SILENT HISTORY OF JAPANESE TRADITIONAL MATHEMATICS =WHO IS TAKAHARA YOSHITANE?=

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ABSTRACT. At the end of his last book "The Birth of Wasan", HIRAYAMA asked "Who is TAKAHARA Yoshitane?" In the present paper, we shall give an answer: TAKAHARA is nothing but CHIARA who is a jesuit father joined the last systematic sneak into closed feudal Japan.

1. Genealogy of early traditional Japanese mathematician / Position of TAKA-HARA Yoshitane

The person who is the most famous in Japanese mathematical history is SEKI Takakazu (1640? - 1708). But his teacher TAKAHARA Yoshitane is little known. It is also said that SEKI Takakazu crowned with success without a teacher. But even granting that he was a genius, it is doubtful whether he could amount to much without a teacher.

According to a common view, I think SEKI Takakazu was taught by TAKAHARA. From this point of view, I'd like to think who TAKAHARA Yoshitane is.

2. A mysterious traditional Japanese mathematician TAKAHARA Yoshitane.

There are only three valuable books of the first stage in which TAKAHARA Yoshitane's name is found.

One is a manuscript "ARAKI sensei sadan" (the book's name means ARAKI Murahide's (1640?-1710?) talk over tea).

Others are ISOMURA Yoshinori's (1630?-1718) "Sampo ketsugisho" and "Tosho sampo ketsugisho" (or "Zoho sampo ketsugisho").

"ARAKI sensei sadan" said that TAKAHARA Shozaemon Yoshitane had called himself ICHIGEN later. It also said that TAKAHARA's disciple ISOMURA Kihei Yoshinori had written "Sampo ketsugisho" and "Tosho sampo ketsugisho" and he had worked under the lord of Nihommatsu, NIWA Sakyotaifu-dono. It is a positive fact that ISOMURA Yoshinori was one of TAKAHARA Yoshitane's disciples. This coincides with ISOMURA's book in which he printed TAKAHARA's name. It is also important that there are two names of YOSHIDA Mitsuyoshi (1598-1672) and IMAMURA Tomoaki (?-?), who are very famous along with TAKAHARA Yoshitane, in "Sampo ketsugisho" and "Tosho sampo ketsugisho". Besides "Sampo ketsugisho" was published repeatedly and became best-selling masterpiece.

This book says that "the master" was first taught by this ICHIGEN. But it is a problem who "the master" is . A common view has assumed this "master" to be SEKI Takakazu. Namely the master of SEKI Takakazu is TAKAHARA Yoshitane.

ARAKI sensei is ARAKI Murahide (1640?-1718?). He was a pupil of SEKI Takakazu and was well-known as shoden, the first direct disciple, of SEKI school.

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Key words and phrases. Wasan(Japanese traditional Mathematics) and TAKAHARA Yoshitane.

ARAKI was also a disciple of TAKAHARA Yoshitane before. It is widely known that SEKI school became the main current of Wasanka, traditional Japanese mathematician, later. Accordingly, it is very much important to make a study of TAKAHARA Yoshitane.

Though TAKAHARA is a key person in history of wasan, no one has made researches after him.

The late HIRAYAMA Akira(1904-1998) submitted an essential problem - research after TAKAHARA Yoshitane - at the end of his work "Wasan no tanjo" [2].

3. A hypothesis; TAKAHARA Yoshitane = Giussepe CHIARA

I submit a hypothesis - this mysterious wasanka TAKAHARA Yoshitane was an Italian missionary Giussepe CHIARA who had sneaked into closed Japan. I can give some evidences for that. Moreover, this hypothesis can throw light on many incomprehensible problems of wasan history. Lots of matters derived from the hypothesis will add a new light to wasan history.

(1) Who is Giussepe CHIARA (1602-1685)?

Who is Giussepe CHIARA? Most Japanese know a masterpiece "Chimmoku" [1] or "Silence" written by a famous novelist ENDO Shusaku. It was translated into English, too. Its hero Rodorigo is this Giussepe CHIARA.

In 1643 Giussepe CHIARA sneaked into closed Japan as one of members of RUBINO Party. At that time Japan closed the country and prohibited the Christian faith strictly. RUBINO Party was a 19-men suicide mission organized by a Jesuit Antonio RUBINO.

RUBINO Party was divided into two groups and sneaked into Japan separatedly. The members of the first group led by RUBINO himself were caught as soon as they sneaked into Japan. Then they were martyred in Nagasaki.

But strange to say, the second group to which CHIARA belonged weren't executed in Nagasaki. On the contrary, all of them were sent to Edo and confined to the so-called Kirishitan Yashiki or Christian residence by Kirisitan magistrate INOUE Chikugo-no-kami Masashige (1585-1661). The magistrate who figures in ENDO's "Chimmoku" is this INOUE Masashige. It is said that Giussepe CHIARA and others all abandoned their faith because of INOUE's strict thorough. They did not only abandon their faith but also were given Japanese names and wives. CHIARA was named OKAMOTO San'emon. They left stigma in history as apostates given Japanese names.

ENDO Shusaku's thema is that GOD kept silent to Rodorigo (CHIARA) being in anguish in such a situation.

(2) Relation between Giussepe CHIARA and TAKAHARA Yoshitane

The years of TAKAHARA's birth and death aren't known at all. ISOMURA Yoshinori's work, the first edition of "Sampo ketsugisho" was published in 1659. Since "Tosho sampo ketsugisho" was brought out in 1684, it is possible that TAKAHARA lived from 1659 to 1985

Giussepe CHIARA came to Japan in 1643 and died in 1685. After all both TAKAHARA and CHIARA lived in the almost same period.

(3) Giussepe CHIARA's learning

By the way, how much was the extent of CHIARA's knowledge? He left "OKAMOTO San'emon manuscript" his record, behind.

In this record, he wrote about his learning. He listed 20 heads in all. I'm copying his learnings about mathematics and science among them.

"Arithmetica, Mathematica, Astrologia, Cosmographia, Milicia, Pilotaem, etc." Because "Arithmetica" is very important, I copy in detail:

"San-kan-no-gaku", arithmetic, is called Arithmetica. Namban, European, arithmetic doesn't have soroban, abacus. They use mathematical characters. If you use them, you can settle all the matters.

He said that European mathematics didn't use an abacus but had characters for mathematics, and by using them they could calcurate, think and settle matters. It is obvious that these characters don't mean numerals, mathematical symbols, i.e, algebra.

This description is very essential. Besides I think that his mathematical level was high. It is known from the relation with other sciences.

I guess Giussepe CHIARA was given learning in conforming with a curriculum of Roman Academy of the Society of Jesus, the present Gregorio University.

But I'd like some informations showing Guissepe CHIARA and others taught mathematics in Edo.

There is Padre Felipe Marino's letter datelined Tonkin to the head office of the Society of Jesus in 1649. In this letter, he said that he (CHIARA) as a mathematician had been to Shogun's palace to teach la sphera.

I know "Kenkon bensetsu", a translation of European astronomical book. The preface of this book says that a senior missionary, who had sneaked into Japan and been caught, was well informed about astronomy and he presented an astronomical book to INOUE Chikugono-kami Masashige. And it also says that he told Chuan, FERREIRA, father of Society of Jesus, to translate it into Japanese and so on.

OBARA Satoru, a scholar of Kirishitan history, says that this missionary to be well informed about astronomy is Giussepe CHIARA.

Under such informations I explained that Giussepe CHIARA had learned mathematics and astronomy and he had taught them.

4. Information from Wasan books

(1) A secret of "Sampo futsudankai"

In 1673 MURASE Yoshimasu published "Sampo futsudankai". He is said to have been ISOMURA Yoshinori's disciple. This "Sampo futsudankai" is very valluable in wasan history. Because in the book, he first in wasan history solved a cubic algebraic equation with succesive approximation. Besides he used three methods consciously. This fact appeared suddenly without any precedents in the previous history of wasan books. I think from this point wasan began to take off scientifically. It is a really so important book. I investigated the publisher of this "Sampo futsudankai" and found two kinds of "Sampo futsudankai". One was published by Kameya, Hibiya yokocho. And the other was a same edition but its publisher's name was deleted. It is very strange, I think. I'm sure that they had a reason why they deleted its publisher's name.

So I looked over a map of Edo period. Then I found a part of reason. The circumference of Hibiya in Edo period was a region of Buke yashiki, samurai's place of residence. To my surprise again, there were two houses of the domain of Nihommatsu for which ISOMURA Yoshinori worked. From the above mentioned matters, I happened to clarify that "Sampo futsudankai" had hid a big secret.

(2) "Tongwen suanzhi", edited by Matteo Ricci and Li Zhizao and "Sampo futsudankai"

Recently TSUCHIKURA Tamotsu, a proffessor emeritus of Tohoku University, clarified a mechanism of extraction the square root in "Tongwen suanzhi" or "Dobun sanshi". The way to extract was quite successive approximation. NAKAMURA Masahiro, a proffessor emeritus of Osaka Kyoiku University, and I thought that "Sampo futsudankai" had applied successive approximation into a cubic algebraic equation as this analogy. The person who gave ISOMURA a hint and taught him was no other than Giussepe CHIARA. Because in 1630 Kirishitan books were prohibited, "Tongwen suanzhi" couldn't be introduced into

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Japan. But as an example "Kenkon bensetsu", it was easy for INOUE Masashige to get such a book. There is a document that shows existence of "Tongwen suanzhi", too.

Besides some strange marks are found here and there in "Sampo futsudankai". We call the marks "Kakure Kirishitan Kiqo" or underground Christian's mark.

(3) Mystery of MURASE Yoshimasu

In a preface of "Sampo futsudankai" MURASE Yoshimasu says that he was born in Sado and studied under ISOMURA Yoshinori in Edo. And at the end of the book it is said that he lived in Sekiyado (in Chiba pref.). After reading and comparing "Sampo ketsugisho", "Tosho sampo ketsugisho" and "Sampo futsudankai", I came to believe that MURASE Yoshimasu is a pseudonym of ISOMURA Yoshinori.

(4) ISOMURA Yoshinori's "Sampo ketsugisho" (First edition in the 2nd year of Manji)/Hidden secret.

At the very end of the first edition "Sampo ketsugisho", its publisher's name was printed. There I read a hint of possibility that MURASE Yoshimasu was ISOMURA Yoshinori.

The very end says that "村瀬三郎右衛問 開板" or MURASE Saburouemon published. Up to now "問" has been said to be a printer's error. I agree with that if "問" had been mistaken for "問". But the reverse is the case. A fact is that the publisher pretended to have mistaken "問" for "問". It was a cipher which let "問" have double meaning of "問" and "問", —"問 mon" is part of name, and "問 mon" is to ask. To add to this "郎 rou" is a strange letter which is like "肩" or "房". In my opinion, this letter means Latin "Patri", on study of Kakure Kirishitan. Seeing that, I think "村瀬三郎右衛問" = "MURASE asks Patri San'emon".

Besides since MURASE is ISOMURA and San'emon is Giussepe CHIARA, that means ISOMURA asked Padre Giussepe CHIARA. By putting these matters together I drew the conclusion that TAKAHARA Yoshitane was OKAMOTO San'emon or Giussepe CHIARA.

Moreover, ISOMURA Yoshinori cautiously wrote "村瀬三郎右衛門 開板" at the end of "Sampo ketsugisho" edited in the 3rd year of Manji, a year after the first edition. Now "郎" can be read clearly. "門" doesn't have "口" like "問", either.

After all, ISOMURA planed that he could excuse himself —— he mistook "門" for "問" etc. This first edition of "Sampo ketsugisho" was a secret press. "Tosho sampo ketsugisho" published in 1684 dropped a hint that "Sampo ketsugisho" published in the 3rd year of Manji had been the first edition. It says that the first edition was done in the middle of spring in the 3rd year of Manji——.

Like this, ISOMURA Yoshinori wanted to praise his master TAKAHARA Yoshitane secretly. ISOMURA Yoshinori was careful and that bold.

5. OKAMOTO San'emon in "Sayo-yoroku" (Diary of Kirishitan yashiki)

Kirishitan yashiki where Giussepe CHIARA (OKAMOTO San'emon) lived had been originally INOUE Masashige's second house. It was in Kobinata, northeast of Edo Castle. It had an area of 33,000 square meters. Giussepe CHIARA lived in this house for 42 years and died on July 25th in 1685.

It is important to know how he was treated for 42 years. The diary of this Kirishitan yashiki was named "Sayo-yoroku". It was written from 1672 to 1691. Sad to say, important decription from 1643 to 1671 wasn't left.

First of all, in 1672 CHIARA received 10-persons-allowance and a servant. Others, Bokui, Juan, Nampo and Nikan received 7-persons-allowance. At that time some lower samurai, warriors, were treated 3 or 5-persons allowance. For that reason I'm sure that CHIARA and others were treated better than I imagine they were. There also is a description "San'emon's house". From this word "house", we should not think that CHIARA was put in prison.

Condition of CHIARA's death in 1685 and matters after his death were written minutely. When he died, he left gold coin 28 ryo(about 40,000\$) and some things which seemed to be Christian sacred goods. His wife was given his money, sacred goods, 8-persons allowance and a servant.

The shogunate took the widow into consideration even after his death. Officer of shogunate instructed to raise Giussepe CHIARA's tomb like Japanese grave.

6. Gravestones of Giussepe CHIARA / Its truth

By the way, on inquiry about CHIARA's grave, I was surprised. There are two graves today. One is at Denzuin temple, Koishikawa, Tokyo. The other is at Salesio Theological school, Chofu city, Tokyo. The former was rebuilt in 1977, and there is a monument written by Italian ambassador next to the tomb. The latter is a real thing. It was left owing to an Italian missonary Padre Clodoveo Tassinari. The grave is fine as you see in the picture. It is about 2-meters tall in all.

Whoever see the picture for the first time is surprised at the shape of its head. Everyone says that it's a hat. Any Japanese in Edo period didn't wear such a hat. This grave has a shape of a hat which Catholic priest wears.

What does the matter mean? I'm sure that CHIARA died not as apostate but as Padre. It is contradictory to description — to raise a grave like that of Japanese. But the grave wearing a priest hat exists with dignity. It was under shogunate control and maintained till the Meiji Restoration. Though CHIARA had no children, his tomb was valued. That shows how achievements of CHIARA and others were important for shogunate.

7. Organizer INOUE Chikugo-no-Kami Masashige / The source of power and background

CHIARA and others needed a person who was a leading figure of shogunate to get such a treatment. The person was INOUE Chikugo-no-kami Masashige (1585-1661) and he was one of Ometsuke. He also was the first Kirishitan-aratame-bugyo, a magistrate who investigated Christian, and he rebuilt his house and let CHIARA and others live there.

Ometsuke was a high-rankig officials under the direct control of Shogun and had a big power to inspect daimyo, feudal lords. He also commanded Nagasaki bugyo and negotiated with foreign countries. By virtue of his office, he had a huge power and organized a secret service. Ronald P. Toby explained "The secret service designed by shogunate was remarkably similar to a modern consulate and a military secret service in point of its system and action ——. It is close to Allen DULLES or people working at a consulate and a secret survice."

(1) Splendid relation by marriage

I will inquire into the background of his huge power. INOUE Chikugo-no-kami Masashige was in the center of TOKUGAWA shogunate authority. The reason why he got such a power was that of course he had ability, besides he had relation by marriage to influential persons. His brother INOUE Kazue-no-kami Masanari was a foster brother of the second shogun TOKUGAWA Hidetada and became roju, the highest responsible person of shogunate, later. Moreover Masanari's daughter married famous roju, MATSUDAIRA Izu-no-kami Nobutsuna. Masashige's wife was a sister of OTA Sukemune, who was also one of the responsible persons of TOKUGAWA. When the Shimabara Rebellion occured, the highest commander was MATSUDAIRA Nobutsuna and the chief of the General staff was INOUE Masashige. Such human relations were the source of his power. It is an important factor that he had the confidence of shogun under shogunate despotism.

(2) Interest in scientific technology and its background

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"Diary of Dutch trade office" and "Diary of Castle Batavia" made mention of INOUE Massashige. According to these diaries, he took interest in scientific technology, for example guns, mortar, technology of castle construction, military affairs, medicine, pharmacy, natural history, geography and mathematics. He also let dissect a pig.

The reason why he had interest in scientific technology was that he was a Christian in the past, I think.

From the end of 1630's, with getting cold, a countrywide famine began.

Because of inflation, prices rose suddenly. In 1639 the shogunate forbade Portuguese ships to come to Japan. In 1640 the shogunate burned a Portuguese ship, which had come to demand trade, and cut off crew heads.

In such a situation, shogunate strengthened the coast guard for fear of Portuguese attack. In connection with that matter national map was drawn.

At that time in China, because NUERHACHI gained power, the Ming dynasty was in a critical condition. After that in 1644 the Ming dynasty was ruined.

As you see, shogunate was in a situation to introduce the newest scientific technology and cope with the difficulty. INOUE Masashige was the highest responsible person to propel that. The newest technology of those days was held by missionaries and Kirishitan. Shutting Kirishitan out, or cutting off their heads, and using them alive are contrary to each other. INOUE Masashige practiced this contradictory policy at Kirishitan yashiki which was an isolated secret place. In a sence Kirishitan yashiki was a secret institute like Los Alamos Institute during WW

After the end of Cold-war, former Soviet and China announced officially that they had secret military institutes. The early Edo period was also very much stained in military terms. When thinking of this matter, I can understand naturally.

The contents of study at Kirishitan yashiki were drawing up a map, instructing new civil engineering to establish financial basis and improving a calendar to make out a diplomatic document and to gain an advantage at the negotiating table.

In 1643 CHIARA and others sneaked into Japan. The first members of Rubino Party were all cut off their heads in Nagasaki. But the second members including CHIARA outlived. They were given works to make a map and train civil engineers. They also introduced a new astronomical chronology and trained experts because then Japanese calendar was 2 days behind.

From the above, what CHIARA and others did at Kirishitan yashiki were researches on scientific technology and training new engineers. And the organizer was INOUE Masashige.

8. Giussepe CHIARA and HONDA Rimei / Ground water vein of wasan

I wonder if those matters were strictly kept secret. There was a leading wasanka whose name was HONDA Rimei (1743-1820) in the last days of the TOKUGAWA shogunate. He is known as a political economist better than as wasanka.

In his writings "Seiiki Monogatari" and "Koekiron" he regarded mathematics and astronomy as important by way of basis of industry and trade.

He also called CHIARA and others charisma, guides. Besides in a headnote of his "Koekiron", he said that they had never had sexual intercourse and had lived splendid lives as saints. This coincides with that CHIARA's grave has a priest hat.

HONDA Rimei was in the main current of SEKI school and was one of proposers when SEKI's gravestone was erected. It comes as a surprise to learn that he knew about CHIARA's deed which had been probably secret.

As a practical matter, leading wasanka of SEKI school knew that, but they didn't write plainly.

KUSAKA Makoto (1764-1839), the 5th direct disciple of SEKI school declared an influence of western mathematics in a preface of "Fukyu sampo" which was posthumous manuscripts of AJIMA Naonobu (1739-1798), the 4th direct disciple of SEKI school. He said that since a mathematician had come from Europe, and so on. While HONDA Rimei and KUSAKA Makoto wrote those books, Kirishitan yashiki was abolished.

That is to say abolition of Kirishitan yashiki meant removal of a ban of the secret. As you see, an influence of western mathematics on wasan ran through SEKI school traditions like ground water.

9. Death of Giussepe CHIARA and wasan

In 1685 Giussepe CHIARA died aged 84. I'll survey the then wasan. In 1684 ISOMURA Yoshinori's "Tosho sampo ketsugisho" was printed and SHIBUKAWA Harumi's Jokyo calendar was introduced. In 1686 TAKEBE Katahiro (1664-1739) published "Hatsubi sampo genkai taisei". Before or after this year, most main results of SEKI Takakazu were copied concentratedly.

Is this a historical coincidence? As I told until now, I don't think Giussepe CHIARA's death had nothing to do with main writings of SEKI school.

10. Conclusion

It has been reported that Giussepe CHIARA(1602-1685) had given up his faith and investigated Kirishitan, Christians in feudal Japan.

That brought disgrace upon him and his truth was forgotten. I first cleared up his role which had done in Japanese mathematical history. This matter decides that European mathematics had influence on Wasan. In China its mathematics was affected mainly by Chinese version of European math books. But in Japan it was done through the strict filter which had been made by prohibition against Kirishitan and isolation.

But conversely that matter made an opportunity for enough mastication and new creation when they were in process of acceptance of a civilization. When a mass of foreign civilization flow into suddenly, they in some cases destroy existing civilization.

During the Age of Great Voyages, Western civilization could flow into Japan freely for about 80 years. While making sacrifices caused by prohbitation against KIRISHITAN, restriction of informations from the West and enough term for mastication promoted Japanese original civilization with the sphere of Chinese civilization though.

But we have to give attention to the fact that former view of isolation has changed in a big way of late years and things and information flew into then Japan more than we think they did.

TAKAHARA Yoshitane, alias Giussepe CHIARA was a teacher of SEKI Takakazu(1640?-1705), ISOMURA Yoshinori(1630?-1710) and ARAKI Murahide(? - ?). Therefore it is unavoidable to say that European mathematics had an effect on the essential part of Wasan. That is by no means strange when I consider in what way firearms, Namban or Western medicine and refining art of gold, silver and copper were accepted at that time.

Besides when I consider INOUE Chikugo-no-kami Masashige's (1585-1661) part that he did, I think that it has deep relation with establishment of the shogunate system during the period of 3rd Shogun TOKUGAWA Iemitsu (1603-1651).

When considering from domestic affairs, a big famine during the Kan'ei era(1624-1644) and a sudden rise in prices hit Bakufu, shogunate, it was urgent to reclaim and enrich the finance. It was an urgent necessity for the shogunate to build water ways, to establish surveying art and to spread the art. Since foreign trade was reduced and the internal output of gold and silver also decreased, increasing food was the only given choice.

When considering from diplomacy and military affairs, it was necessary to improve a calendar because of diplomatic problem. They also had to establish the system of coast guard, make Japan's map and collect foreign informations.

The researches were done at Kirishitan yashiki, Christian house (1643-1792?), which was a secret Institute for Advanced Study.

The formation of Wasan became one, inside and outside, with the formation of TOKU-GAWA Bakufu which was the modern country, I think.

An essay on Wasan as an amusement which was written by Dr.MIKAMI Yoshio(1875-1950) points to the situation that Wasan became popular art after the Genroku and Kyoho era(1688-1735). When we talk about the period of formation of Wasan, it is from the Kan'ei era(1622-1644) till the Jokyo era(1684-1687).

At that time CHIARA contributed to secret researches at Kirishitan Yashiki. I conclude that at the request of shogunate, his pupils, ISOMURA Yshinori, SEKI Takakazu and others formed essential part of Wasan not as amusement but as practical science.

I detailed about those affairs in my writing "Wasan no Seiritsu", The Formation of Wasan.

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