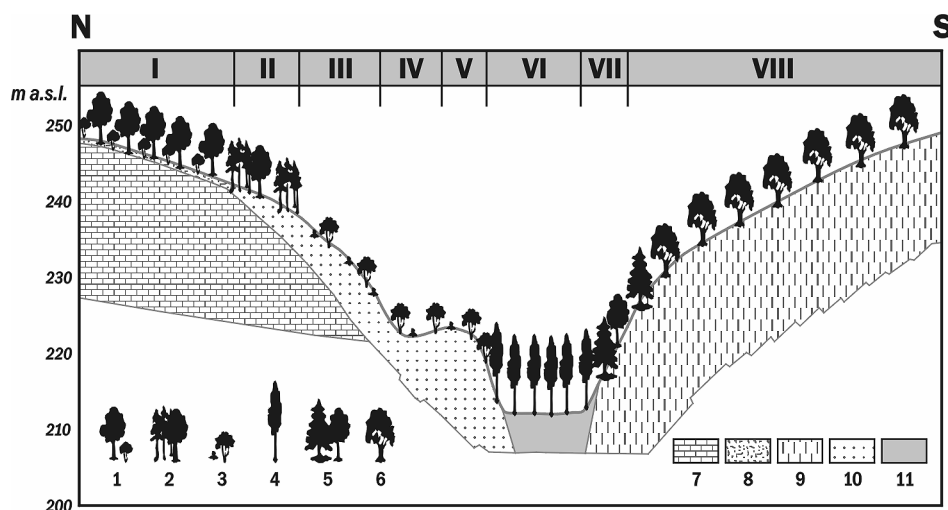


Fig. 4. Scheme of the landscape profile on the areas with loess bedding. Explanation: *Vegetation*: 1 — dry deciduous forest, 2 — mixed forest, 3 — clearing association with elements of stenothermal vegetation, 4 — wet elm-and-ash forest, 5 — dry deciduous forest with admixture of spruce plantings, 6 — oak forest. *Lithology*: 7 — Cretaceous marls, 8 — waste of the Cretaceous marls, 9 — typical loess formations, 10 — loess-like sandy formations, 11 — deluvial formations. *Types of geocomplexes*: I — L16z₂c.R9₁.U6, II — L9.R9₁.U3, III — L9.R9₃.U12, IV — L4/L9.R4.U12, V — L9.R9₃.U12, VI — L4.R3.U8, VII — L7.R10₃.U6, VIII — L7.R10₂.U5.

the significant share of the areas transformed under human influence. The outcome from the work conducted in this domain is the map of the topoclimates, published on the scale of 1:25,000, whose fragment is presented in Fig. 3. The basis for the delimitation and the characterisation of the distinguished topoclimatic units was constituted by the observations conducted at more than 300 points. These observations were carried out in the summer seasons, at various times of the day, and at different weather types. These observations made it possible to grasp the quantitative differences between the spatial units and to elaborate the isarithmic maps, describing the fields of air temperature and humidity.

A detailed typology of the natural landscape of the vicinity of Pińczów constitutes the object of the paper by K. Ostaszewska, T. Grabowski, A. Harasimiuk and W. Lewandowski. The authors emphasise the fact that the landscape of the surroundings of Pińczów is among the most diversified and interesting in Poland. Landscape differentiation was presented using the concept of catena, while the basis for delimitation of the landscape units was constituted by the field mapping conducted according to the scale of 1:10,000, complemented with drillings and soil outcrops. The structure of the landscape of the area under elaboration is illustrated with the trans-sections characterising the fundamental settings of the natural conditions, including the landscape profile for the terrain with the loess bedding (Fig. 4).

The problem of spatial limits of natural units in various types of landscape is dealt with by S. Kulczyk. She conducted a detailed analysis of the boundaries of geocomplexes, previously distinguished within the area, concentrating on the following features: density, sinuosity, contrast, and uniqueness. She concludes that the differentiation of the types of boundaries between the units appropriately reflects the landscape differentiation of the area studied.

The previously mentioned collaboration with the University of Basel in Switzerland resulted in the report concerning the assessment of landscape in southern Poland (M. Potschin, Ch. Waffenschmidt, F. Weisser). The way of proceeding applied was conform to the *Guidelines for Assessing the Capacity of the Landscape Budget*.⁴ Due to the shortage of time, it was not possible to consider all the functions and potentials of the landscape budget. The investigation had to be limited to erodibility and to the biotic yield potential. The result of the spatial evaluation is constituted by a series of maps. With the aid of these maps, conclusions of importance for the landscape planning and for the projects associated with the land-use changes could be drawn.

The object of interest of P. Śleszyński is, on the other hand, constituted by the evaluation of the aesthetic value of landscape. The evaluation was conducted with reference to the surface of geocomplexes, distinguished on the basis of the relief and the surface cover. Independently, the reach and the attractiveness of the views were assessed, and the survey study was carried out on the perception of landscape. The conclusions drawn were addressed at the needs related to planning of the development of tourism on the area in question.

The subsequent paper, by A. Krzymowska-Kostrowicka, presents the results of studies of this author on the utility of the natural environment of the surroundings of Pińczów for tourism and recreation. The utility was considered with reference to the types of habitats. For each of them, the abiotic conditions, the natural and the replacement vegetation, and the possibilities for recreation activities were presented. Such characterisation concerns nine types of habitats dominating in the vicinity of Pińczów.

The volume here outlined closes with the article by M. Durydiwka, M. Grochowski and S. Osiński, concerning the structural transformations of rural areas. The study reported concerned the rural settlement system, the internal characteristics of agriculture, and the technical infrastructure of the farms. The authors documented the economic hardships of the inhabitants of rural areas of the region in question. They demonstrated that job creation has the fundamental significance for the region, since it can lead to the decreased nominal employment in farming, and the deployment of non-agricultural activity within the farms. It is also indicated in the paper that the nature-

⁴ Marks R., Müller M.J., Leser H., Klink H.-J. (eds.), 1989, Anleitung zur Bewertung des Leistungsvermögens des Landschaftshaushaltes (BA LVL), *Forschungen zur deutschen Landeskunde*, 229, Trier.

based attractiveness of the surroundings of Pińczów should become the prerequisite for the development of rural tourism, including agrotourism.

The volume here commented upon presents a rare instance of the long-term studies conducted on the same area, simultaneously and in a collaborative setting. It appeared appropriate to us to provide information on these studies also because they constitute a good example for the association of the research process with teaching, and for the use made of the teaching of students in gaining a deeper cognition of the structure and functioning of the area in question.