Quaternary

by

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The Quaternary deposits in the Sümeg area cover the surface in the form of a thin, discontinuous blanket. In the Marcal Basin tracts there are fluviatile sediments, while elsewhere the Quaternary is represented by slope-deposited sediments. The geographic distribution of the formations is shown in Fig. 88.

The lithostratigraphic classification of the Quaternary deposits has not been completed yet, so that, beside the chronostratigraphic scale, a genetic and a granulometric classification is used.

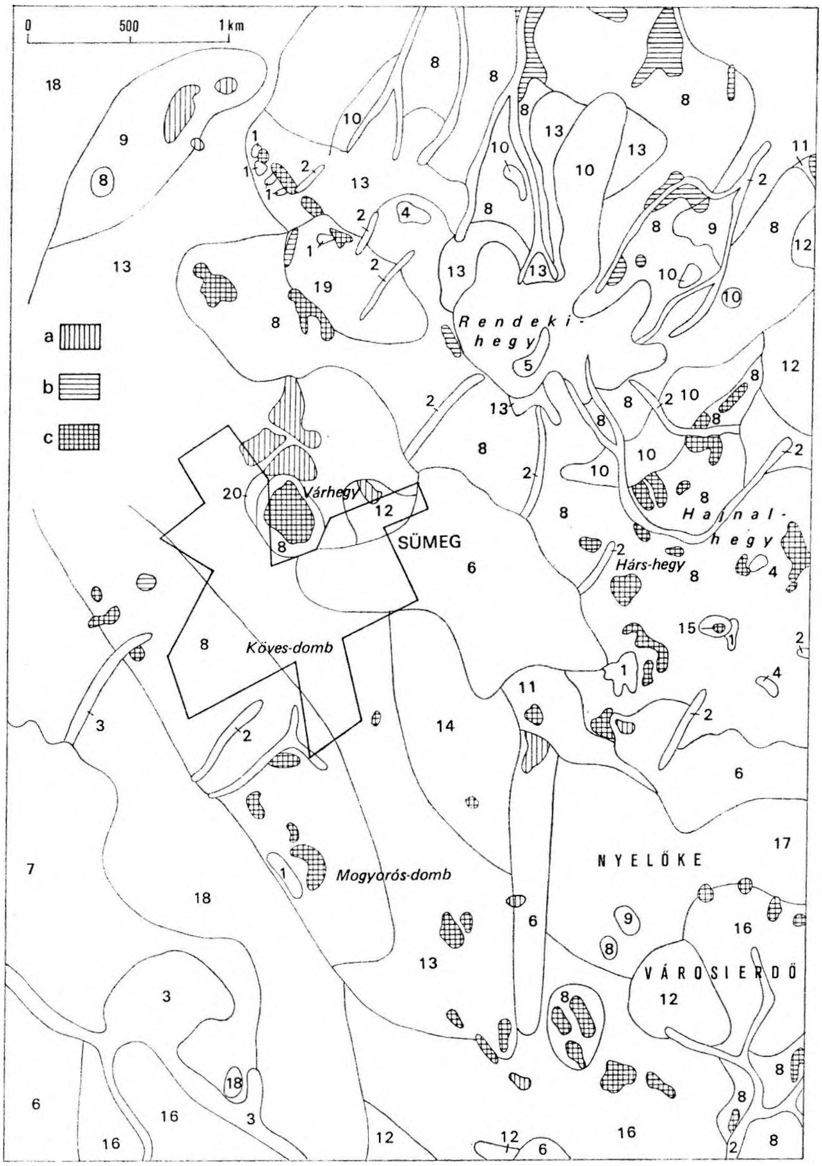

Fig. 88. The Quaternary of the Sümeg area

1. Mine spoil-heap, 2. derasion valley-fill 3. alluvium (mud, sand, gravel, detritus) (1—3. Holocene), 4. eluvial detritus, 5. eluvial gravel, 6. deluvial and proluvial sand, 7. fluviatile sand, gravel (4—7. U. Pleistocene to Holocene), 8. talus, 9. deluvial gravel deriving from the Uzsa Fm. and from Pannonian gravels, 10. deluvial gravel from the Csatka Formation and from Miocene abrasion pebble, 11. deluvial sand and debris, 12. deluvial sand and gravel, 13. deluvial gravel and debris, 14. deluvial and solifluctional clay and sand, 15. deluvial and solifluctional clay, bauxitic clay, bauxite and sand, 16. deluvial sand, gravel and debris, 17. deluvial and solifluctional clay, sand gravel and debris (8—17. U. Pleistocene), 18. fluviatile gravel and debris (M. to U. Pleistocene), 19. blocky talus and gravel 20. deluvial and colluvial sand and clasts. — Pre-Quaternary formations: *a)* Neogene, *b)* Paleogene, *c)* Mesozoic

Fluviatile sand and gravel

In the Sümeg area it is the Marcal Basin tracts that are covered by fluviatile sediments of comparatively large areal extension. They are composed of sands, gravelly sands, gravel lenses and stringers enclosed in sands and, in the deeper-situated parts, silty sands. The sediments are usually cross-bedded. Their average thickness is 2 m, their colour varies between yellow and grey. The Quaternary is underlain by Pannonian sands.

On the margin of the Marcal Basin, the oldest fluviatile beds coming into contact with the pediment formed on the slope of the Rendeki-hegy are found at altitudes of 150 to 160 m a.s.l. During the Pleistocene, detrital and gravelly sediments arrived from the direction of the pediment and got deposited, in some places, in the study area—a process during which the fluviatile sediment was partly lost to erosion. A high flood-plain below 150 m a.s.l. and a marshy low flood-plain at even lower altitudes, can be distinguished. The deposits of the high flood-plain are primarily sands and gravelly sands. The gravels occur scattered or possibly in thin beds or lenses of 10 to 20 cm. The low flood-plain and the present-day alluvium being accumulated at the valley floor of the Marcal river contains, in addition to coarser sediments, a comparatively high percentage of silt and clay.

The valley floor- and the low flood-plain deposits are of Holocene age, those of the high flood plain, as suggested by its geomorphological setting and the absence of cryoturbation phenomena, being of Early Holocene age, while the higher ridges above 145 m altitude may correspond to the Upper Pleistocene. The fluviatile sediments deposited at altitudes higher than 148 to 150 m are of Middle to Upper Pleistocene age.

Eluvial sediments

At the top level of highs composed of pre-Pleistocene rocks an in-situ blanket consisting of weathering products has evolved. Its areal extension is reduced to minor patches, since its material is lost to denudation even at a gentle angle of slope. Its thickness if 1 to 2 m. On the Hajnal-hegy and to the south of it there are small patches of eluvial limestone and dolomite detritus. At the flat top level of the Rendeki-hegy degraded in-situ weathering products of Oligocene to Lower Miocene gravels are found. Because of the gradual transitions and the lack of exposures the eluvium and the slope sediments surrounding the hilltop are difficult to delimit from each other. The weathering blanket was formed mainly in Pleistocene time when the climate was favourable for cryogenic fracturing and disintegration of rocks, but in lesser part it continued to exist during the Holocene as well.

Slope deposits

The overwhelming part of the Sümeg area, except for the Marcal Basin tracts, is covered by slope deposits of varying composition showing the following distribution:

At the southwest foot of the Rendeki-hegy, to the northwest of Sümeg, an area of about 1 km^2 is covered by blocky rock detritus composed mainly of Eocene limestone blocks enclosed in clay, silt and sand. In lesser amount, the clastics include debris of Cretaceous limestones weathering and products from well-rounded boulders of Eocene limestone attacked by abrasion in Miocene time. They widely vary in grain size. A characteristic feature strikingly different as compared to the other slope deposits surrounding the hill is the block-like enclosure of huge slabs of Eocene limestone (Fig. 89; Plate LVII, Fig. 1–2). The biggest blocks vary between 3 and 6 m $\times$ 8 and 10 m in size. The complex is 4 to 8 m thick and extremely ill-sorted. In the deeper strata the rock is cemented by a calcareous cement, the interstitial material being of whitish grey to grey colour. As far as the medium of transport is concerned, the various forms of mass-gravity movement, the direct effect of gravity, the intermittent streams, the sheetwash of slopes and slides seem to have played a role in it.

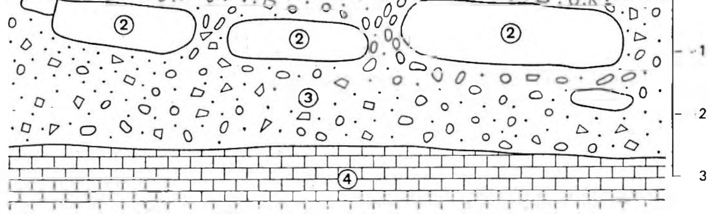

Fig. 89. Blocky talus (quarry to the northwest of Sümeg)

1. Soil, 2. allochtonous Eocene limestone blocks, 3. limestone debris and redeposited silt and sand, 4. Cretaceous limestone

On the platform of the Rendeki-hegy mainly a clastic blanket was formed. On the steep slopes of the hill rockfall, stone-fall, downslope flow of clastics and formation of stone rings were conspicuous mainly in Pleistocene time, but are observable even nowadays. The detritus enclosed in the finer-grained interstitial material was redeposited by solifluction, sheetwash and minor slides on the slopes. The accumulated talus is of mixed composition including unrounded Eocene limestone debris, Eocene basal conglomerate pebbles of mainly chert composition and weathering products of Oligocene to Lower Miocene gravels. In some places, Cretaceous limestones and, mainly on the southern slope of the hill, Eocene limestone detritus is admixed as a result of their abrasion and reworking in Miocene time. The matrix is represented by polished, wind-blown sands; in other places, the sands are accompanied by silts and clays (Fig. 90, Plate LVII, Fig. 3). In some beds the sandy silts and clays outscore the coarse detritus.

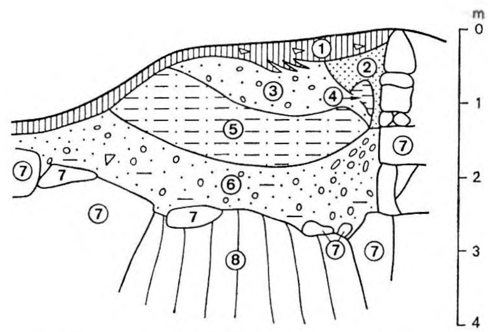

Fig. 90. Fissure filled by slope deposit in limestone (abandoned quarry on the eastern slope of the Rendeki-hegy

1. Soil, 2. sand, 3. gravelly (quartz) sand, 4. redbrown clay, 5. argillaceous sand, 6. argillaceous, gravelly (quartz and limestone) sand, 7. Eocene limestone, 8. talus

To the southeast of the Rendeki-hegy (Hárs-hegy–Hajnal-hegy group), in the northwestern part of the slope, the deposits are composed of Oligocene to Lower Miocene gravels, the products of weathering of Upper Cretaceous to Eocene limestones and, elsewhere, of weathering products of Triassic dolomites and Upper Cretaceous limestones, clays, red clays, bauxites and Upper Pannonian sands.

The southern foot of the hill between Sümeg and Bárdió-tag is covered in a thickness of 1 to 6 m by sands and deluvial and proluvial sediments transported by sheetwash and, in the derasion valleys, by intermittent streams. The sands were removed from Upper Pannonian beds. They largely vary in grain size, being medium- to small-grained in the majority of the cases with an average of 0.2 to 0.6 mm and a maximum of 0.1 to 1.0 mm. Cross-bedding can be observed in some places. The colour of the sediment is yellowish-grey and there is a little muscovite in it, being disintegrated into minute particles. Upon deflation, the grain surfaces are polished, well-rounded.

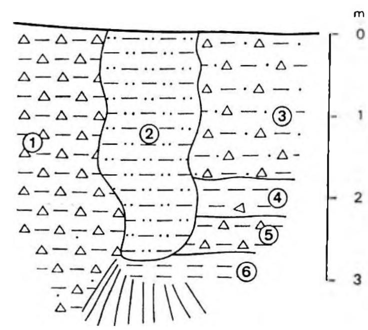

Fig. 91. Ice-sack in slope deposit (abandoned bauxite mine by the Bárdió-tag)

1. Detritus and clay (yellow, grey and greenish-grey), 2. clay, sand (grey to whitish-grey), 3. detritus, clay, sand (grey to whitish-grey), 4. clay (greenish-grey), 5. clay and detritus (greenish-grey), 6. clay (greenish-grey)

In the small basin to the north of the Városi-erdő (Nyelőke) an argillaceous, silty, sandy and clastic blanket has developed on the slopes and in the derasion valleys (Fig. 91). In the Városi-erdő the surface is covered by a mixture of Neogene gravels and Triassic dolomite detritus with sands. Its average thickness is of 1 to 2 m (Fig. 92).

On the pediment surrounding the Rendeki-hegy a detritus deriving from Cretaceous and Eocene limestones, Eocene conglomerates, Oligocene to Lower Miocene gravels and Miocene abrasional gravels is intermixed with the redeposited material of Pannonian gravels and sands.

The Pannonian gravels, to the north of Sümeg is covered by 1 to 2 m of limestone detritus. Under the detritus—and particularly where the detritus is absent—the upper part, on the average 1 m thick, of the Pannonian gravel is reworked, redeposited by slope processes.

At the western foot of the Vár-hegy of Sümeg talus enclosed in Pannonian sands is accumulated in a thickness of 20 to 50 cm. The talus, unconformably overlying Pannonian sand and sandstones, is cemented by a calcareous and limonitic cement, being greyish-yellow to yellow in colour. The unrounded detritus consists of Cretaceous limestone of Vár-hegy origin and, in lesser amount, of well-rounded Pannonian quartz pebbles. A little bit further away from the foot of the hill (at a distance

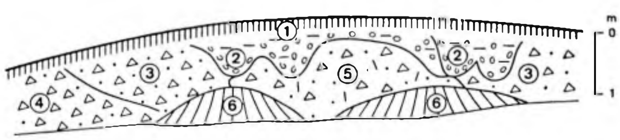

Fig. 92. Ice-sacks in slope deposit (Városi-erdő, road-cut at a distance of 500 m to the north of the gravel pit)

1. Soil, 2. gravelly clay, 3. detrital sand, 4. sandy detritus, 5. detrital, loessy sand, 6. talus

of about 100 m), it contains Eocene limestone debris deriving from the Rendeki-hegy, too. The detritus has an average grain size of 2 to 4 cm with a maximum of 15 cm. The interstitial sand is redeposited with a short-distance transport and is rather unrounded, ill-sorted, reworked, and loosened.

On the Köves-domb and the Mogyorós-domb the loosened detritus of Mesozoic rocks and—locally—the upper strata of the Pannonian abrasional conglomerates are redeposited by different Quaternary slope processes.

On the pedimented margin of the Marcal Basin around the Rendeki-hegy, i.e. its zone of greatest altitude, a thin layer of talus is superimposed on the underlying fluviatile sand and gravels. In the southwest part of the study area, to the west of the Marcal valley, sands with basalt detritus redeposited by slope-sheetwash are found.

The narrow floor of the derasion valleys is filled with sediment removed and introduced from the adjacent areas, ordinarily mixed with solifluction products. Its thickness is 1 to 4 m.

The processes responsible for the slope-deposited blanket were extremely intensive under the periglacial climate that recurred repeatedly during the Pleistocene. Heavy freeze action resulted in large-scale fracturing and disintegration. The resulting detritus underwent a mass gravity movement which, coupled with the solifluction and the sheetwash by snowmelt and periodical torrential rains, brought about a sedimentary blanket that has covered the slopes and piedmont areas as a result of areal transport processes. The effect of gravity and the sheetwash and linear erosion by meteoric waters manifested itself even in Holocene time, while the other agents were pushed into the background.

The slope deposits are for the most part of Upper Pleistocene age. On the basis of the appearance of cemented clastic sands at the western foot of the Vár-hegy and by virtue of its being cemented, the boulders and blocks seem to be older as compared to the rest of the slope deposits. Their Pleistocene age, however, is proved by the cryoturbation phenomena observable in some exposures, by the cryogenic orientation and sorting of the detritus (a phenomenon observable even under huge blocks) and, finally, by the roundness of the intercalated sands—a feature typical of Pleistocene sands in the Central Range. The probable age is Lower or Middle Pleistocene. The bulk of the slope deposits is of Upper Pleistocene age; however, mainly on the steeper slopes, a redeposition was still going on even in Holocene time.

The accumulation of sediments of sandy composition liable to an easy destruction in the area between Sümeg and the Bárdió-tag and to the west of the Marcal valley and also the filling-up of the derasion valleys started in Late Pleistocene time, but continued well during the Holocene.

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