

## What are Bi-Metal Swords?

Science

Easy question, easy answer:

**Bi-metal swords have an **iron** blade  
(usually straight and double-edged)  
and a **bronze** hilt**

- With this definition I neglect the occasional iron sword with a silver or gold hilt. I shall also neglect the "later" Celtic swords meeting that definition, e.g. the ["Celtic Anthropoid Hilt"](#) sword, as well as Chinese swords, or anything else made after about 700 BC.  
Examples of what I mean are shown below:



### Examples of bi-metal swords

Other examples are shown in various parts of the hyperscript, like [here](#), [here](#), and [here](#).

[This link](#) shows a collection of all I could find

- The three swords above were offered at an auction in Feb. 2021. They were described as "Western Asiatic *Luristan* Swords" and that is not necessarily wrong since "Western Asiatic" covers a lot of territory. However, if these swords are from Luristan proper remains to be seen.

The presently held majority opinion in the archaeological community puts their origine rather to "North Iran".

Now I want to present something that puzzled me very much. In a major and important [paper](#) from 2010, C. K. Piller states: "Swords of this type can have a bronze or *iron* blade of considerable length with a cast-on bronze hilt. *Bi-metallic* objects such as this have been designated as "*Leitfossil*" (=leading, guiding or index fossil) of the Iron Age II (10th to 9th centuries BC)."

That appears to be quite clear and encouraging for my objectives here. However:

**The three swords above plus  
a few more shown in the links,  
is about all you can find  
while searching the literature in the Net**

- Where are all those "Leitfossilien"? Khorasani in his [splendid book](#) has exactly one, shown [here](#). Piller, in his [important review](#), shows this specimen:

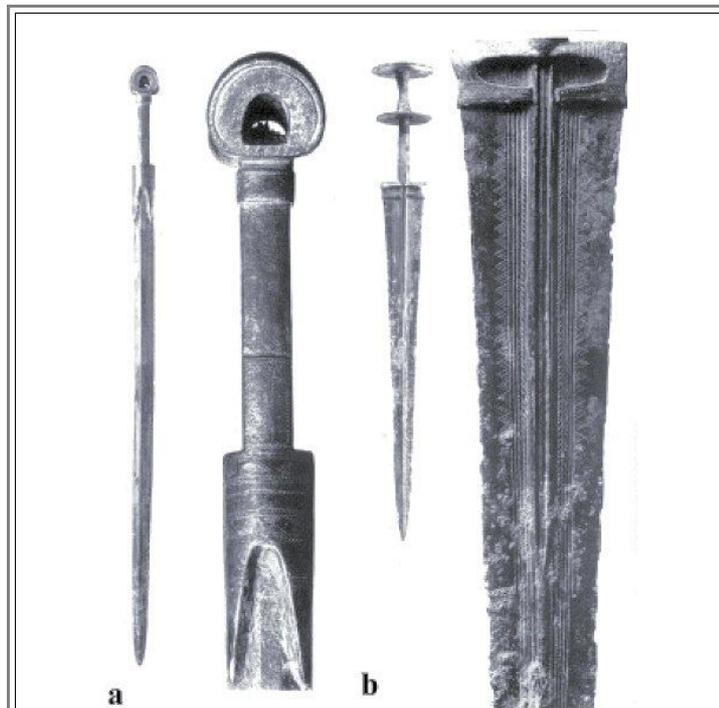


Fig. 2.  
a) Long sword with „ear pommel“ from the art market; b) Sword with „cotton reel“ pommel from the art market. After Hopp, Schaaf, Völcker-Janssen 1992, Pl. 24-25.

- Note the bi-metal sword shown is actually "from the market", not from a dig discussed in Piller's paper. It is interesting to look at the text to this picture:  
"In some cases, the hilts and pommels seem to represent so called swords with ear-like pommels (Fig. 2a). In fact, some bronze daggers have been found in a number of graves around the stelae. Typologically, these weapons have good comparisons in Northern Iran, especially with the material excavated by de Morgan in the Talesh Region. (That excavation took place 1896). .

Typologically, the sword belongs to the type with so called "ear-like pommels" (Fig. 2a) which is distributed mainly in the Talesh Region, but also in adjacent territories of Azerbaijan (Uzuntepe) as well as in northern and north-western Armenia.. Similar weapons are also present in the destruction level of Hasanlu IVB3. Swords of this type can have a bronze or iron blade of considerable length with a cast-on bronze hilt. Bi-metallic objects such as this have been designated as "Leitfossil" of the Iron Age II (10th to 9th centuries BC)4.

Note now that it is not clear if the sword on the right is actually bi-metal (I'm rather sure it's not)).

- The scarcity of bi-metallic swords, in the face of the commonly stated belief of many archaeologists that they are ubiquitous ("Leitfossilien"), induced me to start a "collection" of what I could find. It's in [this illustration module](#). The collections does not contain a single example from a museum - so far I couldn't find one!

▶ We are are forced to conclude that a lot of what was dug out by archaeologists has disappeared in museum basements or made it to the "market". So far, I have not founds a single one with a clear and undisputed [provenance](#). Moreover, none of these "Leitfossilien" (excepting the (unprovenanced) [Essen sword](#)) has ever been investigated metallurgically. It is obvious that the "market". i.e. the hated trade with "unprovenanced" objects is the place to look for bi-metallic swords. To me it what follows is equally obvious:

**It is imperative to take good bi-metallic swords out of the market and move them to qualified museums for preserving and (metallurgical) investigation**

- That means that somebody needs to buy these swords and donate them to a museum. Unfortunately, this is made difficult bey the German "[Kulturgutschutzgesetz](#)"  
More about the "provenance" issue [here](#).

▶ Classical archaeology looses points here. And it get's worse. Find out about the rather embarrassing market-related so-called "pastiche" issue [here](#).

## How Were Bi-metal Swords Made?

▶ How does one make a bi-metal sword? This seems to be a relatively easy question. All you need to do is to forge a lump of iron into a blade with a tang, and then cast the bronze hilt unto it.

- How the the casting part might have been done is described in [Pigott's article](#). Around 1000 BC working with bronze had reached a rather sophisticated level and the ancient metal workers would not have had a problem with that part. They might not have had a problem with the forging part either - we just don't know what they really did. Maybe they had access to the bi-pyramidal stock iron as found in [Sargon II palace in Khorsabad](#) 720 BC but most likely was around much earlier, too. You could just bang it into the required shape or you could use faggoting / piling techniques to homogenize the rather inferior stuff somewhat. Unfortunately we have no metallurgical data besides the ones of the [Essen sword](#) investigated by Yalcin.

Here is a quote from the paper " "Zum Eisen der Hethiter" from Ünsal Yalcin

"Die jüngste Untersuchung eines hethitischen Schwerts brachte *sensationelle Ergebnisse*: Die Schneide des Schwerts wurde aus mehreren Stücken zusammengeschiedet, die mterschiedlich aufgekohlt waren. Diese Technik bildet den Grundbaustein des berühmten Damaststahls und wird noch heute für die Herstellung hochwertiger Klingen angewandt."

Sensational results! A "damascene" i.e. piling technique was used.

▶ In short: While the production of this kind of sword was not necessarily very complex, we just don't know how it was really done. Once more the conclusion is clear

**It is imperative to take good bi-metallic swords out of the market and move them to qualified museums for preserving and (metallurgical) investigation**

● Sorry for being repetitive. But there is no other way.

▮ The story continues [here](#).

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- 1) Gayle Wever: A Persian puzzle. A bronze sword from Teheran  
Penn State Museum "Expedition"  
Fall 1969, p.25
- 2) Simpson and La Niece: New light on old swords from Iran  
British Museum Technical Research Bulletin (4) (p.95-101)  
Archetype Publications, London, 2010