LODE SYSTEM OF TOROIAGA NEAR BORSABÁNYA (NE CARPATHIANS)

by G. PANTÓ

Geological study of ore deposits is everywhere a function of mining development. By approaching exhaustion of the Central European classical deposits on which fundamental investigations were begun, preponderance of the researches was transferred to America due to exploited occurrences of greater economic importance. The results of these large scale investigations appeared chiefly in the Economic Geology and in the Lindgren volume. Due to difficulties in obtaining these publications they did not influence later Hungarian literature.

Hungarian deposits are always described as being products of extrusive rocks and genetical connections are supposed between lode and wallrock. We wish to describe the classical Hungarian deposits as soon as possible in up to date terms.

Borsabánya lies on the southern slope of Máramaros Mountains, in its surrounding hydrothermal and metamorphic ore bodies of stock, vein and lens shape were found. In near by the Mount Toroiaga a lode system was found in the 18^{th} century. Mining was started here in 1798 but in the last 80 years no significant exploitation was achieved. The only description of the ore occurrence is given by Cotta dated from 1854. (2. p. 125–128.) His accurate informations are noteworthy even today.

On the basis of our survey made in company of Aladár Földvári geological structure of the area may be outlined as follows: Mount Toroiaga and its surroundings are built up mainly of an epizonal metamorphic series including phyllites, porphyroides and quartz-schists. This series is intersected by injections and dikes of holocrystalline porphyric dacite.

On the southeastern slope of the peak Stana lui Vertici (-♦- 1888) outcrops of seven lodes were discovered (fig. 1). The parallel outcrops lie between 1000 and 1600 meter altitude (above sea-level) separated by 50–250 meter intervals. The lodes in descending order of altitude are named : Katalin, Zsófia, Károly, Kisasszony, Péter Pál, Mihály and Stefánia. The general strike is N 10–20° E with 70–80° eastern dip. The lodes fill tectonic fissures, thickness varies between 5 and 130 centimeters. The wallrock is chiefly dacite. The Mihály lode lies on dacite-schist contact and the Stefánia lode was followed after Cotta's data crossing dacite-schist boundary into phyllite. In the fillings of the lodes ore and calcitic gangue alternate in banded structure.

Pyrite and mispickel are ubiquitous in the lodes. Sphalerite, chalcopyrite, galena, tetrahedrite, bournonite show enrichments on some sections, but are lacking entirely in some instances. The succession of ore minerals is not defined. Pyrite and mispickel are the first products. The deposition of chalcopyrite lasted during the whole ore-forming period.

Prospecting was started by adits from the valleys crossed by the lodes. Longest exposure is related by Cotta, a 600 meter long adit on the Stefánia lode, today approachable only to half length. Other lodes were exposed on even shorter sections, and no stope higher than 50 meters was made. The well developed, straight fissures of the lodes indicates even greater continuity both horizontally and vertically. An adit was excavated from the Secu valley according to Cotta's suggestion but reached only two lodes. If it continued to the intersection of the farthest lode (and the intersect should take place within 1200 meters) a 600 meter vertical section of the Stefánia lode might be exploited (fig. 2.).

Significant extension of the lodes is attested by another exposure lying on the northwestern slope of the Mount Toroiaga. In the valley of the Makerló brook, 2 kilometer distant from the above exposures, a 70 centimeter thick lode was followed on few meters by an adit. The lode lies in the strike of the Stefánia lode and is included in a dacite dike.

In actual exposures only the extraction of the precious metals would appear to be profitable. In deeper zones increasing amounts of copper, lead and zinc may be expected.

Metal content of the lodes is shown in following analyses:

	Pb%	Cu%	Zn%	S%	As%	Pyrite %	Ag g/t	Au g/t
1. Katalin lode	1·22	0·70	0·25	—	—	18	64	3
2. Zsófia »	0·27	5·20	0·17	8	trace	—	77	trace
3. » »	trace	0·84	trace	—	—	33	84	1
4. Őrangyal »	0·37	0·67	0·30	47·28	trace	—	92	63
5. » »	trace	0·25	trace	—	—	60	50	52
6. Kisasszony »	0·34	0·13	0·47	12·94	trace	—	19	5
7. » »	trace	0·76	trace	—	—	25	55	19
8. Mihály »	0·76	0·70	1·41	8·20	0·05	—	92	1
9. » »	1·49	4·97	0·49	—	—	—	331	1
10. Makerlói »	3·51	0·23	1·28	7·27	trace	—	181	1
11. » »	1·57	0·27	15·02	10·58	trace	—	92	1

The lodes of the Mount Toroiaga are considered to be epithermal. Examining this occurrence in its connection with other ore deposites of the region, some general conclusions may be drawn (fig. 3.).

1. Sulphidic ore deposits appear in epizonal metamorphosed rocks, while mesozonal rocks contain metamorphosed deposits of iron and manganese oxides, carbonates, silicates.

2. The ore bodies strike parallel with the axis of the crystalline belt.

3. The presence of extrusive rocks does not necessarily signifies the presence of ore deposits, but ore deposits appear even far from any outcropping extrusive rock.

4. In the neighbourhood of effusive masses ore-forming fluid might have been more aboundant, as indicated by some ore-stocks lying close to dacites.

Both the origin of the acid effusives and epithermal ore deposites may be deducted from a granite batholite which is supposed to lie a few thousand meter below the crystalline belt.

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HOZZÁSZÓLÁSOK.

Vitális István: A bemutatott táblázat szerint az aranytartalom átlagban 5—50 g/t, ami igen nagy aranytartalmat jelent, ha tekintetbe vesszük, hogy a háború előtt Magyarországon az olyan érctelep, amely 5 g/t aranyat tartalmazott, annak termelése rentábilis volt. Az ilyen adatok azonban a mintavétel körülményeinek a megadása nélkül nem lehetnek becslésnek az alapjai. Meg kell adni ugyanis, hogy a megvizsgált minta, egy teljes résspróba átlaga, vagy pedig csak a tiszta szfalerit és pirit aranytartalmára vonatkozik, így ha a közölt adatokba a meddő nincs beleszámítva, az egész gyönge minőséget is jelenthet.

Érdekes volna megtudni, hogy ha az érctelér elhagyja a dacitot és a palába jut, miként változik meg, mert például Selmecbányán, amint azt a Hozzászóló személyesen is látta, hol az értelérek szintén részint dácitban vannak, kijutva a dacitból, érctartalmukat elvesztik; az ottani bányász-kifejezés szerint »elseprűsödnek«.

Pantó Gábor: A közölt elemzések teljes telérszélességből, de nem vágatszélességből vett résspróbákra vonatkoznak. A magas aranytartalmú telérrészek mindössze 20 cm vastagságúak.

A telérek folytatódását a kristályospalában Cotta adatai alapján említette, feltárások híján azt megfigyelni nem tudta.