

# THE TO-KEN SOCIETY OF GREAT BRITAIN

for the Study and Preservation of Japanese Swords and Fittings



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## PROGRAMME 84

JANUARY - FEBRUARY, 1975

EDITOR - TONY GIBB

25 Dorville Crescent,  
London W.6.

### NEXT MEETING

Monday, 3rd March, 7.30 p.m. at the Princess Louise, High Holborn, To get there: underground to Holborn, turn west, cross Kingsway and the P.L. is 50 yds down on the left hand side. SUBJECT: Gendai-To.

FOLLOWING MEETING: Monday, 7th April, 7.30 p.m.

FEBRUARY MEETING: Bizen Blades.

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The January meeting was a small turn out and a general discussion only was held. We talked about blades with Alan Bale making some interesting observations on recognising a re-tempered blade.

The February meeting consisted of a most interesting lecture by Bon Dale on blades. The talk was concerned with blades exhibited after the Newport Beach Shinsa in 1974 but with Bon's observations.

All the members present, I think, enjoyed the talk, including some new faces. I think I learnt more at this particular meeting than I have done for a long time. Congratulations Bon, now over to you:-

SOME REMARKS ON CHARACTERISTICS OF HAMON & JIHADA, BASED ON SWORDS EXHIBITED AT NEWPORT, CALIFORNIA, 1974 by Bon G. Dale.

The Northern Californian Japanese Sword Club organised a Shinsa, at Newport Beach, California in June 1974. This was the second such event to take place in the United States, the first was in Dallas, Texas, in October 1972. In both instances the Committee of the Northern Californian Club are very much to be congratulated on their enthusiasm and determination in persuading

Japanese sword experts to leave their native, comfortable, shores to journey to the United States to judge swords. The experts are to be congratulated on working from 9.00 a.m. to usually about 9.00 p.m., examining and judging around two thousand entries in each case. They can hardly have had time to see much of the beauties of the country. Having been fortunate to attend both functions I can say that the enthusiasm and dedication of the American sword collector is without parallel, and both were tremendous events to have participated in. The great names responsible for getting these things airborne were undoubtedly Keith Evans, Mike Quigley, and David Pepper, R.B. Caldwell and John Yumoto in both instances. Many other hard workers were involved and I make no apologies to them, because this was the great thing about these functions, everyone, myself included in Dallas, could and did become involved in the enthusiastic hard toil to make the thing a success. I hope there will be a third time.

The Newport Beach Meibutsu Exhibition at the end of the Shinsa session showed forty-nine blades judged to be of exceptional merit. Some of these were loaned for the exhibition by collectors, others had been "discovered" when submitted for appraisal to the Shinsa panel. The display committee selected some blades especially to emphasise the study of hamon and jihada. The idea being to help the visitor to see at first hand characteristics of sword blades which are difficult to describe and almost impossible to draw or photograph adequately.

In the discussion this evening I shall use illustrations from "Juyo Token Nado Zufu" to show examples of the various blades exhibited. Unfortunately, after all these years we as a Society still cannot afford to reproduce and publish these illustrations, so our corresponding members will have to be content with the list of swords, with brief notes on characteristics of hamon and ji.

I have selected some thirty blades to remark upon, but will publish the full list of forty-nine blades. I think also we should publish the glossary given away at the Meibutsu Exhibit to help viewers identify what they were looking at. I don't know who compiled it, but it is a good one, and I'm sure the Meibutsu Committee of the Northern Californian Sword Club will not begrudge us giving it wider publication. If they do, then on my head let the blow fall.

### SUMMARY

The blades which I have selected to discuss from the Newport exhibition all have examples illustrated in "JUYO TOKEN NADOZUFU". In other words although the blades in the exhibition were not all JUYO-TOKEN all the swordsmiths were of JUYO standard. This publication for new members not aware of its existence is issued about once each year by the N.B.T.H.K., the main and most powerful Sword Club in Japan. "JUYO" as we tend to shorten the name, consists of two volumes of illustrations 9" x 12", Koto and

Shinto. These are of blades which have been designated of JUYO-TOKEN quality during the previous year. Each issue now consists of around 400 detachable pages. These can be split up into groups of individual swordsmiths or schools. The current two volumes are "Volume 21". The total amount since the first issue is now astronomical, and needs about ten feet of shelf space to accommodate it. But, very very useful in the absence of actual genuine blades, to compare hamon characteristics and nakago details of any particular swordsmith. In the examples which I have selected I have had the invaluable help of Mr. Hiroshi Yanagi in translating the remarks on the reverse of each illustration.

Confining our attention to hamon and kitae, or jihada, one surprising fact emerges. That is that all these swords ranging from Late Heian to Genroku, a period of about 750 years, have very similar characteristics. Maybe this is not surprising because a good sword is a good sword, and it seems that they do not change very much. In the Dallas Shinsa exhibition the range of blades was even greater, from mid Heian to the Showa period, and still these basic characteristics did not change.

In broad terms these characteristics may be simplified into one fact. That is that all the work within the hamon of a good blade will be confined within the hamon. Very little will happen to the jihada above the habuchi, or nioi line, whatever you like to call it, but an awful lot will happen below it, towards the ha or sharp edge. These "happenings" will consist of suna-nagashi, ashi, yo, and many of the other things you will find at the end of this article in the Glossary. Two final qualifying remarks. How strictly this rule is adhered to in a sword blade depends on how good it is, and even a good swordsmith didn't get it all right all the time. A blade where everything happens above the nioi line will be a bad one. Second remark, Soshu School is different, and we will go into that some other time.

#### KO-BIZEN CHIKAKANE (Late Heian, early Kamakura)

This was the peak period for blades of the Ko-Bizen school, that is from about the mid 11th century to first quarter of the 12th century. Swords of this period are usually narrow tachi shape, tapering towards the point, that is strong fumbari, with distinct Koshizori in the Bizen tradition. Ko-Bizen Chikakane is a rare swordsmith and this is a particularly fine example of his work.

Hamon Ko-Bizen Chikakane are mainly suguha with many ashi, but rather simple and quiet in style. This example is much more exciting. Choji midare in Ko-nie with deep ashi.

Jihada Is running Itame, with strong midare utsuri. It is

interesting that the boshi narrows, with little Kaeri, and the utsuri is very distinct here too.

BIZEN IYESUKE

Was the son of first generation MORIIE, and may have lived in Bunei period (1264), but seems more likely to have been late Kamakura period. The blade signed with this name in the Newport Shinsa may have been a later generation of Nambokucho period, but it was certainly one of the most beautiful blades I have ever seen.

Hamon Saka choji, reverse choji, which lean backwards towards the nakago, worked in nioi, with ashi. Narrows to suguhá on the monouchi and then broadens again on the boshi.

Jihada Running Itame, with midare utsuri.

KANEUJI

From Yamato Province, a Masamune Jutetsu (one of the ten pupils of Masamune). No connection with Shidzu Kaneuji. Nambokucho period. This blade is in very healthy (as opposed to "tired") and perfect condition. A strong broad blade, O-Kissaki.

Hamon Shallow Gunome with ashi, very good Ko-nie, sunagashi and kinsuji.

Jihada Itame with ji-nie, also has chikei.

HASEBE

Hasebe School. Swords exist signed KUNISHIGE, KUNINOBU, KUNIHIRA, and are usually dated Bunwa (1352) Embun (1356). This blade is typical Nambokucho style, and is signed HASEBE in red lacquer, it seems it must be by one of the three swordsmiths.

Hamon Gunome mixed with midare. Kinsuji and sunagashi with much nie.

Jihada Itame Nagare, with ji-nie mixed with chikei. Broad round boshi is typical Nambokucho style, also nakago shape.

KANEMITSU

Judged to be Kanemitsu but not a masterpiece of his style. Example here of gaku-mei. Also has distinct Kiri-kome on the mono-uchi mune (battle cut).

Hamon Small midare and choji mixed, has ko-nie and ashi.

Jihada Itame-hada with ji-nie and chikei. Slight midare utsuri.

## CHOGI

Traditionally Masamune Jutetsu, but this is not absolutely certain according to modern research. Study suggests that oldest examples show Soshu influence but also are not typical Bizen in style. Blade illustrated dates from around Shohei period (1346).

Hamon Midare haku-gakari mixed with gunome. Has ashi and yo, with some kinsuji and sunagashi.

Jihada Itame Nagare hada, with ji-nie. Slight Utsuri.  
2nd example. Brilliant Chogi style Katana, with Choji gunome hamon with tobiyaki. Very deep ashi with yo. Made in Ko-nie.

## YOSHISADA

Ubu and mumei, small tanto of Nambokucho style. Nakago has o-sujichigai yasurime which means SA YOSHISADA school. Very wide blade and very busy hamon is typical of SA YOSHISADA.

Hamon Gunome midare and very strong midare with ashi and yo. Sunagashi and kinsuji. Habuchi is very clear and sharp. Very distinct Ko-nie.

Jihada Itame hada with pronounced ji-nie. Has Utsuri.

## SADAMUNE

No signed examples ever found, all are mumei, son of Masamune. This is very good Soshu work and is judged to be Sadamune. The suguha hamon is typical Sadamune style, as also the large kissaki with hijuba boshi.

Hamon Has very good work in the habuchi which is very broad. Basically suguha with slight midare. Has strong ara nie with sunagashi and kinsuji.

Jihada Itame and mokume mixed, very distinct ji-nie.

## SAGAMI HIROMITSU

A masterpiece of Sagami Hiromitsu, typical Nambokucho Soshu style sword. You can't miss it, or make a mistake if you see this.

Hamon Hitatsura, Ko-midare mixed gunome but also has o-midare. Ashi with strong sunagashi, kinsuji. Hitatsura is very strong and beautiful.

Jihada Very distinct strong itame. Tobi-yaki, jinie and chikei.

SAGAMI NORISHIGE

Masamune Jutetsu, another theory suggests that he also may have been a student of SHINTOGO KUNIMITSU. Tanto are common but long swords are very rare. Tanto are usually "bamboo sprout" in shape.

Hamon Mixture of suguha and notare, choji ashi, the hada mixes into the habuchi, has kinsuji and inazuma with strong nie.

Jihada Matsukawa hada, typical "Norishige hada" also impossible to miss; Itame with very strong nie and chikei, also has Yubashiri ("running hot water"). Yes, that one is difficult!

YUKIMITSU

Father of Masamune, taught by Shintogo Kunimitsu, as later were Masamune and Norishige. Masamune established Soshu Den. But style started with Shintogo Kunimitsu, through Yukimitsu to Masamune who developed the techniques into Soshu Den.

Hamon Ko-midare with Gunome, very deep nioi mixed with ko-nie, sunagashi, kinsuji and inazuma. Has midare boshi with a long kaeri which becomes mune-aki.

Jihada

Itame mixed with mokume, thick ji-nie with chikei. Mune-aki.

SHINTOGO KUNIMITSU

According to tradition the son of Kunihiro; Kunihiro, Kuniyasu and Kunishige also signed KUNIMITSU, so it is very difficult to distinguish which is which. However, this tanto is Kamakura style and can be judged to be Shintogo Kunimitsu.

Hamon Very skilful hoso suguha in Shintogo Kunimitsu manner, with deep nioi and excellent ko-nie. Has kinsuji.

Jihada Ko-itame hada. Has good ji-nie and chikei.

BIZEN SUKEZANE (Ichimonji)

Suriage blade, signed tachime low on the nakago. When Sukezane became old he was retrained by the Kamakura Bakufu and went to work in Kamakura and he became a pioneer of the Soshu School. But he was well nicknamed "Kamakura Ichimonji" because he always retained the Bizen Fukuoaka Ichimonji style.

Hamon Ko-Choji, mixed with midare and gunome. Has ashi, sunagashi and kinsuji.

Jihada Itame nagare gokuro ("running and wavy"). Midare Utsuri.

2nd Example Is a broader heavier with a rather more flamboyant choji hamon with midare utsuri. It is interesting that both hamon become flatter ko-choji on the end of the monouchi and narrow into thin suguha boshi.

### FUKUOAKA ICHIMONJI

Full Fukuoka Ishimonji style, originally a naginata, changed to Katana in mid Kamakura period. Maybe the mune of the boshi has been straightened to reduce backward curve. Bo-hi may be partly atabori. Still a very beautiful blade.

Hamon Kawazu Choji, "Tadpole", nioi and nie with deep ashi in the Ichimonji style.

Jihada Itame nagare, has ji-nie and midare utsuri.

### BIZEN NAGAMITSU

Typical slim Nagamitsu tachi style, is suriage but still very good shape. Simple pure blade, others are more flamboyant. Shinsa example was similar to this, o-suriage but retaining very beautiful shape.

Hamon Chu-suguha changing into Ko-choji with many Ko-ashi and many yo.

Jihada Ko-itame hada, midare utsuri.

2nd Example Broader choji hamon, but boshi again both narrowing and very similar in appearance.

### BIZEN MORIMITSU (Oyei Bizen)

In this period the two most famous Bizen swordsmiths were Morimitsu and Yasumitsu, both worked in a similar style. According to tradition Morimitsu was younger brother of Yasumitsu, but this is not certain. This example is certainly Morimitsu style and is signed and dated Oyei 19th year.

Hamon Gunome with choji, Ko-ashi and yo. Deep nioi and ko-nie.

Jihada Itame. Ji-nie with chikei. Bo-utsuri straight utsuri just below the bo-hi, this is a hira-tsukuri tanto.

### MURAMASA

Lived in Kuwana, Ise Province, the oldest sword which exists is dated Bungi (1501) 1st generation Muramasa. This example may be 3rd generation, Tensho 1573, by style of signature. But nevertheless is a masterpiece in the typical Muramasa school style.

Hamon Midare hakoba style (box) with Gunome, large kaeri with mune yaki. Very active, has tobiyaki and sunagashi all over the place including in the muneyaki.

Jihada Itame nagare with ji nie.

#### ISENOKAMI KUNITERU

First generation KUNISUKE had many children and it seems KUNITERU was probably his fourth son. He became Isedaijo and the following year Kanbun 12 he became Isenokami. His style is Toran with gunome. His nakago are distinctive fishtail, or go hei, shinto paper style. He was good at Toran but not so good as Tsuda Sukehiro.

Hamon Gonome Midare, sunagashi. Small ashi, deep nioi and very clear nie. The habuchi is very sharp and there is yaki-dashi.

Jihada Ko-itame with ji-nie.

#### KAWACHINOKAMI MASAHIRO

Second generation Masahiro, Hizen province. Early signature was Masanaga, also used by 1st generation Masahiro in early work. Second generation changed to Masahiro when his father died in Kanbun 5 (1665).

Hamon Notare with gunome, small ashi with occasional yo. Sunagashi and kinsuji. Nie are sharp and clear.

Jihada Ko-itame with ji-nie. Nakago is inlaid in gold with name of the sword "Ara-namei" Rough Wave.

#### OMINODAIJO TADAHIRO

Second generation Tadahiro was eldest son of 1st generation Tadayoshi. Probably started to make swords when his father died in Kanei 9. He died in Genroku 6 (1693) when he was 80 years old. This example is a masterpiece by him.

Hamon Choji-ba soroi, (equal size choji) with many ashi. Habuchi is very clear in ko-nie.

Jihada Small itame hada. Has nie utsuri, which is different style from Koto utsuri which is more distinct.

BLADES EXHIBITED IN THE MEIBUTSU ROOMat the NEWPORT SHINSA - 1974

The order is not chronological or does not infer any superiority of workmanship. It is merely the order in which I recorded them as I walked around the exhibition, with odd remarks.

1. BIZEN IYETSUGU. Said to be a recorded National Treasure pre-war. Very thick, very good horimono, choji-midare.
2. ETCHU NORISHIGE. Gold attribution by Honnami Koyo.
3. KANEUJI. Gold attribution by Honnami Chokon.
4. HASEBE. Mumei. Tanto.
5. KANEMITSU. Gold attribution.
6. CHOGI. Tanto, very strong wide habuchi.
7. YOSHISADA. Illustrated in "Tsuchiya Oshigata", tanto.
8. SADAMUNE. Mumei, no signed work ever recorded. Son Masamune.
9. SAGAMI HIROMITSU. Tanto. Very similar to the Sadamune but more hitatsura. Son of Sadamune.
10. SOSHU NORISHIGE. Tanto. Student Masamune.
11. YUKIMITSU. Tanto. Father of Masamune.
12. SHINTOGO KUNIMITSU. Tanto. Teacher of Masamune's father.
13. BIZEN SUKEZANE. Ichimonji. Signed Tachimei.
14. BIZEN NAGAMITSU. O-suriage, but very beautiful shape still.
15. SHINTO MUMEI. Influenced by Nagamitsu style of hamon.
16. FUJIWARA KANESADA. Typical shinto blade.
17. SEKIDO KOREKAZU.
18. DOSHU KUNIMASA.
19. BIZEN MORIMITSU. Tanto
20. MURAMASA. Tanto. Second character altered to read MASAHIRO, not to offend Tokugawa Shogunate.

21. YASHYUKI S A School. Turned back Nakago.
22. FUKUOKA ICHIMONJI
23. WAKIZASHI, SOSHU SCHOOL Showing typical style, with fantastic sunagashi.
24. ISENOKAMI KUNITERU
25. ISENOKAMI KUNITERU Wakizashi, Daisho with 24, both with "fishtail" nakago.
26. KAWACHINOKAMI MASAHIRO II
27. OMIDAIJO TADAHIRO Most beautiful skin, Nashiji-hada, but very distinct.
28. HIKOZAEMON SUKESADA Juyo Token
29. KO-BIZEN CHIKAKANE Tachimeii. A little tired, boshi thin? but beautiful.
30. YOSOZAEMON SUKESADA Juyo Token
31. BIZEN UKAI UNJU Big sword.
32. MIHARA SCHOOL with koshirae.
33. UDA SANEKUNI Presented to President Wilson (October 23rd)
34. YAMASHIRODAIJO KUNISHIGE
35. DAISHO WITH 34, Hamon exactly matching
36. TAMBANOKAMI YOSHIMICHI
37. Ditto, both very similar in style, but mei different, suggesting different men?
38. SOSHU NORISHIGE. Tanto
39. HEIANJO HIROYUKI Tanto
40. HOSHO MASASADA Tanto
41. KATSUMURA NORIKATSU
42. OMIDAIJO TADAHIRO Later generation
43. ECHIGONOMKAMI KANESADA
44. SHOJI YAMON NAOKATSU

45. MIHARA SCHOOL Very similar to No.32
46. MIHARA SCHOOL Very different. Except all have similar  
kaen boshi.
47. YAMATODAIJO MASANORI
48. ETCHUNOKAMI MASATOSHI
49. NYUDO KIJU

### G L O S S A R Y

JI - Surface of blade.

1. HADA - Surface texture

- a. Itame - Wood grain. This is the most common texture found on blades, all through periods. Sizes and formations vary; however, it is one of the basic textures along with "Masame" and "Mokume".
- b. Masame - Straight grain. It is commonly found on blades of Yamato School or its subsidiaries. There were a few smiths in the Shinto period who carried out the tradition of Yamato School making blades with this "Hada".
- c. Mokume - Burl grain. This texture is always found mixed with "Itame", however, it is predominated by the burl-like grain. It is often found on older Bizen blades and it is said that a blade with this texture shows up "Utsuri" distinctly.
- d. Ayasugi - Curved wavy grain. Often found among work of Gwassan School, it is called "Gwassan-hada". Late work with this "hada" appears symmetrical and prominent.
- e. Itame-masa - Wood grain with straight along edge.  
Predominantly found among work of Yamato School.
- f. Itame-nagare masa - Wood grain and straight grain mixed.  
Predominantly found among work by smiths of Kyushu area.
- g. Muji - No grain. Chief characteristic of so-called "modern" factory-made blades.

- h. Nashiji - Texture of sliced pear fruit. Grain is so fine and existence of fine and powerful-"Ji-nie" appears like "Kin Nashiji" - a term used for lacquer similar to "gold Aventurine Lacquer". This hada is also found among "Shinto" blades; however, it lacks intensity and its Ji-nie is coarser.
- i. Konuka - Rice bran. Similar to "Nashiji"; however, lacks on "Ji-nie", the grain is fine and "whitish" - as if rice bran has been spread over. Often found among the work of Shinto Hizen work, it is also called "Hizen-hada".
- j. Matsukawa - Pine bark. Coarse Itame with strong Ji-Kei, often found among the work of Norishige and his school, it is called "Norishige-hada"; also called "Hijiki-hada".
- k. Hiraji Itame and Shinogiji Masa - The most outstanding characteristic of the majority of Shinto blades.
- l. Namazu-hada - Catfish. Dark greyish patches in white surface. The greyish colour is that of "shintetsu". This is also called "Sumi-hada" or "Aoe-hada" since it is often found among the blades of Aoe group.

YAKIBA - Tempered surface along edge

2. Nioi - A fine misty white martensite grain on tempered area of blade. Similar but much finer than Nie.
3. Nie - Rather coarse misty-white martensite grain on tempered area of blade. Ko-Nie - small Nie; Ara-Nie - coarse Nie.
4. Nioi-gire - Interruption of Nioi, considered an extremely undesirable flaw.
5. Hamon - Yakiba pattern.

HAMON - Yakiba pattern

6. SUGUHA - Straight Hamon.
  - a. Ito-Suguha (Hoso-Suguha) - narrow straight.
  - b. Chu-Suguha - medium straight
  - c. Hiro-Suguha - wide straight.
  - d. Suguha Ashi-iri - straight with short vertical lines extending from Nioi or Nie.

- e. Suguha Gyaku-Ashi-iri - straight with short oblique lines.
  - f. Suguha Choji-Ashi-iri - straight with Choji (clove pattern) notches.
  - g. Suguha Gunome-Ashi-iri - straight with Gunome notches.
  - h. Suguha Hotsure - brushed effect Suguha.
  - i. Nioi no Shimatta Suguha ni Ashi-iri - Suguha with taut Nioi with Ashi (short vertical lines).
  - j. Chu-Suguha with Nijuba - medium Suguha with double Nie.
  - k. Sunagashiba - "Sand in bed of stream".
  - l. Suguha Komidare - straight with slight irregularities.
  - m. Suguha Kuzureba - straight Suguha broken up in places
  - n. Suguha Hotsureba - straight with frayed line.
  - o. Suguha Kofushiba - straight with upward notches.
  - p. Suguha Midare - straight with irregularities.
  - q. Suguha Choji - straight with clover pattern
7. GUNOME - Zigzag or wavy tempered line.
- a. Kataochi-ba - drooping shoulder.
  - b. Nokogiri-ba - sawtooth zigzag.
  - c. Sanbon-sugi - three cedar zigzag.
  - d. Koshibiraki - broad hipped.
  - e. Togariba - sharp pointed.
  - f. Juzuba - Priest's beads
  - g. Gunome Choji - mixed wavy and clover pattern
  - h. Gunome Kochoji - wavy with small clover pattern
  - i. Gunome Midareba - wavy, irregular with scattered Nie.
8. CHOJI - Clover tree blossom pattern
- a. Juka Choji - double clover tree flower
  - b. Kawazu Choji - tadpole or frog shaped clover tree flower
  - c. O-Choji - large choji pattern
  - d. Ko-Choji - small choji pattern
  - e. Gyaku-Choji - Oblique choji
  - f. Ashinaga - long vertical lines (ashi) extending from Choji pattern
  - g. Kengyo Choji - fist shaped clover tree blossom pattern
  - h. Ko Choji Midareba - small clover tree blossom pattern

- i. Choji Midare - uneven Choji.
  - j. Choji-Gunome - mixture of Choji and Gunome.
9. MIDARE - Irregular, wavy lines
- a. Ko-Midare - small irregular patterns
  - b. Hako-Midare - box shaped
  - c. Chu-Midare - medium-sized Midare
  - d. O-Midare - large Midare
  - e. Nokogiri Midare - saw toothed and irregular
  - f. Saka Midare - slanted irregular shaped
  - g. Suguha Midare - straight with irregularities
  - h. Yahazu Midare - arrow notch and irregular
  - i. Mimigata Midare - ear shaped and irregular
  - j. Doran - Billowing waves
  - k. Doran Uranani - high breaking waves with spray

#### MISCELLANEOUS HAMON

- 10. Notare - wavy
- 11. Mimigata - ear shaped
- 12. Yahazu - dovetailed
- 13. Hitatsura - full temper pattern - all over the blade.  
Tobiyaki (isolated tempered spots or islands)  
common on Hitatsura blades
- 14. Gunome-Choji-Midare - mixture of all three
- 15. Kikusui - Chrysanthemum and water
- 16. Sudare - rattan screen
- 17. Kuzure - crumbled line
- 18. Fuji-ni-Saigyō - Poet priest viewing Mount Fuji
- 19. Yakiotoshi - Temper line stops about an inch or so above the ha-machi, leaving small portion of blade without tempered line. Used by a very small number of smiths in the Old Sword period.
- 20. Yakidashi - Area a few inches above ha-machi which has a straight or less wavy tempered line. Found mostly on blades of New Sword period.
- 21. Koshi-ba - Area a few inches above the ha-machi with wider and wavier tempered lines than rest of the blade. An almost exclusive feature of swords of Old Sword period.

22. Utsuri - Reflections of Yakiba pattern between Ha and Shinogi.
- a. Kage Utsuri - shadow; also known as Midare Utsuri
  - b. Ji Utsuri - no fixed shape. Covered with white mist or fog between Yakiba and Shinogi.
  - c. Botan Utsuri - Peony Utsuri; well known Utsuri of Kanemitsu of Bizen
  - d. Bo-Utsuri - also called Sugu-Utsuri (straight) - white streak usually located along the top of Yakiba
  - e. Shiraki-Utsuri - white cast Utsuri, ghostly and not prominent. Not found among great swords. Also can be looked upon as reverse temper line.
  - f. Tsukare-Utsuri - tired; from repeated polishing, the Shintetsu (inner core) shows through. Of whitish hue and considered a flaw.
23. Kin-suji - thin radiant line of dark spots on tempered area of blade. It is similar to Sunagashi but is more radiant.
24. Sunagashi - sweeping lines along Hamon like floating sand ridges.
25. Gin-suji - basically the same as Kin-suji but slightly duller in colour.
26. Inazuma - zigzag or lightning Kin-suji. Thin radiant line of dark spots in zigzag pattern
27. Yubashiri - "Running of hot water". Seen only under light; it appears as light white fog on Ji. There is no set form or shape.
28. Ji-fu and/or Ji-kei - Ji-fu and Ji-kei used interchangeably. "Fu" means marking; "Kei" means scenery. Small whitish grain shapes formed by the lamination.

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The next article has been passed to me by Malcolm Hutchinson. It is from Mr. E. Dobrzanski of:-

Ste. 502,246 Roslyn Road,  
Winnipeg, Manitoba  
Canada, R3L 0H2

and is concerned with sword metallurgy which reads:-

INAZUMA and KINSUJI: THEIR CAUSES AND SIGNIFICANCE

The question is frequently asked: what are inazuma and kinsuji. Most reference books give drawings and brief descrip-

tions, but skirt the issue of causes. We are told that they indicate the very highest standards in Nihon-to, but not why they are so important.

The author is extremely interested in the metallurgy of Nihon-to, and has tried to learn as much as possible of their construction. The subject of this paper is especially fascinating. An attempt will be made to explain how they are produced, why, and their importance as a tool in appraisal.

One important method to produce them is given by the Shinshinto smith, Kawabe Masahide:

"Secrets of Ogon Kitae and Kotetsu Kitae: When smelting cast iron, mix one momme of copper to one kwamme of iron (1/1000). Of course, copper does not "agree" with iron, and it is difficult to forge them together, but when they are well forged it hardens the iron, and when made into a sword it produces silvery lines or Inazuma (lightning) when the sword is polished. If gold was used the quantity would be slightly more, this is called Ogon Kitae".

from Sword and Same, Joly, Holland  
page 76.

Copper is much more soluble in molten iron than in iron at room temperature. When the solution of copper in iron is cooled, the copper tends to separate out as minute globules. However, the iron is normally cooled too quickly to allow any significant separation, and the copper is held in the iron in an unstable form. Masahide advises the addition of only one part per thousand. However, in order to get the greatest effect from the copper-iron alloy, the copper should be added in the ratio of one part per hundred. The pot of molten alloy would not be homogenous throughout, and there would be spots where the copper might be in much higher concentration than average. When the sword was made, these areas would stand out, since they are harder than the surrounding metal (reason will be given later). They would show as lines of nie of slightly different colour than normal when polished.

The reasons for their importance are not so easy to understand. I will give a very basic explanation of crystal structure so that the processes will be better understood.

Everyone is probably aware by now that all matter in the universe is made up of atoms. In most substances, these atoms are arranged in a very definite pattern, not at random. In the case of iron, the atoms are arranged as shown in fig.1; that is, a cube with atoms at each of the corners, plus an atom at the centre of each face of the cube.

This is the basic building unit of a crystal. Crystals

are built up of any number of these units arranged together as shown in fig.2. If a crystal were free to grow without interference, it would be cube-shaped. However, when iron is solidifying, the crystals grow until they touch each other, and interfere with each other's growth. Thus solid iron consists of small crystals (grains) of irregular shape. However, each grain keeps its orderly arrangement of atoms internally (fig.3).

One can think of these cubes being in layers on sheets. When a force sufficient to deform the crystal is applied (by hammering or bending), the layers slide over each other, as in fig.4. One must remember, however, that these cubes are free to move in all three dimensions. Thus, the sheets can slide parallel to any face of the cube.

The more easily the crystals are deformed by the sliding of the layers, the softer the metal, the lower the tensile strength, the greater the malleability and ductility. Pure iron is very soft, easily bent, etc. because the layers are relatively free to move about.

Anything which will make it more difficult to move the layers will therefore increase the hardness and tensile strength. One way this may be accomplished is by a process called "dispersion or precipitation hardening", which will be explained now.

As stated earlier, copper is much more soluble in molten iron than in cold iron. As the iron is cooling, the copper tries to separate out, but can do so only very slowly, and usually the iron freezes before the process gets very far. With some alloys, the separation can take place at room temperature (called aging), but with the iron-copper system, it can take place only at elevated temperatures. Also, it takes time for the process to start (10 to 15 minutes usually). The copper separates as minute granules dispersed throughout the iron. The higher the temperature the larger and fewer the granules. Also, the longer the metal is held at the higher temperature, the larger the crystals of copper grow.

These minute granules of copper tend to "key" the layers of iron together. One might possibly think of them as tiny "nails" holding the layers together. Thus, it becomes more difficult to deform the crystal, as the tiny "key" must be either sheared or bypassed, which takes a greater amount of energy (fig. 5a).

Because the copper tends to increase the hardness, tensile strength, and toughness, the process is usually referred to as dispersion hardening.

A very important factor in dispersion hardening is the size of the "keys". If they are too small, approaching the size

of the basic cubes, they have very little keying effect. If too large, they become fewer, with the possibility of some layers being left unkeyed, (fig. 5b). Therefore, a worker can vary the properties of the iron-copper alloy somewhat if he knows how to control the size of the keys.

The above explanation shows how the addition of a small amount of copper (less than 1%) can be used to increase the hardness and strength of iron and steel. It must be understood, however, that the heating process to form the copper granules is a very precise one. There is a very narrow temperature band in which good results can be had. The optimum size and number of keys is very difficult to produce even with today's scientific instruments and techniques. Only a smith with absolute control of his iron's temperature could possibly get consistent results.

How did the Koto smiths discover this technique? The author believes that copper was originally added accidentally and later was used for quite different reasons.

In very early times, iron-making was a long and tedious process, and the smiths would have used any scrap iron they could find to save themselves labour and expense. Among the scrap were probably obsolete or damaged armour, or tsubas with a small amount of copper adhering as decoration. It would have been too small an amount to remove, or worry about. Eventually some alert smith would notice an improvement in his iron, and putting two and two together, would arrive at the conclusion that the copper was the reason. After that, he would make it a point to throw in a little copper to every pot of molten iron.

In early Koto times, the end product of iron-smelting was a cast iron of high carbon content, with many impurities, which would have to be refined out. A very common and harmful impurity is phosphorus. Phosphorus in iron increases hardness somewhat, but also causes brittleness, a fatal defect in a sword. Unfortunately, it is almost impossible to eliminate it entirely. In modern structural steels, 0.05% is the maximum allowed, and in tool steel only 0.035%. Swords, which require maximum toughness, (resistance to shock) would have to be even more phosphorus-free.

This is where the copper came to the smith's aid. The dissolved copper combined with the phosphorus, and counteracted its harmful effects. Thus, the smith who threw copper into his melting pot would have noticed an increased toughness in his blades.

Later, smiths developed more efficient smelting techniques and would have eliminated so much of the phosphorus that it no longer was a serious problem. The chemical analysis of a blade

given by Dobree (Japanese Sword Blades, 1971 ed. page 9) shows that later smiths had solved the refining problem.

With the phosphorus problem solved, copper was no longer needed, and therefore was no longer added by most smiths. The best smiths, however, must have noticed that their blades lacked a certain "something" when copper was left out. In this case, they would no longer have the dispersion hardening of the copper. Therefore, they kept adding copper.

Lesser smiths, who had never had control over the process, would probably not have noticed any difference by the deletion of the copper.

In the forging of a Japanese blade, there are many variables. Hardness can be controlled by carbon content, grain size, quenching, tempering, as well as many methods too numerous to mention. Each method has its good and bad points. With so many variables, it was very difficult to produce a sword blade with optimum hardness, toughness, etc. With so many other variables to worry about, it is no wonder that the lesser smiths had no desire to meddle with the copper method, especially considering the extreme difficulty of getting consistent results.

Thus, inazuma and kinsuji came to be a symbol of a very high standard of workmanship in Japanese swords.

In the above discussion, only copper has been talked about. However, as stated by Masahide, gold was also used for the same effect. And in the present state of metallurgy, we know of numerous other additions which will produce similar effects. Perhaps some other smiths used other alloys, which we do not know about, because they were never written down.

I have tried to give one explanation for the results we see in Nihon-to. Perhaps, as we get to know more about the old smelting and forging techniques, we may come across other methods to create inazuma and kinsuji.

### References

- Sword and Same Joly and Hogitaro Holland Press ed. 1962  
 Japanese Sword Blades. Alfred Dobree. Shumway 1971  
 Physical Metallurgy for Engineers Clark and Varney Van Nostrand  
 Precipitation Hardening J.W. Martin Pergamon Press 1968  
 Practical Microscopical Metallography Greaves and Wrighton  
 Chapman and Hall 1967  
 The Structure of Steel Gregory and Simons Odhams 1957.

Mr. Dobrzanski then goes on to qualify his article:-

I would like to make a comment about the article I sent you in my previous letter. I mentioned that in order to get the temper-hardening effect, the metal has to be reheated. Actually, I realized after I sent the article in, that I hadn't stressed the importance of this fact. Most books on Japanese swords state that sometimes, when a blade has been hardened by quenching in water, the smith may reheat it slightly. Most books state that this is done to relieve strains set up by the quenching. While this may be true of some smiths, I think that the real reason is to increase the toughness of the metal at the cost of a slight loss in hardness. When a carbon steel, such as would be used in swords, is heated above its critical point, and then quenched in water, a material called martensite is formed. Martensite is extremely hard, but brittle. If the martensite is heated to a temperature not much exceeding 400 degrees C., the martensite breaks down into another substance called troostite (now called upper Bainite). Troostite is slightly softer, but more resistant to shock. The slight loss of hardness would be more than made up for by the gain in toughness. Since this is the case, one would think that a smith wanting the best blade would reheat (temper) his blade after quenching. However, as pointed out in *Sword and Same*, by Joly, this is not so easy. It is extremely difficult to get even results in a long, narrow object such as a sword blade, due to the difficulty of heating it evenly. Because of this, most smiths were content to leave well enough alone, and dispense with the tempering process. They were quite happy if the quenching worked out well, and sold their blades in that condition. However, the very best smiths weren't content to stop there. They were willing to put the time and effort into their work, and carried out the tempering.

As stated by Joly and others, swordsmen were reluctant to buy blades which had been reheated. The risk was too great that the tempering had been carried out improperly, and would break in combat. However, certain smiths, with skills out of the ordinary, could do the job properly. These men earned a reputation for their products. And swordsmen were willing to risk their lives on their blades, because it had been proven that these blades would stand up to the severest test. Now, here is the point. Only these highly-skilled smiths could profit by the temper-hardening. Lesser smiths didn't temper their blades, or if they did, samurai were suspicious of them. Temper-hardening was of no use to them. The best smiths could temper their blades, and were able to make use of the process.

This is a rather roundabout explanation, and I hope I've gotten the point across. To put it simply, if the smith failed in the tempering, the blade was probably ruined, and temper-hardening couldn't save it. If the tempering was carried out properly, the temper-hardening could be an added plus.

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REPORT FROM THE SECRETARY OF THE NORTHERN BRANCH OF TO-KEN SOCIETY  
by Ian Bottomley.

Report of the Annual General Meeting of the Northern Branch of the To-Ken Society held at the Manchester Club on the 12th Nov. 1974

Eighteen members and five guests were present.

Several points arose from the minutes of the last meeting and the Chairman commented on them.

Firstly the exhibition of Japanese Art held at the Leeds Polytechnic had been an unqualified success with over 2,000 visitors passing through the gates. Thanks for this were partly due to Mr. Bateman and the staff of Liverpool Museum for their generosity in making this superb collection available.

Secondly it was announced that a stall had been obtained for the To-Ken Society at the next Arms & Armour exhibition, to be held in Manchester on March the 15th 1975 at The New Century Hall.

The Chairman concluded by thanking all members and especially Mr. Moon for making the last year a most successful one for the Branch.

There then followed the election of officers and at long last your threadbare Chairman was allowed to step down.

The new appointments were:

Chairman:	Joe Jolly
Secretary:	Ian Bottomley
Treasurer:	John Hymas

The official part of the evening was terminated by a vote of thanks to our retiring Secretary Stephen Turnbull and his continuing success on the T.V. programme "Mastermind".

The remainder of the evening was given over to our new Chairman who had agreed to repeat his talk of long ago on polishing, but with the difference that he now has a set of real stones.

Joe started by showing a series of blades in various stages of polish and explaining the nature and action of each type of stone. Anyone who had been present at his original talk could have detected straight away the enormous leap forward Joe had made now that the real stones were available. This is all the more surprising since a geologist at the University of Leeds had examined them and declared them to be calcareous mudstones, outcrops of which occur in many parts of the country. In view of Joe's diligent searching in the past it is remarkable that he did

~~not turn up equivalents~~ or perhaps he had but did not know it.

Joe pointed out the difference in quality between the old and new polishes. Whereas in the past every slight irregularity in the yakiba was faithfully followed with the stones, modern polishers (at least those we encounter) simply polish all blades as if they had suguha or notare hamon. The pressures of modern life influence every aspect of it.

At this point the meeting was declared informal and it was interesting to look at blades and their polishes in new light. An unsigned wakizashi blade of undoubted Bizen origin brought along by Ian Gee would have shaken any polisher to the core. One had the impression that the swordsmith was determined to include every possible feature in the blade which was a veritable riot of choji, tobiyaki, crabclaws and the rest. If ever a yakiba had activity this was it - a wonderful blade in spite of being a tour de force.

One of our newer members, Mr. Gates, brought along some of his treasures including three tsuba which were outstanding. A maru-bori design in shibuichi signed 'Soten', of the sages in the bamboo-grove. Well maybe not 'The Soten', but whoever had made it had had a fair bit of practice. Another, a nambam piece in iron, with the usual rampant dragons and tama was a superb example of the type with none of the sloppiness that is often found. This had all the crispness of finish one associates with the better classes of work - even the rim being fretted in the thickness of the edge with little rectangular holes.

The meeting ended about 10.00 p.m.

- Forthcoming meetings to be held at the Manchester Club at 7.30 pm
- 14th Jan. A special meeting to select items for inclusion in our Exhibition at the Arms Fair
  - 11th March A talk by B. Bateman on the development of the sword.
  - 13th May A talk by S. Turnbull on the Momoyama Period
  - 8th July Another of J. Hymas' talks on some aspects of Japanese Art.
  - 9th Sept. An open meeting to discuss care and cleaning of swords and armour.
  - 11th Nov. Annual General Meeting.

We have been informed that the following sword has been lost or stolen somewhere en route to Los Angeles, California. If anyone hears of it or sees it please contact our Secretary Malcolm Hutchinson at his usual address. The sword is (blade only):-

KODACHI - UBU  
 TACHI MEI - "BITCHU (No) KUNI JU NIN SADATSUGU SAKU"  
 OMOTE - "KŌRYAKU NI NEN NI GATSU HI"  
 (1380)

Hawley Ref. SA 360  
 FUJISHIRO KOTOHEN KA 31.

The owner, Mr. B.W. Thomas, P.O. Box 126, Belgrave,  
 Victoria, Australia 3160

is prepared to give a reward and also states that if any person has bought this sword in good faith then he (Mr. Thomas) will make good their loss with cash and/or swords as far as he is able to do so.

### OSHIGATA

A reminder to members who may have difficulties in reading tang inscriptions due to inadequate references; if they care to send a rubbing (oshigata) of the tang addressed to Alan Bale, 46 West Close, Woodthorpe Road, Ashford, Middlesex, he will check it for them and send them all available information he has on the smith or inscription. Please remember to make a careful rubbing of the whole tang, both sides, not just the inscription.

### NEW MEMBERS

Vulcan Freight Services Ltd., Unit 16, Staines Central Trading  
 Estate, Staines, Middlesex  
 P.J. Jones, 7 Cedar Road, Hounslow West, Middlesex TW4 7QL  
 R. Hicks, 5 St. John's Road, Old Fletton, Peterborough  
 P. Hepworth, Flat 18 Maritime Court, 23 Harboro Road, Sale, M33 5AF  
 D. Searle, Clef House, Riverside, Twickenham, Middlesex.  
 A.F. Quirt, 4421 Garfield Avenue South, Minneapolis, Minn 55409  
 U.S.A.

### CHANGE OF ADDRESS to:

Tony Gibb, 25 Dorville Crescent, London, W.6. (Editor)  
 H. Benn, 51 Blakes Lane, New Malden, Surrey  
 D. Mecone 2620 North 40th Street, Apartment 17, Phoenix,  
 Ariz. 85008, U.S.A.  
 A. Listopad 600-16th Street, Oakland, California 94612, U.S.A.  
 Yasu Kizu 2022 Pennsylvania Avenue, Los Angeles, Calif 90033, USA

### RESIGNED

B. Carver 1 Boundary Road, N.22  
 A.A. Kingdom Highworth, Wilts.