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Use of Explosives in the Southwestern Archipelago Immediately after World War II

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Abstract Immediately after the Fifteen Years' War with the US, China, and colonizing states of Southeast Asia, the Japanese suffered from general shortage especially food, which got worse when the repatriates from Taiwan, Micronesia, Southeast Asia and Manchuria began their new life in Japan. To make their living, both former occupants and newcomers employed all means, among which use of explosives or 'dynamite fishing' near the coast. This technique is now prohibited to protect fishing grounds, but the emergent economic and social conditions let the people show the generosity to overlook it. The paper reconstructs the general conditions of this fishing in coastal villages in the Southwestern Archipelago as a step to clarify the farther details of fishing innovation on individual base.

Keywords Blast Fishing. Yaeyama Archipelago. World War II.

1 Introduction

In the aftermath of 15 years of war with the USA, China, and the nations that had colonized Southeast Asia, the Japanese suffered from general shortages of all essential goods, but especially of food. Food shortages worsened when Japanese former settlers were repatriated from Taiwan, Micronesia, Southeast Asia and Manchuria and began their new life in Japan. To make a living, both the original occupants and newcomers employed many methods of fishing near the coast, including the use of explosives (commonly known as 'dynamite fishing'). To protect fishing grounds, the use of explosives is now prohibited, but under the severe economic and social conditions prevalent after the war their use was tacitly permitted.

The general conditions of blast fishing in coastal villages of the Ryukyu Islands are reconstructed in this article, focusing on the Yaeyama Archipelago (map 1). The five archipelagos of Satsunan, Amami, Okinawa, Miyako, and Yaeyama, which lie between Kyushu and Taiwan, are known as the

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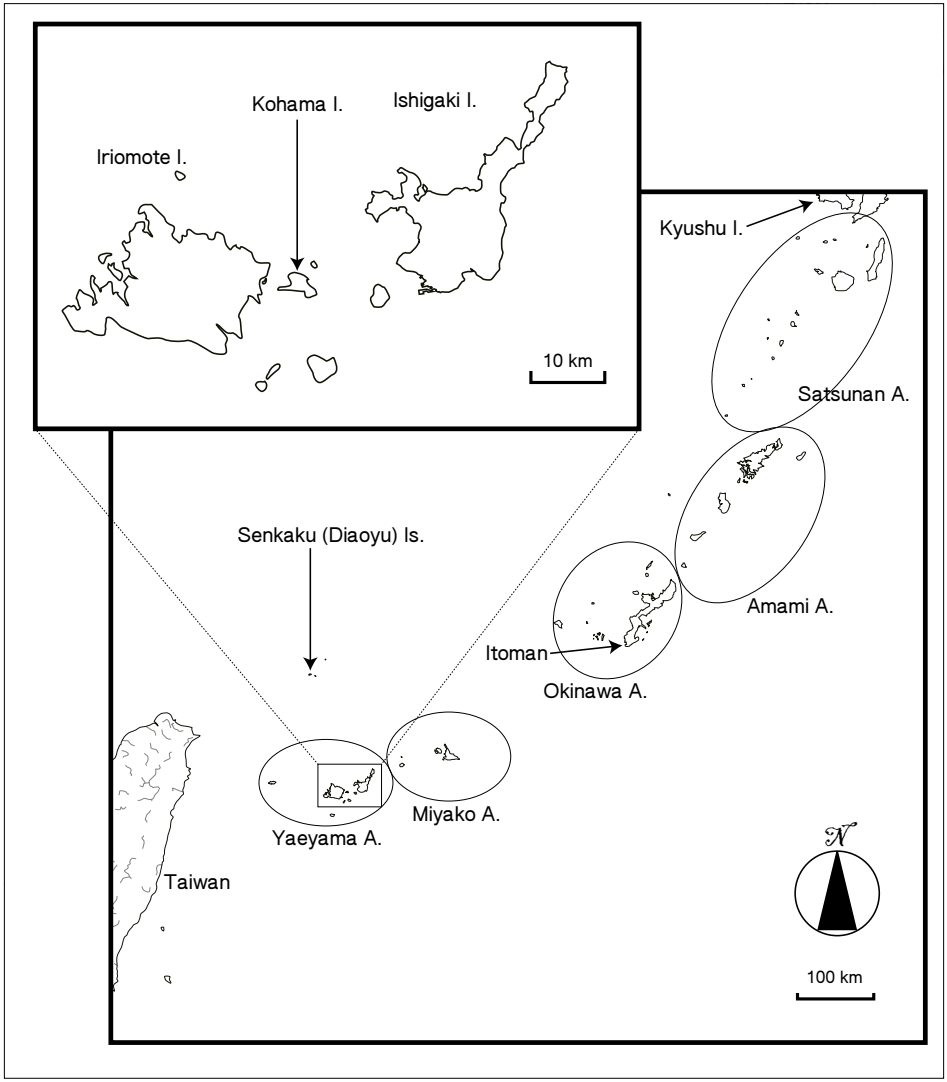

Map 1. Yaeyama Archipelago

Ryukyu Islands, but in Japanese the term Nansei Shotō (lit. 'Southwestern Archipelago') is used more frequently. An additional complication is that the toponym 'Okinawa' is applied at three different geographical levels. It refers to the main island of the Okinawa Archipelago, to the entire archipelago, and to the three archipelagos that present-day Okinawa Prefecture includes, i.e., Okinawa, Miyako and Yaeyama. However, the Yaeyama Archipelago, the focus of this paper, is more than 400 km southwest of Okinawa Island.

Contemporary blast fishing is reported most frequently from Southeast Asia (Pet-Soede, Erdmann 1998; Pet-Soede, Cesar, Pet 1999; Akamine 2006), as well as Hong Kong (Cornish, McKellar 1998) and continental Africa (Jiddawi, Öhman 2002; Cinner 2010). All these works admit, considering environmental ethics, the negative aspect of blast fishing that destroys coral reefs and fish habitats (Fox et al. 2003). However, they share a tendency to ignore diversity of this type of fishing, either because they are based on a single case or because they oversimplify the diversity of this fishing. Focusing on historical blast fishing, this article demonstrates the diversity of the actors who fished with explosives and the variety of methods that were employed.

The objective of this paper, documenting an aspect of fishing with explosives, is so restricted that the place and period are specified narrowly. However, it leads toward several broader topics, namely arms in society, the combination of modern items into a subsistence system, innovation in fishing and its sustainability, and the role of a boom industry in economic growth. On the other hand, one important rationale for conducting the research is the reticence or even unwillingness that its former practitioners exhibit about the topic, undoubtedly because of its illegal and therefore illicit character. However, because a half-century has already passed since fishing with explosives ended in the region under study, its former practitioners would forever keep silent were broad scale research not organized quickly into a major project. Therefore this paper elucidates the relevance of such a 'dark side of history', and it explains the need for collaborative joint research and information sharing regarding this topic.

The paper consists of three parts. The first one outlines this type of fishing from published records and fragmented oral testimony collected during the author's research. The second is a detailed analysis of the case of Iriomote Island, where non-fishers used explosives to off-set their lack of both skill and fishing gear. In this example explosives were a means to expand the capacity of the sea as a place of production. The third is a detailed analysis of the case of Kohama Island, where fulltime fishers used explosives in many different ways according to target species. For example, mullet (*Mugil* sp.) was killed by the blast, whereas fusiliers (*Caesio* sp.) were just rendered quiescent, for selling as live bait for bonito fishing. In the latter case fishers simulated fish and fish school behaviour, and controlled it with explosives.

2 Published Records of 'Dynamite Fishing'

The earliest records on the use of explosives in fishing are found in newspapers. The *Ryukyu Shimpō* on 17 September 1901 published a reader's opinion that Itoman fishers used explosives throughout Okinawa, despite a prefectural ban. Itoman is a toponym in the south of Okinawa Island, and its fishers are famous for the remarkable expansion of their activities through the first half of the twentieth century (Ueda [1975] 1991; Ichikawa 2009). Equipped with newly-invented water goggles and large nets, as well as a labour recruiting system of mortgaging a debt (*Itoman-gai* or Itoman purchase [of labour]), the area of their drive-in-net expanded to Central Honshu, Taiwan, Micronesia and insular Southeast Asia. In 1882, the first Itoman family migrated to Ishigaki and began to sell fish that they speared (Noguchi 1987, 293). In 1907, 11 of 17 groups that conducted drive-in-net from Ishigaki Island of the Yaeyama Archipelago were based in Okinawa (Ichikawa 2009, 118). At the time of the newspaper article, it was supposed that many Itoman fishers had already migrated seasonally to Ishigaki.

Nothing can be said regarding the popularity of the use of explosives in Okinawa during this period. It was only in 1866, less than 40 years before the newspaper article, that Alfred B. Nobel invented dynamite using a combination of diatomaceous earth and nitroglycerine. In 1875 Nobel improved its effectiveness by replacing diatomaceous earth with nitrocellulose. And this was a quarter of a century before the newspaper article. Such a rapid diffusion of explosives might be explained by the 1894 Sino-Japanese War, the first modern war engaged in by the Japanese government. With the end of the war, by the Shimonoseki Treaty of 1895, Japan began to colonize Taiwan. Its inhabitants resisted. This tense atmosphere between Taiwan and mainland Japan might have initiated the permeation of explosives into Okinawa, which is situated between the two. As the army transported dynamite from the mainland Japan to Taiwan, it is quite possible that some of it entered the black market in Okinawa. However, such a hypothesis requires verification by further research.

Reports are few, particularly before World War II, on the use of explosives in fishing. However, according to the author's interviews at several sites throughout the Ryukyu Islands, either soldiers themselves used explosives for fishing, or they gave explosive to professional fishers to secure food for their troops (a case from Yaeyama is reviewed below). Such military food security was, in some places at least, apparently the beginning of the use of blast fishing.

Fujio Ueda ([1975] 1991) points out in his essay on history of Okinawan fisheries that the commercial network for explosives had been established before World War II. Explosives were introduced via this network by several actors: thieves, explosive merchants themselves, and those involved in construction and mining businesses. A pack of dynamite, containing

50 sticks of the substance, 100 blasting caps, and 15 m of fuse, cost 6.50 yen[1] in the 1910s. This was the official price whereas it cost six times more when a package was subdivided for sale on the black market. This information was based on interviews with those involved, although Ueda did not identify his sources.

Judging from published modern history and journalism reports, explosives were used most frequently just after World War II, when disarmament was being conducted by the US Army and immediate food security was a severe issue for all citizens. Masaie Ishihara, a writer who described the general public's wartime experiences, points out that explosives were used by fishers who had lost their means for production by having been drafted into the military and having been bombed out. However, "it was a most dangerous way to make a livelihood. Many people killed themselves accidentally, although all of them survived the smoke of guns and a rain of bullets miraculously" (Ishihara 1982, 269). Elsewhere in the same book (252), Ishihara states that most smugglers going to Hong Kong were armed with explosives for self-defense.

None of the published materials mentioned above, however, provides details on social backgrounds. In particular nothing was mentioned about the ways of acquiring explosives, the situation that facilitated their circulation, or fishers' actual status. More often than not, invaluable testimonies on the use of explosives have been interpreted as an abnormal experience during wartime (Sakai 1990; Kobayashi 2003; Nakamura 2003; Imamura 2003). As a result, most authors pay attention only to sensational aspects, and omit important details.

It is necessary to examine newspaper articles more closely to further elucidate the history of blast fishing. However, the writers were usually too interested in 'abnormality' of the fishing, especially illegality and numbers of dead or injured, to make historical contributions by documenting the incident's social contexts.[2] The least documented aspects of the topic, including the acquisition of explosives, specific motives for using them, and folk knowledge regarding use, remain to be examined.

1 Before the inflation that occurred during the Fifteen-Year War (1931-1945), two yen were almost equivalent to one US dollar, and one gram of pure gold cost 1.5 yen. In the 1910s, a policeman started his career at the salary of 15-20 yen (Asahi Weekly Magazine 1988).

2 This tendency occurs also in the recently-published works of the Association for Documentation of the Senkaku Islands (2012, 2014). These works, however, demonstrated that significant numbers of Okinawan (not Yaeyaman) fishers went as far as Senkaku or Diaoyu Islands, situated more than 400 km from Okinawa, and now the subject of a border dispute between Japan and People's Republic of China, to fish with explosives. This implies that Okinawans (notably Itoman fishers) avoided, at least during a certain period, using explosives in their home waters. That implies that blast fishing was probably regarded as neither a necessary evil for livelihood nor a criminal act, but as a means of obtaining a large amount of money. This hypothesis should be tested through future research.

Another remarkable article, which examined the end of blast fishing in the Ryukyu Islands and Southeast Asia (Kakuma 2008), reported its conclusion in Yaeyama. It explains that immediately after the US occupation ended, in 1972, the Japanese Coast Guard conducted an exposure, which successfully eliminated this kind of fishing. This article is regarded as the only academic work using historical documents, but it provides too few details. From where did fishers obtain explosives? Did they conduct this method occasionally or regularly? If done regularly, what was the periodicity of the activity? How severe was the exposure? How did the fishers respond to it? Was fishing with explosive regarded as a necessary evil and used by the majority of fishers, or was it seen as an antisocial livelihood activity for just a minority?

This article does not attempt to provide general answers to these questions. However, through dialogue with former practitioners of blast fishing, it does provide more detailed primary materials than have been available hitherto. In this way it also clarifies a limited type of fishing conducted from the period from Japan's defeat in World War II to the reversion of the Ryukyus to Japan in 1972.

3 Outline of the Fishing Method

Since the author's field research on fishing with explosives is still on-going, it cannot be said that a detailed picture is clear. However, a general picture will be outlined based on research so far conducted, in order that readers can better understand the cases presented below.

The author uses the term "fishing with explosives" or "blast fishing" rather than "dynamite fishing", which is more popular in Japanese publications, because not only dynamite is used. Dynamite is an explosive that includes nitroglycerin and nitrocellulose as its principal components, and once used frequently for blasting in the construction and mining industries. At present, although the blasting explosive is customarily referred to as "dynamite", it is ammonium nitrate fuel oil (ANFO), not dynamite.

In addition, other blasting explosives have been employed for fishing, including hand grenades and homemade explosive extracted from artillery shells or marine mines. To include such cases the author has adopted the expressions "fishing with explosives" and "blast fishing" without referring to a particular kind of chemical. This also avoids the frequently used mass media term which inevitably connotes illegality.

According to the author's interviews, the kinds of explosive used were of various colours, including white, gray, yellow, and other. They also varied in shape, with some being rectangular, like explosives made specifically for the construction industry, whereas others were powdered or appeared like aggregated grain. Their chemical composition is not identified. According

to the participant fishers' explanations, dynamite in a strict sense of the term was also probably used.

Explosives were not used without a container, a fuse, and a blasting cap.[3] As an explosive disperses readily in water, it must be either bottled or wrapped with waterproof paper. A fuse is required to maintain the fire while a fisher is either manipulating or throwing the explosive. The fire is transmitted from the fuse to the blasting cap, which causes an explosion by igniting the main body of the explosive.

The fuse and blasting cap were packed together with the main body when ready-made 'dynamite' was purchased. If not, the user had to make them for himself. A waterproof paper wrapping could be replaced with leaves (see below). Whether a fisher used ready-made or homemade explosives, this method of fishing required prudence and skill to gauge the precise timing of an explosion.

Some fishers used fishing nets to retrieve their quarry, although most did not. Informants in most interviews made by the author noted that fishers, whether professional or not, dived underwater to retrieve their fish by hand, an activity that risked attracting sharks that had been already lured by the fish blood. Often a fisher had to retreat without being able to retrieve his fish. Some retired fishers related that the main reason for loss of body parts was not a premature explosion, but shark attack.

4 Research Methods

The evidence demonstrated below is based on interviews the author conducted in November 2013 on Kohama and Iriomote islands in the Yaeyama Archipelago. Since 2001, Kohama has been the location of the author's long-term research. He learned of fishing with explosive only incidentally during the research on the modern fishery. In the 2013 research, therefore, he did nothing more than verifying with an acquaintance the details of the use of explosives, and the research covered only one case. Nevertheless, because the information collected then was detailed and realistic, the author asked the informant to agree to their publication.

Only few cases were collected in Iriomote also. Unlike on Kohama, the author visited several people on Iriomote, with no clear idea of who he would be able to interview. In a two-days research trip the author was guided by Hidenobu Itai, who had conducted field research on artisan boat building on Iriomote. He introduced the author to some of his informants, most of whom agreed that blast fishing was conducted from time to time

3 Both blasting caps and fuses were filled with explosive. In this point, a fuse is fundamentally different from the wick of a candle, and it is the reason that the fire is difficult to extinguish even when thrown into the sea.

just after World War II.

The informants related one of the two contradictory versions regarding blast fishing: either "Iriomote islanders did use explosives to catch fish" or "it is fishers from Ishigaki Island who did it, and Iriomote non-fishers were not involved in it". There are two ways of explaining this inconsistency. One explanation stresses that there are few eyewitnesses because of the irregular, rare and short-term essence of this kind of fishing. The second stresses the islanders' tendency to conceal their neighbours' 'violation' of the law by underestimating Iriomote people's involvement. Whereas the research reported here could not determine which explanation predominates on Iriomote, both should be considered in every interview about blast fishing.

It is asserted in the following section that Iriomote islanders did use explosives to catch fish. It thus contradicts some other assertions that sustain the alternative view. However, for the two reasons mentioned above, it is natural that there are contradicting assertions. The one that follows is trustworthy not only because of its detailed and realistic description, but also because of the informant's demonstrated sincerity. When the author asked him to permit publication of his story, properly anonymised, the informant required the author to relate it as a tragic result of the war and the consequent food shortage. This informant, an avid relater of wartime experiences, kept an artillery shell and his own military boots at home. To him, fishing with explosives is a historical and unforgettable fact, if not exactly legitimate.

To prevent misunderstandings on his part, the author made complementary interviews on both islands in December 2015 with the same informants that were used in 2013, showing them the draft of this article to clarify some ambiguous details. On this occasion, the author asked his informants to correct the expressions he had used in writing it, and to agree that a part of the informants' own past would become regarded as the author's own writing when published.

5 Diversity of the Actors: Evidence from Research in Iriomote

Blast fishing started in Iriomote before World War II. According to the informant, born in 1929, farmers from several villages used to gather in 1937-38 to fish with explosives at the river mouth of one of the island's largest river. The explosive material, called *sakuramaito* or sacramyte, was traded informally from a nearby coal mine that had just opened. The composition of sacramyte is not identified. The fishers retrieved fish, dead or dazed, using their hands, but not a net.

This fishing sometimes caused accidents. An inhabitant of another village, just on the other side of a small stream close to the informant's vil-

lage, was injured seriously during the fishing operation, and was obliged to have both hands amputated. Because he mistakenly thought that the explosive he threw into the water had misfired, he dived into the water immediately before the explosion. Use of explosives were not blamed then. On the contrary, there were many fishers from different villages fishing with explosives. Because most were farmers and did not possess fishing nets, throwing explosives may have been the easiest way for them to catch fish. In other words, using explosives was nothing special. Nevertheless, the fishing ground was not severely destroyed before the war, possibly because the frequency of blast fishing was limited. According to the informant, it was fishers from Miyako Archipelago who blasted and destroyed the fish habitat after World War II. Although Miyako islanders were good at sea fishing, but not in the river, blasting in the river was easier, according to the informant, because fishers did not have to compete with sharks.

Around 1942, the informant enlisted in the 18th regiment, the Fourth Division of the Japanese Army[4] and moved to Ishigaki Island. The army then stationed a part of this regiment in Ishigaki, to back up posts in the Mariana Islands. The regiment consisted of 9,000 soldiers, 3,500 of which were stationed in Ishigaki and 5,500 in Okinawa. During the informant's service, some soldiers of his company worked for a fishing squad, using explosives to supplement their meagre rations. The informant himself also saw his senior ordering soldiers to extract explosive from a 15 cm artillery shell. Probably, they did not use nets. They caught large fish like *chinuman* (sea bream, *Acanthopagrus* sp.),[5] but all were eaten by their superiors. The informant remembers even now that there was nothing in the soup on that day.

These anecdotes inform us that: 1) the army took the initiative in fishing with explosives, despite the danger of the activity; 2) non-fishers played a significant role in the operation; 3) there was not just a single means of acquiring explosives, as the farmers along the river used that obtained from a coal mine whereas Ishigaki soldiers extracted explosive from artillery shells. Such information cannot be obtained from published materials, such as newspapers and academic articles.

When the war ended, in 1945, the informant returned to his home in Iriomote. It was only after the war ended that he witnessed fishing with explosives. The first time was on occasion of 'disarmament', when habit-

4 The number of the regiment and the division is based on the informant's testimony, but not confirmed by the author.

5 While *chinuman* usually refers to *Naso unicornis* (*tenguhagi* in standard Japanese) in Yaeyama as well as in Okinawa, the informant explained repeatedly that it is identical to *minamikurodai* (standard Japanese), which corresponds to *chinu* (Okinawan) and *Acanthopagrus sivicolus* (scientific name). The informant was apparently confused, but the author left this 'mistake' uncorrected respecting the informant's understandings.

ants of neighbouring villages were required by the US Army to dispose of the defunct Japanese Army's food and ammunition. Then, villagers found a marine mine that had drifted ashore. Two former Japanese Army sergeants dismantled it to extract the explosive. The informant watched this work from a distance, fearing an accidental explosion. The work was successful, and the two subsequently fished with the explosive the color of which was a *miso*-like yellow.[6] This material, as well as a fuse, was wrapped with a *kuwazuimo* (taro, *Alocacia* sp.) leaf, and bound together with string, to form it into an explosive device. They did not have a blasting cap, but made a substitute with a small paper cylinder containing powder scaled from match heads. The resultant blast was so strong that some fish flew onto the land! The left over explosive was put into a rice sack and buried in the mountains.

Sometime following the 'disarmament', the informant gave a friend some hand grenades which he had found. This friend used them for fishing and the informant received in return *bora* (mullet, *Mugil* sp. and other *Mugilidae* species) which formed part of the harvest. Because this fish forms large coastal spawning aggregations, it was assumed that the fisher threw the hand grenade after visual confirmation. Meanwhile, the sergeants continued fishing with explosives. One of the two returned home to Honshu, whereas the other married a woman in the informant's village. He not only used the explosive buried in the mountains, but also extracted additional explosive. Subsequently he died in an explosion when he hammered an artillery shell and accidentally hit a detonating fuse. According to the informant's recollection, this was before the end of 1945, the year of Japan's defeat.

There were people who fished with explosive in the sea to provide shrine offerings on the occasion of a festival. Although the food shortage had not yet been overcome, nevertheless the festival had to be celebrated. In such a difficult condition, the people were fortunate to obtain some explosive material. Whereas people fished in the river when they felt ashamed to use explosives, on this occasion of a public event they fished at sea, in that way to share in the process. As a result, the fishing assumed the emotions of a festive event. The informant was watching it from a distance in the water. He observed the one-metre-high column of water that arose at the moment of the explosion, and felt a sharp pain on the skin because of the blast. The harvest consisted of *chinuman*, *budai* (parrot fish, *Scarus* sp. and other *Scaridae* species), and the like. This time, too, sharks gathered to eat the dead fish.

The informant's story continued. The following account of a death caused by an explosion happened when "life had already settled down",

6 *Miso* is a soybean paste used to season soup.

supposedly in the 1950s. A man from the informant's village and another from the village beyond the stream fished together with explosives. The one from beyond the stream had worked in a gold mine in Taiwan and, according to the informant, possibly had a route via which to acquire explosives. One man lit the fuse with an incense stick, but the flame was too dim to be seen in the daylight. As a consequent, the one having lit it did not throw the explosive and was killed by its explosion. The other was injured and went to hospital. When the informant heard about this tragedy he rushed to the location where he observed that the body had been eviscerated and that hermit crabs were swarming all over it. This was the informant's only experience of seeing death or injury from an explosion.

The author was surprised that so many examples were provided by a single informant in a village where the people rarely fish. This informant in Iriomote gave six examples of fishing with explosives in different situations: 1) river fishing by individual farmers using ready-made explosives; 2) fishing with ready-made explosives by a military unit in Ishigaki to supplement its rations; 3) fishing with extracted explosive by soldiers with knowledge of weapons; 4) fishing for mullet with such weapons as hand grenades on the occasion of disposing of ammunition; 5) fishing at sea on occasion of a local festival; 6) fishing with ready-made explosive by those who obtained it from outside the island. All these examples show that there were various non-professional fishers who used explosives. They included farmers, mine workers, military officers, and general islanders who had lost their means of production during the war.

They had also various motivations, ranging from a need to compensate for an everyday food shortage to an unusual means of acquiring offerings for a shrine. Noteworthy is that none of these was ever intended to provide easy money. Ishihara's indication (1982) that it was people without means of production who were obliged to fish with explosives might be accurate, although it should be verified by much more evidence. The examples also show that the actors who facilitated acquisition of explosives were those concerned with coal and gold mines (1 and 6) and with the army (2 and 3). In exceptional cases (4) and (5), hand grenades were easily acquired under a special situation where the US Army was disposing of Japanese ammunition. The explosives include those ready-made for mining use, military weapons, and explosive extracted from artillery shells and marine mines.

6 Diversity of the Method: Evidences from Research in Kohama

On Kohama Island, which forms part of the Yaeyama Archipelago as well as Iriomote, semi-professional fishers used explosives. The informant, who was born into a fisher's family in 1956, experienced blast fishing for the first time about 1965 or "around the age of the third year at elementary

school". His father was targeting mullets, which disperse as soon as the explosive hits the water. Therefore a long fuse was attached to the explosive in order to ensure that the explosion would occur after the dispersed mullets have regained their composure and gathered again near the landing point. They retrieved the stunned fish by hand, and did not use nets. This anecdote demonstrates that professional fishers controlled explosion based on the behaviour and habits of a target species.

The informant became involved regularly in blast fishing around 1971, or "at the age of 15, after graduation from secondary school", when he began to work on the sea. During this period, most of the informant's neighbouring fishers made contracts with owners of *katsuo* (bonito or skipjack tuna, *Katsuwonus pelamis*) fishing boats to provide them with *jako* (live bait consisting of species that form large schools, such as *Caesio* sp. and *Chromis* sp.). For live bait fishing, fishers were divided into four groups, each composed of six or seven members. Each group was allocated priority rights by lottery to fishing grounds or rocks inhabited by *jako*. Skippers and crews of each boat memorized 40-50 sites. They sold their harvest only to the party with whom they had contracted. The contractor with the informant's group came from Hateruma, the southernmost island in the Yaeyama Archipelago.

The informant's father purchased the explosive from a dealer living in Ishigaki. It seems to have been a ready-made explosive for a construction use because, the informant said, it caused a strong explosion when used together with the fuse and blasting cap attached in the pack. It was rectangular in shape with a square cross-section and sides 6-7 cm long and height of 18-20 cm. The oil paper which wrapped the explosive individually had an English text printed on it. It seems to have been produced outside Japan, and supposed to have originated from a US military base in Okinawa. The texture of the explosive was like that of consolidated sand, i.e. easy to break into pieces but not sticky.

The informant never used this explosive together with the fuse and blasting cap, as the maker had expected. Instead it was crushed in a bowl, wrapped with a paper from a cigarette package, and then bound with a cotton string together with a fuse and blasting cap. The case of the blasting cap was made of metal and as thick as drinking straw. When an explosive is divided in this way, the explosion does not kill fish, but slows their motion. The fishers retrieved them alive with fishing nets, because a dead fish cannot be used as a live bait. The informant prepared this "homemade explosive" on the night before a fishing trip.

The target of this kind of fishing method was limited to *gurukun* (fusilier or *Caesio* sp. and other Caesionidae) that form fairly large schools. *Suzumedai* (damselfish or *Chromis* sp.) was also used as live bait, but since it forms smaller schools it did not yield a good harvest. Even if fished with an explosive, fishers had to make repeated explosions to reach the ordered quantity. On the other hand, a transparent fish called *shiroumi*

(unidentified) that was also used as live bait rarely emerges from coral reefs. To harvest it, fishers used an oil feeder filled with solution of potassium cyanide. In contrast, fusilier was good to target because fishers could increase their productivity by using explosive to reduce the number of individuals that escaped.

Having confirmed that fusiliers were schooling around a particular 'rock', fishers unfolded the net, directed by the *sekinin* or fishing chief. This was a lift net with bottom weights and connected to long lines. Meanwhile the *kata-sekinin*, or vice-chief, dived into the water and observed the school's movement, to determine when and where to throw in the explosive. A crew on the boat threw it into the water as soon as *kata-sekinin* gave a signal. It was important that the *kata-sekinin* indicated the top of the school, but not the middle, to keep it going without dispersing. Since *kata-sekinin* in the water felt the blast directly, he mitigated it by hitting, kicking and stirring the water to deflect the blast wave. After the explosion, he lifted the base of the net with the lines and enclosed the school, whose movement had been slowed by the blast. The use of explosive minimized the loss of fish from the net. The harvest was kept in a bamboo basket (*bāki*) 2.5 meters in diameter set in a prearranged location where the bonito fishers' boat picked up the harvest and the basket.

After a short period of this kind of fishing, the informant moved to Osaka where he spent May 5, 1972, the day of the reversion to Japan of Yaeyama, his homeland, as well as Okinawa and Miyako. His stay in Osaka lasted about 18 months. His experience of blast fishing for bonito bait occurred just before 1972, and can be estimated to have lasted less than a year.[7]

The comparison of the two examples which the informant gave, mullet fishing and fusilier fishing, shows that fishers employed different methods for different targets. When they were seeking to harvest live fish, they reduced the quantity of explosive and aimed at the top of the fish school. A fishing net for retrieving the fish was also indispensable in this case. Professional fishers used their meticulous folk knowledge, including that of mullet and fusilier behavior, as well as of explosive materials.

7 The most important reasons why this kind of fishing ended can, as Kakuma (2008) points out, be attributed to the Japanese Coast Guard's organisational exposure immediately after the reversion of the Ryukyus to Japan. At the same time, however, we should not underestimate that the social order was recovering in this period after the confusion caused by defeat in the war and accompanying return rush of colonists from the former Japanese territories.

7 Conclusion

Surviving newspaper articles tend to stress the illegality of blast fishing, and testimonies published after more than 30 years do not go much further than illustrating the chaotic situation during the post-war era. Both types of material cover the deeper context of the fishing with explosives, which includes the boom of primary-industrial products, for example. Keeping this point in mind, the author's research revealed many significant facts for the future study of blast fishing.

The interview in Iriomote revealed that not only professional fishers used explosives, but so too did farmers, soldiers, and former soldiers. These non-professional fishers, who lacked both fishing gear and skills, faced the difficult situation of rapid increase in neighbouring population and in food demand. The testimony tells us that blast fishing was conducted in an age of remarkable social change, from 1930 through 1960, by the socially vulnerable for their own survival.

On the other hand, the interview in Kohama demonstrated that professional fishermen combined explosives into their technological system and regulated the way of using them according to fish behaviour. They also had to make a living when opportunities for earning an income were limited, and they never intended to make easy money. As is evident from the different methods employed in mullet and fusilier fishing, the use of explosives is not necessarily destructive. Especially in fusilier fishing, an explosion greater than that required to 'astonish' fish caused the death of the target and therefore the loss of a harvest. As a result, unintentional destruction of fishing grounds was avoided. In practice, a *kata-sekinin* escaped injury, when another crew member threw the explosive near him, by moving immediately to the sea bottom. This anecdotes demonstrates that a blast did not penetrate the water to the point of sea bottom where corals live.

The preceding facts and suppositions mentioned go beyond the stereotypical and negative image of blast fishing. However, people with experience of fishing with explosives generally hesitate to tell their story, probably because of a sense of shame. One cannot say unequivocally that fishing with explosive had no negative aspects, but the whole picture of this type of fishing should be clarified quickly now that its witnesses have reached an advanced age.

The memories of blast fishing relate to political and economic issues relevant to the present time, including war, famine, return of expatriates, poaching, smuggling, coal mining, and the US military bases. All of them tend to make the witnesses silent for the very reason that the issues are significant. Excavation of 'negative heritage' that individuals hesitate to publish is strongly recognized as necessary (Nora 1989) to transmit to the next generation, especially now that the memories of wars and disasters are being challenged. This topic should be pursued, with careful attention to privacy and post-traumatic stress disorder, in relation to the general representation of history.

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Bibliography

Akamine, Jun (2006). "Who Is to Be Blamed? Socio-cultural Notes on Blast Fishing in the Spratly Islands". Japanese Coral Reef Society (ed.) *Proceedings of 10th International Coral Reef Symposium*, 1427-33.

Asahi Weekly Magazine (ed.) (1988). *Nedanshi nenpyō: Meiji, Taishō, Shōwa* 『値段史年表――明治・大正・昭和』 (A Chronology of Commodity Prices: Meiji, Taishō, Shōwa). Tōkyō: The Asahi Shimbun Company.

Cinner, Joshua E. (2010). "Poverty and the Use of Destructive Fishing Gear near East African Marine Protected Areas". *Environmental Conservation*, 36(4), 321-6.

Cornish, Andrew S.; David McKellar (1998). "A History of Fishing with Explosives and Poisons in Hong Kong Waters". *Naga, the ICLARM Quarterly*, 21(3), 4-9.

Fox, Helen E.; Pet, Jos S.; Dahuri, Rokhmin; Caldwell, Roy L. (2003). "Recovery in Rubble Fields: Long-Term Impacts of Blast Fishing". *Marine Pollution Bulletin*, 46, 1024-31.

Ichikawa, Hideo (2009). *Itoman gyogyō no tenkai kōzō: Okinawa Amami wo chūshin toshite*『糸満漁業の展開構造――沖縄・奄美を中心として』 沖縄タイムス社 (Development of Itoman Fisheries. A Perspective from Okinawa and Amami). *Okinawa Times*.

Imamura, Haruka (2003). *Shima wo tabi suru* 『 島を旅する』 (Travelling over the Islands). Kagoshima: Nampou Shinsha.

Ishihara, Masaie (1982). *Daimitsu bōeki no jidai: senryō shoki Okinawa no minshū seikatsu* 『大密貿易の時代――占領初期沖縄の民衆生活』 晩聲社 (The Age of the Great Smuggling: Okinawan People's Lives in the Early Period of US Occupation). Tōkyō: Banseisha.

Jiddawi, Narriman S.; Öhman, Marcus C. (2002). "Marine Fisheries in Tanzania". *Ambio*, 31(7-8), 518-27.

Kakuma, Shin'ichiro (2008). *Gyogyō to sangoshō seitaikei no kyōzon wa kanō ka? Jizoku-teki shigen riyō ryūtsū ni yoru Ajia taiheiyō no sato umi o mezashite* 漁業とサンゴ礁生態系の共存は可能か?――持続的資源利用・流通によるアジア太平洋の里海をめざして (Does Fisheries Compatible with Coral

Reef Ecosystems? Toward Establishment of satoumi through Sustainable Resource Use and Distribution in the Asia-Pacific Area). Nobuhiro Kishigami (ed.), *Kaiyō Shigen no ryūtsū to kanri no jinruigaku* 『海洋資源の流通と管理の人類学』 (Anthropology of Distribution and Management of Marine Resources), Tōkyō: Akashi Shoten, 173-94.

Kobayashi, Teruyuki (2003). "*Uminchu*" 『海人』 (Fishers). *Mainichi Newspapers Press*.

Nakamura, Zen'ei (2003). *Okinawa uminchu: hitori oikomi ryō ni ikiru* 『沖縄ウミンチュ―― 一人追い込み漁に生きる』 河出書房新社 (Okinawan Fisher: A Lonely Livelihood by Drive-in-Net). Tōkyō: Kawade Shobo Shinsha.

Noguchi, Takenori (1987). *Hyōkaimin no jinruigaku* 『漂海民の人類学』 (Anthropology of Sea Nomads). Tōkyō: Kōbundō.

Nora, Pierre (1989). "Between Memory and History. *Les Lieux de Mémoire*". *Representations*, 26, 7-24.

Pet-Soede, Lida; Cesar, Herman S.J.; Pet, J.S. (1999). "An Economic Analysis of Blast Fishing on Indonesian Coral Reefs". *Environmental Conservation*, 26(2), 83-93.

Pet-Soede, Lida; Erdmann, Mark V. (1998). "Blast Fishing in Southwest Sulawesi, Indonesia". *Naga, the ICLARM Quarterly*, 21(2), 4-9.

Sakai, Atsushi (1990). *Okinawa no Uminchu* 『沖縄の海人』 晶文社 (Okinawan Fishers). Tōkyō: Shobunsha.

Senkaku Shoto Bunken Shiryo Hensan Iinkai (2012). *Senkaku kenkyū Senkakushotō kaiiki no gyogyō ni kansuru chōsa hōkoku: Okinawa-ken no gyogyō kankei-sha ni taisuru kikitorichōsa 2012-nen* 『尖閣研究尖閣諸島海域の漁業に関する調査報告――沖縄県の漁業関係者に対する聞き取り調査 2012 年』 (A Report of Fisheries in Senkaku Waters: Interviews with Okinawan Fishers in 2012). Naha: Association for Documentation of the Senkaku Islands Issue.

Senkaku Shoto Bunken Shiryo Hensan Iinkai (2014). *Senkaku kenkyū Senkakushotō kaiiki no gyogyō ni kansuru chōsa hōkoku: Okinawa-ken no gyogyō kankei-sha ni taisuru kikitorichōsa 2014-nen* 『尖閣研究尖閣諸島海域の漁業に関する調査報告――沖縄県の漁業関係者に対する聞き取り調査 2014 年』 (A Report of Fisheries in Senkaku Waters: Interviews with Okinawan Fishers in 2014). Naha: Association for Documentation of the Senkaku Islands Issue.

Ueda, Fujio [1975] (1991). *Okinawa no uminchu: itoman gyomin no rekishi to Seikatsu* 『沖縄の海人―― 糸満漁民の歴史と生活』 (Okinawan Fishers: Historical and Quotidian Issues of the Itoman People). Naha: Okinawa Times.