JAPANESE SWORD BLADES.[1]

By ALFRED DOBRÉE.

Within the limits of a paper such as this it is impossible to deal adequately, not only with the sword as a whole, but with any part of it, such as the guard and other fittings. Such space as is available will therefore be devoted to a very brief and condensed account of the blade and the methods employed in making it.

Such information as I can lay before you on its earliest history is derived from the works of Mr. Gowland and Captain Brinkley, and from information given to me by personal friends among the Japanese themselves.

It seems to be fairly well established that the art of casting bronze was unknown to the aboriginal inhabitants of the Japanese Islands, but was brought there by the ancestors of the Japanese proper as distinguished from the Ainos. The date of the arrival of these immigrants is about the sixth century B.C. Coincident with their arrival is the appearance of barrows or tumuli for burial purposes. Many of these barrows have been opened and explored, and in them have been found a large number of objects of metal and pottery, including swords. In all cases the metal-work from the barrows is of bronze. Apparently no stone weapons have been found in the barrows, so that it would seem that the immigrants had already passed through their Stone Age, and were nearing the end of their Bronze Age.

These barrows continued to be used for a few hundred years, and were then superseded by the construction of megalithic dolmens, the change taking place about the second century A.D., and being coincident with the arrival of a second wave of immigration. During the barrow period the Japanese seem to have made some progress in metal-working, and so also, but at a more

[1] Read at the Meeting of the Institute, on 1st February, 1905.

rapid rate, did the members of the parent stem from which they sprang. For the second immigration brought with it not only the practice of dolmen building, but, what was much more important, a knowledge of the working of iron. That the second immigration consisted not of members of another race, but of a fresh batch of colonists from the same parent stem, seems to be conclusively shown by the continuity in the forms of the objects found in the dolmens with those found in the barrows, the change being rather one of material, though there was a change in the shape of the swords. This change is, of course, to be expected, since, owing to its greater rigidity, iron or steel could be wrought into a more effective blade than one cast in bronze.

The dolmen period came to an end about 600 or 700 A.D.

Now, both in the barrows and dolmens many swords have been found. The earliest, those in the barrows, are of bronze, straight, leaf-shaped, and double-edged, and these were cast in one piece in stone moulds. Such stone moulds, according to Captain Brinkley, still exist in Japan, though their antiquity is a matter of conjecture. Similar stone moulds are also found in Korea, and their existence, together with the fact that the barrows are most numerous in the south-western parts of Japan, probably indicates the route taken by the earliest immigrants, namely, by way of Korea, the Island of Tsushima and the western parts of Kyushu. The Island of Tsushima is easily visible on a clear day from both Korea and Kyūshū.

With the arrival of the second immigration the use of bronze for weapons seems to have been entirely abandoned, though, in a country of the peculiar configuration of Japan, changes would spread slowly, and no doubt the two periods overlapped to some extent.

In the dolmens are found swords of iron only, and of a different shape from those of bronze. They were straight and single-edged, similar to those now in use but for the absence of curvature.

The introduction of Buddhism towards the end of the dolmen period brought with it another form of blade, also of iron or steel, but in shape more like the earlier

bronze swords, since it was straight and double-edged. This type was called *Ken*, or *Tsurugi*, but does not appear to have come into general use as a weapon.

At the close of the dolmen period appeared the type of blade as we now know it, and this is the only one of the three forms of which we have really complete and definite information. It is therefore to this form that I would draw your attention. Progress in the art of sword-forging during the dolmen period seems to have been rapid, for at the time of the Emperor Ichijo, 987–1011 A.D., no less than 3,000 blades were recognised as fine, thirty as excellent, and four as superlative.

Great impetus was given to the art by the Emperor Gotoba, 1186 A.D., who certainly tempered, and, I believe, forged blades himself, and two or three examples of his work are extant in Japan. During the year 1206 A.D. he summoned to his Court twelve of the leading smiths of the time, each smith remaining one month. Their names in order of their arrival are :— Norimune of Bizen, Kuniyasu of Awataguchi, Tsunetsugu of Bitchu, Kunitomo of Awataguchi, Muneyoshi of Bizen, Tsuguiye of Bitchū, Sukemune of Bizen, Yukikuni of Bizen, and Sukenari of Bizen. They were followed by twenty-four smiths who came in pairs, two every month. Their names in order of arrival are :—Kanemichi of Bizen, and Kunitomo of Awataguchi ; Morosane and Nagasuke, both of Bizen ; Shigehiro of Yamato, and Yukikuni of Awataguchi ; Chikafusa of Bizen, and Yukihira of Bungo ; Kanechika and Sanefusa, both of Bizen ; Tomosuke of Bizen, and Munetaka of Hoki ; Narisane and Sanetsune, both of Bizen, Kanesue and Nobufusa, both of Bizen ; Tomotada and Sanetsune, both of Mimasaka ; Kanesuke and Norimune, both of Bizen ; Norisane of Bitchū, and Koresuke of Bizen. Finally six smiths were summoned, each for two months, their names in order being :— Norikuni, Kagekuni, and Kunitsuna, all of Awataguchi ; Muneyoshi, Nobumasa, and Sukenori, all of Bizen.[1] The swords forged by these smiths at these times bear special marks cut on the tang.

It is evident, then, that by the tenth century the

[1] All these names are taken from the *Koto Meizukushi*, printed, *circ.* 1780.

Japanese smiths had attained to a very high degree of excellence and enjoyed a very honourable position.

Nowhere in the world has the sword occupied so important a place as in Japan, where it became an object of veneration and almost of worship. The distinction it conferred upon the wearer, its association with the celebrated deeds of the national heroes, the reputation of an expert swordsman, the fabulous value attached to a first-rate blade and other reasons gave to the sword an importance and, as a factor in the national life, an influence which we ourselves can scarcely realize.

A sword is included in the three objects, or three divine precious things forming the regalia of Japan. It is called *Murakumo*, or the cloud-cluster, and sometimes *Kusanagi no Tsurugi*, or the grass-cutting sword. A long sword by Masamune and a short one by Kunimitsu formed the insignia of the Shogun.

These considerations make it the more remarkable that while other Japanese productions have been carefully studied in Europe the sword has been almost entirely neglected. Indeed, I know of only one European who has made a really serious study of this subject, and I need scarcely say that I refer to the late Mr. Gilbertson; and I should like to take this opportunity to acknowledge his unfailing kindness to me and the help he was always so ready to give.

Among a Japanese gentleman's possessions nothing was nearly so precious as his swords. Unique skill and perfect taste were lavished upon their forging and decoration, their mounts and furniture, and in their complete and best form they represent the highest development of artistic metal-working. That this enthusiastic view is not altogether unwarranted may be shown by quoting two authorities. Mr. Gilbertson says :—

"I look upon a well-finished Japanese blade as a marvel of mechanical skill and perfect workmanship, as delightful to contemplate as the grinding and polishing of a speculum or large telescope lens. No competent judge either of the workmanship of a sword or of its practical value as a weapon can fail to appreciate the extraordinary skill displayed by the Japanese swordsmiths or to comprehend the unique position occupied by a master smith of renown."

1. A SMITH AT WORK.

2. SAMURAI WEARING TWO SWORDS.

Gouse, the French authority on Japanese Art, says :—

"Japanese blades are incomparably the most beautiful the world has ever produced; those of Damascus and Toledo, as examples of the working and tempering of steel, appear beside them merely as the efforts of children."

Now, if we consider the way in which the swordsmiths worked we shall see some of the reasons for this almost superhuman excellence. The swordsmiths of Japan held a high and honourable position; they were not artizans, but artists, and worked as such. A long series of smiths existed in the different provinces, forming separate schools, and each school has existed for very many centuries. Their experience and skill, transmitted from one generation to the next, grew as time went on. The forging of a sword was a semi-religious ceremony, and was only undertaken after considerable preparation. As a condition of success the smith must live a more or less religious life, and abstain from excesses of all kinds. Before commencing his work he clad himself in a special ceremonial costume, and wore a special head-dress. He suspended at the entrance to the smithy a *shimenawa*, or plaited straw rope, with gohei or charms hanging from it to drive away evil influences, and he prayed to the gods for assistance in his work. Fig. 1, Pl. I, shows a smith at work.[1]

This is a very brief and imperfect description of the proceedings of the swordsmith, but we can scarcely wonder that a work undertaken in this spirit should be so splendid in its result. The essence of the matter is admirably given by Professor Inazo Nitobe in his book, *Bushidō, The Soul of Japan;* and this is what he says :—

"The swordsmith was not a mere artizan, but an inspired artist, and his workshop a sanctuary. Daily he commenced his craft with prayer and purification, or, as the saying was, he committed his soul and spirit into the forging and tempering of the steel. Every swing of the sledge, every plunge into water, every friction on the stone[2] was a religious

[1] This illustration from *Tales of Old Japan* is reproduced here by the courtesy of Lord Redesdale and Messrs. Macmillan.

[2] In the original, Professor Nitobe uses the word "grindstone," but I have altered this, since it would convey a false impression to English readers, as will be seen later.

act of no slight import. Was it the spirit of the master or of his tutelary deity that cast such a spell over our sword? Perfect as a work of art, setting at defiance its Toledo and Damascus rivals, *there was more than art could impart.*[1] Its cold blade collecting on its surface, the moment it is drawn, the vapours of the atmosphere; its immaculate texture flashing light of blueish hue; its matchless edge upon which histories and possibilities hang; the curve of its back uniting exquisite grace with utmost strength; all these fill us with mixed feelings of power and beauty, of awe and terror."

"There was more than art could impart"; in these very striking words Professor Nitobe reveals, I believe, the swordsmith's principal secret.

Swords are made in Japan at the present time, but not in any great quantity now that they are no longer worn, and the swordsmiths work under the special protection of the Government. From a recent number of the monthly reports of the Proceedings of the *Tō-Ken Kwai* (Sword Society) of Tokyo, to which I have the honour to belong, it is interesting to note that at some of the meetings swords were exhibited by their maker, Horii Taneaki, one of the members, when they were examined and discussed. The same member also exhibited two swords made by Horii Taneyoshi, no doubt his father, one made in 1903 and one in 1904, when he was in his eighty-second and eighty-third year respectively. We may note here that the swordsmith's profession, judging from the particulars given in various Japanese works on the subject, seems on the average to have been conducive to great length of days.

By the Japanese swords are divided into two great classes, called Koto and Shinto,[2] meaning respectively old sword and new sword. The Koto swords are those made prior to the eighth year of Keicho, or 1603 A.D., and the Shinto swords those made after this date. This division was made by the Taikō, Toyotomi Hideyoshi, in whose time flourished the first sword expert whose judgment was accepted as infallible. His name was Honami Kōsetsu, and Hideyoshi appointed him the first official sword expert. This office has been held by the same Honami family down to the present time.

[1] The italics are mine.—A. D.

[2] This word has no connection with the Shintō religion, which happens to be the same reading of two entirely different characters.

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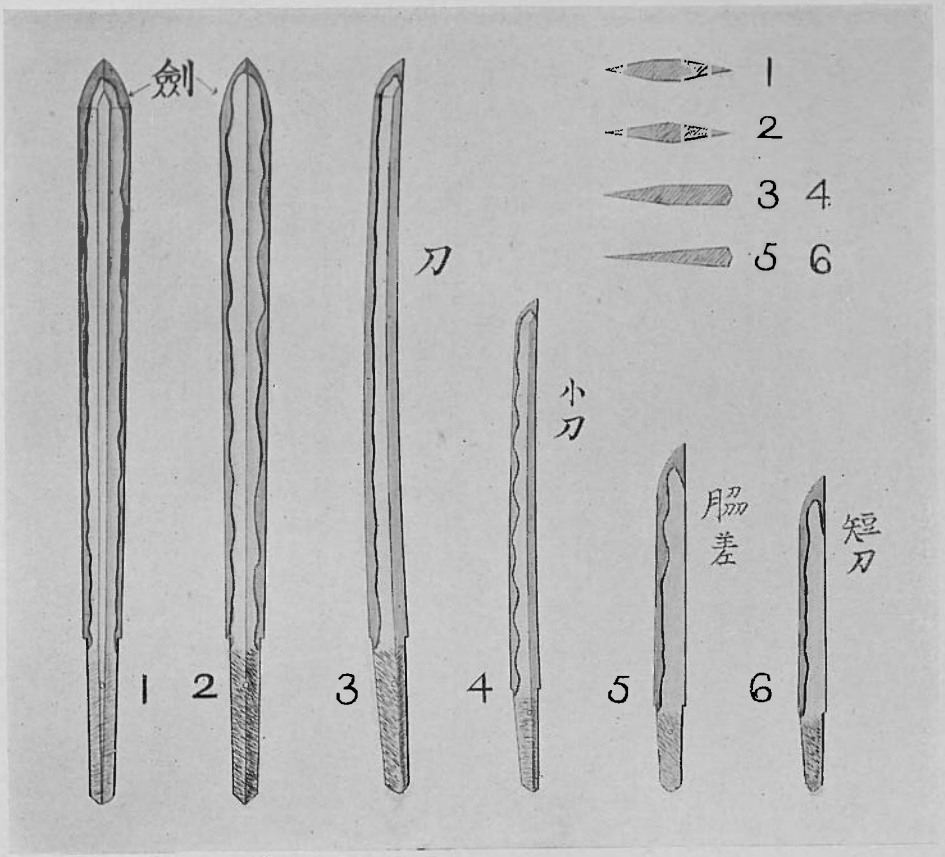


VARIOUS FORMS OF THE BLADE.

Very fine specimens of swords have been made in recent times, but the greatest value is attached to the Koto swords, especially those made in the twelfth, thirteenth, and fourteenth centuries. Plate II shows various forms of the blade. Nos. 1 and 2 are two forms of the *Tsurugi* or *Ken*. No. 3 is the *Tō* or *Katana*, No. 4 is the *Chiisai Katana* or small sword, No. 5 is the *Wakizashi*, used in the performance of *Harakiri*. No. 3 was usually called *Dai Tō*, and No. 5 *Shō To*, or collectively *Daishō*. The two together formed the pair of swords the wearing of which was the distinguishing mark of the *Samurai* class. At the same time the smaller one of the pair of swords not infrequently took the form shown in No. 4. All the blades 1 to 5 were mounted with a guard or *tsuba*, but No. 6, the *Tantō*, often carried by women in the upper part of their dress, had no guard.

Fig. 2, Pl. I, shows a *Samurai* bearing his two swords.

The metal from which swords were forged was derived from the deposits of magnetic iron ore and ferruginous sand, the iron being converted into steel by what we should call the cementation process. The blade itself is made of a soft elastic iron combined with steel, both of very high quality, or, for the best work, of two or three grades of steel combined together.[1]

Many different methods were employed in building up the billet from which the blade was finally forged, and the following is one of the most favoured. The smith first prepared some iron and steel plates of equal size and thickness and of suitable dimensions. A plate of iron and steel were then welded together to form one plate. This plate was notched across the middle on a line perpendicular to its length, folded on itself, welded

[1] Actual tests of a piece of the soft portion of a blade give a breaking strain of 33 tons per square inch, with an elongation of 13½ per cent. in a length of 2·3 inches. The following is the analysis of the same blade:—

	Soft Part.	Hardened Edge.
Combined carbon	0·47 per cent.	2·52 per cent.
Uncombined carbon	Trace.	Trace.
Sulphur	0·005 per cent.	Too small for estimation.
Silicon	0·079 „	

Phosphorus and manganese were tested for, but could not be detected.

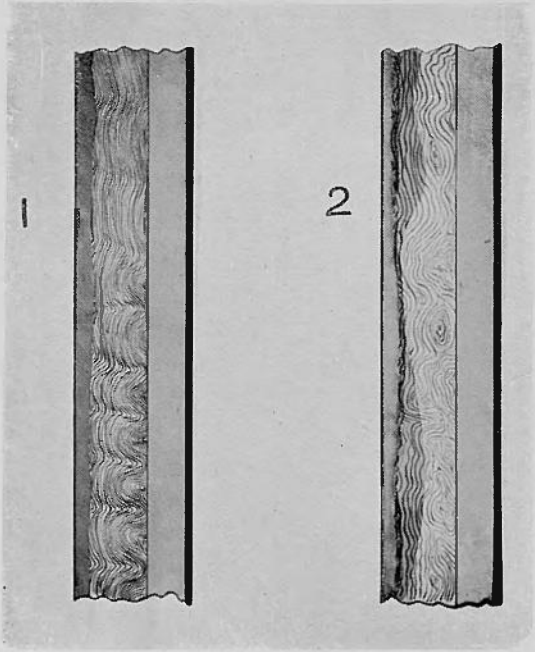
together and drawn out under the hammer to its original size. This process was repeated from twelve to eighteen times, resulting in a billet containing many thousands of layers of alternate iron and steel, and from this billet the blade was forged. In some cases, several such billets were prepared, welded together and folded and welded as before. In any case, the resulting billet was then drawn out under the hammer and the proper curve given to it.[1] Some very fine effects were produced by hammering the billet on the narrow side until this became the broad face, or by hammering on the angle, and this, combined with folding the metal in a particular way, produced the beautiful effect known as the Gassan style. This style is characteristic of a school founded by a smith named Gassan, who lived in the province of Yamato in the latter part of the twelfth century.

The smith's fire was made of pine charcoal of peculiar quality. At the commencement of his forging, the smith coats the metal with a thin layer of clay strewn with burnt straw ashes before placing it in the fire, and during the forging is most careful to keep his anvil scrupulously clean lest any piece of grit should get worked into the metal and produce flaws or specks in the finished blade.

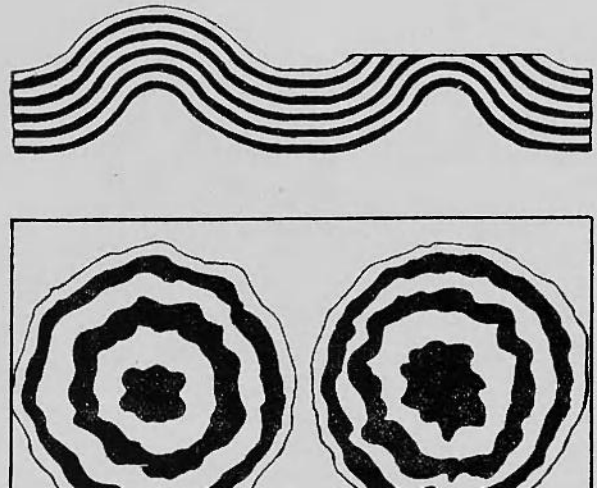
On examining many Japanese blades, beautiful wavy markings like the grain of a piece of planed wood are seen. This effect is called *mokume*, or wood graining. To describe in words the means by which this effect and the Gassan style is produced is not easy, but as far as the *mokume* is concerned, we can imagine that if a billet consisting of alternate layers of different grades of metal is heavily punched in different places on one side with a round-ended punch, similar but larger protuberances will be raised on the opposite side. If these protuberances are partly ground off and the whole brought level again with the hammer, there will be exposed the edges of the overlapping layers forming a series of more or less irregular concentric rings. Fig. 3, Pl. III, will make this clearer.

In Fig. 1, Pl. III, I have tried to draw the appearance

[1] A wooden scale, called *hinagata*, was used to measure the length and curvature.

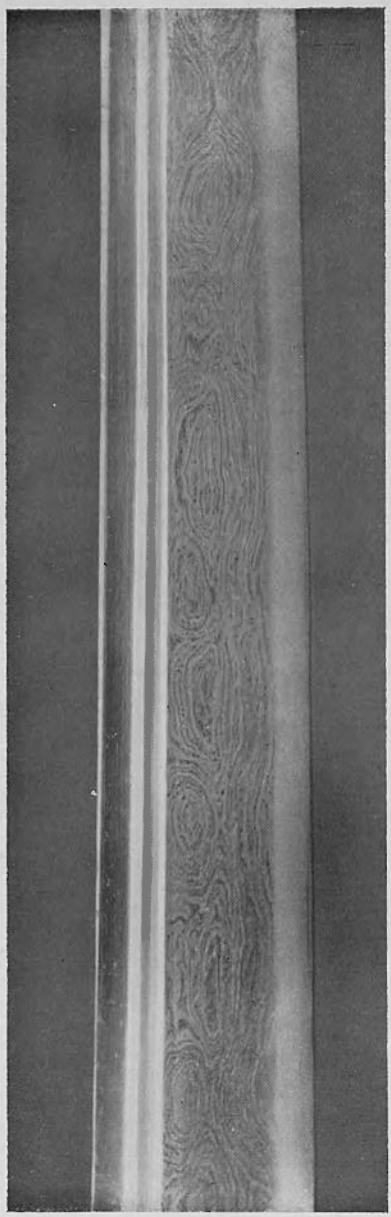


1, 2. MOKUME OR GRAINING.

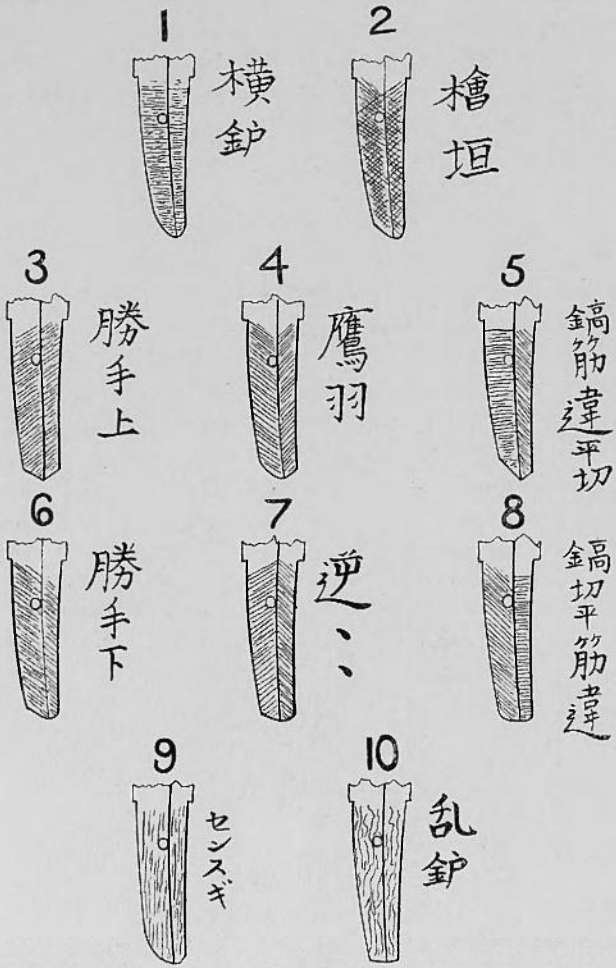


3. PLAN AND SECTION.

1. GASSAN SWORD.



2. SWORD BY YUKIYASU.



CHARACTERISTIC SHAPES AND FILE MARKS ON THE TANG.

of a form of the Gassan style in Fig. 2, Pl. III, is an exact as possible copy of a portion of a blade in my own possession attributed to the master smith, Masamune, living in the early part of the fourteenth century.

Fig. 1, Pl. IV, shows an actual example of the Gassan style. This sword was made by Gassan Sadayoshi so lately as 1865. Fig. 2, Pl. IV, is an actual example of *mokume* somewhat different from that on my drawing. This sword was made in 1352 by Yukiyasu. The last two illustrations are of swords in the collection of the late Mr. Gilbertson, and were made from very fine photographs most kindly given to me by his son, Mr. Charles Gilbertson.

When the forging was completed the blade was scraped with a kind of draw knife, called "sen," and was then filed all over, the surface being carefully examined for defects. At the same time the smith shapes the tang and files it in a particular way, for these file marks or "yasuri-me," as well as the shape of the end of the tang itself, are characteristics of the different schools of forging. Plate V, shows all the forms of yasuri-me in use, as well as some of the shapes given to the end of the tang. As will be seen, they have their appropriate names :—

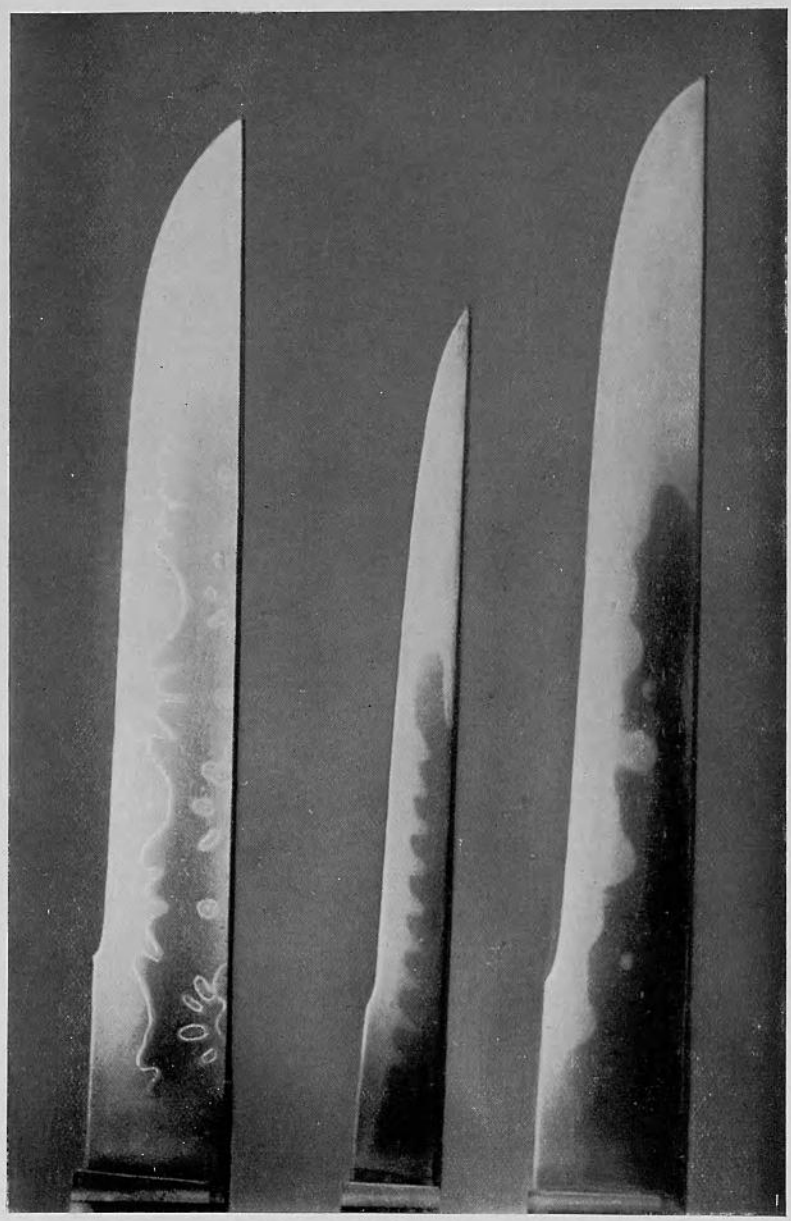
No. 1. *Yoko yasuri*, or transverse file marks.
„ 2. *Higaki.*—The *Higaki* is a lattice fence of *hinoki* wood.
„ 3. *Katte agaru.*
„ 4. *Taka no ha.*—The hawk's feather.
„ 5. *Shinogi suji kai hira kiru.*
„ 6. *Katte sagaru.*
„ 7. *Saka taka no ha.*—Inverted hawk's feather.
„ 8. *Shinogi kiri hira suji kai.*
„ 9. *Sen suji.*
„ 10. *Midare yasuri.*—Irregular.

At this stage the most important operation in the making of the sword is undertaken. This is the production of the *yakiba*, or hardened edge, which appears as a clouded band of pearly lustre from one quarter to one half inch wide along the edge of the blade. In

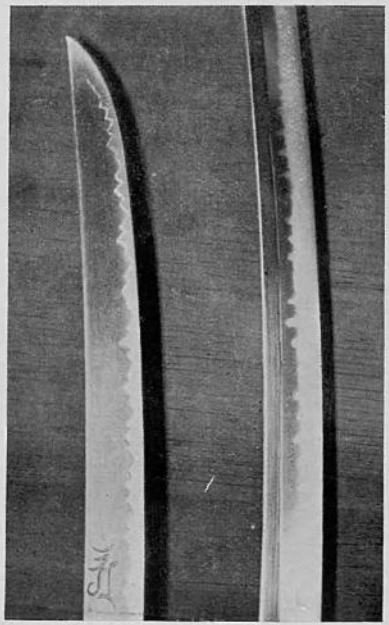
Plate VI, and Fig. 1. of Pl. VII, some actual examples are shown.

The *yakiba* was produced in the following way :—The smith first covers the whole blade with a mixture of clay, sand, and a small proportion of powdered charcoal. The clay was of a ferruginous character, called *sabidore*, or literally "rust-earth." When this coating had hardened a little the smith took a piece of sharpened bamboo and with it cut through the coating near and along the edge on both sides in the particular outline desired. The clay over the edge, thus separated from the rest, was then removed. Fig. 2, Pl. VII, shows the appearance of the sword at this stage.

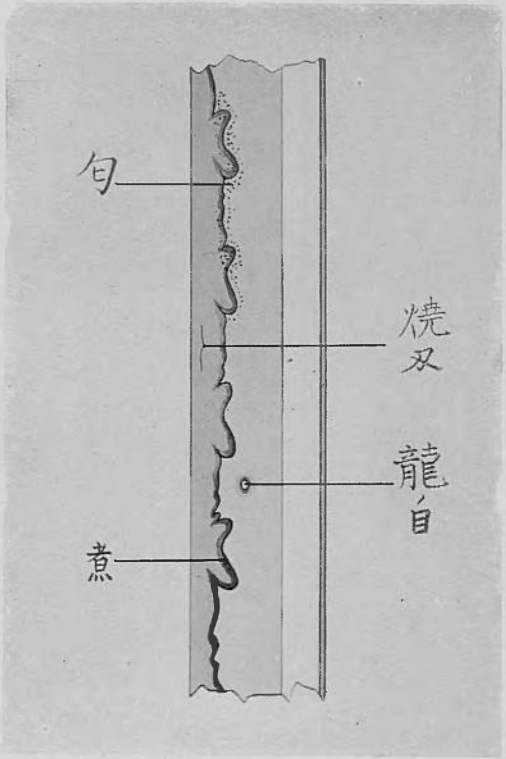
When the remaining coating was dry and hard the smith held the blade edge downwards and ran it backwards and forwards over the fire until he saw by the colour that the proper temperature was attained. To be able to estimate exactly when the proper temperature was reached required great experience, and this temperature would no doubt vary with the composition of the particular blade under treatment. The blade was then plunged into water horizontally if curved, and vertically if straight. The temperature of the water seems to have been of great importance, as also its quality ; and it is remarkable that many people in this country ascribe the excellence of the Sheffield cutlery not so much to the steel as to some peculiarity in the Sheffield water. The same belief existed in Japan, and the smiths usually worked near some source of water which was considered specially suitable for their purpose. We may note here that when a sword is dated and the month is also given, this month is nearly always the eighth. If not, then it is the second, which is the opposite one of a twelve months' cycle. The reason for this is that the water at those times of the year was considered most suitable for hardening the edge. I have, however, seen two or three blades dated the first month, and one dated the third month. Cold water does not seem to have been used, but it was slightly warmed, different smiths using different temperatures, the exact temperature being a sort of trade secret of each smith. There is an interesting story told illustrating this.



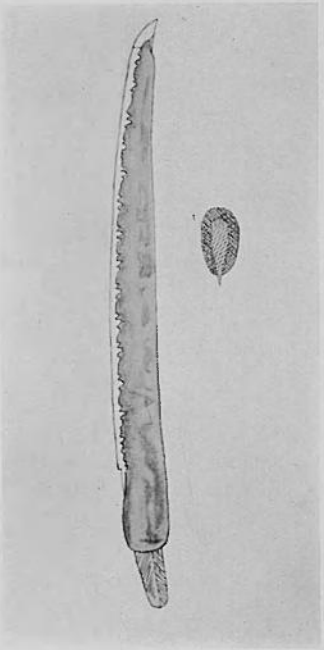
THE YAKIBA OR HARDENED EDGE.



1. THE YAKIBA.



3. NIOI, NIYE AND RYŌ-NO-ME.



2. COATING OF CLAY PARTLY REMOVED.

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Goro Nyudo Masamune of Soshu, who flourished at the end of the thirteenth and beginning of the fourteenth century, though placed second in order of merit by some of the Japanese experts, was the most famous of them all. He had eleven pupils, to whom no doubt, as their progress and skill deserved it, he imparted his secrets and experience. His favourite pupil was Samonji, who was to have become his adopted son, and to have married his daughter, an only child. Samonji appears to have been of an inquisitive nature, for one day, when Masamune was tempering a sword, Samonji stealthily put his hand into the water to ascertain its temperature. He was detected by Masamune, who immediately struck off the offending hand with the sword. Samonji, of course, fell into hopeless disgrace, and died at the early age of thirty, his place being taken by Sadamune, who became Masamune's adopted son, and married the daughter. This interesting wedding took place in the third year of *Geno*, or 1321.

The difficulty of producing the hardened edge, and at the same time keeping the blade perfectly straight and true, is very great, but for the Japanese smiths this difficulty, like many others, seems to have existed only to be overcome. If the edge was found to be too hard, it was possible to let it down, as we should say—that is, after having been made roughly bright all over, the blade was gradually and uniformly heated from the back until the colour of the film of oxide forming on the edge showed that the required reduction in hardness had been obtained, when it was plunged into water. This operation was, however, considered to impair the quality of the blade, and to diminish its value.

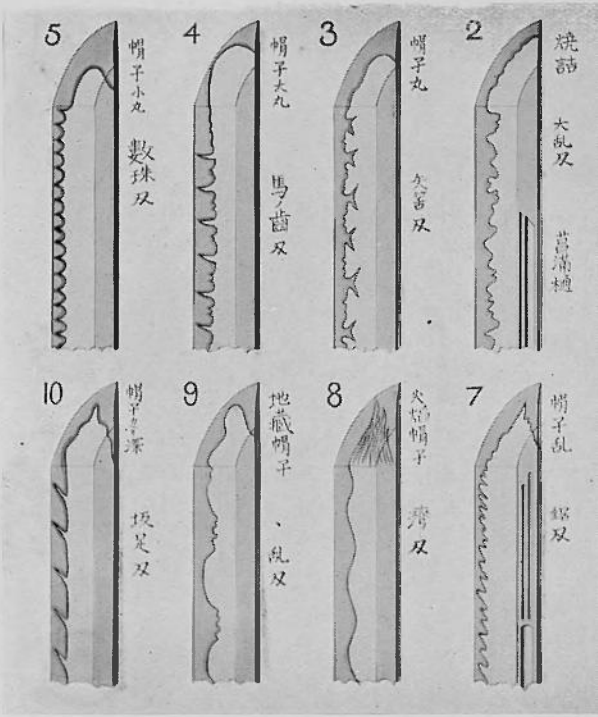
The idea of using a hardened edge, while the body of the blade remained relatively soft, is the most essential point of difference between Japanese blades and all others, and it may be interesting to consider this difference a little more closely. The Japanese blade is essentially a cutting weapon, and was made with a view to the production of a blade with an extremely hard and keen edge, so as to obtain the best cutting effect combined with durability of the edge, while at the same time to avoid all danger of breakage, however hard a blow might

be struck. Now, the European sword is made equally hard all over, and, to avoid danger of breaking, it cannot be made of more than a certain degree of hardness. This degree of hardness is insufficient to produce a really keen and durable edge. If a European sword were made as hard all over as the edge of a Japanese blade, it would be nearly as brittle as glass, and quite useless for practical purposes.

The outline of the yakiba, as will have been seen, is of many different forms, and these variations in outline form the characteristics of different schools and smiths. There are thirty-two recognised principal classes, with some further subdivisions. On Plate VIII, will be seen drawings of some of the more interesting ones, as well as some of the different forms given to the *yakiba* at the *boshi*, or head of the blade. The outlines at the *boshi* do not necessarily correspond with the outline along the edge in these drawings, but have been shown in this way to economise space. The various outlines shown have their special names, and are :—

No. 1. *Sugu ha.*—Straight yakiba.
,, 2. *Dai Midare.*—Large irregular.
,, 3. *Yahazu.*—The repeated forms here represent the notch called yahazu at the end of an arrow, into which the bow string fits.
,, 4. *Uma no ha.*—Horse's tooth.
,, 5. *Juzu.*—The rosary.
,, 6. *Hyotan.*—The gourd, *i.e.*, the Japanese gourd, consisting of two roughly hemispherical parts connected by a waist.
,, 7. *Nokogiri.*—The saw.
,, 8. *Notare.*—Undulating.
,, 9. *Notare-midare.*—Undulating combined with irregular.
,, 10. *Saka ashi.*—Literally, the "road-up-mountain-leg." If the illustration is turned round so that the "legs" are vertical, the edge will represent the slope of a steep mountain.

The outlines shown at the boshi have also their appropriate names, and are :—



VARIOUS FORMS OF OUTLINE IN THE YAKIBA.

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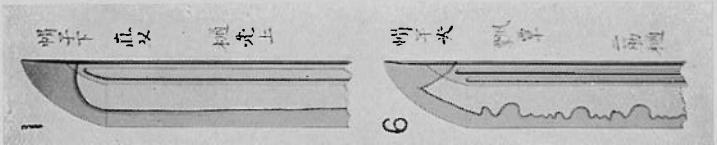


No. 1. *Bōshi sagaru.*—Low boshi.
„ 2. *Yaki tsumete.*—The hardened edge stopped off.
„ 3, 4, and 5. *Bōshi maru, dai maru,* and *ko maru,* or round, large round, and small round respectively.
„ 6. *Bōshi togare.*—Pointed.
„ 7. *Bōshi midare.*—Irregular.
„ 8. *Kayen boshi.*—Flame boshi.
„ 9. *Jizō no bōshi.*—The head of Jizo.
„ 10. *Kayeri fukaku.*—Deeply turned back.

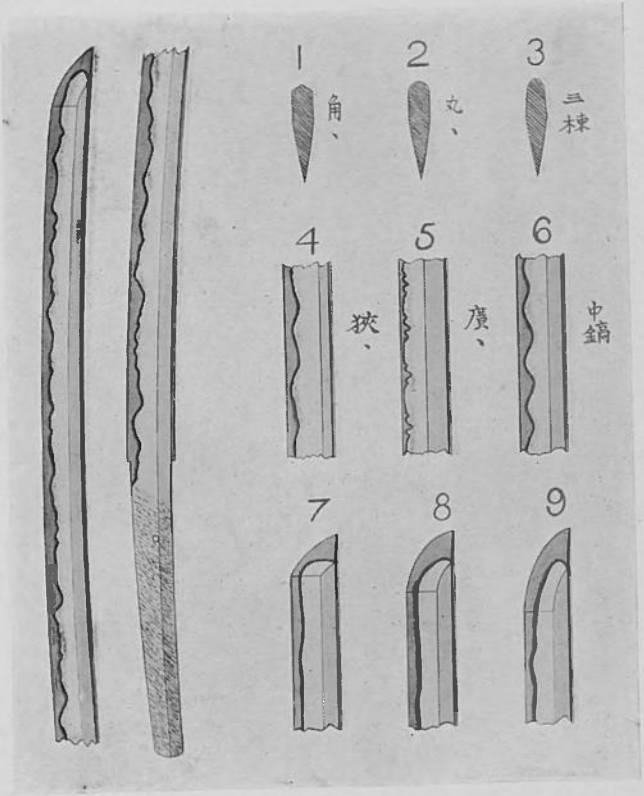
Of these No. 9 is the most interesting. The outline here is intended to represent the upper part of a human head seen in profile, and is called the head of *Jizo.* He is the god whose special business is to look after children, and is one of the most beautiful conceptions in the Japanese Pantheon. He is generally represented as a young and handsome man with a beautiful smile. This particular outline is characteristic of one smith only, namely, Sadamune, the favourite pupil of Masamune, already referred to.

A careful study of the yakiba, and a knowledge of the characteristics of different smiths in this respect, are of great importance in forming an estimate of a blade and determining its age and maker if not signed or dated, or whether the name appearing on the tang is genuine.

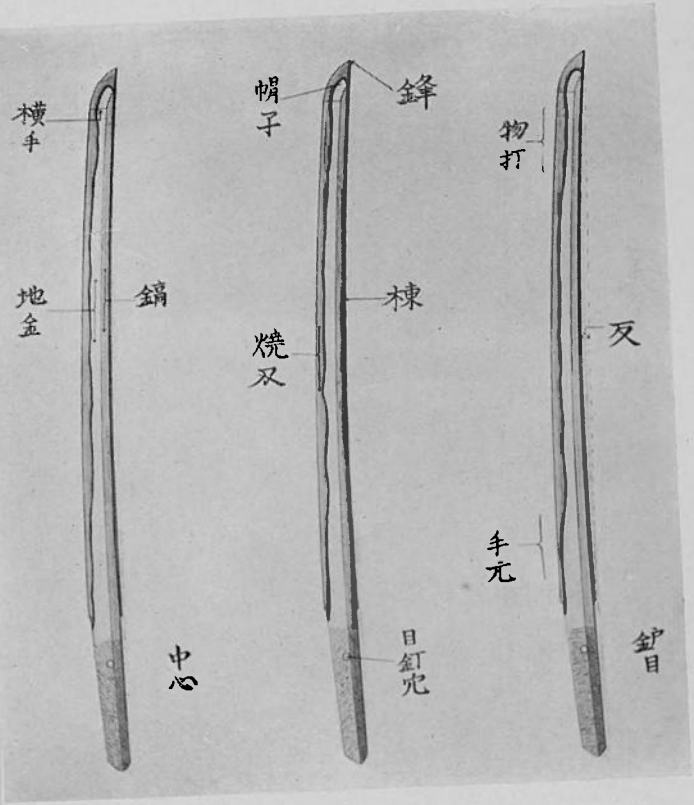
The blade had now to be ground, sharpened, and finished. For the first part of the operation a large stone of a special kind, called the *tō-ishi,* is used. It is mounted on a board laid across a circular wooden vessel containing water to be applied to the stone as required. The sword was held in both hands with pieces of cloth, and rubbed backwards and forwards on the stone. The sword was forged by the smith to a very exact shape, and it was only necessary to remove a very thin layer of metal; but with such a large aggregate surface, this naturally took a long time. This preliminary grinding left the blade quite true and smooth, but with unfinished surfaces. To finish it a series of small stones of graduated size and fineness were used, but these were held in the hand, and the blade rubbed with them. Finally, the

back and the flat surfaces running along each face of the blade near the back were burnished with a migaki hari, or burnishing needle of steel.

The blade is then minutely examined, for many things have now become visible which could not be seen at an earlier stage. Besides the graining of the metal and the quality of the *yakiba*, these are more especially the *nioi*, the *niye*, the *ryo-no-me*, &c. Fig. 3, Pl. VII, will make these clearer. The specks or dots along the inner side of the yakiba represent the nioi. These appear as small and very brilliant specks of a whiter colour than the surrounding metal. The niye is the somewhat differently coloured band running along the inner edge of the yakiba. In some blades this is very marked, in others it is scarcely visible, and in the same way the nioi may be almost entirely absent. The *ryo-no-me*, or dragon's eye, is the elliptical spot formed of a ring of hardened metal with a softer centre. A long time is required for grinding and finishing, as will easily be realized on examining a good blade. To enable us to form some idea of what has to be done we will now consider the shape and section of a blade. Fig. 1, Pl. IX, gives drawings of a blade with sections. The usual length of the blade without the tang is about 30 inches. Each face of the blade consists of three surfaces; the face shown on the drawing is called the *omote*, and the opposite one the *ura*. Of the three surfaces the broader one sloping down to the edge is slightly rounded or convex, and is called the *jigane*. The narrower one, called the *shinogi*, is flat, and the portion at the head, called the *boshi*, is convex. The blade is curved and diminishes in width from butt to point. The three surfaces meet on lines of intersection as shown, and of these lines those dividing the *shinogi* from the *jigane* and *boshi* are curved, while that dividing the *jigane* and the *boshi* is straight, and is called the *yokote*. All these edges of intersection of the surfaces are perfectly sharp and true, and not rounded off in the least. The back may be of three forms as shown, called in order of numbering, *Kaku mune*, *Maru mune*, and *Mitsu mune*, that is, square or two-sided, round and three-sided back respectively. The *shinogi* on one face is not necessarily



1. DRAWINGS OF BLADES.



2. CHARACTERS DENOTING THE PARTS OF A BLADE.

To face page 14.

parallel to that on the other, but they may be inclined to one another as in Drawing No. 3. Here the junction line between the *jigane* and *shinogi* is the highest part of the face, and in this form the *shinogi* is technically said to be *takaku*, or high. This is characteristic of the blades made in the province of Bingo, and especially those of Mihara in that province. The *shinogi* may be narrow, wide, or medium, as in Drawings 4, 5, and 6, and the *bōshi* may be short, medium, or long, as in 7, 8, and 9. All these variations are also characteristics.

The blade is remarkable for its three exactly similar curves, that of the edge, that dividing the *shinogi* from the *jigane*, and the back. These curves are all absolutely true without the smallest variation from the true sweep. Also the line dividing the shinogi from the jigane is always at the same proportionate distance from the edge and back. The blade is, in fact, a true geometrical figure. To accomplish this result, keeping all the curves perfectly true, preserving a uniform, transverse convexity of the jigane, and a uniform sharpness from butt to point, is a marvellous technical feat. The curves are the arcs of circles, the average radius being about $8\frac{1}{2}$ feet. There is an exception to this rule in the swords made in the province of Bizen—which province, by the way, produced by far the greatest number of smiths, and in this case the curves are made up of the arcs of two circles of different *radii* which become tangential at a point 3 or 4 inches from the butt. This gives the Bizen blades their peculiar "cocked-over" appearance.

Fig. 2, Pl. IX, shows the characters used to denote the principal parts of the blade. Many of these have been already referred to, but we may note the *nakago*, or tang, the *mekugi ana*, or hole in the tang through which passes the *mekugi* or peg for securing the handle or *tsuka*, the *kissaki* or point. The degree of curvature is called *sori*, and is the distance between a line drawn between the butt and point and the back at the centre of the blade. This will be seen in the right-hand figure. Particular attention is to be given to the two portions of the *yakiba* indicated at the top and bottom of the blade on the right-hand drawing, each 3 or 4 inches long. That at the top is called the *mono-uchi*, and at this

point the *yakiba* is usually deeper, and should be keener and harder than elsewhere. That at the butt is called *temoto*, and here the *yakiba* should not be so deep. This is to avoid the occurrence of too great an amount of hard and brittle steel at this point, for it is here that the maximum strain is likely to come on the blade. Flaws or blemishes are always objectionable, but their appearance on either of these parts is held to be a fatal defect.

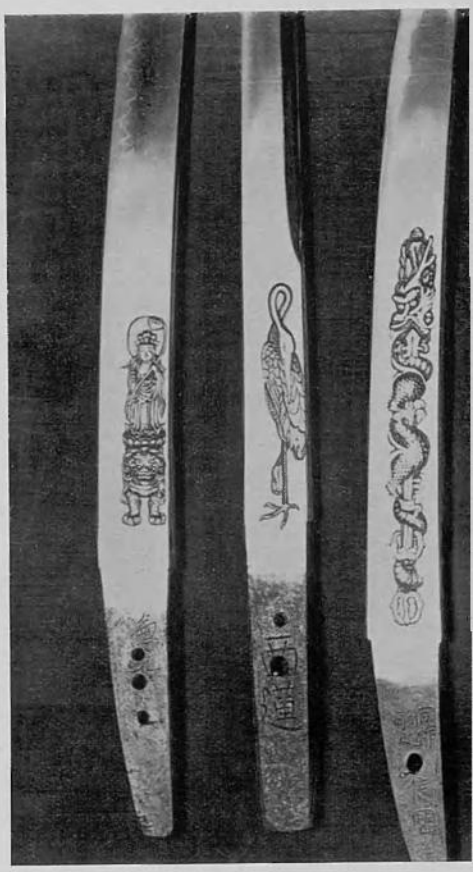
The smith usually signs his blades, but by no means always, and sometimes the date and other particulars were added. Figs. 1 and 2, Pl. X, show actual examples of signatures and dates, and it will be noticed that both swords are dated the eighth month.

Swords differ considerably in shape : some are narrow and thick, some broad and thin, and, as we have seen, there are considerable variations in the width of the *shinogi* and length of the *boshi*.

So far, only plain swords have been considered, but the blade is frequently decorated with *horimono*, or engraved figures. These are sometimes elaborate and sometimes quite simple. Examples will be seen in Fig. 3, Pl. X. Also grooves or "hi" are frequently cut in the *shinogi*, sometimes a simple broad one, or two parallel narrow ones, or one broad one half-way up the blade and two narrow ones for the other half.

I have made complete measurements of a great number of blades, weighed them, and determined their centre of gravity and centre of percussion, moment of inertia, and so on. Though the tables of statistics thus formed have not been completely analysed, I have got some interesting results. In spite of differences of length and other dimensions, the smiths have, by experience, been able to observe a wonderful uniformity in, and are evidently quite alive to the importance of, the position of the centre of percussion. In order to show graphically what is meant by centre of percussion, I have made a piece of apparatus. (See Plate and note at the end of the paper.) Different swords agree remarkably in the position of the centre of gravity and the centre of percussion, when the distance of these points from some fixed point is expressed as a percentage of the length of

1. EXAMPLES OF SIGNATURES AND DATES.



3. HORIMONO, OR ENGRAVED FIGURES.

PLATE X.

2. EXAMPLES OF SIGNATURES AND DATES.

To face page 16.

the blade. The distance of the centre of gravity from the butt averages 31 per cent. of the length of the blade, and its distance from the end of the tang averages 44 per cent. of the total over all length of the sword. The distance of the centre of percussion from the *mekugi ana*, or hole in the tang, averages 63 per cent. of the distance of the tip of the blade from the same point.

In all the swords I have measured these percentages do not vary more than about 1½ per cent. either side of a mean; this close agreement clearly shows that it is the result of design, not accident.

There are a great number of points of which, it will have been noticed, nothing has been said owing to lack of space. There are, for example, the characteristics of different schools and smiths, the proper method of making a *kantei*, or critical examination of a blade, the indications from which many valuable deductions may be made, the differences between Koto and Shintō blades, and the estimation of the quality and probable date and style. Also there is the extremely interesting social aspect of the sword, but these must be left, since for their complete treatment not one paper, but several volumes, would be required.

That greatly-prized possession—

> "The girded sword of Great Japan was regarded as of divine origin, dear to the General as the symbol of his authority, cherished by the Samurai as almost a part of his own self, and considered by the common people as their protector against violence. What wonder, then, that we find it referred to in glowing terms as 'the precious possession of lord and vassal from times older than the divine period,' or as 'the living soul of the Samurai.'"[1]

Of exquisite beauty and perfectly adapted to its purpose, the theme of poets and the pride of warriors, we may not improperly regard it as truly symbolic of the brave, loyal, and chivalrous spirit of the nation that produced it.

[1] "The Sword of Japan," by T. R. H. McClatchie, *Asiatic Society of Japan*, II, 50–56.

NOTE.

Explanation of Plate XI.

Apparatus for showing the centre of percussion.

This apparatus consists of a wooden sword fixed in a stand in such a way that it is free to swing about the end of the tang. At the junction of the tang with the blade, a friction joint is provided, the pressure of which can be adjusted by a small bolt passing through it. The pressure is adjusted so that the friction at the joint will hold the blade as shown in Fig. 1, Plate XI. A trigger-catch is fixed in the upright to hold the sword as shown. A block seen to the left hand side of the figure is provided with a leather top, on which the blade falls. On releasing the trigger the blade falls and the block being as shown in the above figure, the blade is deflected at the joint as shown in Fig. 2, Plate XI. Similarly if the block is placed near the upright and the blade falls as before, it will now be deflected at the joint as shown in Fig. 3, Plate XI. Since therefore the direction of deflection is reversed as the block is moved from left to right, it is clear that there must be some point between these two where no deflection will take place when the sword falls. (*See* Fig. 4, Plate XI.) This point is the centre of percussion.

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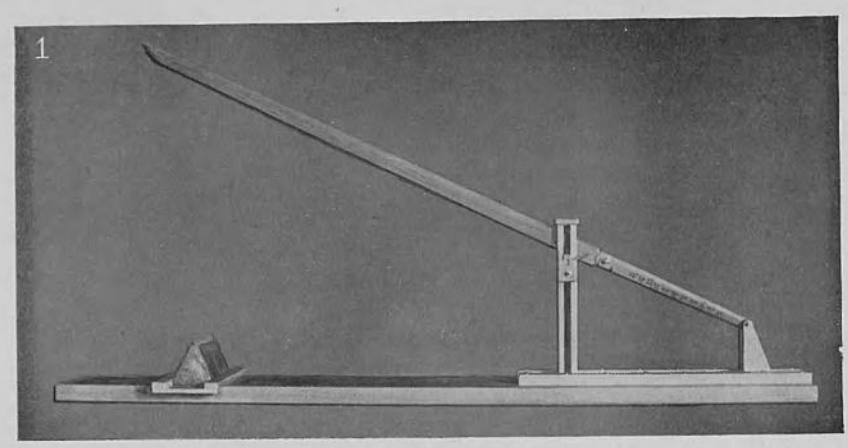

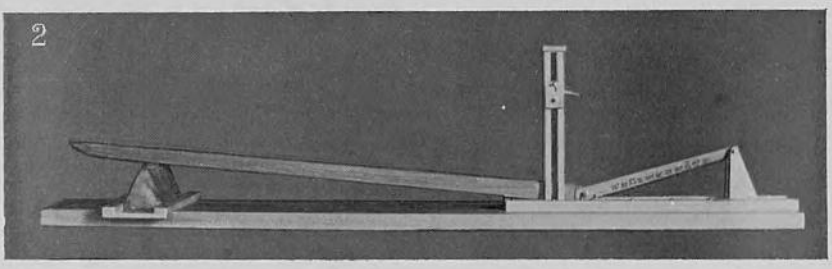

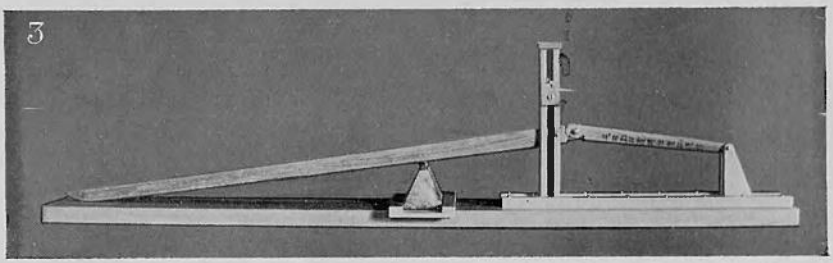

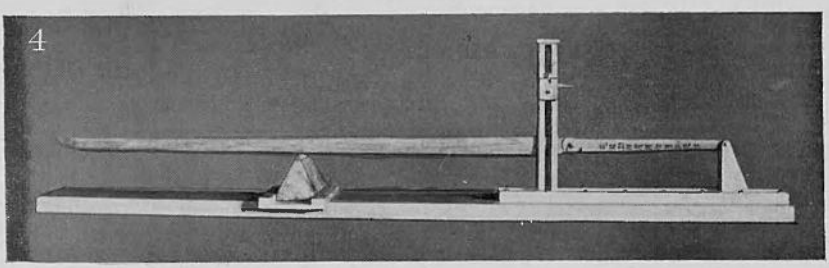

APPARATUS FOR SHOWING THE CENTRE OF PERCUSSION.

JAPANESE SWORD BLADES.[1]

II.

By ALFRED DOBRÉE.

I had the honour, on a previous occasion, of reading a paper before the Institute on Japanese Sword Blades, when I briefly dealt with their origin, development and method of manufacture. However inadequately I was able to deal with it, the subject is an intensely interesting one, and I firmly believe the time will come when these wonderful weapons will be collected and studied as eagerly as any of the other productions of Japan: in order to make this the more possible of realization, I have prepared the following notes in the hope that they may be of some practical value to present and future students of the subject. And by student I mean not the collector of swords merely because they are swords, but the true amateur, the lover of his subject, who loses no opportunity of adding to his knowledge as well as to his collection.

The writer of the Kotō Meizukushi makes some instructive remarks for the benefit of Japanese beginners. On hearing a sound, he observes, we can imagine the cause, and by seeing any object we can form some conception of the idea in the mind of the maker, and while information may be obtained even from quite foolish people yet we must not depend entirely upon others, but must use our own intelligence and imagination. He goes on to say that the expert is primarily a man of trained memory: if he has studied the blades of a particular maker, he can recognize an example of his work at once, although it may not be quite usual, just as the back view of one's friend is readily recognizable; but a friend dressed in quite a different garb may not at first be easily identified: guesswork pure and simple is immoral, and imagination, however useful in itself, must have the support of facts. He then gives certain specific instructions: first it is necessary to remember the names of all the provinces and

[1] Read before the Institute, November 1st, 1905.

to be able to read and write them, then the names and duration of all the Nengo, or year periods, from the period Daido, or 806 of our time. Everything in the books as to the history, technique, peculiarities, and characteristics of blades is to be committed to memory, since to refer to a book in the presence of others is not considered polite. Another Japanese writer has observed that one who can correctly read signatures is already half an expert.

Though I do not suggest that it is essential for European students of Japanese swords to commit all these details to memory, I have prepared the following tables :—

1. Tables of the Nengo, or year periods, from 1077 A.D. to the present time, with the English transliteration and corresponding date. (Figs. 6, 7 and 8, see pp. 238, 239, 240.)
2. A list giving 252 of the characters used in names of sword-smiths with the English transliteration. (Figs. 4 and 5, see pp. 234, 236.)
3. A list of the provinces in which swords were made, giving in each case the Japanese characters for the standard and alternative forms, with the English transliteration. (Figs. 2 and 3, see pp. 232, 233.)
4. A table (Fig. 9, see p. 255), containing miscellaneous information.

It will not often happen that a character will be met with which does not occur in these lists.

The two columns on the left, in Fig. 9, are the Ju-ni-shi and the Jikkan of the sixty-year chronological cycle. These are sometimes used in addition to the year period, but may be neglected in this case.[1] I have also added four of the most usual family names (though these occur most frequently on Shinto swords) and some copies of actual signatures and dates with the respective transliterations.

We may now be presumed to have acquired some of the information stipulated for by the Japanese writers, and will see what use can be made of it.

We learn that there is a proper way to make an examination of a blade, this examination being technically

[1] Full particulars as to their use will be found in Hoffmann's *Japanese Grammar* or Bramsen's *Japanese Chronological Tables.*

called *Kantei*, and the expert a *Kanteisha* or *Mekiki*. The observer should stand near a window, with his back to it, holding the blade in a vertical position, and inspection should take place in the following order :

1. The search for *kizu*, or flaws.
2. *Tsukuri*, or the shape and workmanship.
3. The *Yakiba*, or hardened edge.
4. The *Ysuri-me*, or file marks on the tang.
5. The *mei*, or signature.

1. Flaws may appear as cracks, flaking due to imperfect welding, and bubbles in the metal, technically known as *fukure*, due to the occlusion of gas or air in the process of welding. Flaws occurring in the *temoto* or *monouchi* are considered specially detrimental. (See my previous paper, pp. 15 and 16 of this volume.)

It sometimes happens that if a flaw appears on a blade an engraved design is cut so as to remove it, and this is one reason why swords are sometimes seen with engraving of obviously later date than the blade. A flaw has become visible only when the blade has been worn down by repeated sharpenings and polishings, and the engraving is then cut to remove it. Of course, good blades may be met with in infamous condition, due to neglect and improper treatment, but a little experience will soon enable the collector to judge of the real quality. I have myself picked up blades for a few shillings which I would scarcely part with for as many pounds, now that they have been sharpened and polished in Japan.

2. The workmanship must be good and the blade true, straight and well finished. All the curves of the edge, back, and junction lines of the three surfaces on each side of the blade must be perfect and free from variation. Grooves if they exist must also be perfectly true with sharp edges, and on letting the reflection of any object move down them they must not produce distortion in the image formed. The *jigane*, or surface sloping down to the edge, should be slightly convex. The shape of the blade should be carefully noted, also the length of the *boshi*, and whether the *shinogi* is narrow, wide, or normal, as all these variations form characteristics.

3. The *Yakiba* should be distinct and usually, though

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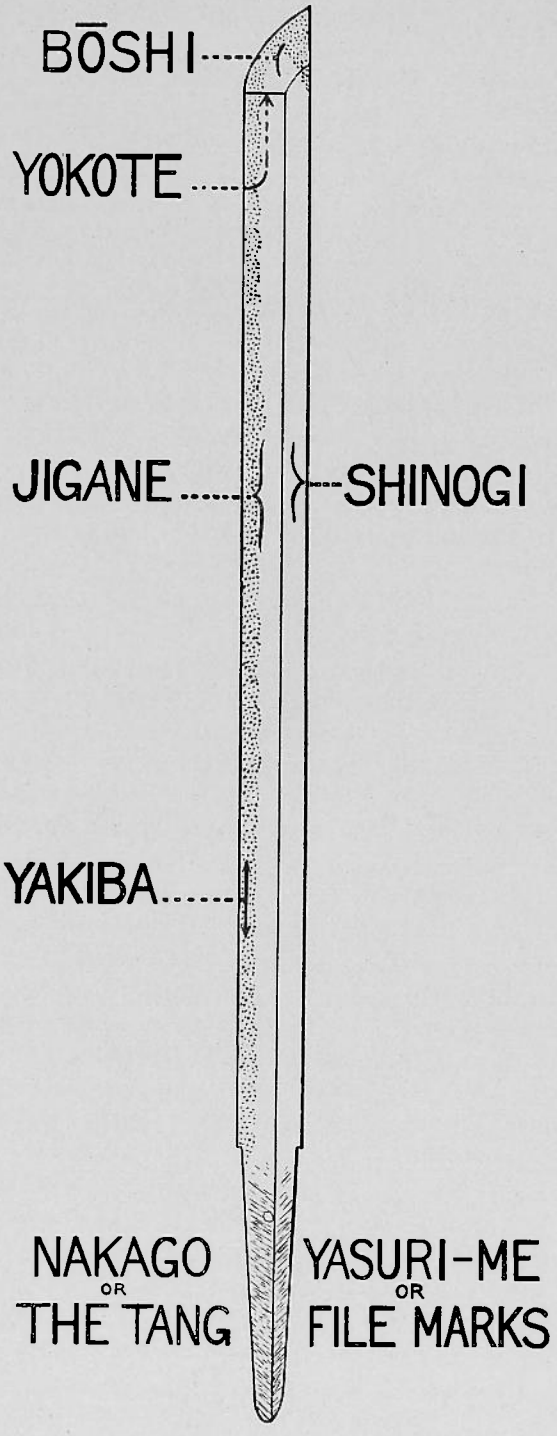

NAMES OF THE PRINCIPAL PARTS OF A SWORD BLADE.

there are exceptions, should show a clear line of demarcation between it and the softer part of the blade. It should not be too narrow in places compared with its average width and should of course be free from defects. Careful examination of the Yakiba is most important, as it forms one of the chief characteristics.

4. The *Yasuri-me* should be visible, if not there is reason to suspect that the tang may have been tampered with, though, of course, if it had been allowed to get very rusty this would cause their disappearance. Before making any examination of the tang the *habaki* or metal collar at the butt of the blade should be removed.

5. The *Mei*, or signature, should be clearly cut and should show what is technically known as the *tagane-no-makura*, or "chisel's pillow"; that is to say, the burr raised by the chisel on the edges of the incised lines. Both as regards the signature and the file marks a great deal may be learned by carefully comparing a series of tangs which have been preserved intact, beginning with quite recent ones and going back to old ones. The gradual change in appearance due to aging then becomes clear, and it is extremely difficult to imitate the effect artificially: this is sometimes attempted by the use of various corrosive agents, and for that reason it is always advisable to examine the hole or holes in the tang carefully. Should they show signs of corrosion inside or raggedness at the edges, any suspicion as to the tang having been tampered with will be confirmed. Signatures are sometimes altered by eating away the original metal, recutting the signature of an older and more famou smith and then artificially giving the appearance of age. In the same way the date is sometimes tampered with. When I was selecting blades to be shown at the exhibition of Japanese Arms and Armour earlier in the year, I came across two good examples of forged dates. Each sword had of course originally been correctly dated, but in each case the characters representing the original year period had been removed and those of a much older period cut in their place. On one blade which seemed to me to be obviously Shintō, I was surprised to see, on removing the handle, that the date was given as *Embun shichi Nen*, or the seventh year of the year period *Embun* which

began in 1356. But as a matter of fact there were only five years in the period *Embun*, so that a seventh year was impossible and the forger had not carried his alterations quite far enough. The original period was of course one of much later date and also one which contained at least seven years. The case of the other blade was precisely similar. Sometimes a genuine old tang with a signature on it is welded on to a comparatively modern blade, but it is extremely difficult to do this sufficiently well to deceive an intelligent observer.

While we are considering this subject it may be well to mention that in the case of *katana* and *wakizashi* the signature is always cut on that side of the blade called the *omote*. This is the side seen if the blade is held vertically with the edge towards the left hand. That is to say, that when the blades are in the correct position in the wearer's sash with the edges uppermost, the signatures would be on the outside, while the date is almost invariably cut on the reverse side. But in the case of *tachi* or blades which are slung on cords with the edge downwards the signature is always cut on the opposite side or *ura*. If, therefore, we come across a blade having the general appearance of a *katana* and mounted as one, but with the signature on the *ura*, we know that the blade was originally made as a *tachi* and *vice versâ*. This change of type often involves an alteration to or cutting away of part of the tang in order to get the handle fixed at the proper inclination, but this cutting away does not imply that the tang has been tampered with for purposes of deception. Cases have come under my notice in which nearly half of the vertical column of characters on the tang has been cut away merely to alter the inclination of the handle.

It is important to remember that if a blade is signed with a certain name it by no means follows that it is by the great master smith of that name. To give an analogy from Europe, if it were the rule to sign pictures with the surname only, it would be unreasonable in the purchaser of a picture, good, bad, or indifferent signed with a certain name, to assume irrespective of other data which should be taken into consideration, that the picture in question was by a master of that name.

Besides the many famous smiths there were many others bearing the same name. For example, in addition to the master smith Masamune there were thirteen others of that name recognised in the books and possibly others existed who were not worthy of record. Similarly there were seven of the name of Sadamune and no less than forty-six called Sakesada and forty-seven called Kuniyoshi. Yet there is more than one blade signed Masamune which the owner, knowing or having been told that the characters on the tang are read Masamune, fondly believes for that reason alone to be by the great master. In some cases the fallacy is so obvious that it is difficult to understand how it could deceive anyone with the smallest acquaintance with the subject. Dealers, often quite innocently no doubt, will weave the most fantastic legends round a blade they have for sale, while all the time the blade itself, for those who can read it, is a silent refutation of their statements.

I may refer here to the popular legend as to what are called scented blades. These are seriously believed to be produced by the incorporation of some perfume with the metal during the forging, and command a higher price in consequence and also on account of the almost uncanny skill of the smith. It would indeed be uncanny if true. But no one explains what perfume known to us will combine with red hot steel, or will stand being heated to a bright red heat. Moreover, the scent of these blades is that of an organic substance easily recognisable as oil of cloves. This oil is not infrequently used in Japan for applying to blades, and its perfume is extraordinarily permanent and seems to be readily absorbed by the metal. Some time ago I had a discussion on this point with my friend Mr. J. D. G. Little, in consequence of which I took a piece of sword blade which I had cut up for experimental purposes: and after soaking it in oil of cloves for some time, I sent it to him for experiment. He reported that boiling in nitric acid, in hydrochloric acid, and in concentrated solution of perchloride of mercury had no effect; neither had moderate heating: a red or white heat for some time destroyed the scent: also when boiled for some time in potassium ferrocyanide and then immersed in copper sulphate, the smell was certainly

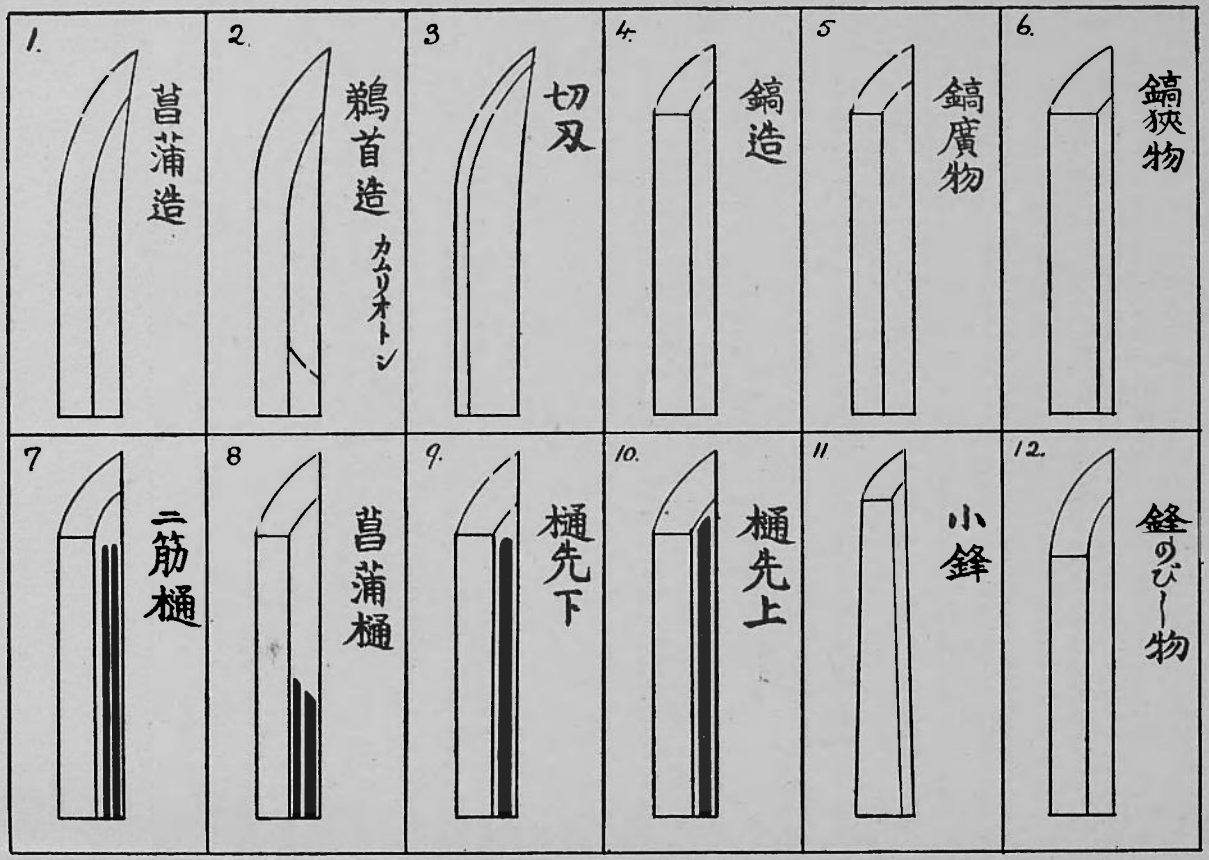

FIG. 1. NOS. 1 TO 12.—VARIOUS FORMS OF BLADES AND GROOVES.

greatly diminished if not altogether destroyed. This was possibly due to the formation of a precipitate of copper ferrocyanide *within* the pores of the steel, as a similar method is adopted to prepare the "semi-permeable membrane" of Traube's cells used in osmosis experiments; though of course in the latter case the precipitate is formed in the much larger pores of an earthenware pot. In any case, whatever the reason in this experiment, the smell became imperceptible after three hours' immersion.

It is possible, however, to give an explanation of the origin of this belief which seems to me very probable. We have seen in the previous paper (p. 14 of this volume) that certain bright specks occurring in clusters or bands in or near the *yakiba* are called *nioi*, and a blade specially distinguished in this way might be called a *nioi* blade. The word *nioi* means perfume, and the same word written with the same character is used technically to describe this special feature. The other possible steps in a course of involuntary deception are obvious.

As a general rule the older smiths signed their blades with their name simply, sometimes followed by the characters read *tsukuru* or *saku* corresponding to our use of *fecit*, but in later times it became usual to add other details. The province and place of abode of the smith, his family name and title were often added. Some of the Japanese books enumerate those who only used what is called the *ni-ji-mei* or two-character signature (or *san-ji-mei* in the rare cases of three characters being used, *e.g.*, *Samonji* and *Hasebe*) and also whether the signature is followed by *tsukuru*. If therefore we find a blade signed with two characters only and from the book learn that only two smiths of that name signed in this way we know that it must be by one of these two. If the date is given also we can in the majority of cases decide which of these two it is. If not, then we must search for other characteristics: similarly if we see a blade signed otherwise than plain "Masamune" or "Masamune tsukuru" we know at once that it is not by the great master-smith.

It will be seen from the above that the problem of

deciding who was the maker even of a signed blade is often far from easy, and if unsigned we can at present only vaguely conjecture in the absence of a decision by such an authority, for instance, as the present Director of the Imperial Museum of Arms in Tōkyō, Mr. Nagayoshi Imamura. A very great deal may be learned by a careful study and comparison of the drawings of actual blades and signatures which appear in such books as the Koto Meizukushi and the Honcho Kaji Ko, and also of course by the study of authentic examples.

We have already noted that swords are divided into two classes called Kotō and Shintō respectively, or those made before and since 1603. There are some indications by which a Shinto can be distinguished from a Kotō blade. Where the hardened edge turns over the point on to the back, the distance it is carried down the back is greater in Shintō blades. There is also frequently seen a very marked peculiarity of Shintō blades called the *yakidashi.* This is a narrowing of the *yakiba* for about three or four inches at the butt of the blade. It does not usually appear if the *yakiba* is straight or nearly so. A drawing of an actual example from a blade in my own possession will be seen in No. 1, Plate II. This blade is by Nagamichi of Musashi, and we know at once by inspection that it is a Shinto blade, being made as a matter of fact about 1660. There were only two smiths of this name, the other having worked in the latter half of the fourteenth century. Also in Shintō blades the *horimono* or engraving occurs more frequently and is more elaborate. In some cases an indication of the age of a blade may be obtained by noting the reduction in thickness of the blade as compared with the tang produced by many sharpenings and polishings.

The type of blade varied according to the province in which it was made, and as there are hundreds of instances of smiths of the same name but working in different provinces and producing swords of different types, it is necessary to know something of the types peculiar to the provinces. For example, besides the great Masamune of Soshū there were smiths of that name working in Echizen, Yamato, Bingo, and other provinces. The four principal types are those of Bizen, Sagami, Seki, and

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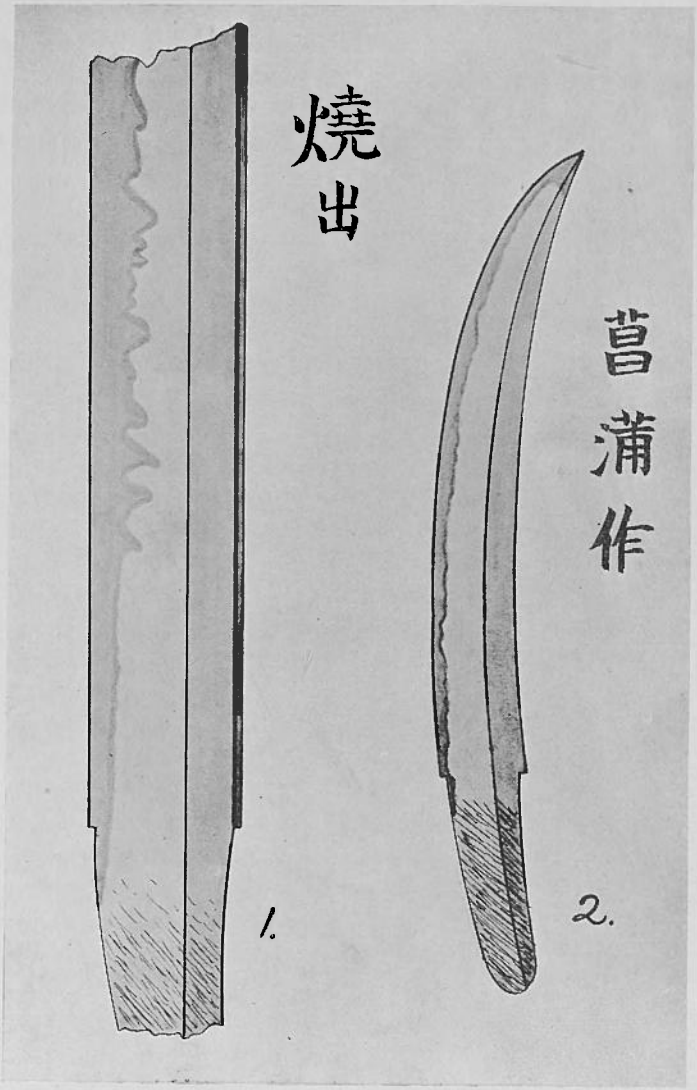


1. THE YAKEDASHI.

2. THE SHŌBU TSUKURI.

Bingo. There are in existence a number of short poems or *uta* which are intended to be committed to memory, and they give some brief particulars of the characteristics of different provinces and smiths. From these we learn that Bizen blades have a considerable degree of curvature, that the *boshi* is short, and the back of the two-sided type; also that the blades are thick and rather narrow. The swords made in Sagami (Soshū) are thin and wide and also considerably curved, *moku-me* graining is usual, and they have a three-sided back. The Seki blades have a narrow *shinogi*, the shape of the blade looked at on the flat tends to become barrel-shaped, or rather wider at the middle, and the *yokote* is placed low down, making the head of the blade long. In the Bingo swords, especially those made at Mihara in that province, the *shinogi* is said to be *takaku* (see previous paper, pp. 14 and 15), the blade is often of the type called *shobu tsukuri* (see No. 2, Plate III, and No. 1 of Fig. 1), and there is a *ni-ju yakiba*. The *shōbu tsukuri* is so called because the shape of the blade is supposed to resemble the leaf of the *shobu* or wild flag. The *ni-ju yakiba* is almost impossible to describe in words and must be seen. There are many other points, of course, to be noted, but space does not allow of our going into them; but we may remark that the Soshu blades have large and bold engraving, if any. Bingo swords of the ordinary, as distinct from the *shobu* type, occur in great numbers, the latter being only a special type. The Seki swords have usually the *yasuri-me*, called *higaki*.

When we come to consider the characteristics of different smiths we are confronted by such a mass of detail that it is impossible to put information into the form of a written description. I have therefore made drawings showing the different forms of blade, the different kinds of *yakiba* and the different kinds of *hi* or grooves in the blades. Drawings of the different forms of *yakiba* at the *boshi* were given in the previous paper (Plate VIII, p. 12). For each characteristic I have written out the names of the more important smiths who employed it. All these particulars apply to Koto swords.

Having now at least in theory acquired some blades and learnt something about them we have to know how to

take care of them. As a rule the best blades are kept in plain white wood scabbards called *shirasaya*. But whether in plain scabbards or fully mounted, the sword should be placed in a bag (*fukuro*) preferably of heavy silk and lined with silk inside and should be kept in a dry place. It is quite unnecessary to keep the blades oiled. Blades are frequently to be seen which have been covered with some thick and sticky oil which has dried and left a messy coating all over the surface, and this usually results in stains being produced on the blade, especially on the *yakiba*, due possibly to the presence of some free acid in the oil. Moreover the inside of the scabbard gets covered with a mixture of oil and dust, so that if the blade is cleaned it will become dirty again when placed in the scabbard.

To clean a blade in this condition it should be carefully wiped with a soft rag dipped in paraffin, taking care that there is no grit in the rag. When all the oil and paraffin are cleaned off, the blade should be rubbed all over with the finest machine oil or vaseline, and this being wiped off the blade is dusted over with the *uchiko*. The *uchiko* is a small bag of silk or washleather filled with a white powder. The powder in use in Japan is not readily obtainable here, but the substance known in Germany as *Wiener Kalk* does equally well. The blade is patted with the *uchiko*, so that a light coating of powder adheres to it, and this coating is then removed by rubbing briskly with soft Japanese paper, leaving the blade perfectly clean and bright. To prepare the paper for this purpose, the Japanese expert folds it up until it is about four inches square and then crumples and rolls it until quite soft and silky. The blade is quite stripped while being cleaned, and before the *habaki* is replaced it is desirable to rub the part covered by it with a piece of slightly oiled Japanese paper, since this part being at the joint between the handle and scabbard is most likely to be attacked by rust.

A blade in good condition should not be touched with the bare hand, and after blades have been taken out for examination or exhibition it is advisable to dust them over with the *uchiko* and wipe them.

The sword expert keeps a box containing :—

An *uchiko.*
several pieces of folded and crumpled Japanese paper,
a glass box with ground lid or stopper to hold pieces of oily paper,
a piece of soft washleather,
a small wooden mallet,
a short piece of hard wood (beech is very suitable),
two or three sizes of ivory or bone pegs to be used for driving out the wooden pegs in the handles.

Steel hammers, bradawls, screwdrivers, or anything of that kind should never be used in taking a sword to pieces.

If the handle is tight on the tang wrap the washleather round the lower part of the blade, place the short piece of wood along the blade with the end resting on the end of the handle with washleather underneath it, hold in the left hand with the thumb on the piece of wood, and tap the top of the piece of wood with the mallet until the handle is loosened. Handles should not be so tight as to require this, and if they fit properly can always be removed by holding the handle firmly in one hand, the blade being vertical, and striking that hand with the other fist.

Having now considered the blade in a very brief way from a technical point of view, some notes as to its other aspects may be interesting.

We have seen that the sword in Japan occupied a unique position and was regarded as an almost sacred thing. Its fame as a weapon spread far outside Japan, and it had a terrible reputation in China. In an article in the *Nineteenth Century* for February of this year Professor Giles gives a translation of a Chinese manuscript of the early seventeenth century in which the following quaint remarks occur :—

> "The swords used by these dwarfs are exquisite weapons, six feet in length and one for each hand, thus making a total length of twelve feet. Even if you succeed in parrying the blow of one sword, the other is quite enough to kill you infallibly. Thus the fear of the Japanese is really the fear of their swords."

The sword was regarded as being possibly possessed of certain magical properties, since the five elements.

Sui, Kwa, Moku, Kin, Do or Water, Fire, Wood, Metal, and Earth were required to make it. Some time ago I came across a poem cut on a sword guard (*tsuba*) which illustrates this, and a rough translation of the poem is :—

> "A sword when drawn in a long corridor produces an atmospheric change in fine weather, even in midsummer it brings a cool breeze into a large house."

A sword might be good or bad, lucky or unlucky from causes over which the smith had little or no control. It is frequently noted on blades that they were finished on a *kichi nichi* or lucky day.

As the sword entered so largely into the life of the people it is only natural that an elaborate etiquette was developed in connection with it.

[1]The Samurai boy was initiated into its use at a very early age. When he was five years old he was clad in complete Samurai costume and placed on a "go" board, and a real sword was thrust into his sash to replace the toy blade he had previously worn. From this time he was never to be seen abroad without his sword, although a wooden one might be substituted for every-day wear. At the age of fifteen he became entitled to carry the pair of real swords forming the badge of his Samurai rank, and these now became his life-long companions, the symbols of his loyalty and honour and his most treasured possessions.

On entering a friend's house the longer of the two swords was removed and handed over to the servants and on entering the guest room the shorter one was also usually removed and placed on the floor by the owner's side. When in this position to kick the guard of the sword so as to move it in the direction of any one present was regarded as a deliberate and deadly insult. To draw a blade in the presence of others without permission was regarded, if not as an insult, at least as a grave breach of good manners.

If on the occasion of a visit to a friend's house swords were produced for the guest's inspection, a rigid etiquette regulated the way in which they should be handled. The host would present the sheathed sword to his friend, holding the hilt in his left hand with the scabbard rest-

[1] See *Bushido*, by Professor Nitobe, 10th edition.

ing on the palm of his right hand and with the edge of the blade turned towards himself. The guest, who should be provided with pieces of silk so as not to touch the sword with his bare hands, takes the hilt in his right hand and the scabbard in his left, and turning the sword over until the edge is towards himself, bows in the prescribed manner. If the sword is a completely mounted one, he would first inspect the fittings and lacquered scabbard, and after having admired them would ask permission to inspect the blade. This being given he turns the sword edge upwards and draws the blade an inch or two at a time and minutely examines it. He continues doing this until the blade is about three parts drawn, but on no account would he draw it completely without asking permission from everyone present. Before drawing the blade right out he would turn away from the others, and during his inspection of it would be most careful that the edge should not be turned towards anyone present. When he had finished, the sword would be sheathed and turned over so that the hilt was in his left hand and the edge towards himself, and in this way with the necessary bows return it to the owner.

Any insult to a sword was equivalent to insulting its owner, and in order to provoke a duel to the death it was only necessary to carry out what was known as the *saya-atte*. This consisted in approaching one's enemy and deliberately rattling the scabbard of the long sword against that of his.

Space does not permit of our pursuing the subject further or of saying anything about the mythology of the sword, of practical sword play or other points. But enough has been said to show how great was the influence of the sword on the national life and how important a part it played in the national history. For these reasons it is surprising, as I have already said, that so little attention has been given to the Japanese sword, which in all its aspects presents an unlimited field for enquiry and research.

I can only conclude by expressing the hope that the two papers I have now been privileged to read before the Institute may be the means of inducing others more leisured and more competent than myself to pursue a most fascinating study.

山城 or 城州 Yamashiro or Jōshū	大和 or 和州 Yamato or Washū	河内 or 河州 Kawachi or Kashū	和泉 or 泉州 Izumi or Senshū
攝津 or 摂州 Settsu or Sesshū	伊賀 or 伊州 Iga or Ishū	伊勢 or 勢州 Ise or Seishū	志摩 or 志州 Shima or Shishū
尾張 or 尾州 Owari or Bishū	三河 or 三州 Mikawa or Sanshū	遠江 or 遠州 Tōtomi or Enshū	駿河 or 駿州 Suruga or Sunshū
甲斐 or 甲州 Kai or Kōshū	伊豆 or 豆州 Izu or Zushū	相模 or 相州 Sagami or Sōshū	武藏 or 武州 Musashi or Bushū
安房 or 房州 Awa or Bōshū	上総 or 総州 Kazusa or Sōshū	下総 or 総州 Shimosa or Sōshū	常陸 or 常州 Hitachi or Jōshū
近江 or 江州 Omi or Gōshū	美濃 or 濃州 Mino or Nōshū	飛弾 or 飛州 Hida or Hishū	信濃 or 信州 Shinano or Shinshū.
上野 or 上州 Kōsuke or Jōshū	下野 or 野州 Shimosuke or Yashū	陸奥 or 奥州 Mutsu or Ōshū	出羽 or 羽州 Dewa or Washū
若狭 or 若州 Wakasa or Jakushū	越前 or 越州 Echizen or Esshū	越中 or 越州 Etchu or Esshū	越後 or 越州 Echigo or Esshū

FIG. 2.—LIST OF PROVINCES IN WHICH SWORDS WERE MADE, SHOWING THE JAPANESE CHARACTERS FOR THE STANDARD AND ALTERNATIVE FORM WITH THE ENGLISH TRANSLITERATION.

FIG. 3.—LIST OF PROVINCES IN WHICH SWORDS WERE MADE, SHOWING THE JAPANESE CHARACTERS FOR THE STANDARD AND ALTERNATIVE FORMS WITH THE ENGLISH TRANSLITERATION.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	家	一	春	治	玄	張	晴	泰	日	入	仁	宝	堀	友
B	倫	朝	具	知	共	鞆	朋	侖	住	才	利	俊	歳	年
C	壽	時	季	豊	富	遠	虎	同	近	親	周	了	力	立
D	興	音	乙	往	瀟	包	勝	景	晩	量	和	方	上	吉
E	義	善	能	良	賀	賢	度	克	祥	如	覺	頼	依	仍
F	自	歸	馮	夜	安	忠	亘	督	但	當	爲	高	貴	孝
G	香	隆	宮	武	竹	種	達	龍	次	續	綱	恒	經	常
H	貫	永	長	直	尚	成	業	仲	中	波	奈	南	宗	吉
J	村	氏	雲	梅	右	瓜	則	法	教	範	儀	徳	順	憲

FIG. 4.—CHARACTERS USED IN NAMES OF SWORD SMITHS.

APPENDIX A.

Transliterations of Characters in Figures 4 and 5.

A. 1	... ...	IYE.
A. 2	... ...	ICHI.
A. 3, 4, 5, 6 and 7		HARU.
A. 8	... ...	HADA.
A. 9	... ...	NICHI.
A. 10	... ...	NYŪ.
A. 11	... ...	NI.
A. 12	... ...	HO.
A. 13	... ...	HORI.
A. 14	... ...	TOMO.
B. 1 to B. 9	...	TOMO.
B. 10 to B. 14	...	TOSHI.
C. 1	... ...	TOSHI.
C. 2 and 3	...	TOKŌ.
C. 4	... ...	TOYO.
C. 5	... ...	TOMI.
C. 6	... ...	TO.
C. 7	... ...	TORA.
C. 8	... ...	TO.
C. 9, 10 and 11	...	CHIKA.
C. 12	... ...	RYO.
C. 13	... ...	RIKI.
C. 14	... ...	RYU.
D. 1	... ...	OKI.
D. 2 and 3	... ...	OTO.
D. 4	... ...	Ō.
D. 5 and 6	... ...	KANE.
D. 7	... ...	KATSU.
D. 8 and 9	... ...	KAGE.
D. 10 and 11	...	KAZU.
D. 12	... ...	KATA.
D. 13	... ...	KAMI.
D. 14	... ...	YOSHI.
E. 1 to E. 11	...	YOSHI.
E. 12, 13 and 14	...	YORI.
F. 1, 2 and 3	...	YORI.
F. 4	... ...	YORU.
F. 5	... ...	YASU.
F. 6 to F. 9	...	TADA.
F. 10	... ...	TŌ.
F. 11	... ...	TAME.
F. 12, 13 and 14	...	TAKA.
G. 1, 2 and 3	...	TAKA.
G. 4 and 5	...	TAKE.
G. 6	... ...	TANE.
G. 7 and 8	...	TATSU.
G. 9 and 10	...	TSUGU.
G. 11	... ...	TSUNA.
G. 12, 13 and 14	...	TSUNE.
H. 1	... ...	TSURA.
H. 2 and 3	... ...	NAGA.
H. 4 and 5	... ...	NAO.
H. 6 and 7	... ...	NARI.
H. 8 and 9	... ...	NAKA.
H. 10	... ...	NAMI.
H. 11	... ...	NA.
H. 12	... ...	NAN.
H. 13 and 14	...	MUNE.
J. 1	... ...	MURA.
J. 2	... ...	UJI.
J. 3	... ...	UN.
J. 4	... ...	UME.
J. 5	... ...	U.
J. 6	... ...	URI.
J. 7 to J. 14	...	NORI.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
K	應	意	度	信	延	宣	國	軍	月	廉	恭	保	補	正
L	政	冒	當	匡	增	希	丸	又	万	松	房	芙	冬	藤
M	風	不	伏	二	佛	是	惟	伊	小	有	在	秋	顯	觀
N	鑑	明	章	銘	敦	篤	天	淡	貞	定	眞	實	左	西
O	山	散	廿	清	淨	浪	米	神	金	菊	喜	行	幸	雪
P	光	滿	三	道	通	重	鎭	茂	下	新	心	十	シ	四
Q	廣	弘	寬	門	野	嚴	禮	久	秀	衡	平	兵	匕	彦
R	盛	守	森	林	宴	元	基	本	師	持	用	百	千	泉
S	仙	助	介	祐	資	佐	相	管	末	季	純	住	放	角

FIG. 5.—CHARACTERS USED IN NAMES OF SWORD SMITHS.

APPENDIX A—*continued.*

TRANSLITERATIONS OF CHARACTERS IN FIGURES 4 AND 5.

K. 1, 2 and 3	...	NORI.
K. 4, 5 and 6	...	NOBU.
K. 7	...	KUNI.
K. 8	...	GUN.
K. 9	...	GWATSU.
K. 10 to 13	...	YASU.
K. 14	...	MASA.
L. 1, 2, 3 and 4	...	MASA.
L. 5	...	MASU.
L. 6	...	MARE.
L. 7	...	MARU.
L. 8	...	MATA.
L. 9	...	MAN.
L. 10	...	MATSU.
L. 11 and 12	...	FUSA.
L. 13	...	FUYU.
L. 14	...	FUJI.
M. 1	...	FU.
M. 2	...	FU.
M. 3	...	FUSHI.
M. 4	...	FUTA.
M. 5	...	BUTSU.
M. 6, 7 and 8	...	KORE.
M. 9	...	KO.
M. 10 and 11	...	ARI.
M. 12, 13 and 14	...	AKI.
N. 1, 2, 3 and 4	...	AKI.
N. 5 and 6	...	ATSU.
N. 7	...	AMA.
N. 8	...	AWA.
N. 9 and 10	...	SADA
N. 11 and 12	...	SANE.
N. 13	...	SA.
N. 14	...	SAI.
O. 1 and 2	...	SAN.
O. 3	...	SA.
O. 4 to O. 8	...	KIYO.
O. 9	...	KIN.
O. 10	...	KIKU.
O. 11	...	KI.
O. 12, 13 and 14	...	YUKI.
P. 1, 2 and 3	...	MITSU.
P. 4 and 5	...	MICHI.
P. 6, 7 and 8	...	SHIGE.
P. 9	...	SHIMO.
P. 10 and 11	...	SHIN.
P. 12	...	JU.
P. 13 and 14	...	SHI.
Q. 1 to Q. 7	...	HIRO.
Q. 8	...	HISA.
Q. 9	...	HIDE.
Q. 10 and 11	...	HIRA.
Q. 12	...	HYŌ.
Q. 13	...	HI.
Q. 14	...	HIKO.
R. 1 to R. 5	...	MORI.
R. 6, 7 and 8	...	MOTO.
R. 9	...	MORO.
R. 10 and 11	...	MOCHI.
R. 12	...	MOMO.
R. 13 and 14	...	SEN.
S. 1	...	SEN.
S. 2 to S. 7	...	SUKE.
S. 8	...	SUKA.
S. 9 and 10	...	SUYE.
S. 11 and 12	...	SUMI.
S. 13	...	SUDE.
S. 14	...	SUMI.

兼暦 JO-REKI 1077	永保 EI-HO 1081	應徳 Ō-TOKU 1084	寛治 KWAN-JI 1087	嘉保 KA-HO 1094	永長 EI-CHŌ 1096	兼徳 JO-TOKU 1096	康和 KO-WA 1099	長治 CHO-WA 1104
嘉兼 KA-JŌ 1106	天仁 TEN-NIN 1108	天永 TEN-EI 1110	永久 EI-KYU 1113	元永 GEN-EI 1118	保安 HO-AN 1120	天治 TEN-JI 1124	大治 TAI-JI 1126	天兼 TEN-SHŌ 1131
長兼 CHŌ-SHŌ 1132	保延 HŌ-EN 1135	永治 EI-JI 1141	康治 KŌ-JI 1142	天養 TEN-YO 1144	久安 KYŪ-AN 1145	仁平 NIM-PEI 1151	久壽 KYŪ-JU 1154	保元 HŌ-GEN 1156
平治 HEI-JI 1159	永暦 EI-REKI 1160	應保 Ō-HŌ 1161	長寛 CHŌ-KWAN 1163	永萬 EI-MAN 1165	仁安 NIN-AN 1166	嘉應 KA-Ō 1169	兼安 SHO-AN 1171	安元 AN-GEN 1175
治詔 JI-SHŌ 1177	養和 YO-WA 1181	壽永 JU-EI 1182	元暦 GEN-REKI 1184	文治 BUN-JI 1185	建久 KEN KYŪ 1190	正治 SHŌ JI 1199	建仁 KEN-NIN 1201	元久 GEN KYŪ 1204
建永 KEN-EI 1206	兼元 JŌ-GEN 1207	建暦 KEN-REKI 1211	建保 KEM-PEI 1213	兼久 JO-KYŪ 1219	貞應 JŌ-O 1222	元仁 GEN-NIN 1224	嘉祿 KA-ROKU 1225	安貞 AN-TEI 1227

FIG. 6.—NENGO OR YEAR PERIODS WITH THE ENGLISH TRANSLITERATION AND CORRESPONDING DATE.

寛喜 KWAN-GI 1229	貞永 JO - EI 1232	天福 TEM-PUKU 1233	文暦 BUN-REKI 1234	嘉禎 KA-TEI 1235	暦仁 REKI-NIN 1238	延應 EN - Ō 1239	仁治 NIN - JI 1240	寛元 KWAN-GEN 1243
宝治 HŌ - JI 1247	建長 KEN-CHŌ 1249	康元 KŌ-GEN 1256	正嘉 SHŌ- KA 1257	正元 SHŌ-GEN 1259	文應 BUN- Ō 1260	弘長 KO-CHŌ 1261	文永 BUN- EI 1264	建治 KEN-JI 1275
弘安 KO-AN 1278	正應 SHŌ- Ō 1288	永仁 EI-NIN 1293	正安 SHŌ-AN 1299	乾元 KEN GEN 1302	嘉元 KA-GEN 1303	徳治 TOKU-JI 1306	延慶 EN-KEI 1308	應長 Ō - CHO 1311
正和 SHŌ-WA 1312	文保 BUM- PŌ 1317	元應 GEN- Ō 1319	元亨 GEN-KŌ 1321	正中 SHO-CHŪ 1324	嘉暦 KA-REKI 1326	元徳 GEN-TOKU 1329	元弘 GEN-KŌ 1331	建武 KEM- MU 1334
延元 EN-GEN 1336	興國 KŌ-KOKU 1339	正平 SHŌ-HEI 1346	建徳 KEN-TOKU 1370	文中 BUN-CHŪ 1372	天授 TEN-JU 1375	弘和 KŌ - WA 1381	元中 GEN-CHŪ 1384	明徳 MEI-TOKU 1390
應永 Ō - EI 1394	正長 SHŌ-CHŌ 1428	永享 EI - KŌ 1429	嘉吉 KA-KITSU 1441	文安 BUN- AN 1444	宝徳 HŌ-TOKU 1449	享徳 KŌ-TOKU 1452	康正 KŌ-SHŌ 1455	長禄 CHO-ROKU 1457

FIG 7.—NENGO OR YEAR PERIODS WITH THE ENGLISH TRANSLITERATION AND CORRESPONDING DATE

寛正 KWAN-SHO 1460	文正 BUN-SHŌ 1466	應仁 O -NIN 1467	文明 BUM-MEI 1469	長享 CHO-KO 1487	延徳 EN-TOKU 1489	明應 MEI - Ō 1492	文亀 BUN-KI 1501	永正 EI - SHO 1504
大永 DAI - EI 1521	享禄 KO-ROKU 1528	天文 TEM-BUN 1532	弘治 KO - JI 1555	永禄 EI-ROKU 1558	元亀 GEN- KI 1570	天正 TEN SHŌ 1573	文禄 BUN-ROKU 1592	慶長 KEI-CHŌ 1596
元和 GEN-WA 1615	寛永 KWAN- EI 1624	正保 SHŌ- HO 1644	慶安 KEI - AN 1648	兼應 JO - Ō 1652	明暦 MEI-REKI 1655	萬治 MAN-JI 1658	寛文 KWAM-BUN 1661	延宝 EM-PO 1673
天和 TEN-WA 1681	貞享 JŌ - KŌ 1684	元禄 GEN-ROKU 1688	宝永 HO - EI 1704	正徳 SHŌ-TOKU 1711	享保 KO - HŌ 1716	元文 GEM-BUN 1736	寛保 KWAM- PŌ 1741	延享 EN - KŌ 1744
寛延 KWAN-EN 1748	宝暦 HŌ-REKI 1751	明和 MEI - WA 1764	安永 AN - EI 1772	天明 TEM - MEI 1781	寛政 KWAN-SEI 1789	享和 KŌ WA 1801	文化 BUN KWA 1804	文政 BUN SEI 1818
天保 TEM - PŌ 1830	弘化 KŌ-KWA 1844	嘉永 KA - EI 1848	安政 AN - SEI 1854	萬延 MAN- EN 1860	文久 BUN-KYŪ 1861	元治 GEN- JI 1864	慶應 KEI - Ō 1865	明治 MEI-JI 1868

FIG. 8.—NENGO OR YEAR PERIODS WITH THE ENGLISH TRANSLITERATION AND CORRESPONDING DATE.

APPENDIX B.

NAMES OF THE PRINCIPAL SMITHS USING THE VARIOUS CHARACTERISTICS SHOWN ON THE PLATES.

FIGURE 1, p. 224.

No. 1.—SHŌBU TSUKURI.

Munechika, Rai Kunimitsu, Ryokai, Hasebe, Nobukuni — of Yamashiro (Joshu).
Kaneuji, Senjuin, Norinaga, Aritoshi, Kanetoshi — of Yamato (Washu).
Shimada of Suruga (Sunshu).
The smiths of Sagami (Soshu).
Shizu, Kanenobu — of Mino (Noshu).
Fujishima, Nobunaga — of Kaga (Kashū).
Norishige of Etchu (Esshu), pupil of Masamune.
The smiths of Awami (Sekishū).
Nagamitsu, Sanenaga, Morikage, Chikakage, Nagamori, Motoshige, Nagayoshi, Yoshikage — of Bizen (Bishu).
Atsue of Bitchu.
The smiths of Mihara in Bingo.
Sairen of Chikuzen (Chikushu).

No. 2.—U-KUBI TSUKURI. THE CORMORANT'S NECK (KAMURI OTOSHI).

Rai Kunitoshi, Rai Kunitsugu, Rai Kunimitsu, Ryōkai, Yoshimitsu — of Yamashiro.
Tayema, Norinaga — of Yamato.
Sadamune, Shintogo — of Sagami.
Norishige of Etchu.
Sukekuni, Unji, Sukeyoshi — of Bizen.
Nagamori, Nagayoshi, Yoshimitsu, Tameto, Masamitsu, Morikage[1], Morikage[1] — of Bizen.
Ichijo of Bingo (Bishu).
The Smiths of Mihara in Bingo.
Yoshimitsu of Tosa.
Sairen of Chikuzen.
Yasuyoshi of Bungo (Hoshu).

[1] Different characters for Mori.

No. 3.—KIRI HA.

Munechika, Rai Kunitoshi, Hasebe, Nobukuni — of Yamashiro.
Sadamune, Hirotsugu, Akihiro — of Sagami.
Kinju of Seki in Mino (Noshu), pupil of Masamune.
Fuyuhiro, Munenaga — of Wakasa (Jakushu).
Kagemitsu of Kaga (Kashū).
Kanemitsu (pupil of Masamune), Sadatsugu — of Bizen.
Yukikuni of Nagato (Choshu).
Yasutsugu of Satsuma (Sasshu).

No. 4.—SHINOGI TSUKURI.

Yoshiiye, Hisakuni, Kunitsuna — of Yamashiro.
The smiths of Yamato.
Hirotsugu of Soshū.
Kanetsugu of Mino.
Hōjū, Gassan — of Mutsu (Oshū).
Kagenaga of Inaba (Inshu).
Yasutsuna of Hoki (Hakushu).
Tadasada of Izumo (Unshu).
Ichimonji, Moriiye — of Bizen.
Nobufusa, Kanehira, Norifusa, Norinari, Sukeyoshi Naganori, Yoshikane Muneyoshi, Yoshimune, Sukemune, Yoshihira, Tamekiyo, Kagehide, Naonaga, Unsho — of Bizen.
Moritsugu of Bitchu.

No. 5.—SHINOGI HIROKI MONO. *Wide shinogi.*

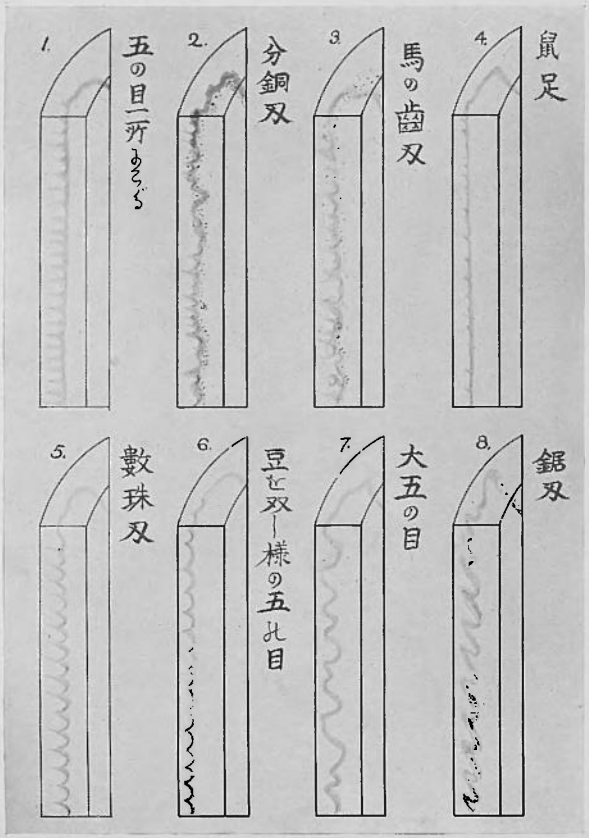
Rai Kunitoshi, Ryokai — of Yamashiro.
The smiths of Yamato.
Kanetsugu, Kanesada — of Mino.
Tomonori of Etchu.
Mitsutada, Unrui, Tsuneiye, Masatsune — of Bizen.

No. 6.—SHINOGI SEMAKI MONO. *Narrow shinogi.*

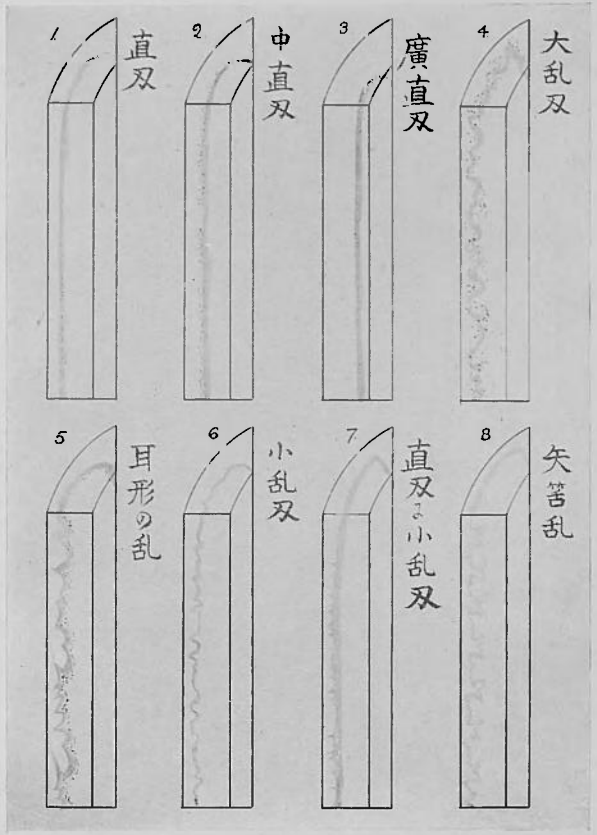
Masamune of Soshu.
Yasutsuna of Hoki.
The smiths of Iwami (Sekishu).
Morikage of Bizen.
Hidemitsu, Masatsune, Sanetada, Unsho — of Bizen.

No. 7.—NI SUJI HI. *Double grooves.*

Nobukuni of Yamashiro.
Masamune, Sadamune — of Sōshū.
Kinju of Mino (pupil of Masamune).
Yukihide, Motoshige — of Bizen.
Sukekuni, Sukenobu, Nagamitsu, Nagayoshi and Kanemitsu (both pupils of Masamune) — of Bizen.



A.—Nos. 1 to 8.



B.—Nos. 1 to 8.

VARIOUS FORMS OF THE YAKIBA.

No. 8.—Shobu hi. *Shobu groove.*

Rai Kunimitsu, Norikuni } of Yamashiro.
Tayema, Hojo, Norinaga } of Yamato.
Akihiro, Hiromitsu (pupil of Sadamune) } of Soshu.

No. 9.—Hi Saki sagaru. *Top of groove low down on the blade.*

Rai Kunitoshi of Yamashiro.
Tayema of Yamato.
Masamune, Yukimitsu } of Soshu.
Yoshihiro of Etchu.
Mitsukane of Omi (Goshu), pupil of Rai Kunitoshi.
Sa Yasuyoshi of Hizen.

No. 10.—Hi saki agaru. *Top of groove high up on the blade.*

Rai Kuniyuki, Rai Kunitoshi, Rai Kunimitsu, Rai Kunitsugu } of Yamashiro.
Bizen swords of about the period Oei (1394–1427).

No. 11.—Ko Kissaki. *Small point.*

Yoshiiye, Sadatoshi, Rai Kuniyuki, Rai Kunitoshi, Rai Kunimitsu, Yoshinori, Ryokai } of Yamashiro.
The smiths of Awataguchi.
The smiths of Yamato.
Hojū, Gassan } of Mutsu.
Kagenaga of Inaba.
Yasutsuna of Hoki.
The early smiths of Bizen.
Ichimonji, Kagehide, Kageyasu, Kagemitsu, Kagemasa, Unsho, Unji } of Bizen.
Akikuni of Nagato.

No. 12.—Kissaki nobishi mono. *Long point.*

Hasebe of Yamashiro.
Sadamune of Soshu.
Kinjū of Mino (pupil of Masamune).
Tomomitsu, Kanemitsu } of Bizen.
Nagayoshi, Kanenaga, Yoshikage, Unju } of Bizen.
Sairen of Chikuzen.

Plate IIIa.—The Yakiba.

No. 1.—Sugu ha. *Straight.*

Munechika, Rai Kunitoshi, Rai Kunimitsu, Ryokai } of Yamashiro.
Yoshinori, Arikuni } of Yamashiro.
Yoshimitsu, Kuniyoshi } of Awataguchi.

Norikuni, Kunitomo, Arikuni, Hisakuni, Kunikiyo, Kunimitsu — of Awataguchi.

Tayema, Kaneuji, Kanenaga, Norinaga, Amakuni, Tomomitsu, Yukihira, Yasunori, Yoshimitsu, Sue no Kanetoshi, Sukenaga, Aritoshi — of Yamato.

Yukimitsu, Masahiro, Shintogo, Kuniyasu, Yamauchi, Kunihiro, Yamauchi Yoshimune — of Sōshū.

Toshinaga of Omi.

Kaneyoshi, Kanekuni, Kaneoto — of Mino.

Toshiyasu., Hoju, Gassan (when working in Dewa) — of Mutsu.

Chozuru of Echizen.

Iyetsugu and Yoshiiye of Kaga.

Yasutsuna of Hoki.

Michinaga of Izumo.

Munetsugu, Yoshisue — of Iwami.

Yukimune of Harima (Banshu).

Mitsukane, Nagamitsu, Motoshige, Yoshimochi, Kagemitsu, Naganori, Morishige, Unjū, Unshō, Kagenori, Hidekage, Morinobu, Moritsugu, Yoshiuji, Yasuhiro, Yoshimitsu, Shigetsune, Shigeyasu., Tomomune, Koremitsu, Yasumitsu, Morimitsu, Norimitsu, Tsuneiye, Tadamitsu, Kiyomitsu — of Bizen.

Atsue, Yukihisa, Seiko, Nyūsai of Aki — of Bitchu.

Yoshimitsu of Tosa.

Sairen of Chikuzen.

Nagamori of Bungo (Hōshū).

No. 2.—NAKA SUGU HA. *Medium width, straight.*

Rai Kunitsugu, Yoshinori — of Yamashiro.

Kunikiyo, Norikuni — of Awataguchi.

Kanenaga, Norinaga — of Yamato.

Kagashiro of Izumi (Senshu).

Shimada of Suruga.

Kunihiro, Hirotsugu, Yoshihiro — of Soshu.

Kanetsugu, Toshitomo — of Mino.

Yasunobu of Echigo.

Munemitsu of Mimasaka (Sakushu).

Mitsukane, Naganori, Nagamori, Unshō, Kunimune, Naotoshi — of Bizen.

Yukihide, Tomonari, Tochika, Yoshikane, Nobunao, Shigenori, Noritsugu — of Bizen.

Nagamitsu, Naomori, Yukisane, Motoshige, Chikakage — of Bizen.
Atsue, Toshitsugu — of Bitchu.

No. 3.—HIROKI SUGU HA. *Straight and wide.*

Kunitoshi, Kuniyuki, Rai Kunimitsu — of Yamashiro.
Kunitsuna of Awataguchi.
Kunitsuna of Yamauchi.
Sanemori of Hoki.
Tadasada of Izumo.
Masatsune, Yoshikane — of Bizen.

Kunitsuna, Suketsuna, Yoshihira, Yoshimune — of Bizen.
Yasutsugu, Atsue — of Bitchu.
Masaiye, Masahiro — of Bingo.

No. 4.—O MIDARE HA. *Large irregular.*

Kaneuji, Kanenaga — of Yamato.
Shimada of Suruga.
Tsunemune of Soshu.
Kaneuji (pupil of Masamune) of Mino.

Suketsuna.
Nagayoshi.
Nagamori, Kanenaga — of Bizen.
Sa Sadayuki of Chikuzen.

No. 5.—MIMI KATA NO MIDARE. *Irregular "ear" style.*

Nobukuni of Echizen (Ōei 1394–1427).

Hōjū of Mutsu.

No. 6.—KO MIDARE HA. *Small irregular.*

Rai Kunimitsu, Kuninaga, Ryokai, Tomonaga — of Yamashiro.
Tatsuma, Hisakuni, Kuniyasu — of Awataguchi.
Masatoshi of Mino.
Gassan of Mutsu.
Yasutsuna of Hoki.
Tomonari, Yukikuni, Sukekane, Kanehira, Sukechika, Takahira, Nobufusa[1] — of Bizen.

Nobufusa[1], Muneyoshi, Nagakane, Yasunori, Yukisane, Unsho, Unji, Unju, Tamekiyo, Norimune, Yukihide, Nagamoto, Chikafusa, Yoshimitsu, Nobumoto, Tomoshige, Sukenobu — of Bizen.

[1] Different characters for Nobu.

Kunisane, Sukemura, Moriiye, Nobumasa, Sadasane } of Bizen.

Kanetsugu of Bitchu.
Ichijo of Bingo.
Yasuyoshi of Nagato.
Yasunori of Bungo.

No. 7.—SUGU HA NI KO MIDARE HA. *Straight with small irregularities.*

Rai Kunimitsu, Ryokai } of Yamashiro.
Kuniyasu of Awataguchi.
Yukihira, Nagamichi } of Yamato.
Morihiro of Kaga.
Morishige, Morihiro } of Echizen.
Kanehira, Masatsune, Tochika, Sanetoshi, Shigenori, Kageyasu, Nagamitsu, Ichimonji, Moriiye, Norinaga, Naoyoshi, Nagamori, Sanenaga } of Bizen.

Kunimune, Kunitsugu, Tsunetsugu, Tameto, Nagamoto, Yukihide, Koresuke, Tsunemori, Unsho, Unji, Unju, Naganori, Sukekuni, Yukiiye, Yoshiuji, Sukeyoshi } of Bizen.
Kanetsugu, Masatsune } of Bitchu.
Sairen, Jitsua (his pupil) } of Chikuzen.

No. 8.—YAHAZU MIDARE. *The notch (yahazu) for the bowstring at the end of an arrow.*

Yoshinori of Echizen.

PLATE IIIB.

No. 1.—GU NO ME, SSHO NI KOGORU.

Tadasada of Izumo.

No. 2.—FUNDO HA. (*Fundō, a weight.*) *The repeated outlines are here supposed to resemble the weights used with the Japanese scales.*

Hasebe.

No. 3.—UMA-NO-HA HA. *The horse tooth.*

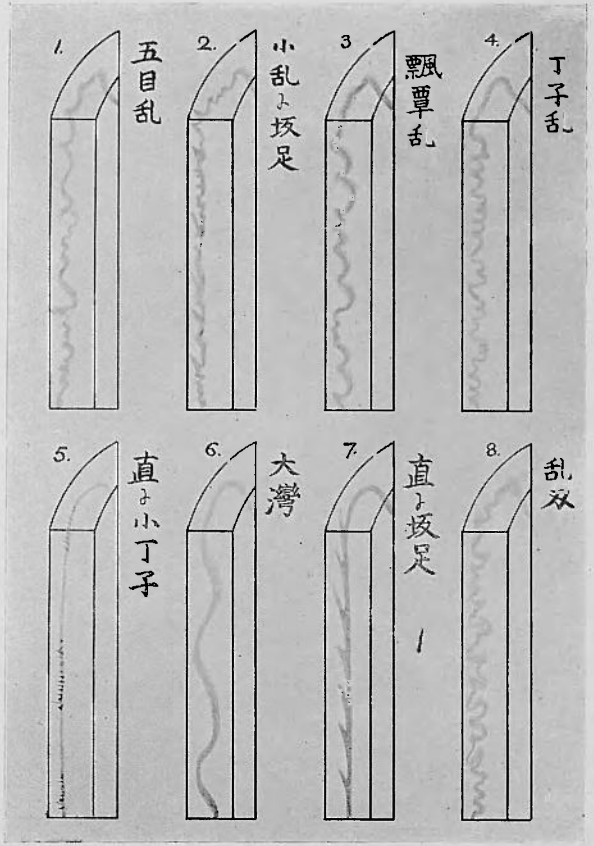
Masamune, Sadamune } of Sōshū.

Kaneuji (pupil of Masamune) of Mino.

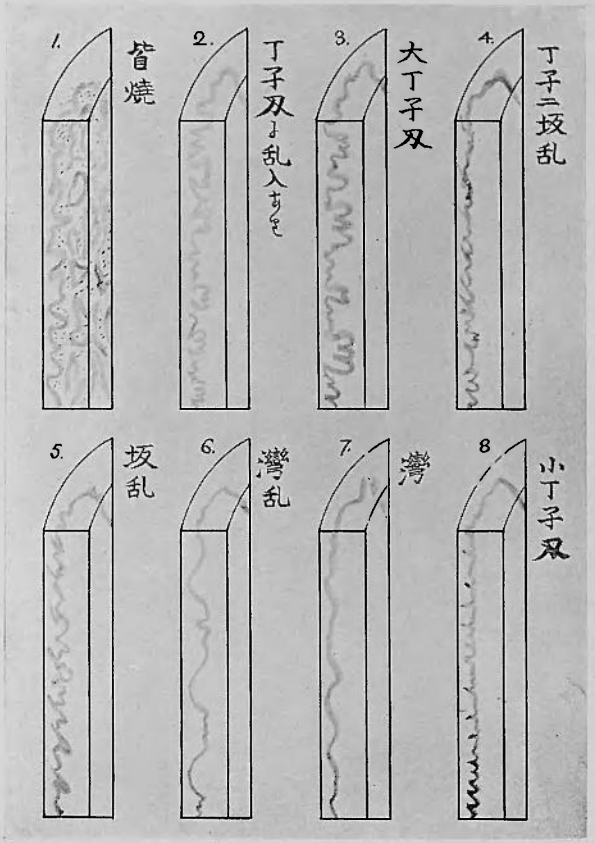
No. 4.—NEZUMI ASHI. *The rat's leg.*

Ryokai of Yamashiro.
Sukekane of Bizen.

Yukisada of Tamba (Tanshū).



A.—Nos. 1 to 8.



B.—Nos. 1 to 8.

VARIOUS FORMS OF THE YAKIBA.

No. 5.—JUZU HA. *The rosary.*

Sadatoshi of Yamato.
Kuniyasu of Awataguchi.
Kageyasu of Bizen.

No. 6.—MAME NARABISHI YŌ NO GU-NO-ME. *Beans in a row.*

Norinaga of Yamato.
Michinaga of Mino.
Nobusane, Yoshii } of Bizen.

No. 7.—O GU-NO-ME.

Nobukuni of Yamashiro.
Shimada of Suruga.
Naotsuna (pupil of Masamune) of Iwami.
Morihisa of Izumo.
Nariiye, Sue no Nagamitsu } of Bizen.
Norimitsu, Sadaiye, Sadamitsu, Koremitsu } of Bizen
Ichijo of Bingo.
Akikuni of Nagato.
Kunihiro of Chikuzen.

No. 8.—NOKOGIRI HA. *The saw teeth.*

Kuniyuki of Yamashiro.
Kaneyoshi, Kanemitsu } of Yamato.
Tomomitsu, Sanenaga, Nagayoshi, Kagemitsu, Yoshimitsu, Morishige, Motoshige, Morikage, Motomitsu } of Bizen.
Kanenaga, Kagemasa, Motomasa, Hidekage, Mitsuhiro, Sue no Nagamitsu, Nariiye, Yoshii, Masamitsu, Yoshikage, Shigesane } of Bizen.

PLATE IVA.

No. 1.—GU-NO-ME MIDARE.

Tokinobu, Hasebe, Nobukuni } of Yamashiro.
Kanenaga, Kaneuji, Norinaga, Sukenaga, Sue no Kanenaga } of Yamato.
Hirotsugu of Soshu
Kaneuji, Kanetsugu, Kanenobu, Kinju, Sue no Toshitomo, Tametsugu } of Mino.
Masatoshi, Senjuin, Michinaga } of Mino.
Naotsuna (pupil of Masamune), Suetsugu } of Iwami.
Koresuke, Kunimori, Tsuneshige, Tsunehiro, Nagamori, Masamitsu, Yoshii, Nobumoto, Sadamitsu } of Bizen.

Shigemitsu, Noriyoshi, Shigetsune, Morikage of Bizen.
Ichijō of Bingo.

Tomoyuki, Tokiyuki, Tomomitsu, Saneyuki, Nagamori of Bungo.

No. 2.—KO MIDARE NI SAKA ASHI. *Small irregular, with "ashi" or "legs" sloping up towards the point.*

Tomonari and Norimune of Bizen.

No. 3.—HYŌTAN MIDARE. *The gourd.*

Hasebe of Yamashiro.

Nagayoshi, Motoshige of Bizen.

No. 4.—CHOJI MIDARE. (*Chōji = cloves.*) *The repeated forms are supposed to resemble cloves.*

Rai Kuniyuki, Rai Kunitoshi, Kunitoshi of Yamashiro.

Kunitsuna of Awataguchi.
Fusho of Mutsu.

No. 5.—SUGU NI KO CHŌJI. *Straight with small choji.*

Kunikiyo of Awataguchi.

Naonaga of Echizen.

No. 6.—O NOTARE. *Large undating.*

Yoshihiro of Etchu.

Morikage of Bizen.

No. 7.—SUGU NI SAKA ASHI. *Straight with "ashi," see Fig.* 2.

Ryokai of Yamashiro.

Masatsune of Bitchu.
Yasunori of Bungo.

No. 8.—MIDARE HA. *Irregular.*

Naganori of Yamato.
Yakuoji of Mikawa (Sanshu).
Masamune, Yukimitsu, Yoshimune (Yamauchi), Kunihiro of Sōshu.
Tametsugu, Kanetsugu of Mino.

Hoju of Mutsu.
Sanekage of Kaga.
Norishige of Etchu.
Sukehira.
Sukekane.
Suketsuna.
Sadasane, Yasumitsu of Bizen.

PLATE IVB.

No. 1.—HITATSURA. *Literally "all over burnt," or hardened places all over the blade.*

Hasebe of Yamashiro.

Kuninaga of Awataguchi.

Shimada of Suruga.
Yukimitsu
Akihiro
Hiromitsu
Hirotsugu
Yoshihiro
Masahiro
Hiromasa
Sukehiro
} of Soshu.

Masanori of Omi.
Tametsugu of Mino.
Morihiro
Iyemasa
Echizen
Iyetsugu
Sue No Tomonari
} of Bizen.
Ichijo
Tatsufusa
} of Bingo.

No. 2.—CHOJI HA NI MIDARE IRI ARI. *Chōji and irregular combined.*

Tamekiyo of Hoki.
Tomonari
Norimune
Moriiye
Yoshihira
Yoshimune
Yoshimoto
Naganori
Norinaga
Nobufusa
Sukenori
Yoshimochi
Kageyasu
} of Bizen.

Tameto
Tamekiyo
Masatsugu
Tsunemitsu
Narimune
Takahira
Kanehira
Sukehira
Takakane
Tochika
Yukikumi
Yoshikane
Kunisane
Nagamitsu
} of Bizen.

No. 3.—O CHŌJI HA. *Large Chōji.*

Ryo Hisanobu of Yamashiro.
Arikuni of Yamato.
Nobufusa
Sukesane
Moriiye
} of Bizen.

Sanemori
Sadatsuna
Sanetoshi
Mitsutada
} of Bizen.

No. 4.—CHOJI NI SAKA MIDARE. *Irregular Chōji type with points tending to turn towards the boshi.*

Tametsugu of Mino.
Sanemori of Hoki.
Nobufusa
Chikakane
Sukefusa
Koresuke
Ichimonji
Moriiye
Sanemori
Chikafusa
} of Bizen.

Nobufusa
Tōchika
Norikane
Yoshifusa
Norinari
Sukesane
Kunimune
Kagehide
Unsho
} of Bizen.

No. 5.—SAKA MIDARE. *Irregular with points sloping up towards the boshi.*

Rai Kuniyuki
Kunitoshi
} of Yamashiro.

Masatsune
Sukechika
} of Bizen.

Sukenobu, Yoshifusa, Sadasane, Suketsuna, Sanefusa, Chikakage, Sukenari, Ichimonji, Sukefusa, Sukenori, Shigesuke, Iyesuke, Sadatsugu — of Bizen.

Atsue, Tsuguyoshi, Tsugunao, Yasutsugu, Tsuguiye, Tsunetsugu, Moritsugu, Nagatsugu, Yoshitsugu, Tsuneto, Iyetsugu, Masatsune — of Bitchu.

No. 6.—NOTARE MIDARE. *Irregular undulating.*

Rai Kunitsugu.
Rai Kunimitsu.
Tomokuni.
Heianjō, Hasebe — of Yamashiro.
Senjuin of Yamato.
Muramasa of Ise (Seishū), a pupil of Masamune.
Yukimitsu, Sadamune, Toshiyuki, Yukifusa, Kunitsuna, Sukehiro, Takahiro, Masanori — of Soshu.
Kinju of Mino.

Sanekage of Kaga.
Morihiro[1], Morishige, Morihiro[1] — of Echizen.
Iyemasa
Yoshihiro, Norishige — of Etchu.
Nagayoshi of Bizen.
Yoshitsugu of Bitchu.
Samonji, Kunihiro, Sadayoshi, Sadayuki, Yoshisada — of Chikuzen.
Kunitsuna, Kuniyasu — of Higo.

No. 7.—NOTARE. *Undulating.*

Rai Kunimitsu, Rai Kunihide, Heianjō, Tatsuma — of Yamashiro.
Kaneuji, Senjuin, Nobuyoshi — of Yamato.
Shimada of Suruga.
Yukimitsu, Sadamune, Kunihiro, Tsuguhiro — of Sōshu.
Kaneuji, Tametsugu, Kinju, Toshitomo — of Mino.

Hiroyoshi, Yasutsuna — of Hōki.
Munemitsu of Mimasaka.
Kanenaga, Nagayoshi, Kagemitsu, Yoshikage, Morikage, Moromitsu, Nariiye, Morinobu, Tomonari, Sukekane, Yoshimochi, Sanetada, Naotoshi — of Bizen.

[1] Different characters for Mori.

Kunimori, Kanemitsu } of Bizen.
Sanetsugu, Yoshitsugu, Yukihisa } of Bitchu.
Hiroyuki, Yoshihiro, Hiroyosu } of Chikuzen.

No. 8.—Ko choji ha. *Small chōji.*

Sadatoshi, Kanenaga, Yoshiiye, Arikuni, Kuninaga } of Yamashiro.
Kuniyasu of Awataguchi.
Masatsune, Sanetada, Nagakane, Nagamoto, Kageyasu, Takatsuna } of Bizen.
Sukenari, Sukekuni, Muneyoshi, Chikakane, Sukenobu, Suketsuna, Narimune, Yasunori, Kunimori, Naganori, Kanenaga } of Bizen.

Plate VIII. of previous paper. *Vol. LXII, p.* 12.

Outlines of the Yakiba at the boshi.

No. 1.—Boshi sagaru.

Rai Kunimitsu of Yamashiro.
Kagashiro of Izumi.
Akihiro, Hiromitsu } of Sōshu.
Fuyuhiro of Wakasa.
Munemitsu of Bizen.
Sanekage, Tadasada, Naotsuna } of Bizen.
Masatsune of Bitchu.
Kaibu of Awa.
Kunihiro of Chikuzen.

No. 2.—Yaki tsume. *Hardened part stopped off.*

Kunikiyo of Awataguchi.
The smiths of Yamato.
Masamune, Yukimitsu, Yukichika } of Soshu.
Toshiyasu, Fūshō } of Mutsu.
Yasunobu of Echigo.
Sukehira, Norimune, Kagenori, Morikage, Nobuyoshi, Tsunehiro } of Bizen.
Kanehira, Norikane, Yoshifusa, Sukeyoshi, Naomitsu, Sukenobu, Yoshikane, Nobusane, Kageyasu, Tsunemitsu } of Bizen.
Nyusai of Aki.
Chikushi Ryokai of Chikuzen (migrated to Yamashiro and became the pupil of Ryokai).
Yasunori of Bungo.

No. 3.—Bōshi maru. *Round boshi.*

Rai Kunitoshi, Kuninaga, Ryokai — of Yamashiro.
Norikuni, Kuniyasu, Kuniyoshi, Kunikiyo — of Awataguchi.
Kaneuji, Kanenaga, Norinaga, Senjuin — of Yamato.
Kunitsuna, Sanekuni, Yukifusa — of Soshū.
Toshinaga of Omi.
Tametsugu, Senjuin — of Mino.
Sanekage of Kaga.
Yoshihiro, Mitsutoshi — of Etchu.
Hiroyoshi of Ōmi.
Nobufusa, Mitsukane, Sukechika, Yukikuni, Sukemune, Sukenobu — of Bizen.
Norifusa, Yoshimochi, Nobufusa, Nobusane, Sanetoshi, Shigenori, Sue no Moriiye, Kagemitsu, Chikakage, Kagehide, Kunimori — of Bizen.
Yoshii, Sadatsuna, Unsho, Unju, Sanemori, Mitsutada, Sukesane, Kunisane, Ichimonji — of Bizen.
Atsue, Kanetsugu — of Bitchu.
Hiroyasu, Chikushi Ryokai, Morihiro — of Chikuzen.
Yukimune of Higo.

No. 4.—Boshi Ō maru. *Large round.*

Rai Kuniyuki, Kunitoshi, Rai Kunimitsu, Rai Kunitsugu, Yoshiiye, Sadatoshi, Kanenaga, Yoshinori, Tatsuma, Rai Tomokuni, Tokinobu, Hasebe, Nobukuni, Heianjo — of Yamashiro.
Kagashiro of Izumi.
Shimada of Suruga.
Shintogo Kunihiro.
Yoshiyuki, Sadamune — of Sōshū.
Kaneuji, Kanetsugu, Kanenobu, Kinju, Kaneyuki — of Mino.
Munemitsu of Mimasaka.
Morihiro of Echizen.
Iyetsugu of Kaga.
Yasutsuna of Hōki.
Naotsuna of Iwami.
Tomonari, Nagayoshi, Unji, Unju, Kunimune — of Bizen.
Ichijō of Bingo.
Kunihiro of Chikuzen.

No. 5.—Boshi ko maru. *Small round.*

Munechika, Kanenaga, Sadatoshi, Kuninaga, Kuniyoshi, Ryokai, Yoshimitsu, Kunitomo, Kunimitsu — of Yamashiro.

Mitsutada of Awataguchi.

Aritoshi of Yamato.

Hiromitsu, Akihiro, Yoshihiro, Hirotsugu — of Sōshū.

Hoju of Mutsu.

Kagenaga of Inaba.

Michinaga of Mino.

Kaneyoshi of Harima.

Tomonari, Muneyoshi, Chikakane, Norimune, Norikane, Koresuke, Yukihide, Sukeyoshi, Nagayoshi — of Bizen.

Kanenaga, Shigenao, Motomasa, Kanehira, Masatsune, Nobufusa, Takakane, Motoshige, Sanetada, Tochika, Sadasane, Suketsuna, Kageyasu, Morikage, Sue no Norimune — of Bizen.

Sadatsugu, Yasutsugu, Tsuguiye, Tsuneto, Tsunetsugu, Iyetsugu — of Bitchu.

Masaiye of Bingo.

Masahiro of Mihara in Bingo.

Akikuni of Nagato.

Sairen, Yoshihiro, Chikushi Masatsune — of Chikuzen.

No. 6.—Boshi togare. *Pointed.*

Rai Kunitoshi, Nobukuni — of Yamashiro.

Tayema, Kunitsuna, Kunihiro, Toshinaga (Toshitomo) — of Yamato.

Tametsugu, Sanekage — of Mino.

Chozuru of Echizen.

Yukimune of Harima.

Takahira, Motoshige, Nobumasa, Yukihide, Nagamitsu, Ichimonji — of Bizen.

Kagemitsu, Morikage, Moromitsu, Shigesane, Yoshii, Yasumitsu — of Bizen.

Atsue, Yukihisa, Ichijo — of Bitchu.

Yasuyoshi of Nagato.

Samonji of Chikuzen.

Kunimitsu of Mimasaka when working in Aki.

Yasuyuki of Chikuzen.

Tokiyuki of Bungo.

No. 7.—Boshi midare irregular.

Masatoshi of Mino.
Tsuguhiro of Wakasa.
Motomasa, Morishige, Mitsutada, Motomitsu, Sukenori, Yoshimochi, Sanetoshi, Masamitsu, Kagehide, Tsuneshige, Yoshimitsu — of Bizen.
Tomomitsu, Shigemitsu, Nobufusa[1], Nobufusa[1], Yoshikane, Sukesane, Moriiye, Sadatsuna, Kanemitsu, Motoshige, Chikakage, Yoshikage, Sue no Moriiye — of Bizen.

No. 8.—Kayen boshi.

Yoshimitsu of Awataguchi.

No. 9.—Jizo no boshi. *The head of Jizo.*

Sadamune of Soshū.

No. 10.—Boshi kayeri fukaku.

Hasebe, Rai Kunisane, Rai Mitsushige — of Yamashiro.
Kunitsuna of Soshu.
Kanenobu, Kanesada, Kanemoto, Kanetsune — of Mino.
Munemitsu of Echizen.
Tomomitsu, Kagemitsū, Iyemasa — of Kaga.
Hiroyoshi of Hoki.
Nagayoshi, Nagamori, Mitsukane — of Bizen.
Atsue of Bitchu.

[1] Different character for Nobu.

FIG. 9.—THE JIKKAN AND JU-NI-SHI, COPIES OF INSCRIPTIONS, ETC.