



BUILDING STONES IN BULGARIA FROM ANCIENT TIMES TO THE PRESENT (SELECT EXAMPLES)

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Bulgaria contains a variety of buildings constructed in ancient and present times predominantly of stone. Bulgaria, along side Antalia, is one of the first civilizations to use metallurgic technologies as much as 4,000 years ago and some of these technologies were used in ancient building construction (Kovachev, 1994). Several buildings are to be examined based on their geologic and historical significance for the country and the region. Subsequently a field guide will be created for Bulgarian stone buildings based on the model created for the city of Washington, DC by the United States Geological Survey (USGS, 1998). Additional field guide models include those created by local geological societies for US cities like Pittsburgh, Pennsylvania (Pittsburgh Geological Society, 2003) and states like Maryland (Kuff and Brooks, 1985). The Bulgarian field guide, like the US models is intended for public use and suitable for tourist and educational applications. The goal is to promote an understanding of geologic and historic connections and encourage an appreciation for the use of dimension stone in building among the public.

Preliminary research involves the collect of information on Bulgarian geology and history relevant to select stone building sites from library and museum resources, as well as, the Ministry of the Environment and Water, Geo Fund database. Field research at select stone building sites includes interviews with representatives from local museums and/or representa-

tives at the building sites to identify the historical context of the building and the technology involved in its construction. A general examination of the stone building is followed by geologic examinations to identify the type of stone materials used (for example: limestone, sandstone, granite, marble, breccia) and their source. Assessment of local landforms, geologic data, and historical records serve as indicators for the source of the stone material, specifically, where it was quarried.

Data for each building will be recorded on a standard data form whose contents include: geography, regional geology, site description, construction materials, source of materials, historical period, and building technology. Each site will be geographically located through the Geographic Positioning System (GPS) and documented through photographs, audio and video media, physical measurements, and visual inspection of the building materials. Site based data will also consist of sketches, graphical representation, maps, and computer models as necessary.

Several sites for research were selected based on their geologic and historic value to Bulgaria and in consideration of the time constraints of the project period (10 months). The site description, the rock material used for its construction, and the historical context of the site is indicated in Table 1 below:

Table 1

| Site Description | Stone Building Materials | Historical Context |
|---|--|--|
| Thracian Tomb near the village of Starosel | Porphyritic granodiorite exterior, analcime tuff interior | 4th Century BC, Thrace |
| Thracian Tombs in the Kazanluk Valley including Sveshtari | Volcanic and intrusive rocks | FILL IN |
| Nesebar, Greek Church | Limestone, clay tile | 6th – 7th Century BC |
| Plovdiv, Roman Amphitheater, and Old Town | Roman Amphitheater – marble Old Town – various rock materials | 4th Century AD, Roman Rule 1700 – 1878, Bulgarian National Revival Period |
| Rila Monastery | Granites (?) | 927 – 1819, FILL IN |
| Veliko Turnovo Castle | Granites | 1187 – 1396 AD, Second Bulgarian Kingdom |
| Melnik, Bulgarian homes | Sandstone | 1215 AD, Second Bulgarian Kingdom |
| Belograchik, Turkish Fortress | Red sandstones and conglomerates | 1396 – 1878 AD, Ottoman Occupation |
| Koprivshitsa, Musuem Town | Granites | 1700 – 1878AD, Bulgarian National Revival Period |
| Sofia, FILL IN | Marble, limestone, sandstone, carbonate breccia, and intrusives | FILL IN |
| Vidin, FILL IN | FILL IN | FILL IN |

Field Guide Format

Collected data will be compiled and transformed into a field guide entitled, “Building Stones in Bulgaria from Ancient Times to the Present (Select Examples)”. The introduction of the guide will describe the unique qualities of Bulgaria including its location at the crossroads of east and west, its rich geology as a mountainous terrain that has experienced tectonic activity, and its long history as a suitable place for civilizations.

Following the introduction, in a second chapter, the geological setting of Bulgaria will be described in terms of its place on the Balkan Peninsula. Further descriptions will include information on geologic processes and landforms specific to Bulgaria. Subsequently, the field guide will contain a geologic map of Bulgaria depicting the major landforms, as well as a geologic timeline. The geologic timeline will be accompanied by an abbreviated historical timeline indicating civilizations in Bulgaria from early humans to the present.

The third chapter of the field guide will contain written descriptions of the common building stone materials used in Bulgaria accompanied by photographs. Ancient and modern technologies for building with stone in Bulgaria will also be described. Technology descriptions will focus on the craft of

building with stone in Bulgaria and tell through text and sketches how stone was historically quarried, fabricated, transported, and set into place.

The fourth and featured chapter of the guide will provide a short tour of Bulgaria’s stone buildings. Each building will be represented with an architectural photo or sketch accompanied by a geologic and historic description. Geologic descriptions in this section of the book will focus on the local landforms and the type of rock material used in construction. Rock material descriptions will include information on geologic age and formation. The historic description will include information on the sponsor, architectural period, the purpose for constructing the building, and the specific building technologies employed.

Follow up chapters in the field guide will include a glossary for geologic terms, as well as resource and reference lists.

Current Field Studies

In October 2004 field studies were conducted at the Thracian tomb outside the village of Starosel and the museum town of Koprivshitsa (Figure 1). The main results are as follows:



Figure 1

The Thracian Tomb outside Starosel

The site is about 3.5 km directly north east of Starosel (GPS coordinates: N42 30.702 and E24 32.822, 525 m above sea level). The tomb was built directly on Mateneshki Paleozoic porphyritic granite and leucogranite which is part of the Mateneshki pluton and slopes towards the river, “Pyasachnik”. In the building, two types of rock materials were utilized:

One building material is a porphyritic granodiorite with large phenocrysts of pink alkali feldspar which is most likely not extracted from a local quarry but rather from a quarry

near Hisar, the Momina Banya quarter situated into the Paleozoic Hisar pluton. The blocks measure 20 cm in height x 40-50 cm length x 30-50 cm width and were cut at the quarry site with the front face most refined and the others left more coarse, in particular the back of the stone. The readied blocks were transported to the site most probably by horse drawn carts a distance of about 20 km (direct distance from the site and the quarry is 14.5 km). These blocks were used for encircling the earthen dome at the site, three blocks in width on level ground. Laid dry, meaning without the use of cement, it was necessary

for the builders to place the blocks on a stable bedrock base.

The source of the soft analcime tuff (Kovachev et al., 2002) used in the interior of the tomb is not clear at the moment. However, the same type of stone is used at the present time for sculpture in Bulgaria. This rock material is characteristic of the volcanic rocks found in the Panagurishte Region, but the exact place of the quarry is unknown. The stone was cut in its place of extraction, and most likely the more delicate surface decorations and sculpting of the stone was done during the on site construction. The measurement of the blocks are noteworthy, as the maximum width of the block for the beams is 3.20m and the blocks used for the dome weigh over one ton each. The interior has been constructed without the use of a cement; however, blocks are secured to one another with the use of iron bars coated with lead to prevent rusting.

The Town of Koprivshitsa

The museum town of Koprivshitsa is characteristic of building during the National Revival Period (GPS coordinates: N42 38.470 and E24 32.822, 1008m above sea level). The town is built above the terrace of the river, "Topolnitsa". Local stone consists of biotite and two mica Paleozoic porphyritic granite (phenocrysts of biotite), migmatized and banded augen gneisses, amphibolites and gneiss shists of the Ardenska group (Precambrian age?). The fundamental building materials are wood (pine, beech, and oak) with rough stone for the first floor. A clay cement laid over a wooden weave is common in

the outer construction of the second floor. The ground floor walls made of stone are commonly 50 – 70 cm in width and 1.5 – 2 m in height. The stone comes from small local quarries of the Koprivshenski and Strelchenski Paleozoic plutons and neighboring metamorphic rocks. Only the corner stones are shaped so that they form a right angle which determines the surface of the walls. Clay is used as the binding material between stones and a wood beam is placed between every two stone layers to ensure a level form.

The street fountains consist of a talc shist which is not found in the region. Typical stone blocks of talc shist measure 0.5 m³ at the front face of the fountain. The talc shist blocks belong to an ultrabasic massif. The stone is especially soft but resistant to weathering; therefore, the decorated and sculpted surface of the stone is well preserved. One large stone block incorporated in the fountain, measures at 1 m³ and has been carved behind the facial surface to provide a water reservoir. There are several possibilities as to the origin of these stones. The first possibility is that the talc shist blocks were brought from ultrabasic bodies from the Ihtiman tectonic block or from the region south of Kardjali. A more likely possibility is that the stone was brought along the traditional trade route from Constantinople, Cario, and Alexandria. A third possibility suggests that the blocks, based on their massive character, are likely to have come from western Turkey.

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