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THE STATE AND PROSPECTS OF RESEARCH INTO GLASSMAKING IN POLAND IN THE EARLY AND LATE MIDDLE AGES. AN OUTLINE

The beginnings of glass production in the Polish lands evidenced by archaeological findings may be regarded to date back to the 9th century¹ or to even earlier times. For the remains of the most ancient glass factory ever found in Poland, uncovered during excavations carried out at Wzgórze Zamkowe (The Castle Hill) in Szczecin, are believed to date back to that time (M. Dekówna 1980, pp. 265—270). The subsequent centuries of the early Middle Ages saw emergence of more factories which manufactured variety of glassware and different kinds of glass that were used to coat building ceramics (J. Olczak 1968). The locations of those factories indicate the existence of three major regions of glass production located in three districts of the country being the principle ones in respect of their social, economic and political importance. They were:

1. the most ancient 9-century-old region of Pomerania (being actually the seaside region) with factories in Szczecin, Wolin, and in all likelihood, Gdańsk (J. Olczak, E. Jasiewiczowa 1963; J. Olczak 1968, pp. 18—57, 166—176; M. Dekówna 1980, pp. 199—339);

2. the 10-century-old region of Silesia with factories in Niemcza Śląska, Opole and Wrocław (this last city had also a glassmakers' settlement) (J. Kaźmierczyk 1968a, pp. 240—241; 1970, pp. 180—216; J. Olczak 1968, pp. 57—79, 148, 166);²

3. the 11-century-old region of Great Poland with factories in Kruszwica and Międzyrzecz Wielkopolski (dating back to the close of the early Middle Ages and the beginning of the late Middle Ages), and most probably, Gniezno (J. Olczak 1960, pp. 125—133; 1968, pp. 79—148, 176—181).

The discoveries of those factories made in the majority of cases in the early fifties of the present century became the basis of the development of multidirectional research into production units (factories) at first, and later on early-medieval glass in general (J. Olczak 1965, pp. 309—328). One might propose the following division of the research into three

frequently overlapping categories: 1. the descriptive /analytical, 2. of studies on technology and production methods, 3. of studies on the socio-organizational and economic aspects of production.

The first category comprises studies on different types of glassware examined in the bearings of typology, technology and techniques of production, utilization and origins (J. Żak 1957; J. Olczak 1959a; A. Chmielowska 1960; K. Dąbrowski 1961; M. Dekówna 1962; J. Olczak, E. Jasiewiczowa 1963; M. Dekówna 1970; O. Lipińska 1973).³ The second category of research is marked by a relatively high degree of novelty for in studies on complex processes of glassmaking, its technology and techniques of forming products some of the methods belonging to the realm of technical and natural sciences have successfully been employed often in collaboration with representatives of those disciplines (J. Olczak 1959b; J. Olczak, J. Shchapova 1961; M. A. Biezborodov, J. Olczak 1964; M. Dekówna, A. Szymański 1971; M. Dekówna 1980).

Not only have studies on the technological aspect of glassmaking enriched the research machine of early-medieval archaeology, but also led to general intensification of studies on the history of glass in Poland.

The socio-economic and organizational aspects of glassmaking (the third category of research) have received less attention due to the material nature of any archaeological findings which, in turn, are the sole source of data for archaeological studies. For that material nature reflects but indirectly some of the aspects of non-material activities of man.

A comparative analysis of the problem led to the construction of a hypothesis on the question of the position and the role of glassmaking in the contemporary economic system, and on the question of demand and disposal of glassware and glazed ceramics. Thus, glassmaking was included in the class of highly specialized, so-called luxurious crafts, operating in two different socio-economic structures: a. within the framework of early-urban, and later urban economy, and b. within the framework of church economy as a monastery craft. This division indirectly implies the consumer as well as the form of disposal of production; on the one hand there was a lay consumer who purchased glassware through a merchant (sometimes it was the manufacturer — the glassmaker himself), and, on the other hand, there was the Church that set up its own factories to produce window glass, stained glass (being the main item), glazed building ceramics and perhaps marginally glass vessels for its newly founded temples (J. Olczak 1968, p. 227; J. Kaźmierczyk 1970, pp. 211—216; J. Olczak 1972, pp. 187—194).

In addition, an endeavour was made to find an answer to the extremely important question of the origins of glassmaking know-how, a problem involving numerous aspects, that belongs to the class of the particularly complex and difficult issues both from the methodological point of view

and in terms of substance. This explains why the proposed solutions have but the character of tentative hypotheses to be verified in the course of research.

Therefore, it is now assumed that the knowledge of glassmaking and forming products was brought by glassmakers coming most probably from several different western and eastern glassmaking centres of the contemporary Europe (M. Dekówna 1966, pp. 116—128; J. Olczak 1970, pp. 219—230).

More or less simultaneously with those fragmentary studies, and often using their findings, an attempt was made to explore the problem of glassmaking in early-medieval Poland comprehensively, with the main emphasis on the technical, organizational and technological aspects of production (J. Olczak 1968). This endeavour, for all its hypothetical and disputable ideas (E. Ostrowska 1973; cf. J. Olczak 1973; M. Dekówna 1980, pp. 288—290, 296—298, 303), to all appearances became an indirect stimulus to further, even more penetrating and detailed as well as methodologically mature, research. An excellent example of this is the recently published *Glass in Early-Medieval Europe*, the extensive work of substantial methodological value, containing a number of novel and unconventional assertions and hypotheses, inter alia respecting also early-medieval glassmaking in the Polish lands (M. Dekówna 1980).

On the basis of the above-presented brief recapitulation of the state of research into early-medieval glassmaking in Poland, one might advance the view that the knowledge of it is satisfying, though on some detailed questions too vague, which however is the consequence of the existence of obvious source-related determinants. Hence the need for continuing multidirectional studies with the extensive use of the modern research methods, mainly the physico-chemical ones.⁴

One of the major research lines reaching beyond the field of glassmaking as such is the problem of the three previously identified regions of glass production: Pomerania, Silesia and Great Poland. Among the specific questions to be studied are: a. the genesis of the regionalization of glass production, b. the existence of differences and technological connections between the regions and also between individual factories within each region, c. the degree to which the local and external demand for glassware and glazed ceramics was met by local production. Another, no less vital research line to be pursued, is the question of establishing a more precise chronology of individual factories, and most of all, the identification of the actual periods of their operation. For while our knowledge regarding their origins is rather good, we still do not know all the dates and reasons of their closures.

The above-mentioned problems show a close relationship with the very complex issue of the internal diffusion of glass production know-how on Polish territories. For the question is whether the emergence of the factories

was encouraged exclusively by external stimuli or whether some of them (the later and the latest ones) were offshoots of the native glassmaking tradition.

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In the context of the whole history of glassmaking in Poland, the early-medieval period, being undoubtedly an important one as it brought a new original kind of production into the civilizational achievements of the Polish lands, was the prologue to its further history. It was however the prologue that made us formulate the basic questions for explaining and understanding the successive stages of glassmaking development in the subsequent centuries. Among those questions should be those that have not been raised so far, as well as those to which unambiguous and reliable answers have not been found, namely:

1. Was early-medieval glass production a lasting contribution to the development of the technological thought and to the productive tradition, or was it merely an episode that did not affect the subsequent history of this branch of production in Poland?

2. May the period be regarded as the origin of late-medieval and modern glass production and to what degree, if at all, was the technological experience of previous ages drawn upon?

3. What were the real causes of organizational changes and, consequently, of differences in the spatial distribution of glassmaking centres in the early versus late Middle Ages? The reason to ask this question is our knowledge that early-medieval factories operated exclusively in the major centres of the contemporary economic life: castle-towns or early-urban settlements, whereas late-medieval ones were usually located in the forests (A. Wyrobisz 1966, pp. 243—244; 1968, p. 11; W. Gluziński 1974, pp. 5—8).

The possibility of providing answers to these questions is determined by the present state of our knowledge about late-medieval glassmaking (the period from the second half of the 13th up to the 15th century), which however, unlike the knowledge of early-medieval glassmaking, is highly unsatisfactory for we know little about glassworks from that period. Fragmentary research by historians based on laconic and quite frequently ambiguous hints scattered in different records, enabled merely a very general sketching of the geographical distribution of glassworks on the territory of Poland (M. Bogucka 1962, pp. 154—156; A. Wyrobisz 1968, pp. 16—28, 38; W. Gluziński 1974, pp. 4—21; M. Grzegorz 1987). The oldest centre of glass production with a relatively largest number of glassworks which are now believed to have operated in the second half of the 13th and the subsequent centuries was reported in Silesia. Some of those glassworks have been localized but only one of them was uncovered

during excavations (Piechowice, the end of the 13th or the beginning of the 14th century; W. Gluziński 1966). Another cluster of glassworks also quite numerous though not as old as the Silesian one, dating back to the first half of the 14th century, was reported in the region of Little Poland. In the North, in the environs of Gdańsk, more than a dozen glassworks dating back to the end of the 14th or the beginning of the 15th century were identified. The available knowledge of glassmaking in late-medieval Great Poland is scarce. Apart from the object near Poznań that is tentatively believed to be a glassworks dating back to the end of the 13th century, and a 13th or 14th century workshop in Międzyrzecz (Great Poland) which in all likelihood processed glass (manufactured jewellery; J. Olczak 1957; 1960), the proper development of glassworks in the region might have taken place only at the end of the 15th century which, however, seems very unlikely.

The above knowledge, although undoubtedly important, covers only a relatively narrow range of facts pertaining to medieval glassworks reported in written accounts; what is missing is all the essential information on materials and methods of production. Thus the basic problems of late-medieval glassmaking, including in the first place the whole of the technical/productive and organizational aspects of production and its size, remain unresolved. Consequently, we do not know to what degree the increasing demand for articles made of glass, the result of a general civilizational advancement (window panes, tableware, storage of liquids, medical care), was met by domestic glass production and respectively, by imports. The few opinions on some of these questions advanced in the subject's literature are usually based on either comparative materials from other areas or those regarding the later stages of development of glassworks in Poland which have more comprehensive written evidence (Z. Kamińska 1974, pp. 44—74). Our knowledge concerning the scope of usage of glass in late-medieval Poland is somewhat better yet also unsatisfactory. We know of only some of the domains in which glass was used; we know nothing of its role and importance. Indeed many a time extreme views have been expressed, either overestimating or depreciating the significance of glass in the overall culture of those times; they were not however supported by detailed analytical studies.

On the basis of past few descriptions of mainly small collections of samples of glass obtained during excavations, at least two spheres of life where glass was becoming increasingly indispensable and irreplaceable material might be distinguished (J. Olczak 1960; S. Ciepiela 1967; 1968; 1972; Z. Kamińska 1974, pp. 44—74).⁵ In the first place, in consequence of development of brick architecture, especially sacral buildings, it became necessary to install panes in large window openings that let daylight in, and at the same time protected building's interior from the harmful

effects of weather. Presumably at first they were installed in the major temples, similarly to stained-glass panels preserved up to the present time in several structures in Cracow, Toruń and Włocławek. Towards the end of the late Middle Ages small panes, usually made of glass of inferior quality, began to appear among the glass outfit of different provincial churches.

As far as glazing secular buildings is concerned, archaeological findings cast rather dim light. We can only presume that in all likelihood residences such as magnates' houses had glazed windows.

Tableware was another important example of application of glass in late-medieval Poland. Glass, due to its aesthetic and practical qualities, had long been used for the production of vessels that served different purposes and tableware was its relatively most frequent application, mainly because it could easily be kept clean. Although glass utensils have been preserved mostly in the form of small fragments which are not very numerous among archaeological findings (reported in publications) from the territory of Poland, they indicate however a considerable variety of shapes and types of glassware used in those times. Some of them are characterized by a relatively high artistic quality similar to that of analogous samples widespread in Western Europe as well as in Bohemia and Moravia. This might be seen as an indirect indication of the fact that the users of glassware were of different social status. This guess is supported up by "the geography" of the sites where glassware has been found, as it has been discovered not only in the major medieval centres of Poland's socio-economic life but also in places quite distant from them. There was one more secondary field in which glass was used in different periods, that ought to be mentioned here: jewellery. There must have been demand for it in the Polish lands in the late Middle Ages. It is evidenced, besides the relatively few findings of beads and rings, by the discovery of the above-mentioned workshop at Międzyrzecz Wielkopolski that manufactured that kind of embellishments.

There is no doubt that the scope of knowledge of glass production and the scale of utilization of glass in late-medieval Poland as presented in this work do not represent sufficient basis for answering the three questions that we have set on the genetic links between early and late-medieval glassmaking. Thus, as we are confronted with the situation when, on the one hand the archaeological sources fall short of our expectations both in respect of quantity of the samples available and, most of all, due to their value and quality, on the other hand the written evidence whose amount may hardly increase provides no hints on those questions, the obtaining of new archaeological sources seems to be the only reasonable solution. And, as the questions concern mainly different aspects of production,

providing answers to them might only be possible through archaeological exploration of the former sites of production, that is glassworks, for glassworks (their remains uncovered during excavations) represent an irreplaceable source of knowledge about the overall production processes, mainly because they are objective in their material shape, and when evaluated by a researcher, they are subject to verification with the use of verifiable analytical methods (eg. chemical, spectral, petrographic and others). Depending upon the state in which they have been preserved, they enable the reconstruction of the spatial organization of glassworks, i.e., their size, their premises, and their equipment (the number and types of furnaces, bowls and tools), whereas the remains of production such as raw-materials agglomerates, the congealed masses of glass from the different stages of melting, clinkers, half-finished products, waste, defective products and finished products reflect all the phases of glass production. Through the use of appropriate analytical, humanistic and technological measures we can find out about both the details of production processes, and also about technological rules, which in turn leads us to the knowledge of glassmakers' know-how and their abilities, and finally of the size and range of glass production. A very essential feature of glassworks unearthed during excavations is the strictly defined place of their location in the given area, that is their connection with various close and distant objects of the natural environment, being their source of raw materials supply (including timber = ashes = potash, sand, the fuels, clay = the bowls, water), it is also the possibility of identifying the period of their operation on the basis of a chronological analysis of the items they manufactured as well as other objects of daily use coming from the same source (W. Gluziński 1966; M. Mucha 1979, pp. 181—199; 1984, pp. 92—113; J. Olczak 1984a, pp. 57—58; M. Rubnikowicz 1984b, pp. 152—155).

The cognitive scope of this "model" research procedure, whose foundation is archaeological exploration of late-medieval glassworks (dating back mostly to the second half of the 13th or 14th centuries) generally overlaps the knowledge we have about production aspects of early-medieval glassmaking. Thus those who enter upon comparative studies on the elements and structures of glass production in the early and late Middle Ages, in compliance with all the principles of the comparative method, might arrive at answers to the above formulated questions about the existence and character of the relationships between them.

With the view of putting this research model into practice, a detailed research programme has been developed in the recent years that is being successfully pursued in north-western Poland⁶ (in the regions of Pomerania, Great Poland; M. Mucha 1984; J. Olczak 1984a pp. 57—63; 1984b, pp. 146—149; M. Rubnikowicz 1984a; B. Stolpiak 1984). On the basis of the previously attempted rare studies on glass production in eastern Great

Poland (M. Mucha 1979), in Lower Silesia (W. Gluziński 1966) and in central Poland (S. Ciepiela, E. Kierzkowska, A. Szymański 1965), a relatively simple, though very time and labour consuming, procedure has been developed. It involves two principal kinds of operations: 1. "arm-chair" research, and 2. field investigations.

"Arm-chair" research compiles all kinds of historical data on glassmaking from all available archives and other publications. Particularly valuable in this respect are toponymical and cartographic materials comprising place-names derived from the word *szkło* (glass) (e.g. Szklary, Szklarki, Szklanów, Szklarnia, Szkleniec, Szklana Góra), and also from the word *huta* (meaning metallurgical or glassworks) (e.g. Huta, Hutki, Hucisko, Chutki, Chucisko, Stara Huta, Średnia Huta, Jasiowa Huta, Trąbczyńska Huta), as well as place-names being combinations of the two words (e.g. Szklana Huta). All the data are first critically analysed and then become basis for construction of detailed questionnaires and field research programmes.

Field investigations aimed at identifying the place-name and location of the site of glassworks suggested by that place-name are carried out by principles of surface-verified studies supplemented by the scrupulous cataloguing of the materials found at the given glassworks site (B. Stolpiak 1984). Interviews with local inhabitants have also proved very useful as they usually advance the identification of the supposed glassworks, and sometimes help discover another one that has not been mentioned in the previously collected data.

The research results obtained so far (1982—1985) have fully testified to the assumption that in the overwhelming majority of cases (80—90 per cent) there were glassworks behind the place-names derived from or combined with words *huta* and *szkło*, and only in few cases the place-names were connected with ironworks or primitive wood distilleries.⁷ Quantitative data appear to indicate good prospects for further research, for more than a hundred glassworks have already been recorded in the examined area, which constitutes only 7 per cent of the whole territory of Poland, whereas the total number of glassworks that operated in Poland within its present frontiers, by the first half of the 19th century, reported by various sources was three hundred. The problem of chronology of glassworks appears to be less ambiguous, as the clear majority of the place-names, especially those found in cartographic materials, are believed to date from modern times or a more recent period. To a certain extent this is also evidenced by the tentative chronology of the glassworks we have discovered, the oldest of which may date from only the 15th century. One should not, however, draw too far-reaching conclusions from this fact, as our research is at the initial stage only, and it has not covered yet the areas where identification of the oldest late-medieval glassworks dating back to

the end of the 13th and 14th centuries may be expected. They are the regions of Gdańsk, Poznań and Szczecin.

Worth mentioning is the additional educational value of our research: the pursuit of the basic source-related tasks (verification and listing of late-medieval glassworks) goes hand-in-hand with accumulation of rich reference materials on modern glassworks which opens up new research prospects for studies on later stages in the development of glassmaking in Poland.

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I have intended to provide a characterization of the oldest as well as early and late-medieval stages of the development of glassmaking in the Polish lands, and to point out to the blank spaces in our knowledge, inter alia those regarding genetic relationships between those stages, and about the causes of some of the differences in the spatial organization of glassmaking in both periods. I have also discussed the ongoing archaeological research aimed at obtaining new categories of material sources, that is unearthed glassworks, first of all late-medieval ones, which might lead to eliminating the main shortcomings of our knowledge and to obtaining a more complete picture of the changes in the development of glassmaking throughout the Middle Ages in Poland.

I have consciously skipped a lot of vital though very detailed problems relating to the subject matter and methodological aspects of the research which I believe require separate penetrating studies.

NOTES

¹ The recent archaeological findings of the remains of glass production in the region of Kuiavia are tentatively believed to date back to late La Tène sub-period. In the event of a reliable confirmation of this estimation they would become evidence that glassmaking in the Polish lands is a thousand years older than it has been thought to be so far (A. Cofta-Broniewska 1979, pp. 121—122; B. Stolpiak 1980, pp. 167—181). There have also been theories about glass production in the Mazurian lake district in the Roman period (J. Wielowiejski 1970, pp. 30—62; J. Okulicz 1973, pp. 385, 418—419, 442), which however have not been confirmed by any kind of source-material (T. Stawiarska 1984, p. 87).

² There are some grounds to believe that there were glassmaking factories elsewhere in Silesia: inter alia in Legnica, Myśluborzyce, Sądowel and Świny (J. Kaźmierczyk 1970, pp. 191, 195, 201, 213).

³ We mention here selected publications that I find most representative.

⁴ The opportunities of undertaking more excavations within the limits of early-medieval urban agglomerations, where we might hope to find new archaeological sources relating to glassmaking for the purpose of our studies, are rather fragile as these areas are now almost completely built over and consequently they are inaccessible to an archaeologist.

⁵ At the same time, however, it should be noted that the degree of researchers' interest in late-medieval glass is indirectly proportional to the available source-materials which have continued to grow as a result of long-term archaeological/architectonic research in the different old-city, and monastery/church compounds and castles and have formed quite a rich and varied collection.

⁶ This research is being carried out by the Unit for Research into the History of Glass in north-western Poland acting within the framework of the Commission for Museums and Glass Collections of Polish National Commission ICOM. The Unit comprises staff of the Institute of Archaeology and Ethnography of the Nicolaus Copernicus University in Toruń, and those of the Institute of Prehistory of the Adam Mickiewicz University in Poznań; the Unit's collaborators are staff of the Institute of History of Material Culture, Polish Academy of Sciences, and of the Archaeological Museum in Poznań. The researches are financed by the Relics and Monuments Records Centre in Warsaw, and subsidized by the Universities of Toruń and Poznań.

⁷ For the sake of precision it should be added that glassworks' production was not always reflected in the place-names that have preserved. We know of glassworks in the eastern part of Great Poland that operated at Bukowe, Skarżyn Kolonia, Świdle (M. Mucha 1984, p. 87).

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