# Slovakian radiolarite in Paleolithic and Mesolithic cultures in Poland

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1. The aim of this paper is to present the distribution and utilization of radiolarite in Poland during the Paleolithic and Mesolithic ages. This raw material is of exceptionally fine aesthetic qualities (velvety textures of the surface and vived red, olive and yellow colours) and is found in deposits in Slovakia, mainly in alluvia of the Vag river valley. Recently, it was also discovered in the Pieniny mountains, on the Polish side of the Carpathians.
2. Radiolarite is of fairly good, technological quality which, however, is not superior to that of such Polish materials as the Cracow Jurassic flint or, especially, of the so called 'chocolate' flint.
3. The main deposits in Slovakia are separated from the Polish sites containing radiolarite artifacts in their inventories by the giant barrier of the Carpathians (rising up to 2500 meters above sea level) and so the only convenient route from one region to the other led through the Moravian Gate, at least during the cold periods of the Pleistocene. Mountain passes, such as the Poprad river valley, were also used at times.
4. Depending on the period in prehistory, the Slovakian radiolarite played a varying role in stone inventories of southern Poland but it was never the principal raw material. Its presence in the region testifies to lively contacts between the inhabitants of the upper Oder and Vistula river basins and communities of the middle Danube basin.
5. The Middle Paleolithic. — The oldest radiolarite artifacts appear in Poland in the Middle Paleolithic (Levalloisian cores from the Kraków - Zwierzyniec I site) but are very few in this period.
6. The Upper Paleolithic - the Aurignacian cultures. — A considerable inflow of radiolarite into Poland is evident during the Upper Paleolithic, particularly in some of the Cracow Aurignacian assemblages where the red variety of this material comprises up to 3% of all the tools (Kraków - Zwierzyniec I). Apart from tools, Zwierzyniec also yielded blades, flakes and even a core. We are thus justified in believing that radiolarite arrived on the site in the form of pebbles and only on the spot underwent the full cycle of core formation and exploitation together with tool production, as was exactly the case with all other local material found in the Zwierzyniec assemblage. If this was indeed what happened, we are probably dealing with traces of a roaming group of Aurignacian hunters which travelled both in Slovakia and in Little Poland constantly picking up concretions of raw material that was available in the given region. The diversity of material in the Zwierzyniec assemblage (Jurassic flint, radiolarite) would permit a reconstruction of the boundaries of the area frequented by the Aurignacian community - this region could have been up to 300 kilometers across. It is worth noting that the Aurignacian assemblages from Zwierzyniec, although distinct, are strongly related to assemblages from across the Carpathians.
   We must also remember that other Aurignacian assemblages from Poland, eg. Piekary II, Góra Pulawska II, do not contain radiolarite. This would indicate that groups from these sites did not venture into Slovakia. It is worth noting that the Aurignacian peoples simultaneously used several materials at any given time, usually favouring the local varieties.
7. Other cultures of the early phase of the Upper Paleolithic. — The remaining cultures of the early phase of the Upper Paleolithic (eg. the Jerzmanowician) were also familiar with Slovakian radiolarite but it is difficult to investigate their raw material management (Nietoperzowa Cave layer 5, Kraków - Zwierzyniec I - 'lower loess').
8. The Gravettian cultures. — In the complex of Gravettian cultures from the second half of the Upper Paleolithic, the managing of raw material becomes more complex with fewer material varieties being used for tool production. Dominant is usually the local variety i.e. one closest to the site; in the latter case the material often arrived on the site partly worked: this is suggested by, for example, the discoveries of specialistic workshops that manufactured precores and even finished blades which were then expedited to the home site (Kraków - Spadzista B). For this reason, the relatively few radiolarites of the Polish Gravettian home sites are in the form of finished tools. This would be evidence that special expeditions were organized to obatin material which, as could have been the case with radiolarite, was perhaps acquired through exchange with other groups.
9. The Late Paleolithic. — The period of particularly voluminous inflow of radiolarite into southern Poland is the decline of the last Glacial, particularly the nineth millenium B.C., during which the regions north of the Carpathians were inhabited by the Swiderian reindeer hunters. These wandering people of the Polish Lowland achieved particularly good results in the extraction, processing and wide distribution of the better sorts of flint material: we had the pleasure of demonstrating this during the Second Maastricht Symposium.
   One such material, albeit of local significance only, was Slovakian radiolarite which reached the Swiderian territory through the Moravian Gate as well as through the difficult transcarpathian passes. This is proved by one Swiderian site in northern Slovakia in the valley of the only river in that stretch of Carpathians - the Poprad (Velký Slavkov site).
   The red variety of radiolarite was used by the Swiderians most often, which means that they either practiced some sort of selection or had access only to some of its sources. The sites yield numerous fragments of large, regular blades as well as many tools typical of the Swiderian culture (tanged points, end-scrapers, burins).

   And now a few words about the possible model of acquisition and distribution of radiolarite in Swiderian culture. The material came to southern Poland from an average distance of 300 to 350 kilometers in the form of, among others, not worked pebbles and, possibly, also precores. The distance was not a great problem for the Swiderians who admirably mastered the acquisition and wide distribution (over distances of up to 450 kilometers) of the local 'chocolate' flint. The deliveries of the required material could have been carried out during the seasonal migrations (probably covering distances of several hundred kilometers) after the reindeer herds. In this case we must assume that Swiderians were periodic visitors in areas south of the Carpathians.
   Another hypothesis is also possible: the southern groups of Swiderians may have been supplied with radiolarite by the Late Paleolithic Epi-tardigravettian communities which probably controlled the region laying next to the Vag river; isolated groups belonging to this culture sometimes drifted north of the Carpathians (sites in the Pieniny mountains and the so called Witowian group in the Polish Lowland?) The above interpretations are not the only ones possible.
   In any case, it is worth noting that it were the Swiderians who were particularly given to good raw material ( the need to produce long and regular blades) and who were willing to utilize every available good material even if its 'import' demanded considerable organizational effort.
10. The Mesolithic. — The strong need of Slovakian radiolarite demonstrated by the inhabitants of southern Poland in the late Glacial is in marked contrast to the situation there during the Early and Middle Holocene (from the eight to the fifth millenium B.C.) Here we must refer the readers to a special lecture devoted to this problem and delivered by Mr. K. CYREK. We will mention only a few points:
    a) firstly, the number of radiolarite artifacts in the south of Poland markedly decreases in those times (nine sites from a period of 4000 years!),
    b) secondly, they are found in assemblages of varying cultural traditions (the Komornica, Janislawice, Chojnice-Pieńki cultures).
    c) thirdly, the selection of radiolarite varieties is greater here than in the decline of the Paleolithic (red, yellow, grey, pink) which indicates a complete randomness in the utilization of this material and testifies to its altogether marginal significance.

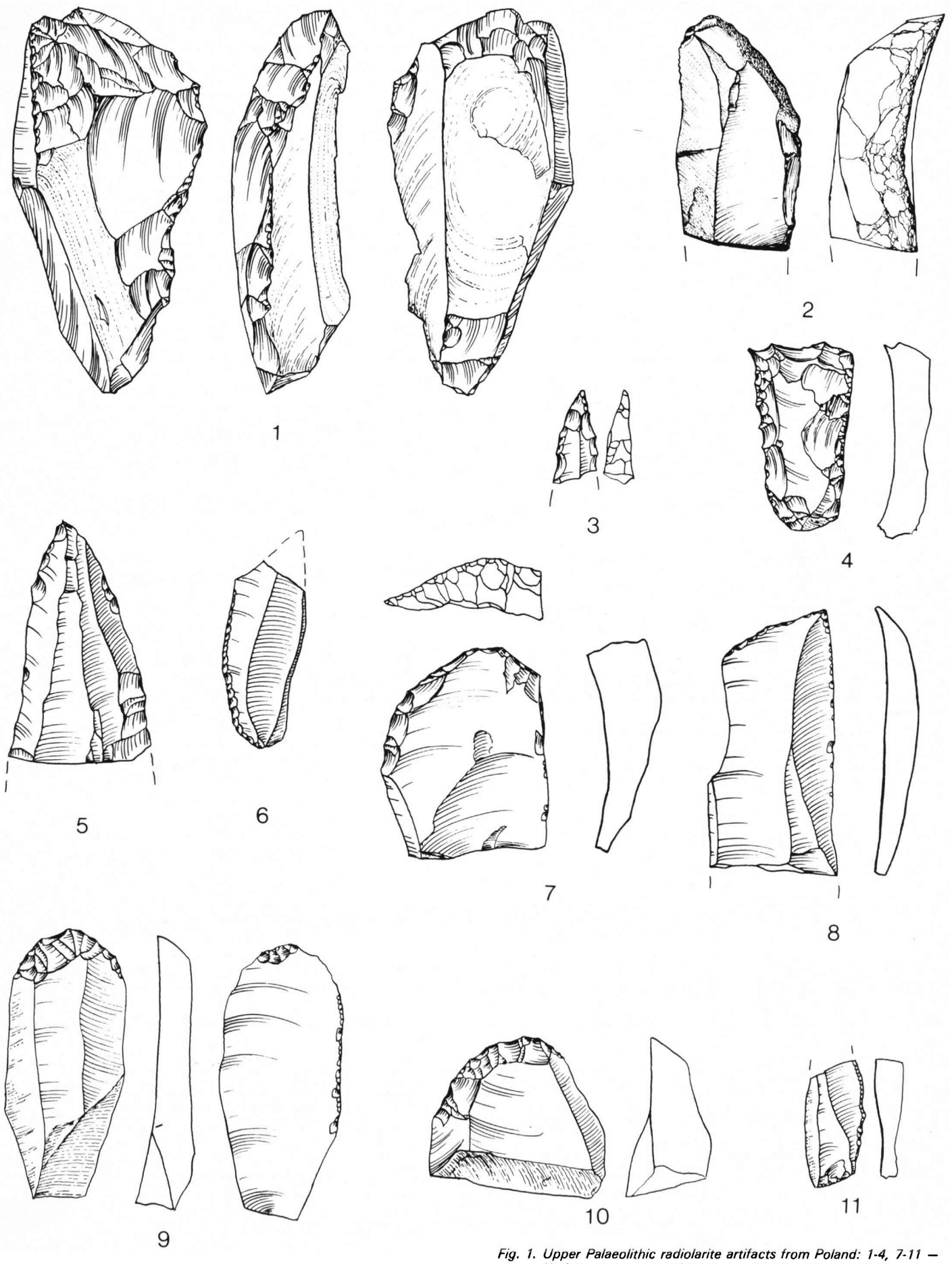


*Fig. 1. Upper Palaeolithic radiolarite artifacts from Poland: 1-4, 7-11 — Kraków-Zwierzyniec I (Aurignacian), 2-3 — Kraków-Zwierzyniec I (early Upper Palaeolithic Backed Points), 5 — Nietoperzowa Cave, layer 5 (Jerzmanowician), 6 — Mamutowa Cave (East-Gravettian) Actual size.*

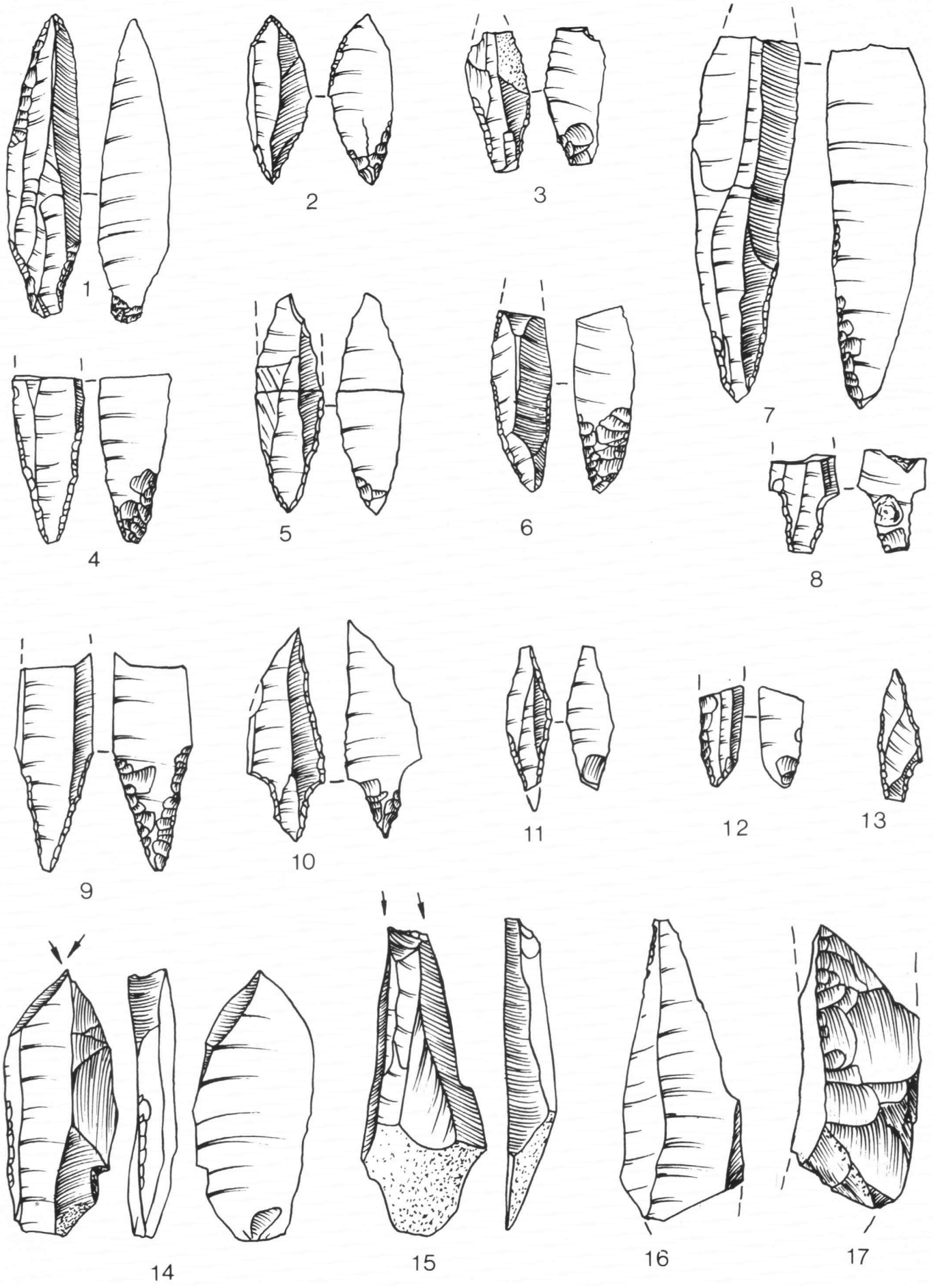


*Fig. 2. Late Palaeolithic radiolarite artifacts from Poland: 1, 4, 7 — Borek Falecki, 2 — Rytwiany, 3 — Brody, 5, 9, 11-13 — Chwalibogowice, 6 — Opatowiec, 8 — Czyzów, 10 — Śladków, 14-16 — Zakrzów, 17 — Kobierzyn III (all Swiderian). Actual size.*

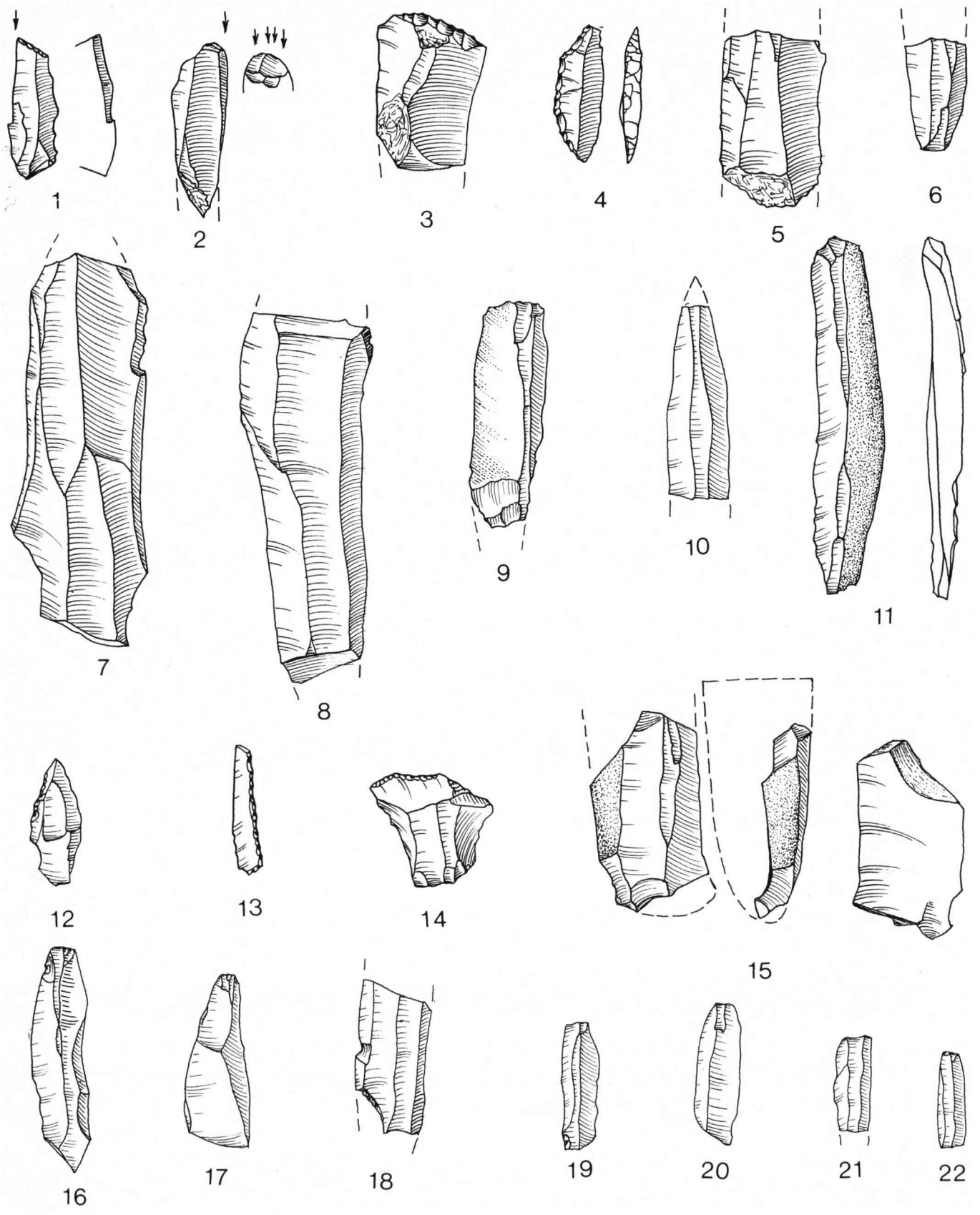


*Fig. 3. Late Palaeolithic and Mesolithic radiolarite artifacts from Poland: 1-2, 8 — Zakrzów, 3 — Kobierzyn, 5-6 — Chwalibogowice, 7 — Sroczków, 9 — Beszowa, 10 — Borek Falecki, 11 — Zyciny, 12 — Dzieslawice (all Swiderian), 4 — Boksicka Wola (Late Backed Points), 13 — Kobierzyn, 14 — Borowa 1, 15-17 — Majdan Królewski, 18 — Borowa 3, 19 — Borowa 5, 20-22 — Jawornik-Czarna (Mesolithic). Actual size.*

The conclusion from this is that, given the miniaturizaton of the majority of our Mesolithic tools, the technological requirements, particularly as to the size of stone material, must have become less stringent (as compared to those from the Paleolithic). In this situation, radiolarite lost its previous importance in regions north of the Carpathians.

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