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POSITION OF PETROARCHAEOLOGY IN RELATION TO
NATURAL, SOCIAL AND TECHNICAL SCIENCES

One of the trends in the development of science which are more and more distinctly seen in recent times is the exhaustion of cognitive possibilities occurring in the fields of competence of particular, traditionally defined and distinguished scientific disciplines. On the other hand, many of the attempts of penetration of marginal zones situated on the border between two or more traditional disciplines appeared to be immensely fruitful:

As effects of these processes, numerous forms of inter-disciplinary researches appear, differentiated according to rank; only a few of them reach in the course of time the shape of autonomous scientific disciplines /for example, biochemistry, geophysics, geochemistry/. Others, not less important for the recent development of science, remain on the stage of certain, specific lines of inter-disciplinary studies, i.e. they either do not reach the phase of institutionalization, or do not develop their original research methods but only employ a specific set of methods, adopted from the disciplines on the border of which they originated.

Speaking about the recent stage of development of archaeologico-petrographic studies, an attempt is necessary to fix their place in such a picture of contemporary science¹. Those studies, sometimes called petroarchaeology, emerged on the borderline between the Earth sciences and historical sciences which deal with the material remnants of human culture. Main problems of petroarchaeology concern the stone objects being the intentional human products from the past. Archaeological sources

made of stone preserve the natural internal structure and are therefore studied by the Earth sciences, mainly by petrography. Simultaneously, in consideration of their outer working they constitute material evidence of human activity and are therefore the research object of historical sciences /archaeology and history of art/ and part of them - also of technical sciences /architecture/.

Petroarchaeology as the interdisciplinary line of studies takes advantage of research methods of several disciplines /see fig.1/. Within petroarchaeology, one can distinguish three main directions of research activities:

1/ Reconstruction of exploitation conditions of stone raw-materials,

2/ Description of their distribution,

3/ Explication of the physical basis of use of rocks.

Therefore petroarchaeology delivers new data mainly to historical sciences, although it brings also some new determinations to geology. They regard:

1/ Properties and application of rock materials,

2/ Palaeogeographical conclusions on the morphology of the earth surface, especially in connection with the rock quarries exploited in the past,

3/ Localization of unknown rock outcrops exploited in pre-history; archaeological research on the distribution of a certain raw-material acts as a stimulus inspiring geological investigations of its quarries.

Besides, petroarchaeology helps to detect and liquidate several imperfections and inconsistencies, both in geological sciences and in archaeology /for example: the archaeological division of rock implements into stone and flint objects/.

Petroarchaeological investigations on the Neolithic stone raw-material economy of the Polish Lowland disclosed the one-sided character of the studies on erratic boulders which were so far analyzed only as indicators of directions and of extents of ice-sheet, while their full petrographical character, necessary for cognitive and practical reasons, was neglected.

From the archaeological point of view, the petroarchaeological line of research is applicable in several stages of research procedure and on the different levels of generaliza-

tion. Below, the effect of use of petroarchaeological research is shown, which rises parallelly to the scale of its application. The more valuable and differentiated the analyzed archaeological sources, the richer problematics can be dealt with this procedure.

Kind of archaeological source	Applied research methods from the Earth sciences	Possible research results
single stone implement	petrographical identification of the raw-material /macro- and microscopic and other physical and chemical methods	extension of source description by definition of raw-material; possibility of linking with primary quarry; definition of physical properties which enriches the functional interpretation of the artefact
series of single stone implements /loose finds/ from a certain culture and region	- " -	general, approximate raw-material structure which characterizes the stone industry of a certain culture
as above, but several series from different cultures	methods of regional geology, geology of mineral raw-materials, geomorphology, palaeogeography and cartography	description of general differences in raw-material structure between the cultures; approximate reconstruction of exploitation patterns in each culture /i.e.: diffe-

rence in adaptation
patterns to the same na-
tural conditions of the
region/

homogenous
stone assemblage
/from the excavations/

- " -

specification of the
hitherto reached con-
clusions; reconstruc-
tion of the stone raw-
-material economy in the
range of a single site

series of related ho-
mogenous assemblages

- " -

comparison of the above
mentioned results; fun-
ctioning of eventual
stone workshops, distri-
bution of their products

References

¹J.Stelcl, J.Malina, Zakłady petroarcheologie, Brno 1975.

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