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 °C will result in the formation of cracks (Sherby and Wadsworth (1983)). On the other hand attempts to forge at temperatures above 800 °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), Part 2. 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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