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A modern field investigation of the mythical “gold sands” of the ancient Colchis Kingdom and “Golden Fleece” phenomena

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ABSTRACT

According to Greek mythology and historical sources the ancient Georgian Kingdom of Colchis was rich of “gold sands” and the natives mined this metal from the rivers, using special wooden vessels and sheepskins. Modern geological research conducted by us in the Svaneti region (Greater Caucasus) has shown that this area is the province of the former Colchis Kingdom where it was possible to obtain abundant gold from the mountain rivers using the methods unique to this region. We think, from our investigations, that the bedrock and placer gold contents of this region give grounds to believe that there was enough gold in this region to describe Svaneti as “the country rich of this noble metal”. After comparing the geological data, artifacts, myths and historical sources, we share the viewpoint of the Roman historian Apian Alexandrine (90–170 AD) and suppose that the myth about expedition of Argonauts in quest of the “Golden Fleece” to the Colchis Kingdom was a real event and that the main purpose of this mission was to obtain gold and sheepskin (fleece) technique of gold mining.

Though there are a lot of variants of the explanation of the “Golden Fleece” phenomena in historical literature. According to one of the theories the “Golden Fleece” phenomena as a symbol of Colchian gold, was not confined solely to representations of actual gold mining. Other theorists saw the “Golden Fleece” as a symbol of the wealth of the Colchis, famed since antiquity for the abundance of their precious metals. The phenomena of the “Golden Fleece” according to our research, is connected with the sheepskin technique of recovering placer gold. The end result of this technique of gold recovery river gravels was a gold imprinted sheepskin, giving rise to the romantic and unidentified phenomena of the “Golden Fleece” in the civilized world.

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1. Introduction

The myth of the Argonauts' trip to the ancient kingdom of Colchis for gaining the “Golden Fleece” is one of the contentious issues of historical science. The Argonauts were a small band of heroes in ancient Greek mythology (Mycenyan myth) who, in the years before the Trojan War, accompanied Jason to Colchis in his quest to find the “Golden Fleece”. Their name comes from their ship, the Argo and the ship was named after its builder, Argus.

There are many contradictory legends, points of view or opinions about this mythical journey. This trip is described as a real story by Homer in his classic poems, the “Odyssey” (VIII-VII c. BC) and by Euripides' in his play “Medea” (Vc. BC). The Greek poet Apollo of Rhodes in the III century BC dedicated a poem “The

Argonautica” (Race, 2008) to this voyage. In this poem Apollo of Rhodes gave a detailed description of the kingdom of Colchis, the capital city – Aia (modern – Kutaisi) and the Georgian tribes Khalibi, Tibarenni and Mosinici. Since then, one can hardly find any fields of European history and art where the theme of the “Golden Fleece”, the Argonauts and Medea the sorceress is not more or less reflected.

The theories existed in 18 in modern science and literature, which try to explain the “Golden Fleece” phenomenon, are grouped about 18 direction. Among them, in our opinion, the most appropriate are as follows: 1. It represented gold extraction technology from gold bearing placers (Strabo, book-XII; Pliny the Elder I c. AD; Appian of Alexandria I-II c. AD; Tran, 1992, and others); 2. It was a sign of power of the Kingdom (Braund, 1994; Lordkipanidze, 2001; Newman, 2001, and others); 3. It was a sign of the Colchis' wealth and high technologies (Urushadze, 1964, 1984), 4. It represented a special breed of sheep (Ryder, 1991; Smith GJ, Smith AJ, 1992, and others).

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The theorists have seen the “Golden Fleece” as a symbol of the wealth of the Colchis, famed since antiquity for their precious metals. It is believed that Aetes and his kingdom reigned in Colchis at the time of Jason's journey. Tales of Aetes's daughter Medea, the sorceress, were known abroad, and yet the fame of the rumored wealth of the country in gold, silver and iron is likely to have been the basic motive for the Argonauts expedition. The mountain rivers of Colchis carried gravels impregnated with particles of gold. These gravels were washed through special pans with pierced holes and the fine gravels carefully strained over and through sheepskins or fleeces lying under the pans. This special system of gold recovery gave rise to the fable of the Golden Fleece, which according to legend came from a country with abundant silver palaces and golden chambers of ancient kings. The legend of this fabulous wealth of the Kingdom of Colchis, and the fame of their rulers riches, is said to have excited the enterprising avarice of the Argonauts.

In the last century this question was again a topical issue so in 1984 the British scientist Tim Severin sailed a “Modern Argo” ship along the same route traveled by the legendary Jason's on his “Argo” journey, more than three thousand years ago. Tim Severin and his crew of “New Argonauts” sailed from the city of Volosi in the Aegean Sea, into the Black Sea reaching the town Poti (Phasis) on the east coast. Tim Severin proved with this voyage that thanks to the ancient Greek mariners superb marine art and great vessels that they could have easily reached the kingdom of Colchis.

In order to form our own opinion, we decided to study the territory of the ancient Colchis kingdom geologically in order to find the areas where mining of gold from alluvial placers could be possible i.e. a place where the Argonauts could have extracted gold and come to know the ancient mining technologies of this particular region. For this purpose, our group has carried our research for more than 25 years in the western part of the Republic of Georgia around the regions of Abkhazia, Samegrelo, Imereti, Svaneti, Racha, Guria and Adjara. Our work has confirmed that Svaneti is a region, uniquely, where the locals still wash gold from alluvial placers through modern domestic, wooden vessels or pans with holes in the bottom and onto a sheepskin or fleece which collects the fine particulate - gold. Described below are the results of our recent research and our interpretations of the social phenomena of the “Golden Fleece”, which has fascinated countless generations since ancient times.

2. Material and methods

In 2007 we carried out research work in the Svaneti region, by using remote sensing for defining areas where ancient and modern placing of streams, for their gold content had taken place. The gold concentrations were studied both in alluvial placers as well as in the bedrock areas drained by the streams; more than 1000 samples were collected and analyzed. The gold content and other trace metals in these samples were determined by using ICP and MS instrumentation in the “ACME LABS” laboratory (Vancouver, Canada). In addition to geological materials, we gathered together a large collection of artifacts including the unique wooden vessels and the sheepskins still used today by the natives for gold-washing. In addition in various villages of Svaneti we collected numerous bronze sculptures of “sheep head” or “Ram Bird”, which in our opinion represent a stylized symbiosis of the golden fleece.

3. Colchis Kingdom

The eastern Black Sea region in antiquity was home to the well-developed Bronze Age culture known as the Colchian culture; this culture emerged towards the Middle Bronze Age. In at least some

parts of Colchis, the process of urbanization seems to have been well advanced by the end of the second millennium BC, centuries before any Greek settlement of the Black Sea coastline (Fig. 1). The Colchian Late Bronze Age (XV–VIII century BC) saw the development of significant skill in the smelting and casting of metals that began long before this skill was mastered in Europe. Sophisticated farming implements were made, and fertile, well-watered lowlands and a mild climate promoted the growth of progressive agricultural techniques (Braund, 1994).

Colchis was inhabited by a number of related but distinct tribes whose settlements lay along the shore of the Black Sea. The Kartvelian tribes differed so completely in language and appearance from the surrounding Indo-European nations that the ancients provided various “wild” theories to account for the phenomenon (Urushadze, 1984). For example, Herodotus states that the Colchians, with the Egyptians and the Ethiopians, were the first to practice circumcision, a custom which he claims that the Colchians inherited from remnants of the army of Pharaoh Sesostris III (1878–1841 BC). Herodotus thus erroneously regarded the Colchians as Egyptians (Herodotus, The History).

Ancient Colchis and Iberia (see Fig. 1) have been regarded as one of the world's important places for the early mining and processing of precious metals. Many archeologists and other scientists consider the area occupied by the Georgian tribes of the Khaldes, Tubales and Mosnikes, as the homeland of Metallurgy (Richardson, 1934; Wainwright, 1936; Forbes, 1950). H. Richardson (1934) believes that iron mining and steel making technology was discovered in the XIV century BC by a Georgian tribe the Khaldes, who lived in the Halys River Canyon. It is interesting, that the French scholar R. Dussaud (1930) relates the Greek term “chalkos”, which is designation of copper, to the Colchis tribe, the Khaldi. He thinks that the root of the word “khal” comes from the word “khaldi”, and the suffix “kos” in Greek language is an ending denoting the origin. In addition, excavated Early Bronze Age burial mounds in the region show that nonferrous and ferrous metallurgy was very well developed, and that noble metal mining also took place at that time in history (Courcier et al., 2008).

Gold products that can be tied to the ancient Colchis culture in western Georgia, do not exist or have not yet been found. The earliest gold implements known are those from the V century BC, and these were found mainly from excavations in Vani (Fig. 2). The high level of artistry exhibited by these artifacts suggests that utilization of this precious metal in the Colchis culture started much earlier than V century BC. However, in eastern Georgia (Iberia) unique gold objects are depicted dated back to the 2nd millennium, and belong to the world's masterpieces (Fig. 3) and shows that gold mining and its artistic processing was at a very high level, very early in the history of the old Georgian kingdoms.

4. Svaneti region

Svaneti (Suania in ancient sources) is a historic province of the ancient Georgian Kingdom of Colchis and was, and is inhabited by the Svans, a geographic subgroup of the Georgians. It is situated on the southern slopes of the central Greater Caucasus Range near the Black Sea (50 km); its rivers flow into the Black Sea (see Fig. 1). Currently more than 30,000 people live in Svaneti, and the region occupies the Enguri, the Kodori and the Tskhenistskali river sources (7500 km²). Before the creation of the Soviet Union the areas of the Kubani and Baksan river sources, on the north slope of the Caucasus, also belonged to Svaneti. Svaneti is the highest inhabited region in the Caucasus, and the village of Ushguli is the highest large settlement in Europe (2300 m).

The Enguri river valley, which, due to its geographic location is called the Upper Svaneti, is the historical center of the province

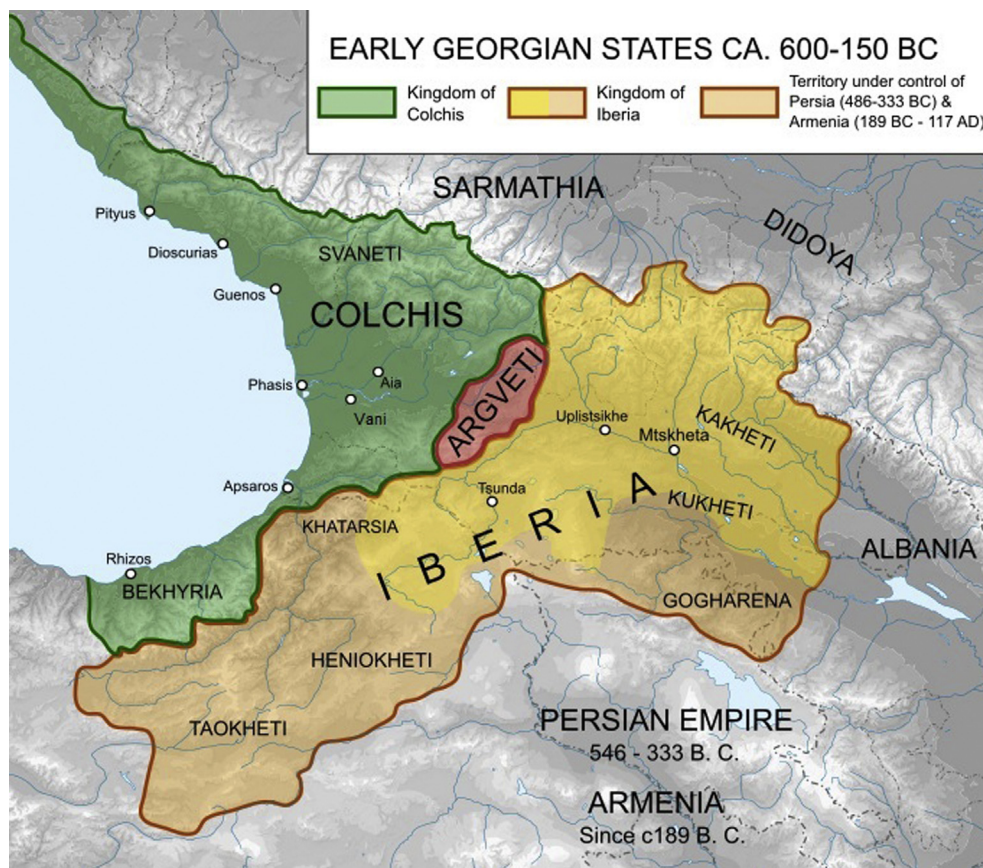


Fig. 1. Political map of the Eastern Black Sea region in VI–II cc. B.C. Adapted after D. Braund (1994).

where the cultural heritage of Svaneti is best preserved. The Upper Svaneti (Mestia district) is known for its architectural treasures and picturesque landscapes. The famous Svanetian towers built mainly in IX–XII centuries make the region's villages more attractive (Fig. 4).

The theme of the Argonauts and the “Golden Fleece” is reflected in the Svan mythology. In excavations around the villages of Svaneti, archeologists have found numerous bronze sculptures of “Ram Bird”, that represents a stylized symbiosis of a sheep head and bird's body (Fig. 5). It seems such sculptures were being created

under the influence of the “Golden Fleece” legend. In addition, many places of mining are met in the Svaneti – where the level of metallurgical skills of the 2nd and 3rd millennium BC (Gambashidze et al., 2010), are demonstrated by the military and agricultural tools and numerous decorative objects of gold and bronze that have been found. A variety of numismatic artifacts have also been discovered there, including Alexander the Great gold coins and the distinctive local silver coins known as “white Colchians”. It should be noted that most of the Macedonian gold coins



Fig. 2. Golden bracelets V century BC from Vani, Colchis.



Fig. 3. Unique golden lion sculpture (3 × 5 cm). Beginning of 2nd millennium BC from Tsnori, Iberia.



Fig. 4. Mestia tawn – the administration center of the Upper Svaneti: Greater Caucasus Main Ridge on the background.

found in Georgia are found in Svaneti, indicating that particular region had close contacts with the outside i.e. Greek, world.

Data on Svaneti's natural resources are met in the works of the ancient Greek and Roman scientists. Greek historian Strabo (44 BC–23 AD) who wrote about Svaneti and its natives: "In mountain rivers of this country there is a lot of gold, mined by these barbarians using the perforated vessels and sheepskin" (Strabo, book-XII). Roman naturalist Pliny the Elder (23–79 AD) in his book "The Natural History" wrote: "in Colchis who on finding a tract of virgin earth, in the country of the Suani, extracted from it a large amount of gold and silver" (Pliny, vol. 6). It is interesting that the ancient Roman historian Appian of Alexandria (95 AD-165 AD) in his XII book (History of Mitridate wars) writes: "many rivers carry invisible "gold sand" from the Caucasian mountains and residents put thick sheepskins into the springs and then collect precipitated gold". In his opinion the main purpose of the Argonauts mission was to obtain the sheepskin technique of gold mining, and that the "Golden Fleece" of Aetes represented a sheepskin with imprinted gold. The secret of this method is that gold as heavy metal and due to it being heavy, it slowly goes down to the bottom of sediment.

Because of this characteristic, sheepskin lined in the ground of the sediment is covered by gold that slowly goes down and is stuck in the sheep fur. The ancient Colchis should have known about this character of gold and used it quite successfully.

According to historical sources of the 18th and 19th centuries, gold was mined from alluvial placers in Svaneti at that time. It should be noted that the mining engineer V. Goliev found a native gold nugget in a quartz matrix, which weighed 365 g, at the Svanetian village of Iely in 1861. Similar facts were fixed many times in Svaneti and that caused great interest by geologists and adventure seekers in this area. Recent geological studies of Svaneti also show that high contents of gold are present here today and that the gold concentration in the river gravels of this region are sufficient to give reason for creating the legend and description of this region as "a country rich of gold".

5. Brief geology of the Caucasus and Svaneti Region

The Greater Caucasus represents a Phanerozoic orogenic terrain formed along the Euro-Asian north continental margin, in an



Fig. 5. "Ram Bird" bronze sculpture (15 × 17 cm) from village Khalde, Svaneti.

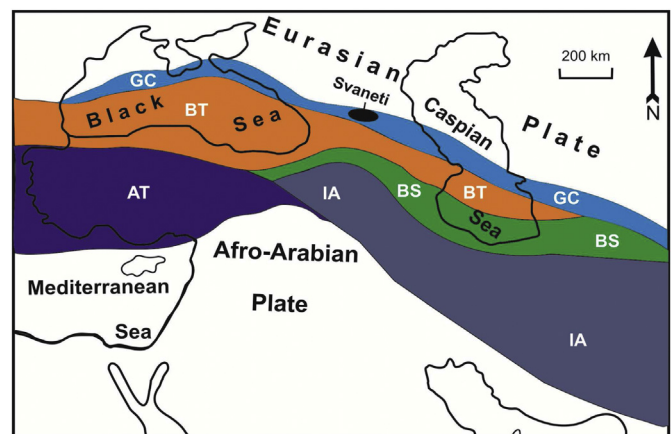


Fig. 6. Tectonic zoning of the Caucasus and adjacent area on the basis of the terrane analysis (after Gamkrelidze, 1997). Terranes: GC – Greater Caucasian, BT – Black Sea-Central Transcaucasian, BS – Beiburt-Sevanian, IA – Iran-Afganian, AT – Anatolian.

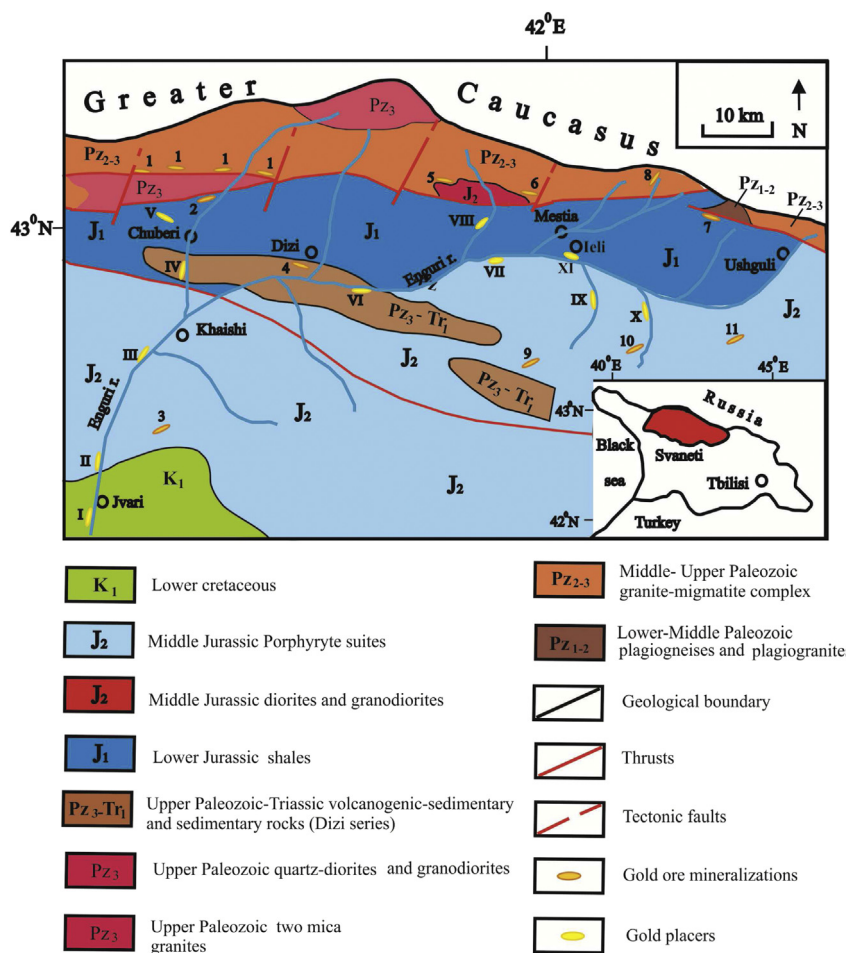


Fig. 7. Schematic geological map of Svaneti and gold ore mineralization and gold placers. Gold ore mineralization: 1 – Sakeni ore fields; 2 – Tetrashera; 3 – Shkenari; 4 – Lukhra; 5 – Guli; 6 – Kvishi; 7 – Sgimazuki; 8 – Tviberi; 9 – Khalde; 10 – Arshir a; 11 – Lasili; Gold placers: I – Jvari; II – Khudoni; III – Khaishi; IV – Chuberi; V – Kharami; VI – Lakhmula; VII – Latali; VIII – Becho; IX – Arshira; X – Lasili; XI – Jely.

NW–SE direction, between the Black and Caspian seas. Currently, it is an expression of continental collision between the Arabian and Eurasian lithospheric plates. Three major orogenic units are distinguished in the Caucasian construction: 1) the Greater and 2) the Lesser Caucasian mobile belts and 3) the inner Caucasian microplate (Okrostsvaridze, Tormay, 2011). According to modern concepts of tectonic zoning the Caucasian orogen (Gamkrelidze, 1997) is built up of three large terranes: the Greater Caucasian, the Black Sea-Central Transcaucasian and the Beiburt-Sevanian terraine (Fig. 6).

The Greater Caucasus terraine is the northernmost expression of the Caucasus orogen and can be traced for more than 1200 km along the southern margin of the Eurasian continent. It is currently a polycyclic, folded-nappe formation in which two major stages of its construction are distinguished: 1) a Pre-Alpine crystalline basement and 2) a younger Alpine volcanic-sedimentary cover. The crystalline basement complex is mainly constructed of Precambrian and Paleozoic crystalline schists, amphibolites, gneisses, migmatites and granitoids (Okrostsvaridze, Tormay, 2011).

Svaneti is located in the southern part of the most uplifted central segment of the Caucasus orogen. It includes the outcropping Paleozoic crystalline basement of the Main Ridge and of the Southern Slope zone overlain by Middle Jurassic volcanogenic-sedimentary formations and Middle-Upper Cretaceous limestones. The Main Ridge zone in the Svaneti region is represented by

older Middle–Upper Paleozoic amphibolites, crystalline schists, migmatites intruded by gabbros, quartz diorites, granodiorites and granites. The Southern Slope zone in the Svaneti area is represented by the Upper Paleozoic–Triassic so-called Dizi series, which forms two lens-shaped “windows” with a general E–W Caucasian direction, within the Jurassic sedimentary cover. It is made of structurally imbricated, thick volcano-sedimentary deposits. During the Middle Jurassic tectonic events in the Svaneti region numerous igneous bodies of various size and composition were intruded into this volcano-sedimentary section.

6. Metallogenic description of Svaneti Region

In spite of the relatively small area occupied by the Svaneti region, numerous examples of significant metallic mineralization of various genetic types occur here (Fig. 7). They are connected in time and space with the spatially associated magmatic rocks as well as with the sedimentary formations which are the host rocks to these intrusives. Starting in Soviet times, since 1934, near the village of Jvari alluvial mining of gold placers along the Enguri River was started and lasted until 1957. After 30 years gold sampling was renewed in this same area. This modern work showed that within what was a geologically insignificant time interval these placers were replenished to levels that were again of commercial importance. It was natural that after the modern successful exploration of

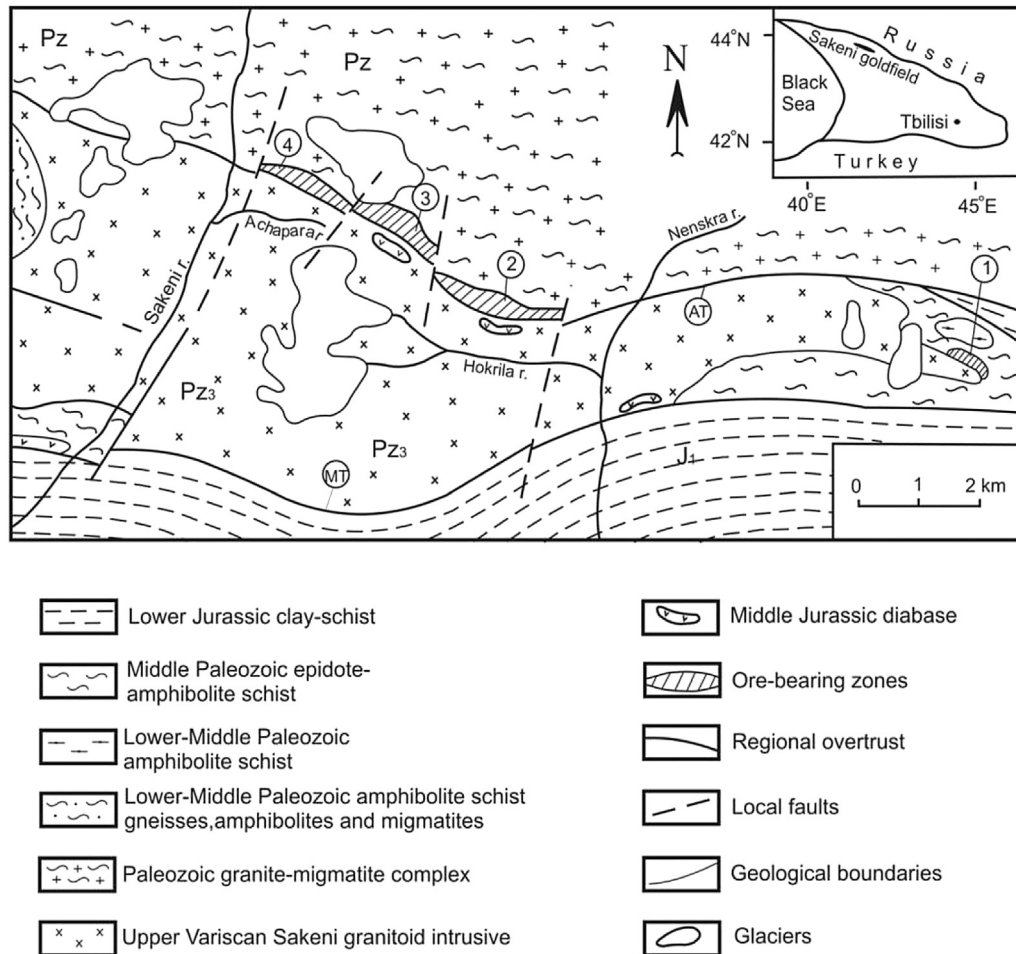


Fig. 8. Geological map of the Sakeni goldfield and recognized gold occurrences. Au-bearing zones in bedrock: 1-Kakrinachkuri, 2-Hokrila, 3-Memuli, 4-Achapara; Regional thrust: MT–Main thrust, AT–Alibeg thrust.

these placers that attention turned to uncovering gold-bearing structures in the bedrock of the Svaneti region. .

6.1. Bedrock gold occurrences

During the 1960's–1970's in the Svaneti region, gold prospecting in the sedimentary cover rocks was started but the results were insignificant. Several ore manifestations were found, but they did not exhibit a quantity of gold that would appear to have been sufficient to account for replenishment of gold placers, over such a small interval of time. However since the 1990's gold prospecting in the crystalline basement of the Variscan terrain was started; this work has given considerable results of interest (Okrostsvaridze, 1992; Kviciani et al., 1997; Okrostsvaridze and Bluashvili, 2000, 2009; Kekelia, 2008). Shown below is a brief description of the recently discovered gold ore-mineralization in the Svaneti region.

The Kvishi polymetallic ore-mineralization is exposed on the right benches of the river Dolra, about 15 km from the village Becho (Fig. 7; VIII). This ore field is connected to a zone of oxidized, silicified Lower Jurassic clay shales. In this zone a 1–1.5 m thick quartz vein is traced along 80 m. The average gold content in the vein is 2.25 g/t, silver – 125 g/t, copper – 0.06%, lead – 7.5%, zinc – 4.8% (Kviciani et al., 1997).

The Khalde gold–antimony ore-mineralization is exposed to the SE of the Khalde village, on the southern slopes of Mt. Tsninari. The mineralization is associated with the contact zone between Lower

Jurassic clay shales and several diabase dykes. In the shales, parallel to the schistosity, a 6 m wide system of quartz veins is developed; this zone can be traced over a distance of 40 m. Analyses of the sample from the vein show Sb contents of from 2.88% to 37.8%, gold from 0.4 g/t–5.3 g/t, and silver from 130 to 362 g/t (Kviciani et al., 1997).

The Tviberi ore mineralization was discovered in 1991 (Fig. 7; 8). The mineralization occurs within Lower Jurassic clay-shales, some 18 km N of the village Zhabeshi. Here, gold content reaches 0.8–1.7 g/t. The size of outcropping mineralization and its grade (a thickness of 180 m and a strike extent of over 750 m) attracted great interest (Okrostsvaridze, 2007).

The Lasili-Arshiri goldfield (Fig. 7:10; 11) is situated in the Enguri River valley, 12 km northwards of the village Eli and is found within Lower Jurassic clay shales. Mineralization consists of gold-bearing quartz veins which appear to genetically belong to the mesothermal class of orogenic gold veins. Gold content in these quartz veins is highly variable ranging from a few grams to tens of grams per ton (Kviciani et al., 1997). On the territory adjacent to this district, gold sand(placer) accumulations are widespread (Fig. 7: X). Nowadays as well as in historic times, numerous objects used for a primitive style of mining have been found here.

Presently, four, gold-bearing bedrock occurrences are known in the Sakeni goldfield (Fig. 7). These include (Fig. 8): Kakrinachkuri (1), Hokrila (2), Memuli (3), and Achapara(4). They are localized along the northern border of the Sakeni granodiorite intrusive of

Upper Paleozoic age whose emplacement was are controlled by the Alibeg thrust zone - the main structure of the region. The mineralized zones are formed in the deformed and greisenized rocks of a Middle Paleozoic granite-migmatite thrust complex and include quartz veins, pods, and stockworks. Gold occurs with quartz-scheelite, quartz-pyrite-arsenopyrite, and quartz-stibnite assemblages. The highest gold concentrations (15–81 g/t Au) are found with the quartz–pyrite–arsenopyrite association at the Hokrila occurrence.

As a result of our investigations, the genetic model for the Sakeni goldfield is: syn-orogenic thermal events activated a fluid system that mobilized metals from the Sakeni intrusive complex. This fluid was focused along the Alibeg thrust fault, and mineralization was localized along and deposited below structural barriers within the thrust itself. We assume that the gold mineralization represents a post-magmatic, gold-quartz-low total sulfide hydrothermal event; such paragenesis is characteristic, world-wide, of many orogenic gold systems (Goldfarb et al., 2005). On a tentative estimation this ore field should contain 65–70 tons of gold (Okrostsvaridze and Bluashvili, 2009). Given the large area of bedrock gold mineralization, and its relation to the headwaters of the primary river system in the region, we think that the Sakeni goldfield should be one of the main suppliers of alluvial gold of the Svaneti region.

6.2. Alluvial gold occurrences

Generally placer gold is widely distributed in almost all alluvial river systems draining important bedrock gold districts of the world. Mobilization and transportation of the erosional products of the weathering of these deposits are the source of alluvial gold. The coarsest gold scales or grains (ie. > 0.5 mm) accumulate near the mineralization sources while the finer-grained gold particles are carried several kilometers from the source by water flows. During transport and subsequent deposition the gold grains undergo significant changes take place in the shape, size and chemical composition of the gold grains. As a result of dissolution and reprecipitation after deposition, the gold grains may increase in size and a “cleansing” of contained iron, copper, and other impurities takes place; this leads to an increase in the fineness of the gold grains.

Svaneti placer gold is mainly found in alluvial sediments. Gold-bearing alluvial sands (gold sands) or gold placers in Svaneti are widespread and the scale of their distribution varies from few to hundreds of meters. In Svaneti, among the gold-bearing alluvial sands we distinguish the Jvari gold placer (Fig. 7; I) because of its considerable industrial scale. The Lasili and Arshiri gold fields (Fig. 7: IX; X) are also similarly remarkable; here gold mining goes far back into the historic past. The Latali gold fields (Fig. 7, VIII) are also distinguished by their large scales. At present the village at Latali is located directly over the historic places. In the Svaneti region, besides the alluvial gold-bearing sands, gold accumulations are also found in so called “bear’s kettles” which are river cut depressions into the underlying bedrock stream bed, where specific, weight-induced accumulation of gold takes place.

At present the Svans are mining gold from the mountain rivers as they did in ancient history, using sheepskins, and special wooden vessels of ash-tree (Fig. 9). It is rather interesting that this wooden vessel is unlike those used for gold-mining in any other region of the world, showing that it underwent independent evolution in this region alone. In general it is 50 cm long, 30 cm wide at its center and 10 cm wide at its ends; This t oval-shaped, deep form is made from one piece from a large ash-tree branch or trunk. Due to its perfect forms and functional efficiency, it is quite clear that its handicraft manufacturing has a long history.

Svaneti natives are well aware of where and when gold should be washed. Except for the wood vessels they use sheepskins, which



Fig. 9. Wooden vessel from Subari's family (Sgurishi village).

they place in streambeds close to gold-containing quartz veins where these veins are washed (and eroded) by springs or creeks and streams. Fig. 10 depicts the gold grains washed from the River Quani gold-containing placers.

7. Discussion

Our investigations of the Svaneti ore fields reveal that the majority of the placer gold was exposed and mined in the historic past. At the same time however, the intensive present day erosional cycle, caused by 1) the abundant modern precipitation as well as 2) extensive glacial melting into the abundant hydrological network and 3) the rapid uplift of the Svaneti segment of the Greater Caucasus (2 mm per year), have all promoted the fast renewal of gold into the present-day river placers. This concept of active enrichment of the stream gravels of this region is the geological argument for the high demonstrated level of gold mining activity in the historical past as well today. Thus, our geological investigations of the Svaneti region, enables us to believe that there was enough reason for the creation of legends that describe this region “as a country rich of gold”.

The results of the geological work as carried out by us in the Svaneti region in, response to comments by Pliny the Elder and other ancient sources, proves in our opinion the assumption, that: “the country of the Suani”, is today's modern Svaneti and not any other province of the ancient Colchis kingdom. In contrast some researchers postulate that Pliny the Elder believed that the Argonauts traveled to modern Vani and not Svaneti, i.e. interpreting “the Suani” to mean Vani rather than Svaneti. However as a result of archaeological excavations, it can be shown that the ancient settlements of the Vani region reached their highest level of development in III c. BC and that the oldest archaeological material dates back to VIII-VI centuries BC (Lordkipanidze, 2000) i.e. younger than the earlier Colchis kingdom. As it was mentioned above, interesting artifacts, including high artistic quality gold objects (see Fig. 2)



Fig. 10. Gold grains washed from alluvial placers of the River Quani.

were found here. However the Argonauts trip cannot be linked to Vani district, because their adventure is a very old story, that happened during the Trojan War, which preceded, and was subsequently described by Homer in VIII century BC. In addition, as it was discussed above, the myth of the Argonauts was first born during the Mycenaean civilization, which, as it's known, was developed during the early Bronze Age, about XVI century BC, and which was suddenly destroyed in XI century BC, together with the eastern Mediterranean civilization (Castleden, 2005). Thus, the Argonauts trip, if it was a real story, should have taken place prior to XI century BC. Colchis on the Black Sea coast was colonized by the Greeks from the ancient period starting in the VIII–VII centuries BC (Hammond, 1996). At that time, the Black Sea coastal cities of Colchis, Rhizos, Phasis, Pittyus, and including Vani, were developed (Lordkipanidze, 2000). We believe this completely eliminates any kind relationship of the Argonauts to ancient but younger periods of history at Vani.

At the end of the discussion, we should note that one of the arguments, according to which the scientists believe that the Argonauts trip to the kingdom of Colchis is a myth and not reality, is that there are no buildings which prove the existence of a powerful Colchis kingdom during the XII–XI centuries, BC. In our opinion, because the Caucasian region represents a young orogenic system, where many intensive natural disasters have taken place we think such events could be a logical reason for the possible destruction of any physical evidence of the culture of ancient Colchis. Such possibilities that the destruction of any evidences of the ancient Colchis civilization was caused by major earthquakes and perhaps associated landslides. the same type of geologic activity which caused the sudden destruction of the ancient Mycean's civilization in XI century BC. In particular, the eruption of the Santorini super volcano in the Eastern Mediterranean, that has been extensively discussed by scientists (Balter, 2006). Of course, we should also take into account what would have been numerous wars of conquest that the ancient kingdom of Colchis had to tolerate, any one of, which would bring about the destruction of its cultural heritage as well. Troy is a good example of such a case where the destruction was so complete that if it were not for Schliemann's obsession with the excavations for the whereabouts of ancient Troy we would not have known anything about its physical existence even now; let alone, from the entire poem of Homer. Taking into consideration the above mentioned and the reality that the Argonaut's expedition took place far earlier than Trojan war, the edifices of that period which confirm the strength of the ancient Colchis kingdom should have been destroyed.

8. Conclusions

This analysis of our geological research and this review has shown that the Svaneti region is rather rich in gold occurrences, which are characteristic of collisional orogens. These occurrences are found in the Paleozoic “crystalline basement complex” as well as in the younger Jurassic intrusions and sedimentary cover. Gold districts that are associated specifically with intrusive rocks of Jurassic age around the world, are not distinguished by their large size. In the Svaneti region these Jurassic-aged gold occurrences are represented by orogenic gold-quartz-sulfide vein systems characteristic of collisional orogens association.

From our modern geological research data we can come to the conclusion that the “gold sands” mentioned in ancient Greek mythology and in historical sources were a geological reality and that our work shows that the gold content in the rivers sands of this region are sufficiently large to give grounds for the creation of legends that describe Svaneti as the “country rich of this noble metal”. When our geological research is coupled with and the

presence of modern implements and techniques, that have ancient historical precedents for gold placer mining, we share the viewpoint of the Roman historian Apian Alexandrine (90–170 AD) who believed that that the myth about expedition of the Argonauts and their quest for the “Golden Fleece” was real. We assert that their expedition to the Colchis Kingdom, was a real event, and that the main purpose of this mission was to obtain gold and gold mining technology from those who were working the rivers sands of the Colchis Kingdom.

The interest in the phenomena of the “Golden Fleece” according to our research, is connected with the sheepskin (fleece) technique of gold mining from the rivers, the final result of which was a gold imprinted sheepskin. It was the fanciful characterization of this factual process which resulted in the formation of the romantic concept or social phenomena of the “Golden Fleece”, that has existed in the civilized world ever since Homer's time.

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