

Hallstatt Swords

Science

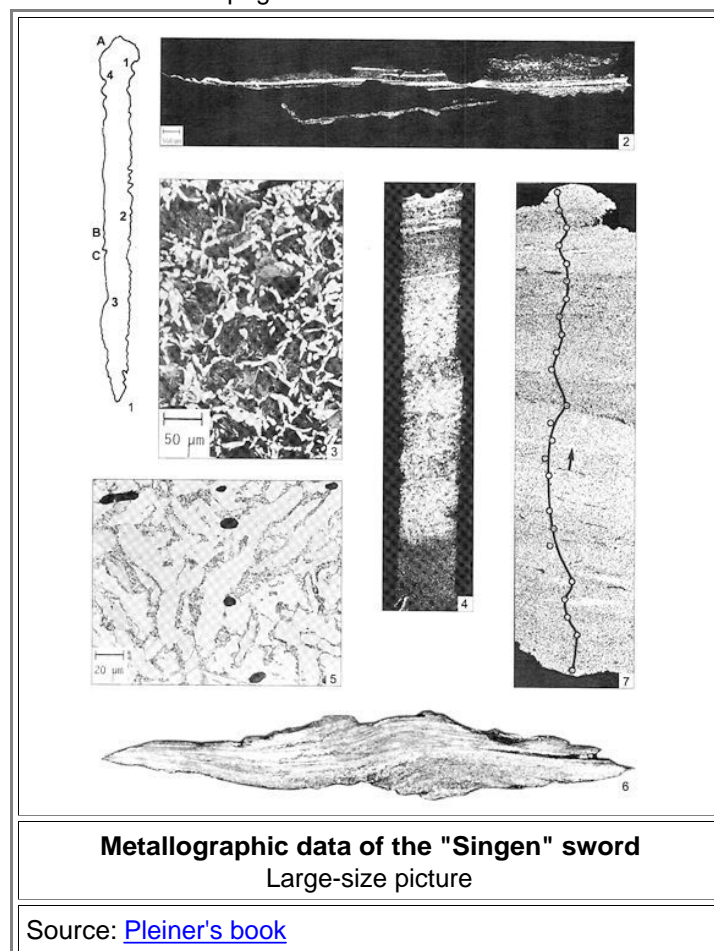
Why do I include Celtic Hallstatt swords here? Quite simple: They are from around 800 BC and their microstructure is similar to the "Leitfossilien" swords discussed here. Well, up to a point. Considering that there are only a few microstructural investigations, the claim that there is a relation between the iron technologies in the north Iran regions and the Hallstatt region in Austria is - so far - quite weak.

Of course we have one more fact supporting the claim above: The similarity between the Assyrian and the Celtic [double pyramid bars](#) of raw iron. If you want to learn more about this, refer to chapter 4 of [Pleiner's book](#); Iron in Archaeology-

● Use the following links for learning more about the [Celts](#) and [Hallstatt](#).

Here we are only concerned about the *early* Celtic sword, i.e. the iron Hallsatt sword, and not about the later stuff; you find that dealt with [here](#).

Unfortunately, this makes the story short.. While there are plenty of 800 BC or so "Hallstatt" swords, some of them in mint conditions, I found no metallographic analysis besides the one [already shown](#). I only found more and better pictures in [Pleiner's book](#). Here is the relevant page:



● What does Pleiner have to say about this sword? Not all that much. Here it is:

Forge welding of carbon-poor iron

A great deal of investigated iron objects reveal the joining of different bands of iron by forge welding (*Pl. X*). In carbon-poor material the individual welds can be recognized by consistent chains of slag inclusions or beaten-in particles of hammer scale, or by discerning parts with differing properties (e.g. phosphoric iron, indicated by Oberhoffer etching; microchemical analyses are still rare). The joining of multiple bands can be denoted as piling. Using parts of various stock may indicate an important economic fact: the recycling of scrap metal. On the other hand, piled blades (if their welds are perfect or accompanied by only minute slag inclusions) have good properties, e.g. they are better resistant against slight bending. The same effect could have been achieved by folding a plate of metal sheet to yield a band intended for the making of a blade. In that case, the welded-together layers did not differ in their composition.

Examples:

The welding-together of bands is attested in the case of one of the earliest European iron swords, that of **Singen**, SW Germany, which comes from a richly equipped inhumation grave of the HB₃ period (9th/8th century BC, see Boll *et al.* 1981, 45 - 51). The investigators drilled out four cylindrical samples from 4 spots on the blade; two of them had decomposed but two revealed an banded structure of alternating iron and steel. Therefore, three cross-sections were later cut out of the blade (A, B, C). The metallic matrix was richly permeated with slag (9 % of volume, 5 % of weight). The slag contained elevated manganese (9 % Mn). The blade was welded together from 2 flat bands; each of them was piled from numerous components of ferritic, ferritic-and-pearlite and perlitic material. Carbon content: 0 to 0.5 % C, average 0.2 %. The spheroidized cementite in some Widmannstätten spots suggest a longer heating under temperature about 700 °C. A steel plate had been placed the edge at the hilt. in the edge. The sword was not of an exceptional quality but the technology of manufacture contained attributes which occurred so frequently during the entire development of hand blacksmithing. *Pl. VIII.*

Pleiner's text to the Singen sword and the pictures shown here.

Source: [Pleiner's book](#)

- It is clear that the Hallstatt smith around 900 - 800 BC knew how the forge weld, "pile" or faggot. It is also clear that his raw material was rather bad (lots of slag and dirt inclusions)
- Taken everything together, I do *believe* (but not know) that there is a connection between the "north Iran" and the European iron technology. Did the early "Celts" bring it along when they migrated West? It is not clear if the Celts had moved in from the East but this "theory" is seriously considered in expert circles.
- Well, nothing helps but more hard data. Some could come from detailed metallurgical investigations of all those "OLD SWORDS"! So, following Shakespeare's advice, let's "kill all those lawyers" (=Kulturgutschutzwächter)¹⁾ and start to do the work.

¹⁾ "Let's kill all the lawyers" is a line from William Shakespeare's Henry VI, Part 2, Act IV, Scene 2. The full quote is "The first thing we do, let's kill all the lawyers"