

Archäometallurgie der Alten Welt

Beiträge zum Internationalen Symposium „Old World Archaeometallurgy“,
Heidelberg 1987

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Titelbild

Eine der wichtigsten Fragestellungen der Archäometallurgie ist die nach der Herkunft von Metallartefakten und deren Zuordnung zur Erzlagerstätte. Hierzu haben in den letzten Jahren verschiedene Forschungsprojekte im Mittelmeerraum grundlegende Beiträge geliefert. Als sehr nützliche naturwissenschaftliche Untersuchungsmethode hat sich dabei die Analyse von Bleisotopen erwiesen.

Das Titelbild zeigt einen der bekannten „Ochsenhautbarren“, eine für das 2. Jahrtausend v. Chr. typische Handelsform von Kupfer. Bronzezeitliche Dolche repräsentieren das Endprodukt der Metallurgiekette. Im Diagramm sind die Bereiche der Bleisotopenzusammensetzung von Erzen aus der Ägäis und von Zypern dargestellt. Da sich die Isotopenverhältnisse des Bleis bei der Kupfergewinnung und Weiterverarbeitung nicht ändern, erlaubt ihre Messung in Zwischen- und Endprodukten Rückschlüsse auf die Ausgangserze.

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Place Names

A Guide in Detecting Ancient Gold Mines in Iran

Introduction

The remnants of ancient mining and metallurgy are a very effective guide for discovering ore deposits. Most of the presently known ore deposits, with ore minerals known and used in the old world, are indeed rediscovered following the remnants of ancient mining and metallurgy. This is true especially for the countries with long history and long culture.

Almost all modern copper, gold, silver, lead, iron and many other mineral deposits in the Middle East, Minor Asia, central Asia, northern Africa and south and central Europe are indeed rediscovered following the ancient mining traces. Application of ancient mining remnants in prospection has unfortunately not received any serious attention by economic geologists and has not any scientific discipline or methodology. Beside the economic aspect, a systematic study for determination and classification of ancient mining-metallurgy sites, in time and geography, can contribute much valuable informations in archaeological studies. There is no doubt that it is necessary to try to develop a method for application of ancient mining culture in prospection for new ore deposits. Combination of such a method with modern techniques in prospection will give much better results.

The knowledge about ancient mining and metallurgy and their traces can be grouped into two categories:

1. Physical remains, like ancient mine diggings, kilns and/or slag sites, ruined workshops and workers' settlements, the tools and artifacts etc.
2. Cultural remains, like travellers itineraries, historical, scientific and technical texts, informations by local people, etc.

One of the most informative remains of the second category is the locality names, especially the name of villages.

In the present paper an attempt is performed to apply the proper place names in rediscovering the remote ancient gold mines in Iran. A brief note about the ancient gold, copper, silver and lead mines in Anatolia is also presented.

Place Name Analysis for Gold Prospection in Iran

The geographical and locality names of villages and cities, as well as the names of mountains, rivers, valleys etc., from the whole Iranian territory are reviewed, interpreted and processed. The base topography map of Iran 1:250,000 (JOG) is taken as the reference source for this study. Some 3200 names (out of 100,000) which could probably reflect any mining and metallurgy of any evidence of mineral resources were picked up and processed. The analysis lead the authors to conclude that the names may refer to several different metals and minerals, like gold, copper, iron, silver, lead, gypsum, rock salt and other salts, alum or vitriol, sulfur, gems, pottery clays, petroleum and asphalt, building stones, mineral and/or hot water, etc. The names which may reflect gold were chosen as an example for further study.

From 3200 place names, which could probably reflect ancient mining 312 are considered to relate to gold. A list of these names in Latin alphabet is prepared (Table 34.1). The geographical distribution of names is shown in Fig. 34.1. According to the probability values indicating ancient gold producing sites, the names are grouped into categories A, B, C, D, and E. The probability value of names is assigned on the base of five parameter:

1. Meaning of the name; in all names the words "Zar", "Ghezel" and "Talā", which mean gold, is a component of the name.
2. Geological and metallogenic setting of the site of name; the country rocks in the site of a name may be proper for occurrence of gold or not. Therefore the rock type of each place is considered on the base of geological map of Iran (1:2,500,000) and symbolized as m, m₁, m₂, m₃, g, Tr, Jk, K, Ki, Kp, T, P, Nv, Ns, and A (Table 34.1). The probability value is higher for the name with more proper geological setting.
3. Presence of known gold occurrences close to the locality.
4. Historical and cultural reputation of the concerned area for gold production in ancient times.

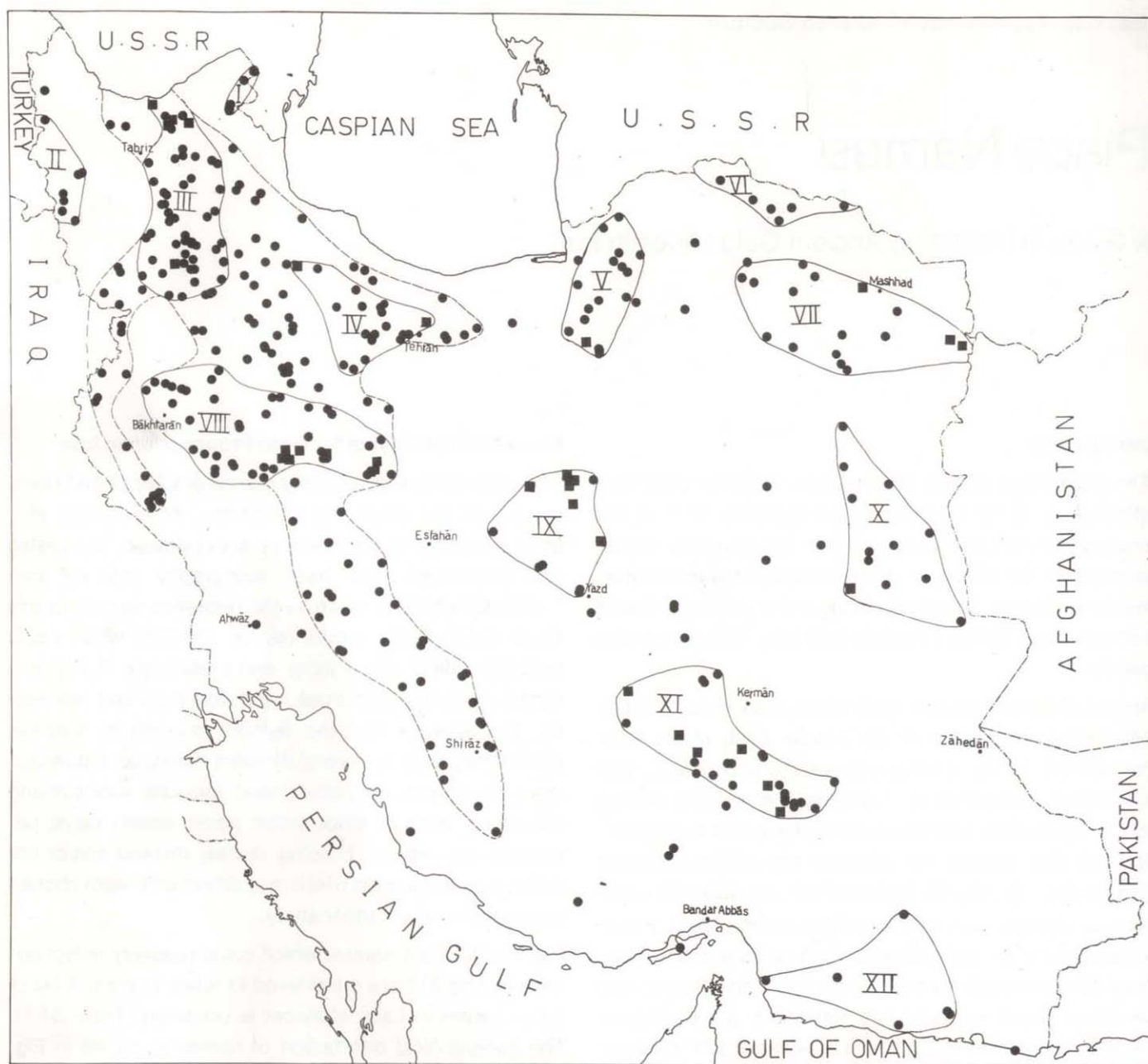


Fig. 34.1: Geographical distribution of place names, which probably reflect ancient mining and/or metallurgy sites for gold in Iran (dots) and the localities of known gold occurrences (squares). Roman numbers I to XII refer to twelve cluster of names, where the probability values of names and their frequency are higher. I = Moghān, II = Orumieh, III = Ahar-Takāb, IV = Zanjan-Tehran, V = Gorgān-Dāmghān, VI = Bojnurd, VII = Mashhad, VIII = Bākhtarān-Delijān, IX = Anārak-Nāiīn, X = Birjand, XI = Rafsanjān-Bam, XII = South Jāzmuriān

5. Personal experience and deduction of the authors in interpretation of the name.

Category A includes the names, which the presence of gold in their sites is proved, like "Zarshurān", "Zarrin", "Kuhzar", "Ghalezari" etc. (Nos. 6, 10, 17, 26, 27 in Table 34.2). Categories B, C, D and E include respectively the names, which the presence of gold in their sites is considered as very probable ($B > 20\%$), probable ($C > 10\%$, $D > 5\%$) and faintly possible ($E > 1\%$). The figures in percent are approximate. For example in the case of category B, from five cases at least one is named after ancient gold mining or gold processing.

The sites of names, when plotted on a map of Iran, shows a zonation, which coincides well with the sites of known gold provinces and occurrences. Some 12 clusters of names are recognized, which we refer to as province I to XII (Figs 36.1–5 and Table 34.1):

- I. Moghān Province,
- II. Orumieh Province,
- III. Ahar-Takāb Province,
- IV. Zanjan-Tehran Province,
- V. Gorgān-Dāmghān Province,
- VI. Bojnurd Province,
- VII. Mashhad Province,

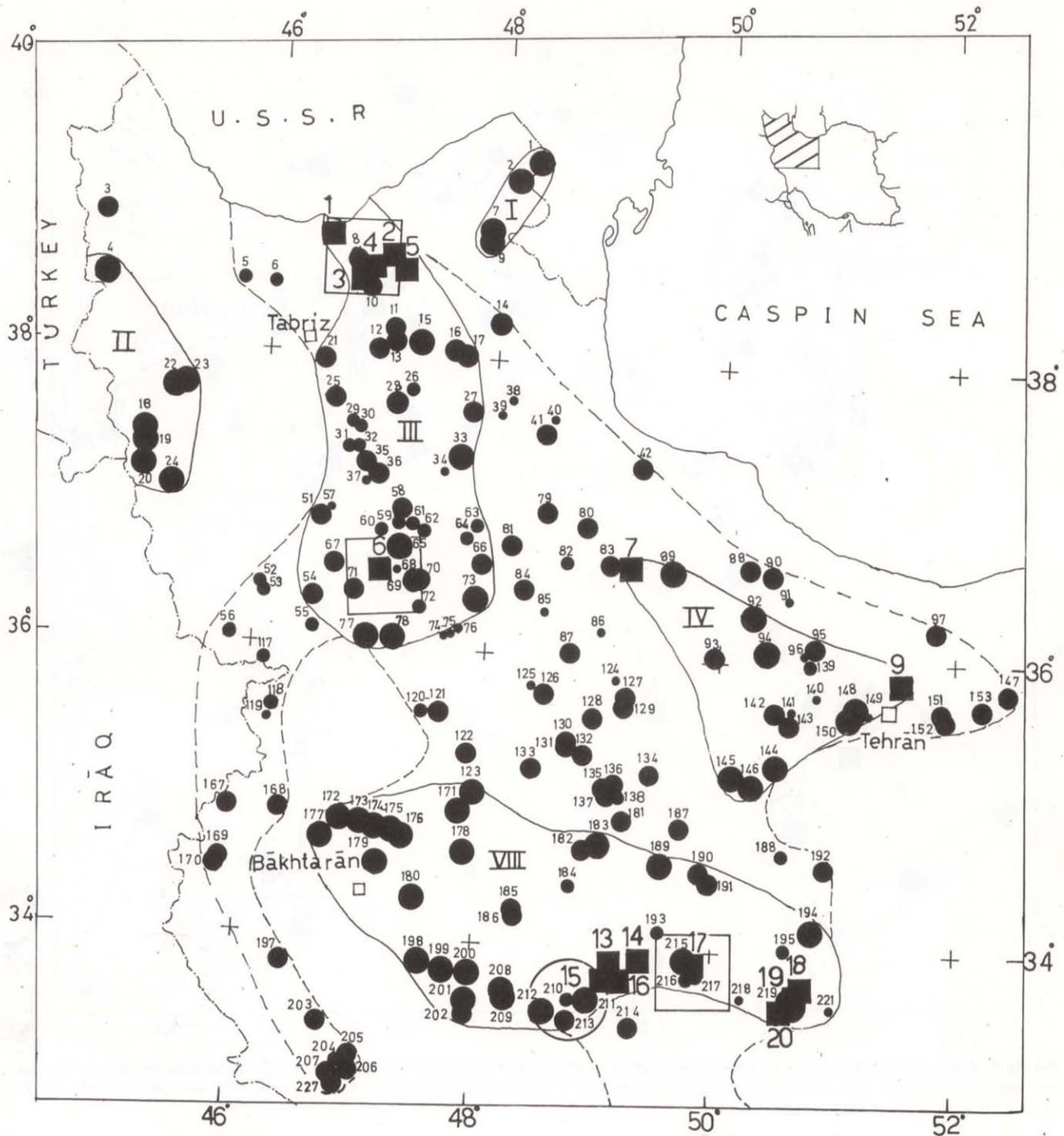


Fig. 34.2: Geographical distribution of place names which probably reflect ancient mining and/or metallurgical sites for gold in NW-Iran (dots): For the names see Table 34.1. The size of the dots represents probability value of each name: largest over 20 %, smallest over 1 % and the two medium sizes over 10 % and 5 % respectively. The squares indicate localities of known gold occurrences. Circles and blank squares indicate place names for gold where ancient gold mines are rediscovered in their localities (In the case of the circle the gold occurrence is rediscovered by application of place name analyses method). For the names see Table 34.2. I = Moghān province, II = Orumieh province, III = Ahar-Takāb province, IV = Zanjān-Tehran province, VIII = Bākhtarān-Delijān province

- VIII. Bākhtarān (Kermānshāh)-Delijān Province,
- IX. Anārak-Nāiin Province,
- X. Birjand Province,
- XI. Rafsanjān-Bam Province,
- XII. South Jāzmuriān Province.

The frequency of names along a wide belt, which runs all along west Iran (west Iran Belt) is higher than in the rest of the country. This belt includes Āzarbāyjān, Kordestān, Zanjān, Hamadān, Tehran, some parts of Lorestān, Khuzestān and Fārs states. Some provinces like Moghān,

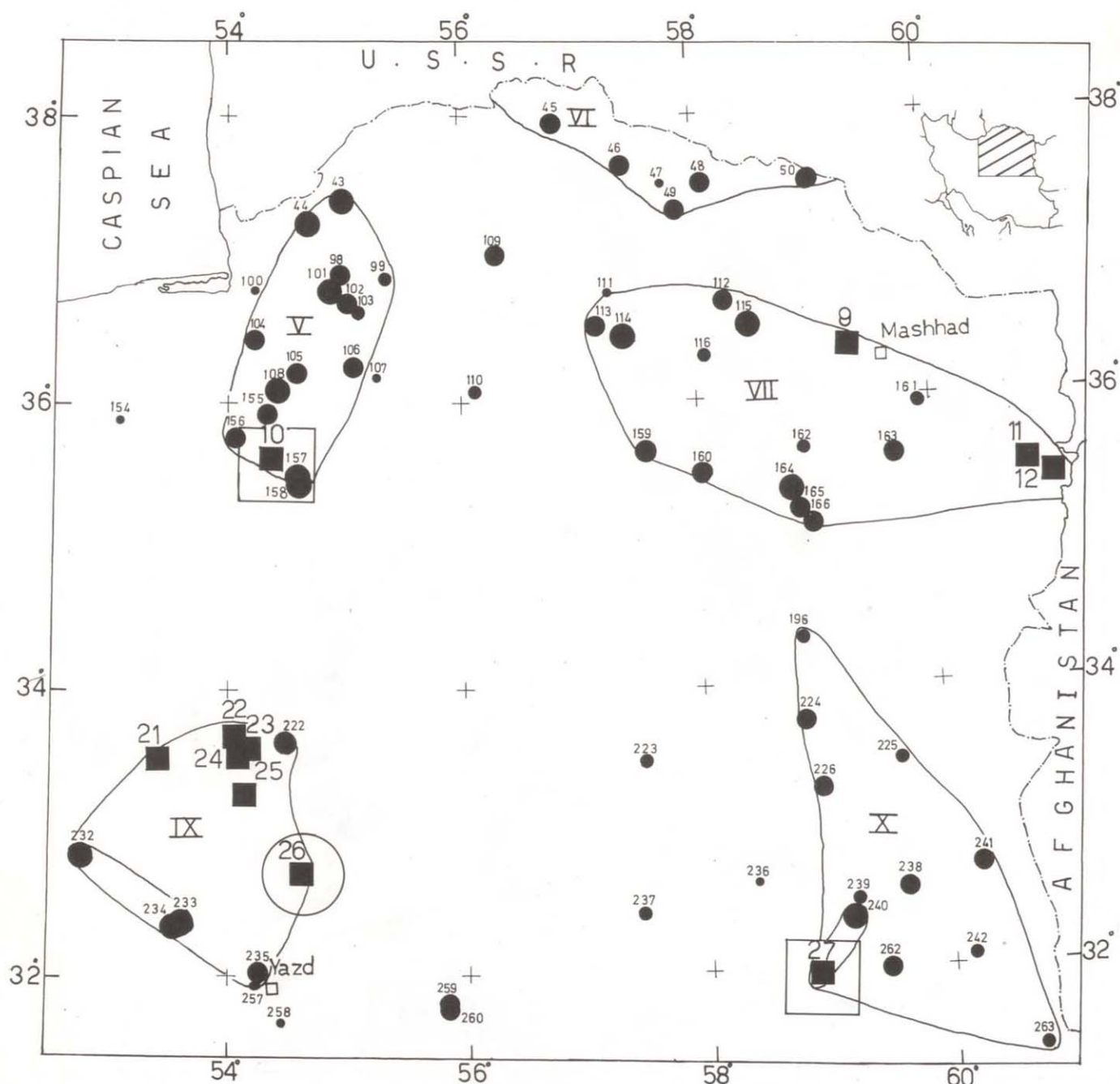


Fig. 34.3: Geographical distribution of place names which probably reflect ancient mining and/or metallurgical sites for gold in NE-Iran. (For legend see Fig. 34.2). V = Gorgān-Dāmghān province, VI = Bojnurd province, VII = Mashhad province, IX = Anārak-Nāin province, X = Birjand province

Orumieh, and Ahar-Takāb seem to extend to the neighbouring countries. In some of the provinces, like Ahar-Takāb, Bākhtarān (Kermānshāh)-Delijān, Mashhad, presence of gold could be expected by the presence of a few known gold occurrences, via the travellers' itineraries, historical texts etc. But in some provinces like Moghān, Orumieh, Gorgān-Dāmghān and Birjand much little is known. The sites of 32 known gold deposits and occurrences of Iran are plotted on the same map for a comparison with the sites of the place names (Figs 34.1–3 and 5).

A list of these gold occurrences is presented in Table 34.2. In such occurrences gold is present either as main element or as associate with copper, lead and zinc. As mentioned elsewhere in this paper the names of several known gold occurrences reflect clearly gold in their meanings (Nos 6, 10, 17, 26 and 27 in Table 34.2). This fact shows that the place name analysis can be an effective method in prospection for gold. On the other hand, the names of some known gold occurrences and presence of ancient working in all of them show that all known gold occur-

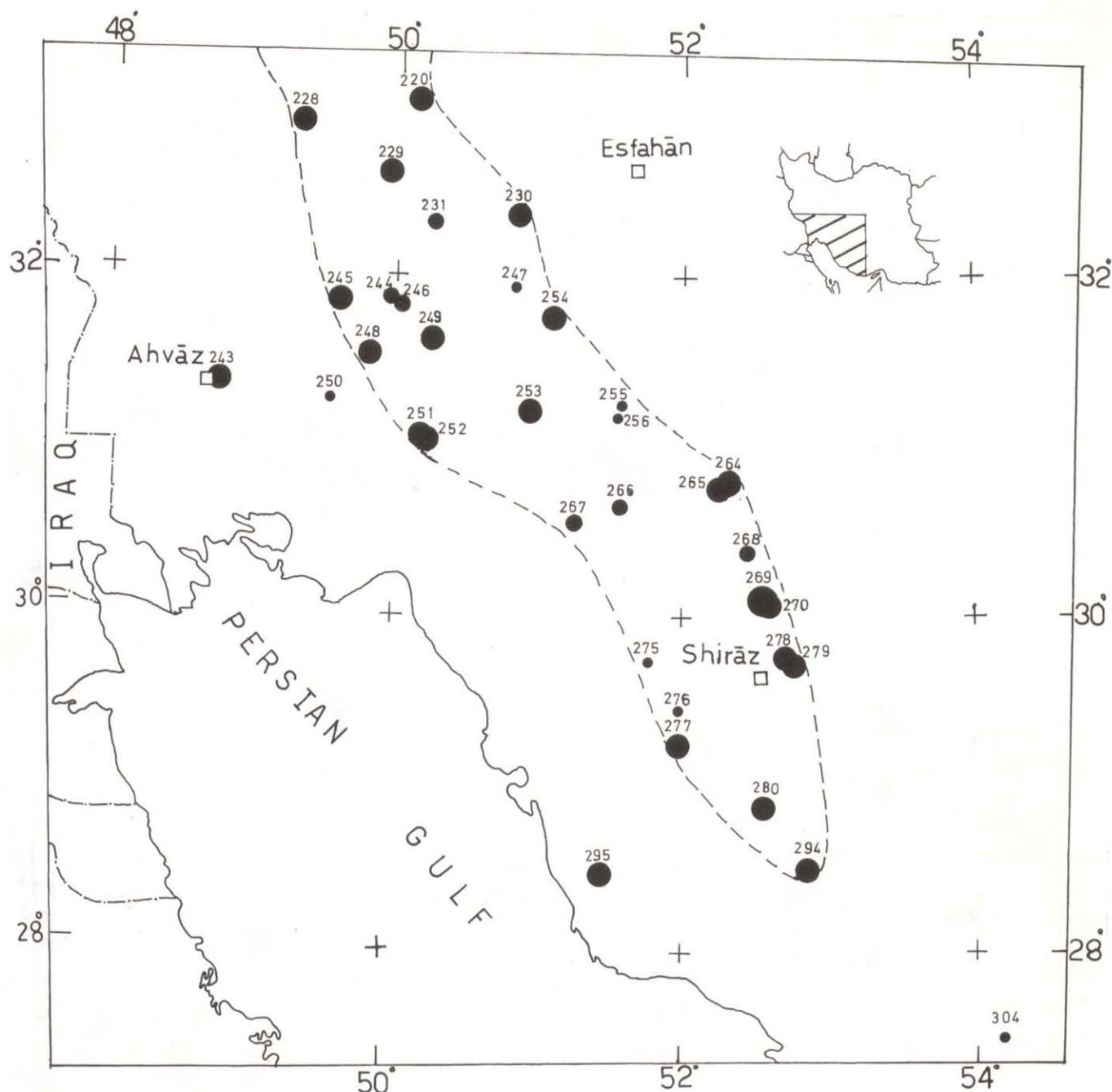


Fig. 34.4: Geographical distribution of place names which probably reflect ancient mining and/or metallurgical sites for gold in SW-Iran (For legend see Fig. 34.2)

rences of Iran are indeed ancient gold mines which have been rediscovered. Occurrences "Zarrin" and "Zarrin-khāni" (No. 26 in Table 34.2 and No. 210 in Table 34.1) were rediscovered recently by application of the meaning of place names and following the ancient mining remnants. A brief description about each occurrence is as follows:

Zarrin Ancient Gold Mine

Zarrin is the name of a village in central Iran on an ancient caravan road from Yazd to Khorāsān (No. 26 in Table

34.2). It has presently only a few families as inhabitants. The ruins of a mud castle adjacent to the village indicates its previous glory. The castle has been probably the living site of the gold miners. The word "Zarrin" means "golden" or "with gold". This meaning was the motive of one of the present authors and co-workers in 1985 for discovering Zarrin ancient gold mine¹. Exploration work is intermittently performed by the same geologists from the Geological Survey of Iran. Several ancient diggings in different places around the Zarrin village, at the southeast and

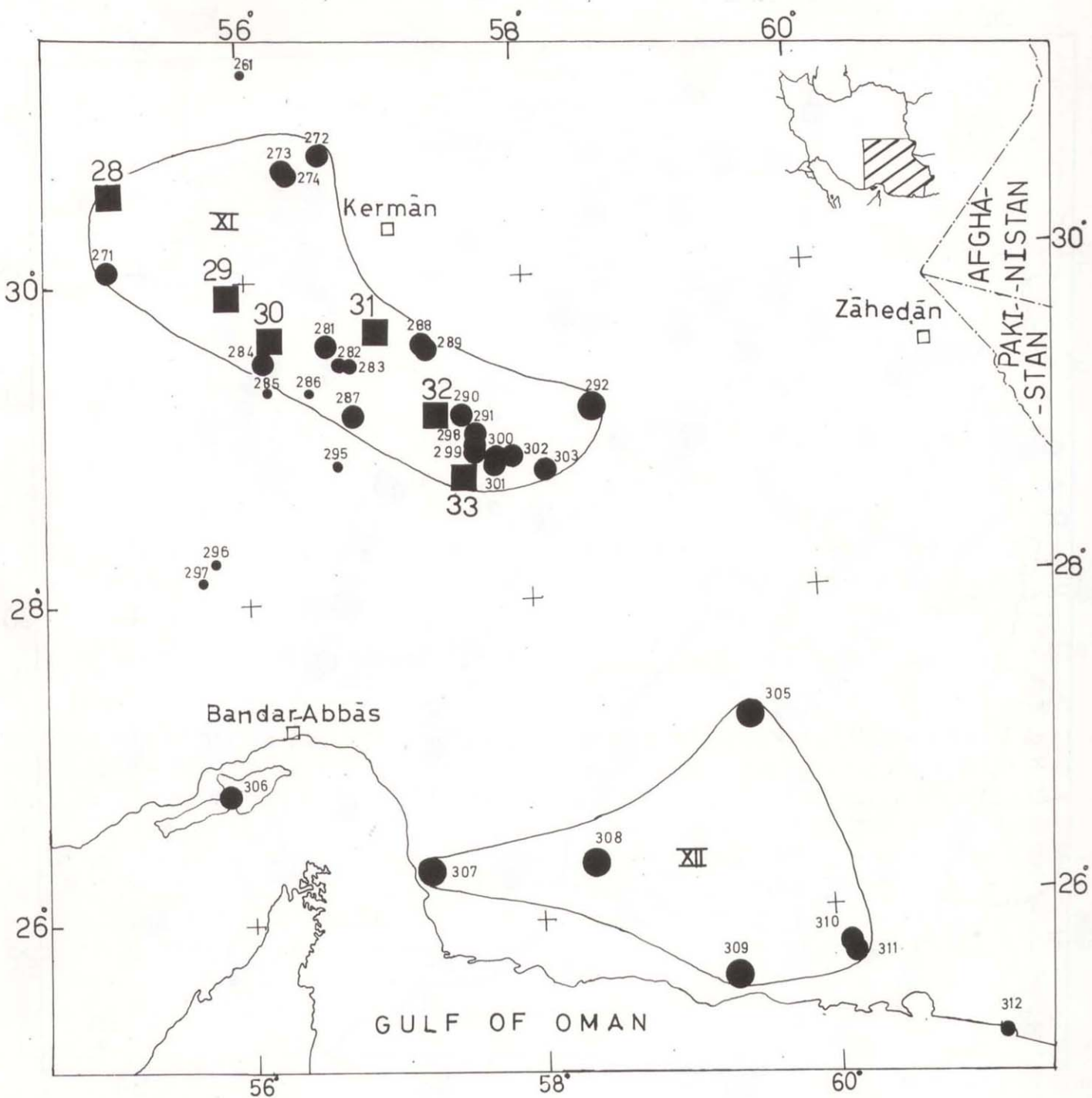


Fig. 34.5: Geographical distribution of place names which probably reflect ancient mining and/or metallurgical sites for gold in SE-Iran (For legend see Fig. 34.2). XI = Rafsanjān-Bam province, XII = South Jāzmuriān province

southwest foothills of the Zarrin Mountain are found. The diggings are located in alluvial fans of three rivers.

The results of the first stage of washing in the river bed with most frequent old diggings, i.e. “Zarrin-e-Kuchak river” showed about 1 g/ton gold in the river sands. A few big grains of native gold, the biggest being 1.70 g were found by washing, as well as by naked eye in the site of ancient diggings. The gold mineralization is apparently in the crystalline complex of Late Paleozoic-Early Mesozoic, along a contact zone between a granite mass and overlying schists, as well as in the schists.

Zarrinkhāni Gold Indication

Zarrinkhāni is the name of a village 100 km east of Khorramābād, Lorestān, west Iran (No. 210 in Table 34.1). As mentioned above “Zar” is gold and “Khān” is probably a modified pronunciation of “Kān” which means mine or deposit. Hence “Zarrinkhāni” means probably gold mine. The meaning of this name was the motive for a prospecting team from the Geological Survey of Iran including one of the present authors, to look for gold around Zarrinkhāni². The first field test was carried out by washing 13 samples of sand in the Zarrinkhāni river. In two samples

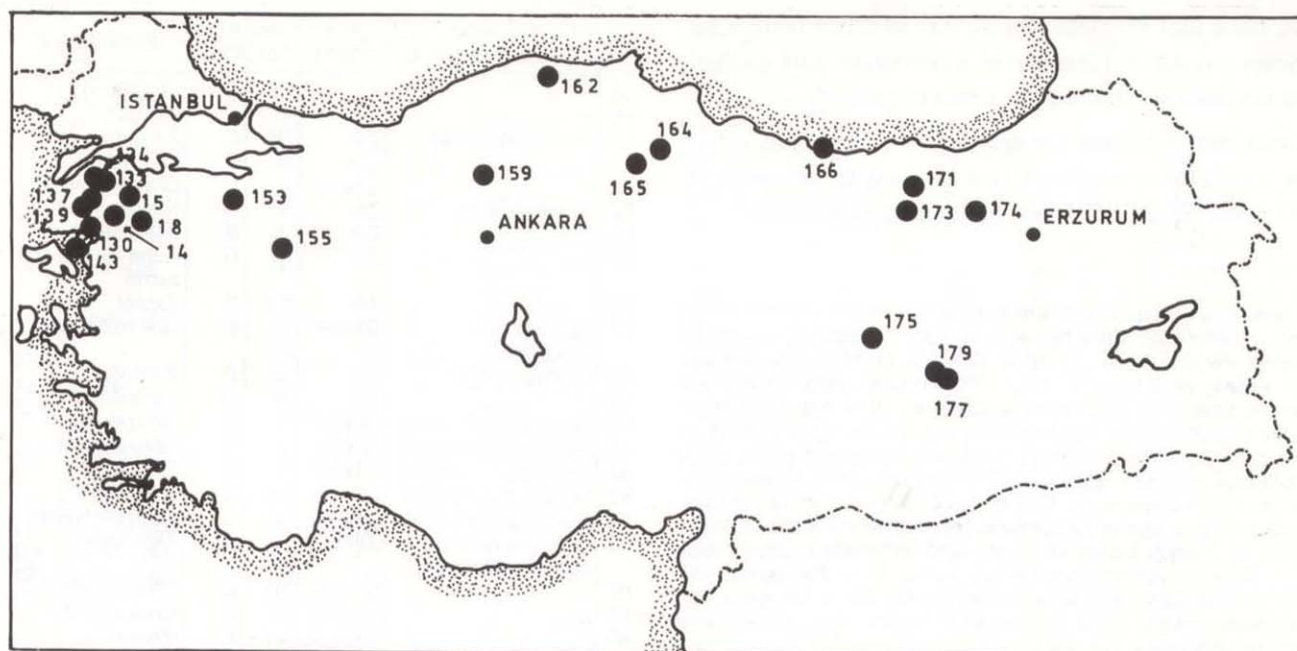


Fig. 34.6: Locality map of some ancient mining and metallurgy sites of Turkey. The names of sites reflect somehow ancient mining and/or metallurgy activities, cf. Table 34.3

gold grains were found. Gold is supposed to be driven from the Upper Cretaceous-Early Tertiary volcanosedimentary rocks, composed of tuff, shales, marls and microconglomerates. This rock sequence is stratigraphically an equivalent of the Upper Cretaceous-Paleogene well known ophiolitic complex along the Zagros thrust zone. More exploration works is required to find out the source rocks.

A brief note about the place names, related to ancient mines in Anatolia:

Some of the ancient mines and metallurgy sites of Anatolia are recently well studied in the frame of a German-Turkish archaeometallurgical project. Round 200 sites with ancient workings are studied and the results are published³. On the base of informations obtained from this two reports a preliminary review of locality names is performed by the present authors.

The ancient mines and/or slag localities are coded as TG 1 to TG 185. In some of the localities several ancient workings, each with its own local name, are clustered under one code (for example: TG 18 and TG 18 D, E, F).

From nearly 200 names of investigated localities 22 names, which reflect clearly or give sign to ancient mining and/or metallurgical activities, are picked up by the present authors (Table 34.3 and Fig. 34.6). From 22 names 15 indicate directly the metals, which have been obtained from the corresponding sites; namely gold, silver, copper and lead (Nos TG 14, 15, 18, 130, 133, 137, 139, 155,

159, 162, 165, 171, 173[?], and 177). In other cases the names indicate mining and/or metallurgy activities without referring to the type of obtained metal. In ten cases the investigations by the German-Turkish team confirm that the metal, which is reflected in the corresponding name, has been the product of that ancient mine (Nos TG 14, 18, 133, 155, 159, 162, 164, 165, 173[?], and 177). In six cases the names clearly indicate gained metal whereas the investigations by German-Turkish team do not mention it (silver in TG 14, 15 and 171, gold in TG 130, copper in TG 137 and lead in TG 139).

Conclusions

The place names can contribute much to rediscover ancient mines and metallurgy sites. This is true especially for those parts of the world with longer culture and history. The systematic and statistical analysis of place names can be applied as an effective method in prospecting for ore deposits. A combination of this method with the ordinary strategic exploration methods will bring about much better results and will reduce the costs. It is equally important from the archaeological point of view. An ancient mining and metallurgy locality is not only a probable ore deposit but it is meanwhile a valuable archaeological site, which may play a key role in some important problems in archaeology. This method is quite effective for discovering such sites.

We hope that the systematic study of place names becomes popular and suggest an international joint geological-archaeological research project to be held.

Concerning the place names for gold prospection in Iran we expect that the informations and results, presented in this paper will be a fair platform for gold prospection.

Table 34.1: Place names which probably reflect ancient mining and metallurgical sites for gold in Iran. Probability values for names are: B > 20 %, C > 10 %, D > 5 %, and E > 1 %. Geological setting of places is: m = Pre-Tertiary metamorphic volcanosedimentary complex; m₁ = Complex 'm' + granitoids; m₂ = Mafic and ultramafics, in association with 'm'; m₃ = complex 'm' of acidic composition; g = Shaly, marly and carbonatic rocks, partly volcanogenetic; M = Mesozoic; Tr = Triassic; JK = Jurassic-Cretaceous; K = Cretaceous; Ki = Lower Cretaceous shales and carbonates; Kp = Upper Cretaceous-Paleogene volcanosedimentary rocks i.e., flysch facies with mafic and ultramafic interbeddings; T = Tertiary volcanosedimentary rocks; P = Paleogene volcanosedimentary (and subvolcanic) rocks; Nv = Neogene volcanosedimentary (and subvolcanic) rocks; Ns = Neogene sedimentary rocks; A = Quaternary

No.	Remarks (Probable meaning)	Key Word	Geol. Sett.	Prob. Value	Place Name
1	Goldsmith	Zar	Ns	B	Zargar
2	—	Zar	Ns	B	Zarnigeh
3	Gold (or red) stone	Ghezel	m ³	C	Ghezeldāsh
4	Golden	Zar	m ²	B	Zari
5	—	Zar	A	D	Golizar
6	Gold mine	Zar	Nv	D	Zarghān
7	Goldsmith	Zar	P	B	Zargar
8	—	Zar	Nv	B	Zarnekāb
9	—	Zar	P	B	Zargar goli-Bālā
10	Golden (or reddish)	Ghezel	Nv	C	Ghezeljeh
11	Golden (or reddish)	Ghezel	Nv	C	Ghezeljeh
12	Golden (or reddish)	Ghezel	Nv	C	Ghezeljeh
13	—	Zar	Nv	B	Zarnagh
14	—	Ghezel	Nv	C	Kuhe-Ghezelgol
15	—	Ghezel	Nv	C	Ghezeljehe-Sādāt
16	Gold (or red) stone	Ghezel	Nv	C	Ghezelghaeh
17	Golden monastery	Ghezel	Nv	C	Sowmehe-Zarrin
18	—	Ghezel	m	B	Zarikhān
19	Gold place	Ghezel	m	B	Zargah
20	—	Ghezel	m ²	B	Gorde-Zarrin
21	—	Ghezel	Nv	B	Zarnagh-Jānghour
22	Gold hill	Tala	Nv	B	Talā-Tappeh
23	—	Zar	Nv	B	Zarmānlou
24	—	Zar	m	B	Zariveh
25	Gold mountain	Zar	Nv	B	Zaridāgh
26	—	Zar	Nv	D	Zarringhobā
27	—	Zar	A	B	Zarnakesh
28	Golden (or reddish)	Ghezel	Nv	C	Ghezeljeh
29	—	Zar?	Nv	D	Zardin-Bālā
30	—	Zar?	Nv	D	Zardin-Paiin
31	—	Zar?	Nv	D	Zareshlou
32	—	Zar?	Nv	D	Zareshlou
33	—	Zar?	Nv	B	Zarnagh
34	—	Zar?	Nv	E	Zardehmalek
35	Gold (or red) mountain	Ghezel	Nv	C	Ghezeldāghi
36	—	Ghezel	Nv	C	Ghezeldābād
37	Red (or gold) stone	Ghezel	Nv	E	Ghezelghaieh
38	—	Ghezel	Nv	E	Ghezel yātāgh
39	—	Zar?	Nv	E	Zarchābād
40	Golden plain?	Zar?	Nv	E	Zardashtābād
41	—	Ghezel	Nv	C	Ghezeldaragh
42	—	Zar?	A	C	Gurābe-Zarmikh
43	Gold (or red) hill	Ghezel	Nv	C	Ghezeltappeh
44	Gold (or red) hill	Ghezel	m	C	Ghezeltappeh
45	—	Zar	Ki	B	Zarneh
46	—	Ghezel	Ki	C	Ghezelghān
47	—	Zar	Ki	E	Ghalehzou

No.	Remarks (Probable meaning)	Key Word	Geol. Sett.	Prob. Value	Place Name
48	—	Zar	Ki	C	Zarghānlou
49	—	Zar	Ki	C	Zarigān
50	Golden mountain	Zar	Ns	C	Zarrinkuh
51	—	Zar	m	C	Zarnachi
52	—	Ghezel	m ¹	D	Ghezelgonbad
53	Golden spring	Zar	m ¹	D	Kānizarrineh
54	—	Zar	m ¹	B	Zarkanān
55	—	Zar	m ¹	D	Kuhe-Shameshir zarrin
56	—	Zar	Kp	D	Zarvār
57	Gold (or red) mountain	Ghezel	m	E	Ghezeldāgh
58	Golden village	Zar	m	D	Zarrindeh
59	—	Zar	m	D	Zarrinābād
60	Red (or gold) castle	Ghezel	T	D	Ghezelghaleh
61	Red (or gold) castle	Ghezel	T	D	Ghezelghaleh
62	Golden (or reddish)	Ghezel	T	D	Ghezeljeh
63	Golden (or reddish)	Ghezel	Ns	D	Ghezeljeh
64	Golden (or reddish)	Ghezel	m	C	Ghezeljeh-Bālā
65	Gold washing site or gold washers	Zar	T	A	Zarshurān
66	—	Ghezel	Ns	C	Ghezeltappeh
67	—	Ghezel	m	E	Ghezelghabr
68	—	Ghezel	Ns	E	Ghezel-gheshlāgh
69	Arsenic pigment. No value for gold	—	—	—	Kuhe-Zarnikh
70	—	Ghezel	m	D	Kuhe-Ghezelgunei
71	—	Tala	Ki	D	Kuchetalā
72	Golden (or reddish)	Ghezel	Ns	D	Ghezeljeh
73	Goldsmith	Zar	Ki	B	Zargarān
74	Red (or gold) dom	Ghezel	Ns	E	Ghezelgonbad-Pāim
75	Red (or gold) dom	Ghezel	Ns	E	Ghezelgonbad-Bālā
76	—	Ghezel	Ns	E	Ghezelkhātun
77	—	Zar	m	D	Zarrinehupātou
78	Golden	Zar	Ns	D	Zarrineh
79	—	Zar	Nv	C	Zarik
80	—	Zar	Nv	B	Zarni
81	Gold hill	Ghezel	Nv	C	Ghezeltappeh-e-Bayāt
82	—	Zar	Nv	C	Zarnān
83	—	Zar	Nv	C	Shizar
84	—	Zar	Ns	C	Zarrinābād
85	—	Zar	Ns	E	Zarzar
86	—	Zar	m	E	Zarepāsh
87	—	Zar	A	C	Zarringar
88	Gold mountain	Zar	T	C	Kuhzare-panjdar
89	Gold mine?	Zar	P	B	Zarrinkhāni
90	—	Zar	m	C	Zarābād
91	No value for gold	—	—	—	Gāzarkhān
92	—	Zar	T	B	Kuhzarnow
93	Golden	Zar	A	C	Zarrinābād
94	Goldsmith	Zar	A	B	Zargar
95	—	Zar	m	C	Kuhe-Zarchigāni
96	—	Zar	m	E	Kuhe-Zardehchāl
97	Golden cliff	Zar	m	C	Zarrinkamar
98	—	Zar	m	C	Zarringel
99	—	Zar	m	E	Kotale-Zarādieh
100	—	Zar?	A	E	Zarāmahalleh
101	Mountain of gold searcher	Zar	m	B	Kuhe-Zarju
102	Golden cliff	Zar	M	C	Kuh-Zarrinkamar
103	Golden river	Zar	A	D	Rudkhānehe-Zarrin
104	—	Zar	m	D	Zardavān
105	—	Zar	A	D	Zarrinābād
106	—	Zar	T	D	Reshtehe-Zarish
107	—	Zar	A	E	Zardineh
108	—	Zar	A	C	Zargārbād
109	Golden cliff	Zar?	A	C	Kuhe-Zarrinkamar
110	—	Zar	m	C	Kuhe-Kamarehzarak
111	—	Zar	A	E	Zurābād

No.	Remarks (Probable meaning)	Key Word	Geol. Sett.	Prob. Value	Place Name	No.	Remarks (Probable meaning)	Key Word	Geol. Sett.	Prob. Value	Place Name
112	Gold (or red) mountain	Ghezel	T	C	Kuhe-Ghezel	180	Golden brook	Zar	M	C	Zarrinjub
113	—	Zar	Kp	C	Zarghān	181	No value for gold	—	Nv	C	Kuhe-Gheziardarreh
114	Gold mountain	Zar	Kp	B	Kuhzar	182	Gold or red mountain	Ghezel	m	C	Kuhe-Ghezeldāgh
115	—	Zar	T	B	Zarandeh	183	Gold mountain	Zar	A	B	Kuhzareh
116	—	Zar	m	D	Zarghi	184	Red or goldstone	Ghezel	m	E	Kuhe-Ghezelghayeh
117	Gold spring	Tala	ml	D	Kānitalā	185	—	Zar?	A	C	Zarāmine-Pāiin
118	—	Ghezel	g	D	Ghezeljehsu	186	—	Zar?	A	C	Zarāmin-Bālā
119	Gold lake	Zar	g	E	Daryāchehe-Zariwār	187	—	Ghezel	P	D	Ghezelghāsh
120	Golden brook	Zar	Nv	E	Zarrinjub	188	Gold village	Zar?	Ns	C	Dehzār
121	—	Zar	Ns	C	Zarrinābād	189	Gold mountain	Zar	m	B	Kudzar
122	—	Ghezel	Ns	C	Zarrinābād	190	—	Zar	A	C	Zarnusheh
123	Golden	Zar	m	B	Zarrineh	191	—	Ghezel	A	C	Ghezeljeh
124	—	Ghezel	A	B	Kuhe-Umerghezel	192	Gold mine?	Zar	Nv	C	Zarghun
125	Gold(en) or red spring	Ghezel	Ns	E	Ghezelbulāgh	193	—	Ghezel	g	D	Ghezeljeh
126	—	Zar	Ns	C	Zarrinābād	194	Gold	Zar	P	B	Zar
127	Gold or red hill	Ghezel	Nv	C	Ghezeltappeh	195	—	Zar	T	D	Zarghāmin
128	Golden or reddish	Ghezel	A	C	Ghezeljeh	196	—	Zar	A	D	Howze-Zargar
129	Gold valley	Zar	Nv	C	Zarrindarreh	197	Gold brook	Zar	T	C	Juyzar
130	—	Ghezel	Nv	C	Kuhe-Ghezelābād	198	Golden	Zar	Kp	B	Zarrin
131	—	Ghezel	Nv	C	Ghezelabad	199	Golden	Zar	Kp	B	Zarrinbon
132	Golden or reddish	Ghezel	Nv	C	Ghezeljeh	200	Gold spring	Tala	T	C	Cheshmeh-Talā
133	Golden or reddish	Ghezel	m	C	Ghezeljeh	201	Golden	Zar	T	B	Zarrin
134	Gold or red mountain	Ghezel	m	C	Ghezeldāgh	202	—	Zar	Kp	C	Ghārzār
135	Gold or red ruins	Ghezel	A	D	Ghezelkharābeh	203	—	Zar	K	C	Varzarān
136	—	Zar	A	C	Zargh	204	—	Zar	T	C	Zarāb
137	Gold mine	Zar	A	C	Zarghān	205	—	Zar	T	C	Zarrinābāde-Bālā
138	Red or golden fence	Ghezel	A	E	Ghezelhesār	206	—	Zar	T	C	Zarrinābāde-Pāiin
139	—	Zar	Nv	D	Kashkzar	207	—	Zar	T	C	Zarrinābād
140	Red or golden fence	Ghezel	Ns	E	Ghezelhesar	208	Golden hill	Zar	K	B	Zarrinchighā-Bālā
141	Golden or red spring	Ghezel	P	E	Ghezel-eshmeh	209	Golden hill	Zar	K	B	Zarrinchoghā-Pāiin
142	Golden village	Zar	P	C	Zarrindeh	210	Gold mine	Zar	Kp	D	Zarrinkhāni
143	—	Zar	P	C	Zarrinābād	211	—	Zar	A	B	Zargarāne-Pāiin
144	—	Zar	A	B	Zarand-Kohne	212	Gold valley	Zar	K	B	Derrehzari
145	Gold village	Zar	T	B	Dehzaru	213	—	Zar	A	C	Zarrinābād
146	Gold mine	Zar	T	B	Madanezar	214	—	Zar	m	C	Zarnān
147	Gold mountain	Zar	Nv	C	Kuhe-Zarrin	215	Big gold mountain	Zar	g	C	Kuhe-Biukghuzar
148	—	Zar	A	B	Zarnān	216	Gold mountain	Zar	g	C	Kuhzar
149	—	Zar?	A	E	Ghaleh-Paiine-Zuman	217	Gold mountain	Zar	g	C	Kuhzar
150	Gold mine	Zar	A	B	Zarkān	218	Gold mine	Zar	A	D	Zurghān
151	—	Zar?	T	D	Zardestān	219	—	—	—	—	—
152	—	Zar?	T	D	Zarādar	220	—	Zar	A	C	Zarneh (Naft)
153	Gold mountain	Zar	T	C	Zarrinkuh	221	—	Zar	m	E	Kuhe-Zarmān
154	—	Zar	T	E	Kuhe-Zarajim	222	—	Zar	K	C	Kuhe-Zarmu
155	Gold mountain	Zar	A	C	Khuzarān	223	—	Zar	A	D	Dashte-Zarichāh
156	—	Zar	P	C	Kuhe-Zarrincheshmesh	224	—	Zar	Ki	C	Zarakh
157	—	Tala	A	B	Madane-Talā-Bāgheh	225	—	Zar	T	D	Zurdān
158	Gold mountain	Zar	P	B	Kuhzar	226	Goldsmith site	Zar	A	C	Zargarān
159	Golden hill	Tala	T	C	Tappehe-Tallāii	227	—	Zar	T	C	Zarrinābād
160	—	Zar	T	C	Zarvaght	228	—	Zar	Kp	C	Suzar
161	—	Zar?	m	D	Gholleh-zardān	229	Valley of gold site	Zar	Kp	C	Darzargah
162	—	Zar	Ns	D	Takhte-Zarvand	230	Gold pass	Zar	Kp	C	Gardaneh-Zar
163	—	Zar	Kp	C	Zarkak	231	—	Zar	Kp	C	Kuhe-Zarāb
164	Gold mountain	Zar	P	B	Kuhzar	232	—	Zar?	P	C	Zardeh
165	—	Zar	Ns	C	Zarmehr	233	—	Zar	m	C	Zarjuh
166	—	Zar	Ns	C	Zarnuh	234	—	Zar	m	C	Parzar
167	—	Zar	Kp	C	Bānehzarrin	235	—	Zar	Ns	C	Ashezar
168	—	Zar	K	C	Zarand	236	—	Zar?	T	E	Kihe-Chesh-mehzardāb
169	Golden brook	Zar	T	C	Zarrinju	237	—	Zar?	Tr	E	Zardāgh
170	Golden brook	Zar	T	C	Zarrinju	238	—	Zar	T	D	Zarsotuk
171	—	Zar	m	B	Kuhzaru	239	—	Zar	P	D	Zarmkuh
172	—	Zar	P	B	Kuhe-Zarneh	240	Gold mine	Zar	P	B	Zarkhān
173	Golden brook	Zar	Kp	C	Zarrinjub	241	—	Zar	Kp	C	Kuhe-Kamarzari
174	Gold or red	Ghezel	Kp	C	Ghezel	242	—	Zar	Kp	D	Marghzar
175	Gold or red valley	Ghezel	Kp	C	Ghezeldarreh	243	—	Zar	A	B	Zarkān-Garāneh
176	Gold mountain	Zar	Kp	B	Kuhzarān	244	—	Zar	K	D	Kuhe-Ruzarak
177	Gold hill	Zar	M	B	Zarrinchoghā	245	—	Zar	Ns	D	Dobalutāne-Zarsavand
178	—	Zar?	m	B	Zardeh	246	—	Zar	K	D	Ruzarak
179	—	Zar	M	B	Kuzarane-Sanjabi	247	—	Zar?	m	E	Zurdakāne-Bālā
						248	Golden mountain	Zar	Ns	C	Zarrinkuh

No.	Remarks (Probable meaning)	Key Word	Geol. Sett.	Prob. Value	Place Name	No.	Name	Elements
249	—	Zar	T	C	Zarāmes	1	Qarachilar	Cu, Mo (Pb, Au, W)
250	—	Zar	A	E	Ghariehe- Zarāgoli	2	Khoynari (Khoynarud)	Au
251	—	Tala	T	C	Talāyeh	3	Gūmūsholan	Cu (Au, Pb)
252	—	Zar?	T	C	Zardeh	4	Sūngūn	Cu (Au)
253	—	Tala	T	E	Talāyeh	5	Mazraeh	Cu (Au)
254	No value for gold	—	—	—	Chahe- chehelzari	6	Zarshurān	As (Sb, Au)
255	No value for gold	—	—	—	Zarghāmābād	7	Dizehjin	Cu (Au)
256	King's gold mountain	Zar	K	E	Kuhzare- Pādesah	8	Torqabeh	Au
257	—	Zar	A	E	Zārch	9	Pasqaleh	Zn, Pb (Cu, Ag, Au)
258	—	Zar	Jk	C	Godārzāru	10	Kuh-e-Zar (Dāmghān)	Au
259	—	Zar	m	C	Zārkūh	11	Tārikdarreh	W (Au, As)
260	—	Zar	m	C	Dehzārkūh	12	Olange-Firuzkuh	Au
261	No value for gold	—	—	—	Gāzorā	13	Hoseinābād	Au
262	Golden	Zar	Kp	C	Zari	14	Āstāneh	Au
263	—	Zar	Kp	D	Kuhe-zārfak	15	Hoseinābād	W (Cu, Au)
264	Gold castle	Zar	Jk	C	Kushkezar	16	Revesht	W (Cu, Au)
265	—	Zar	Jk	C	Kuhe-Kushkzar	17	Kuhzar (S-Arāk)	Au
266	—	Zar	T	C	Zaril	18	Muteh (Chāhkātun)	Au
267	—	Zar	T	C	Kuhe-Zarāvārd	19	Muteh (Sen jedeh)	Au
268	—	Zar	K	D	Kuhe-zarapi	20	Muteh (Chāhbāgh)	Au
269	Goldsmith site	Zar	K	B	Zargarān	21	Meskani	Cu (Co, AS, Au, Ag)
270	Small gold mine	Zar	K	C	Zarghānak	22	Talarji	Cu, Pb (Au)
271	—	Zar	A	C	Zarmeh	23	Jameni	Cu, Pb, Au
272	—	Zar	A	C	Zarand	24	Khuni	Cu, Pb, Au
273	Gold mountain	Zar	m	B	Zārkūn	25	Kāl-e-Kāfi	Cu, Mo, W, Au, Ag
274	—	Zar	m	C	Zārchestān	26	Zarrin	Au
275	—	Zar?	T	E	Zardegh	27	Qalehzari	Cu (Au, Pb, Zn, Ag)
276	—	Zar	T	E	Ghalāzār	28	Lachah (Meiduk)	Cu (Au, Ag, Mo)
277	Gold mountain	Zar	T	C	Zarrin kuyeh	29	Sarcheshmeh	Cu, Mo (Au, Ag, Pb, Zn)
278	Gold mine	Zar	K	C	Zarghān	30	Chahār-Gonbad	Cu (Au, Ag)
279	—	Zar	K	C	Kuhe-Zarghān	31	Dozaraktar	Cu (Au, Ag)
280	—	Zar	T	D	Kuhe-Zarbu	32	Avoros-Marghi	Cu, Au
281	—	Zar	P	C	Kuhe-Zarpaz	33	Jiroft	Au
282	—	Zar	P	D	Dahaneh-Zādār			
283	—	Zar	P	D	Zārdār			
284	—	Zar	Ns	C	Zamzarach			
285	Gold plain?	Zar?	Ns	E	Zardasht or Zardosht			
286	—	Zar	Ns	E	Dehzarāb			
287	—	Zar	Ns	C	Zarjun			
288	—	Zar	P	C	Zārchu			
289	—	Zar	P	C	Zārrude-Bālā			
290	—	Zar	Nv	C	Zarchu			
291	—	Zar	Nv	C	Bondar-Zurak			
292	Goldsmith's village	Zar	P	B	Dehzargar			
293	Gold workshop	Zar	A	C	Zargari			
294	Goldsmith's mountain	Zar	T	C	Kuhe-Zargar			
295	—	Zar	m	E	Zarāb			
296	—	Zar	T	E	Tazaraj (?)			
297	—	Zar	K	E	Saied-Juzar			
298	—	Zar	m	D	Zurakkūh			
299	—	Zar	Nv	D	Dahanehe-Zurak			
300	—	Zar	P	C	Zārin			
301	—	Zar	A	C	Kuhe-Zārin			
302	—	Zar	Nv	C	Zarrinkhule-pāiin			
303	—	Zar	Nv	C	Juzargān			
304	No value for gold	—	—	—	Zarvān			
305	—	Zar	A	B	Zarābād			
306	Golden mountain	Zar	Ns	C	Kuhe-Zarrin			
307	—	Zar	Ns	B	Zarābād			
308	Gold site?	Zar	Ns	B	Zarigeh			
309	—	Zar	A	B	Zarābād			
310	Gold mountain?	Zar	Ns	C	Kuhe-Guzar			
311	Gold mountain?	Zar	Ns	C	Guzar			
312	—	Zar	A	D	Rase-Zarrinsar			

Table 34.2: Some gold and gold bearing copper and polymetallic occurrences in Iran

Locality Index	Place Name	Probable Meaning of Place Name	Seeliger et al. 1984 Pernicke et al. 1985	Interpr. After Name	Locality-(Province)
TG 14	Simirlikursun	Silver bearing Lead	Pb, Zn (Cu, As)	Pb, Ag	Near Karaaydin (Balikesir)
TG 15	Gümüşler	Silver(s)	Pb, Zn, Cu	Ag	A village (Çanakkale)
TG 18	Kızıl Tepe	Gold Hill	Pb, Ag, Au (As)	Au	A hill, Balya (Balikesir)
TG 130	Kızılkeçeli	Gold Keceli?	Fe, As, W, Py	Au	A village near Güre Village (Balikesir)
TG 133	Bakirlik	Copper-lik	Cu, Pb, Zn	Cu	An occurrence near Doğançılar village (Çanakkale)
TG 134	Madaniçi	Mine workings	Pb, Zn, Cu	—	A valley around Koçayayla village (Çanakkale)
TG 137	Hacibekirler	Haci coppers	Pb, Py	Cu	A village (Çanakkale)
TG 139	Kursunlu	Lead work	—	Pb	A village (Çanakkale)
TG 143	Maden Adası	Mine Adası	Pb, Zn, Cu, Fe	—	An Island (Balikesir)
TG 153	Maden beleni Tepe	Mine beleni Hill	Pb, Zn (Cu, As)	—	A hill (Bursa)
TG 155	Gümüşkoy	Silver köy	Pb, Ag, Zn (Cu, As, Sb)	Ag	A village (Kütahya)
TG 159	Küçük Bakir Tepe	Small copper Hill	Pb, Ag, Zn	Cu	Işık Dag Pb, Ag, Zn Occurrence (Ankara)
TG 162	Küre or Küre-i-Nihas	Furnace or Furnace of copper (Arabic)	Cu, Zn (Pb, Ag)	Cu	A big copper deposit (Kastamonu)
TG 164	Bakir Çay Madenköy	Copper river Mine köy	Cu, Fe (Pb)	Cu	Derealan/Bakir Çay Copper occurrence (Amasya)
TG 165	Gümüş (Gümüşacıköy)	Silver (Silver acıköy) Kūs cavern Hill	Pb, Ag	Ag	A village (Amasya)
TG 166	Kus Mağarası Tepe Madenköy Mağara	Mine Köy Cavern	Pb, Ag (Zn, Cu, Sb) Pb, Ag (Zn, Cu, Sb)	—	Piraziz-Madenköy (Ordu)
TG 171	Gümüşhane	Silver center	Pb, Zn, Cu	Ag	An ancient mining locality (Gümüşhane)
TG 173	Hazine Mağara Zankar	Store cavern Copper green (Cu Carbonate pigment, malachite?)	Pb, Zn, Cu, Ag Pb, Zn, Cu, Ag	— Cu	An ancient mining locality An occurrence locality (Gümüşhane)
TG 174	Maden (near Helva Maden Mine)	Mine	Cu	—	A village near Helva Maden occurrence (Gümüşhane)
TG 175	Mistik Mağara	Mistik cavern	Pb, Ag (Au, Cu)	—	A sector of Keban Polymetallic deposit (Elazığ)
TG 177	Kisabekir	Kisa copper	Cu (Zn)	Cu	An occurrence and a village near Ergani deposit (Elazığ)
TG 179	Eski Mağara	Eski cavern	Cu	—	A locality near Haçan village (Elazığ)

Table 34.3: Place names of some ancient mine and metallurgy sites of Turkey. The name of sites reflect somehow ancient mining and metallurgy activities

NOTES

- 1 M. Momenzadeh/N.R. Omran/M. Lotfi: Internal report by the Geological Survey of Iran, Tehran 1985.
- 2 M. Farjad/M. Momenzadeh/M. Lotfi: Internal report by the Geological Survey of Iran, Tehran 1986.
- 3 Pernicka/Seeliger/Wagner/Begemann/Schmitt-Strecker/Eibner/Öztunali/Baranyi 1984.
- 4 Seeliger/Pernicka/Wagner/Begemann/Schmitt-Strecker/Eibner/Öztunali/Baranyi 1985.

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