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Namban steel and Hizen swords: a provocative hypothesis

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An interesting hypothesis was raised by Mr. Kazushige Tsuruta in a small commentary published together with the answer of his Appraisal Quiz number 2 (http://www.aoi-art.com/). This article considers this hypothesis and adds some comments on plausibility. Like all hypotheses this one has supporting evidence but that is far from "proof".

Mr. Kazushige begins his hypothesis by comparing the swords of the *Takada* School of *Bungo* Provence with the *Hizen* School of *Hizen* Provence. These Schools are very familiar to sword collectors and flourished in close proximity to each other in *Kyushu* Japan as shown in old maps of Japan.

Some swords of the *Takada* School are similar in shape and *hamon* to the swords of the *Hizen* School; however, the *Hizen* School enjoys a much better reputation than the Takada swords. Despite the similarity of the two Schools the big difference, according to Kazushige Tsuruta, is in the *jigane* . He maintains that the *jigane* of the *Hizen* swords are simply fantastic and the *jigane* of the Takada schools cannot compare with the *jigane* of the *Hizen* School.

Up to this point, most people would agree with Kazushige Tsuruta; however, he hypothesizes that the difference is due to a closely guarded secret by the Daimyo of the Nabeshima Clan: the use of Namban steel. The *Takada* smiths almost surely studied the *Hizen* methods but without the use of *Namban* steel they could not produce the *Hizen jigane*. *Namban* steel was imported to Japan by the *Nabeshima* Clan and, since this was not an easy thing to do, the *Namban* steel was very expensive.

It is important at this stage to consider a few facts in order to determine whether this hypothesis is tenable.

1) What exactly was the *Namban* steel imported by Japan?

In a previous series of articles (F. A. B Coutinho 2008 parts 1, 2 and 3) it was hypothesized that *Namban* steel was Wootz--high carbon steel-- made in India (see below). The second of the above mentioned series of articles described how this steel was made in India. A complete description is available in an article by Sherby and Wadsworth (1985). The result of the manufacturing process is a "cake" of high carbon steel (with about 1.2% carbon). Figure 1 below shows one of these cakes (The photograph is a courtesy of Oriental Arms). A chunk of a cake was cut and polished. The texture typical of *wootz* is clearly visible.

Real 18 C. Wootz (Damascus) Steel Ingot

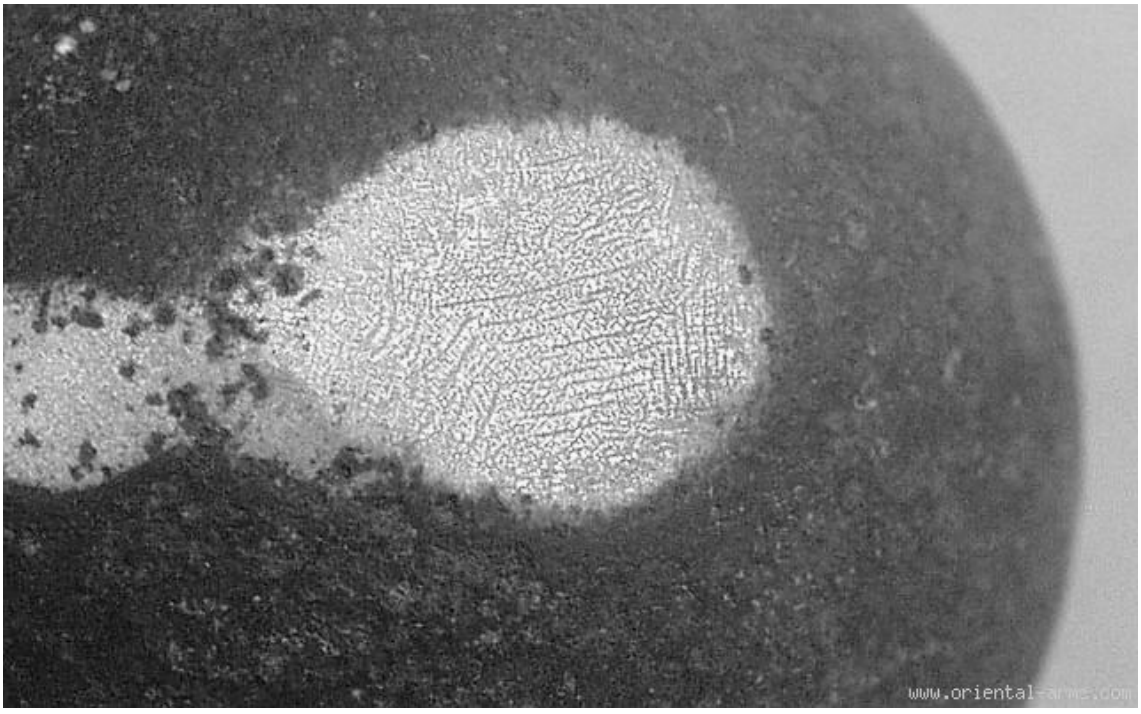

Figure 1- **Real 18 C. Wootz (Damascus) Steel Ingot -**A "cake" of *Wootz* steel (This is an 18th century piece) (Courtesy of Oriental Arms.)

Sensei Tanobe Michihiro (1986) shares the opinion that the *Namban* steel was imported by the Dutch from India (and not from Europe). The cakes are described in an old Japanese book on armor (Sakakibar Kozan (1986)) as being gourd-like. The important passage reads : "The steel known as *Namban* is imported by the Dutch in gourd-shaped (*Hyotan*) masses". In addition, as another argument, it is known that high carbon steel was never used in Europe.

2) Why it is difficult to use *wootz* and how it can be advantageous.

Wootz steel has a content of carbon so high that it is very difficult to work with. In fact attempts to forge it at temperatures below 650 ^{0}C will result in the formation of cracks (Sherby and Wadsworth (1983)). On the other hand attempts to forge at temperatures above 800 ^{0}C will shatter it completely (Sherby and Wadsworth (1985)). The reasons for these phenomena are described in the articles titled "One Problem three solutions" (2008) published in the Newsletter of the JSSUS.

A description of the use of *Namban* steel in *Hizen* swords can be found in Hizen To Handbook by Eguchi Soshin(1997). On page 82 of this book he says that the term *Namban tetsu* is rare in *Hizen* swords but that the term *Oranda kitae* is very common. He continues that the two things are different and that *Oranda kitae* is a different method of forging used in the manufacture of guns. This is hard to believe. The steel used for guns must have completely different characteristics than the steel use for swords (Olson 1974). In fact barrels steel ***must*** be soft while the steel of Japanese swords must be very hard. With this in mind, the *Hizen* swordsmiths were motivated to learn, possibly from gunsmiths, how to tackle the extreme brittleness of *wootz* steel in order to render it more manageable

Ultimately the *Hizen* swordsmiths arrived at the solution of forging the *wootz* steel by mixing it with *tamahagane*.

The *Hizen* smith that is specifically named as having learned how to forge in the Holland style is Yukihiro. According to Eguchi Soshin (1997), page 116, he went to Nagasaki to learn from Yakushiji Tanenaga how to do *Oranda kitae*. In addition, Sensei Iwata Takashi (1987) comments that he also studied, in Hiroshima with a swordsmith called Hisatsugu, learning how to forge in the " Holland style". As suggested above the difficulty in using the Indian *wootz* steel can be attributed to the large mass of high carbon steel uniformly distributed in the iron mass. Due to the nature of *tatara* steel, the optimum technique for swordsmiths involves choosing small chunks of steel of varied carbon content and by multiple folding to produce steel with exactly the amount of carbon considered ideal. Note that the folding process can only **lower** the carbon content. For the best result it is advantageous to start with steel with a high percentage of carbon, although if this content is too high (as it is in the Indian *wootz*) the process is difficult.

3) The *kawagane* (outer skin) of the *Hizen* swords is thin.

As a final consideration, Mr. Kazushige suggests that the *kawagane* of the *Hizen* swords is thin because the price of the *Namban* steel used in making it was very expensive. This is just an additional hypothesis that is worthy of consideration. Swords were not made to last forever but to be very good in their usual period of use. It is unlikely that a seventeenth-century

swordsmith would consider if and how his sword would last in the twenty-first century. If the *Namban* was good and was expensive, the only way of producing swords with it would be by making the outer skin thin.

As a final point I would like to mention that there is an additional method of forging *wootz* , in addition to the two methods described in Coutinho (2008),Part2. It is called crystalline *wootz* or Indian *wootz*. The resulting surface markings resemble in some case, vaguely, *konuka hada* . (See http://www.oriental-arms.co.il/index.php for examples)

It is conceivable that the *Hizen* swordsmiths, starting from higher carbon steel than the swordsmiths from the neighboring *Takada* School could in fact produce a better *jigane*. It is possible that *Takada* swords are not as good as some *Hizento* because of the lack of foreign steel.

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