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Arms Production Problems and Arms Export Companies in Prewar Japan: Focusing on the Roles of Taihei Kumiai and Showa Tsusho

By ATSUSHI KOKETSU*

This paper presents an analysis studies on the Japanese history of arms production problems from the 1920s to 1940s. In presenting and analyzing documents, we focused on Showa Tsusho. We analyzed the established purposes and expected roles of two arms export companies: Taihei Kumiai and Showa Tsusho. These companies were placed under the strong control of the Japanese army. Focusing on Showa Tsusho, we verified that the Japanese army developed policies for arms export and support. In the verification, we clarified the arms production problems that the Japanese army addressed. We also examined the fact that not only Japan but also Western countries, including Russia, the United Kingdom, France, and the United States, which were advanced countries in arms export, were extremely proactive in arms export in spite of the time of disarmament. The arms production problems could be described as "peacetime war." Thus, the proliferation of arms through arms production problems was part of the preparation for the next war.

1. Introduction: Prior Research and Problem Setting

The history of Japanese arms exports in the prewar period began in the early Meiji era.[1] This paper traces the historical development of arms production and import/export, that began in earnest during World War I (WWI). The purpose of this study was to examine the establishment of an independent arms production and export system from the following analytical perspectives: The study focused on the privatization of arms production, which was triggered by WWI, as a joint public-private issue and traced the actual situation of arms imports and exports from the Manchurian Incident (1931) to the beginning of the war against the United Kingdom, the United States, and the Netherlands (1941). In particular, it examined the role of the arms export trading companies Taihei Kumiai and Showa Tsusho, which were responsible for export operations under the control of the Japanese army, which led the arms export.[2]

* Researcher, Emeritus Professor, Institute for the History of Global Arms Transfer, Meiji University

[1]Special Appointment Professor, Meiji University (Research and Intellectual Property Organization, Visiting Fellow, International Institute for the History of Arms Transfer)

Masako Sakamoto writes in "Capital Exports to Europe and Arms Exports during the First World War (I-WWI) (I)" (Nagoya Keizai University Social Science Research Association, Sociological Review, No. 52, November 1991), "The first arms exports were made in 1901 when Mitsui & Co. exported 10,000 guns and 1 million rounds of live ammunition to Korea" (pp. 27-28).

[2] Arms exporting trading companies in Japan in the prewar period were not only Taihei Kumiai and Showa

I believe that the expansion of Japan's munitions industry, inspired by the generalization of warfare in WWI, resulted in the independence of weapons and the joining of the public and private sectors (privatization). The 1920s was a period of both military expansion and disarmament. It was also a time of conflict between arms expansion and disarmament. The main issue for analysis is the interconnectedness of the establishment of the arms production system through the enactment of the Military Industrial Mobilization Law and the role of trading companies specializing in arms exports, which supported this system from peacetime, as a means of specifically tracking the transformation of the arms production problem in Japan while influenced by such domestic and foreign circumstances.

First, in this paper, we summarize previous studies as references for examining this issue. We also mention some of the issues discussed and not discussed in these studies.

(1) Summary of Previous Studies by Akutagawa, Sakamoto, Nagoya, and Shibata

Tetsushi Akutagawa's "The Genealogy of Arms Exports: The Birth of the Taiheiyo Kumiai"[3] is probably the earliest work to focus on the actual state of arms exports in the prewar period and to discuss it as a subject of research. Akutagawa surmised that the Japanese government had a strong interest in arms exports since the early Meiji period. He clearly traced how the Japanese government initially exported unnecessary weapons to the Qing Empire and then expanded its arsenals to meet Russian requests for arms exports during WWI via the Sino-Japanese and Russo-Japanese Wars, as weapons production technology improved after the establishment of the military arsenal. Akutagawa consistently used "The Genealogy of Arms Exports" the title of his article, and left an important mark in the historical clarification of arms exports.

In Akutagawa's articles, he mentioned "Capital Exports to Europe and Arms Exports during World War I (1 & 2)"[4] by Masako Sakamoto, which elaborates on the military character of Japanese capitalism, especially after the analysis and historical introduction of "Capital Exports to Europe and Arms Exports during WWI(1&2)."[5] Sakamoto pointed out the historical fact that Japan exported arms that amounted to 100 million yen in 1915, the year after the start of WWI.[6] He stated that the Japanese army exported arms to Russia alone during the four years of WWI, totaling approximately 180 million yen, and that arms exports to the country amounted to 95% of Japan's total arms exports.

The Imperial Japanese Navy also exported a total of approximately 90 million yen worth of arms to the United Kingdom, France, and Russia. Sakamoto's article argued that the Japanese imperial army and navy, and the leadership of the Japanese government represented by Aritomo Yamagata were extremely active in arms exports and support to Russia to find a possibility of concluding the Japan-Russia alliance to replace the Anglo-

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Tsusho but were largely encompassed by these two trading companies,

Kishimoto Shoten and others were also positioned as arms-exporting trading companies in a broad sense. For more information on these companies, see Kiyoshi Nakagawa, "A Study of Trading Companies in the Meiji and Taisho Periods," Shiroogaku Daigaku Ronbunshu, Vol. 18, No. 2, 1994.

3 Military History (Vol. 21, No. 4 [Vol. 82], Kinshosha, September 1985, in *Military History Society*, ed.

4 Sakamoto's article, "Capital Exports to Europe and Arms Exports during World War I" (in Japanese), is published in "Zaibatsu and Imperialism | Mitsui and China | " (Minerva Shobo, 2003). Sakamoto published these and other articles in the book "Zaibatsu to Teikoku-shugi: Mitsui & Co. and China" (Minerva Shobo, 2003).

5 Same as above, Vol. 22, No. 4 [Vol. 88], March 1987.

6 Sakamoto, "Capital Exports to Europe and Arms Exports during World War I (1)," in The Review of Sociology, No. 52, November 1991, p. 24, edited by the Social Science Research Group of Nagoya University of Economics. Sakamoto states that Japanese arms exports began during the Sino-Japanese War (1894–1895) and became quite active after the Russo-Japanese War. Specifically, he stated that "Mitsui & Co. exported 10,000 guns and 1 million rounds of live ammunition to Korea in 1901, which was the first arms export" (pp. 27-28).

Japanese alliance. Sakamoto also made the important point that "arms exports during World War I were certainly carried out from the two aspects of maintaining the management of these military arsenals and foreign policy."[7] These two aspects are important issues to consider when discussing the issue of arms exports and transfers. This paper emphasizes these two aspects. On the basis of an elaborate economic historical approach, the political process of the period in question was also examined in this study to determine the reality of arms exports.

However, there is almost no mention of the fact that policies to overcome the marginal nature of arms production at military arsenals through legislation, such as the Munitions Industrial Mobilization Law, which was undertaken in Japan from WWI, were vigorously promoted. The Law for the Mobilization of the Munitions Industry and the Law for the Mobilization of the Automobile Industry should have been important policies that complemented the two aspects pointed out by Sakamoto. This point will be discussed in this paper.

Next is Nagoya Mitsugu's "Arms Export of Taiheiyo Kumiai."[8] Nagoya's paper clarifies the actual situation of the Taiheikumiai from its activities after WWI to its dissolution, which is not mentioned in Akutagawa Tetsushi's paper. In this respect Nagoya's paper plays an important connecting role. As to why the Taiheiyo Kumiai was established as an arms export trading company, he explained, "The advantage of the Army was that the union was an organization that did not have to get its hands dirty in the event of any scandals. Since arms exports had always been highly political in nature, it was a convenient way for Japan not to have to directly face the brunt of any problems if its position became an issue."[9] In the Conclusion section of the same paper, Nagoya cites three reasons for the dissolution of Taiheiyo Kumiai: its inability to keep up with the arms standards of Western arms-exporting countries, the enactment of the "Agreement on the Prohibition of Arms Exports to China," and its exclusion from the Manchukuo military exports, which had been the focus of attention as an arms export target.[10]

The article that I referred to most in the discussion of this paper is Yoshimasa Shibata's "Activities of the Army Military Mission Trading Company | Memorandum of Showa Tsusho Corporation."[11] Shibata identified the reason for the dissolution of Taihei Kumiai, which was that "the War Ministry decided to abolish the existing Taihei Kumiai in order to move toward the establishment of Showa Tsusho for the main purpose of exporting weapons to the occupied areas of China during the Sino-Japanese War."[12] The article also states that the reason for the establishment of Showa Tsusho was that "the military distributors' union did not handle weapons and other goods control unions in occupied territories that handled weapons were not established.[13]The reason for the establishment of Showa Tsusho was that "the military distributors' associations did not handle weapons and no other goods control associations in the occupied territories were to be established to handle weapons." Shibata demonstrated that Showa Tsusho was engaged in trade not limited to arms exports with a much wider range of regions and foreign countries than

7 Sakamoto, Maehara, "Capital Exports to Europe and Arms Exports during World War I (2)," p. 17.
8 "East Asia: History and Culture" (No. 16, March 2007, in Niigata University East Asian Studies Association, ed.).
9 Ibid. p. 8
10 Ibid. p. 15
11 China Studies Monthly, Vol. 58, No. 5, May 2004, edited and published by the Institute for Chinese Studies (in Japanese).
12 Ibid. p. 2
13 Ibid. p. 3

Taiheiyo Kumiai. In this sense, Showa Tsusho, a military trading company, had aspects other than arms, ranging from grain to opium, that could not be described simply as a trading company specializing in arms exports.

At the same time, "Showa Trading was involved not only in the export of the War Department's weapons to China, but also in the sale of weapons procured in Europe to the puppet governments in the occupied territories of China. This can be said to be a significant expansion of the scope of Showa Tsusho's conventional arms handling business not seen in the Taiheiyo Kumiai."[14] In other words, it points out the aspect of a general trading company that developed its business with the powerful backing of the army. In the military occupied areas of China, for example, "transactions of weapons and other items in Mongjiang were limited to Showa Trading, which was supported by the Ministry of the Army."[15] Showa Trading continued to occupy a monopolistic position, united with the army. The fact that Showa Tsusho was such a powerful organization can certainly be considered from the fact that when it competed with the Sino-Chinese Military Exchange and Supply Association (commonly known as the Military Distribution Association) in the area of grain procurement, it was ultimately to Showa Tsusho's advantage.[16]

As described earlier, Shibata's paper is noteworthy in that Showa Trading was deeply involved in general economic activities in the military-occupied administrative areas of China and redefined itself as an international trading company by opening branches not only in Europe but also in South America as a target region for arms exports. However, Shibata's paper focused too much on Showa Trading's role as an arms-exporting trading company and paid little attention to the actual status of arms imports. Although this may not be the purpose of Shibata's paper, it is necessary to take a comprehensive view of the actual situation of arms imports and exports, the reasons for their promotion, and the players in the arms industry to focus on the entire issue of arms production. This is one of the issues discussed in this paper.

Reading through Akutagawa's, Sakamoto's, Nagoya's, and Shibata's papers consistently, it is possible to grasp the actual situation and background of arms exports, aside from arms imports from the Sino-Japanese War period to the period of Japan's defeat in WWII. Thus, while learning much from these papers, this paper attempts to approach the issue of arms production from the following perspectives.[17]

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[14] Ibid. p. 7

[15] Ibid. p. 8

[16] Although Gunpai Kumiai was a powerful organization that entered businesses that competed with Showa Trading, it ultimately fell behind Showa Trading. There are not many studies on the Gunpai Kumiai, but I would like to cite "Chapter 3: Management and Enterprises in Japan's Occupied China: Section 2, Military Voucher Operations and the Gunpai Kumiai" (pp. 83-94) in Hideo Kobayashi's "'The Greater East Asia Co-prosperity Sphere' and Japanese Enterprises" (Shakai Hyoronsha, 2012). Although Shibata emphasized the overwhelming dominance of Showa Trading, the role of the Daimong Company, which played a decisive role in supplying weapons to the Mongolian regime, should not be ignored. In this connection, Hisao Mori noted that "[Daimong Kougyou] was still able to play a major role in areas that others could not imitate, such as weapons supply to the Mengkang regime, salt control, and distribution control of various important goods" (Mori, "Kwantungun's Inner Mongolia Operations and the Establishment of the Daimong Company," in "China 21," Vol. 31, ed. by the Modern Chinese Studies Association, Aichi University, May 2009, p. 67). (Mori, "Kwantung Army's Inner Mongolia Operations and the Establishment of the Daimong Company," in Chugoku 21, Volume 31, May 2009, p. 67). Mori's point suggests the possibility that some trading companies in China, including Daimong Corporation, may have been involved in supplying weapons (arms exports) in competition with Showa Trading, but this will also be an issue for future research.

[17] Although not directly related to this paper, the most detailed research results on the actual state of arms production at the army arsenals are Sato Shoichiro, "Rikugun Zoubei Arsenal and Reproduction Mechanism | An Analysis of the Army Arsenal Mechanism in the Disarmament Era | (1-4)" (Hosei University Management Society, ed. (Vol. 26, No. 2, Vol. 27, No. 1, Vol. 28, No. 4, Vol. 29, Nos. 1 and 2, 1989-1992) and Shiro Yamazaki,

(2) Location of the problem and establishment of the issue

The Japanese army continued to suffer from the dramatic depletion of artillery ammunition throughout the Russo-Japanese War (1904–1905). As the possibility of another Russo-Japanese war was discussed, it became keenly aware of the so-called artillery ammunition stockpiling problem. In the process, the question of expanding the arms production system in peacetime was raised again. In fact, it was clear that Japan's munitions production and procurement capabilities were inadequate during that period.[18]

For this reason, after WWI, the Japanese army and navy adopted a policy to broaden the base of the munitions industry through the Military Automobile Industry Subsidy Law (enacted on March 25, 1918, Law No. 15) and the Munitions Industry Mobilization Law (enacted on April 17, 1917, Law No. 38) that legally guaranteed the consignment of arms production to private companies in addition to existing military arsenals, and other measures. The direct impetus for this was the Military Industrial Mobilization Law. The direct impetus was an arms order from Russia during the Great War, as will be discussed later, but the lessons learned from this led to the consideration of establishing an arms export system that would permanently outsource arms production to private companies and guarantee a stable record of arms production. From there, the policy of arms exports to neighboring Asian countries such as China and Thailand came into consideration.

The arms production issue is not limited to the military and economic spheres but is also deeply related to the political and diplomatic spheres of promoting friendship and alliances with the exporting countries through arms. For example, the establishment of an alliance mediated by arms exports through the conclusion of the Japan-China Military Agreement is a symbolic case in point. The issue of arms production should be viewed in the context of the overall perspective. On the basis of this research perspective, by reading and understanding historical documents, this study examined the roles and positions of two trading companies specializing in arms exports, namely Taiheikumiai and Showa Tsusho, which promoted arms exports. The following points are unique to this paper.

First, after the Russo-Japanese War and across WWI, the privatization of the military industry was hastened under the slogan of a literal joint public-private partnership for China's arms export market in the 1920s. Probably in the expansion of the arms export market, the army, while showing a strong interest in arms exports from political and military perspectives, considered it difficult to fully delegate the task to private companies owing to the special nature of arms exports. Therefore, it allowed Taihei Kumiai and Showa Tsusho to operate under their control as trading companies specializing in arms exports. To make this possible, it was necessary to privatize the munitions industry through a joint public-private partnership while spreading the idea of total war as a concept that encompassed the entire industry. This paper will emphasize this point in particular.

The conventional studies of arms exports have tended to focus on the arms exports themselves as the objective and have been weak in their focus on the political process of building a total war system by enhancing the arms production system that underlies the

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"Rikugun Zoubei Arsenal to Gunsan Kogyo Kikinzoku [The Army Arsenal and Military Industrial Mobilization]" (Fukushima University Management Association, "Shogaku Ronbun," Vol. 62, No. 4, March 1994) are also cited as pioneering studies.

18 Regarding the level of Japan's munitions production system at the time of the Russo-Japanese War, Shino Oe wrote, "The technological basis of Japanese capitalism was too limited to cope with the changing nature of the war. Technically speaking, the production of weapons and ammunition, mainly firearms, which belonged to the precision machinery industry, was handled by the two artillery arsenals in Tokyo and Osaka for the Army, and by the naval arsenals and naval arsenals in Tokyo for the Navy" (Oe, Military Historical Study of the Russo-Japanese War, Iwanami Shoten, 1976, p. 401).

arms exports. Therefore, this paper proposes a more comprehensive view of the arms export issue as an arms production issue, with the construction of a total war system as its foundation.

With the fundamental background for the establishment of arms export trading companies under the control of the Japanese army, this study traces the actual situation in which the Japanese army increased its interest in arms production and import/export in the transformation of the war triggered by WWI, that is, from cabinet war to total warfare. At the same time, we will examine the actual state of arms production efforts in Japan, taking into account the enactment of the Military Industrial Mobilization Law, which was implemented to broaden the scope of arms production in Japan. The Japanese army, which was intent on increasing the interest in arms production and responding quickly to it, succeeded in privatizing the munition industry despite the repeated confrontations and compromises with private enterprises. This section examines the intentions behind the privatization of the munitions industry and the independence of weapons production during the period in question on the basis of the statements of managers who were actively involved in the privatization of the munitions industry. These points have not been mentioned in most previous studies.

Second, we will discuss the background of the establishment of Taiheiyo Kumiai and the Showa Trading Co., which were founded as organizations to implement Japan's arms export policy before and after the establishment of the military industrial mobilization system, as discussed in the first section. Although previous studies have discussed the issue from many aspects, they have hardly mentioned one issue. The key words are "weapons independence," "government-private sector collaboration," and "total war system." In addition, the enactment of the Military Vehicle Industry Subsidy Law and the Military Industrial Mobilization Law established laws to ensure weapons production and arms exports as part of the actual policy. This paper focused on the latter, emphasizing that this law was positioned as an indispensable legal development to overcome the inadequacy of arms production and exports that began in the early Meiji period.

Third, we will discuss the actual situation of arms imports in the early 1930s. The Imperial Japanese Navy was responsible for the arms trade with the United Kingdom. The fact that arms imports came to a standstill due to the Manchurian Incident was extremely painful for the navy, which had envisioned the improvement of weapons technology. It is possible that an arms import trading company under naval control may have intervened, but the navy had made statements denying the existence of an intermediary. Although it is difficult to credit this statement out of hand, we will introduce it in this paper as a quotation.

This paper, while focusing on the arms exports of Taiheiyo Kumiai and Showa Trade, attempts to approach the issue from military and political historical perspectives, and from the perspective of viewing the total history of arms imports and exports as an arms production issue.[19] The quoted historical documents were corrected to normal *kanji,* and

[19] While various names such as "arms," "weapons," and "equipment" are used interchangeably, the term "arms" is used, in principle, in this paper in the sense of an individual physical device. In addition, although it may not be necessary to repeat it, "arms transfers" in this paper refers to "the general phenomenon of the transfer of ownership and usage rights related to arms and arms technology beyond the domain of states and other international actors," and "arms exports" refers to "the sale overseas of arms, which are equipment used directly in combat." (The term "arms export" is used to refer to "the sale abroad of arms, which are equipment used for direct combat" [Kan Kawada and Hideki Ohata, International Dictionary of Political Economy, Tokyo Shoseki, 1933, pp. 553-554]). In this paper, we particularly mention the actual situation of arms exports to Thailand, which we treat as virtually synonymous with "arms support" and "arms aid."

punctuation marks were added as necessary to make them easier to read.

2. Background of the Growing Interest in Arms Exports

(1) Arms export requests from Russia

WWI, which began on July 28, 1914, was fought as an all-out war that required vast quantities of arms and ammunition that completely changed the form of warfare up to that point and literally determined the outcome of victory or defeat by the total power of the nation. Modern weapons such as submarines, aircrafts, tanks, and poison gas appeared on the battlefield one after another, expanding the battlefield to include not only land and sea but also air and sea.

As introduced in the summary of the previous study, Akutagawa stated that the Japanese army was already interested in arms exports from the early Meiji period and then revealed that Japan was unable to adequately respond to the enormous requests for arms imports from Russia under WWI. Akutagawa also pointed out that the Japanese army could not fully utilize the opportunities that existed for arms exports. It is assumed that the issue of not fully utilizing the best opportunities for arms exports led to the enactment of the Military Industrial Mobilization Law in 1917.[20]

Incidentally, the second Okuma Shigenobu Cabinet (established on April 16, 1914), led by the Ministry of Finance, conducted a survey of the political and economic systems of the countries that entered the war immediately after the outbreak of WWI. At the same time, the Okuma Cabinet launched an economic policy to promote the heavy and chemical industrialization of the Japanese economy, as the situation became apparent that Japan could not fully respond to the huge orders of military supplies from the participating countries.[21] As part of the policy to promote the heavy and chemical industries in the Japanese economy, the Chemical Industry Research Board (November 1914), the Economic Research Board (April 1916), and the Iron and Steel Industry Research Board (May 1916) were established one after another, and the Law to Encourage the Manufacture of Dyes and Pharmaceuticals (March 1915) was also enacted.

On April 29, 1916, as part of the heavy and chemical industrialization policy, Prime Minister Okuma gave the following instructions at the first meeting of the Economic Research Council. “The benefits Japan has received from the Great Rebellion in Europe have been considerable. The greatest benefits was the order for munitions. If only Japan had the manufacturing capacity, or could easily obtain raw materials, it could supply three or five times what it does today.”[22] The supply of these munitions will be of great benefit. To achieve this, he concluded, “I hope that the public and private sectors will work together to develop Japan’s postwar industry and economy.”[23]

In the midst of the all-out war, Russia and other European countries, which could no

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20 For Japan’s arms exports to Russia during WWI, see Eduard Baruishoff, “‘Japan-Russia Arms Alliance’ and Business Relations between Japan and Russia during World War I: The Case of Brinell & Kuznetsov Trading Company” (Shimane Center for Northeast Asian Area Studies, ed. No. 23, March 2012) and “The Background of Japan-Russia Military Cooperation during World War I: Mitsui & Co.’s Trade Strategy with Russia” (No. 21, March 2011).

21 See “On Investigating the Financial, Economic, and Social Conditions of European Countries” (Kobun Zasshosha, [National Archives of Japan], Taisho 5, Imperial Diet, Vol. 2, 24).

22 History of Commerce and Industry Policy, Vol. 4, 1961, p. 141, edited by the Ministry of International Trade and Industry.

23 Ibid., p. 144.

longer continue the war with their own weapons production alone, requested that Japan export arms. In response, the Japanese government proposed to the Imperial Diet to increase the working capital of the Tokyo and Osaka artillery arsenals to increase their production capacity. On December 22, 1915, the then Minister of War Ichinosuke Oka, who was in charge of explaining the purpose of the bill, said, "In response to the demand for arms during the recent war in Europe and North America, the demand for such arms is very great, so we will order Japan to increase the working capital. We have not even considered the quantity that we have dreamed of. We cannot possibly meet this large demand." He further stated the reality of the situation in a blunt manner.[24] Russia's orders for arms were enormous, with the volume of orders far exceeding Japan's arms production capacity during the period in question.[25] The total value of Japan's exports to Russia during the war reached 189.61 million yen.[26]

Meanwhile, the navy was also active in arms exports during the period under review. In this connection, on March 4, 1917, at the 40th meeting of the House of Representatives Accounts Committee, Hisatsuna Furuya, a member of the House of Representatives, asked, "Did the Navy sell the total amount of weapons to the Allied Powers?" He also stated, "In the relationship between the Ministry of the Navy and ally, the transfer was made and received, and an intermediary was inserted between the two".[27] The amount of 26 million yen is considerable, but this implies that no arms export trading company such as Taihei Kumiai was involved in the army. In other words, the Navy itself was responsible for exporting arms, rather than relying on arms export trading companies. Furthermore, he stated that unlike in the army, the proceeds of the sale were paid to the national treasury.

As symbolized by Russia's arms orders, the enhancement of the domestic munitions industry was strongly demanded by the military officers dispatched to the main battlefields in Europe to prepare for the all-out warfare that had become evident in WWI. WWI required war resources that far exceeded those of previous wars. The countries involved in the war saw this as the beginning of a full-scale form of warfare called total war; thus, they began to work on the thorough recognition of total war and the establishment of a total war system.[28] As part of this effort, Japan hurried to develop legislation, including the

[24] In Proceedings of the Imperial Diet, National Diet Library ("37th Session of the Imperial Diet, House of Representatives," Class V, No. 1, Minutes of the Committee for the Draft Law Concerning the Increase of Stationary Operating Capital of the Tokyo Artillery Arsenal and Osaka Infantry Arsenal, 2nd Session, December 22, 1915, p. 9).

[25] According to the Akutagawa article, Japan's arms exports to Britain, France, and Russia during the war took three forms: sales of arms, consignment manufacture of arms, and free gifts of arms, amounting to 11.24 million yen in sales proceeds, 39.76 million yen in total manufacturing costs, and approximately 1.085 million yen in free gifts of arms (Akutagawa, Tetsushi, "Arms Export Genealogy [continued] Arms Exports during World War I" (Military History, Vol. 22, No. 4, March 1987, p. 33). Furthermore, the actual amount of arms exports to China during the period from November 1917 to November 1918 totaled 17 million yen (Tetsushi Akutagawa, "Arms Exports to China during World War I" (Military History, Vol. 28, No. 2, September 1992, p. 71).

[26] Minister of War Kenichi Oshima answered a question from Representative Buntaro Kashiwabara at a meeting of the House of Representatives Accounts Committee on March 4, 1918: "(The amount of arms exported to Russia) was 180 million yen, starting on December 23, 1914, and for the next four years and for the last two years, it was more than 105 million yen, The amount for the last two years is 105 million yen, and the amount for the next five and six years is 189.61 million yen" (Imperial Diet Proceedings, 40th Session of the Imperial Diet, House of Representatives, Class II, No. 1, Minutes of the Accounts Committee, 6th Session, March 4, 1918, p. 48, National Diet Library).

[27] Ibid. p. 49

[28] KOKETSU has long been engaged in the study of the total war system, the first of which was "Total War System Study: The National Mobilization Concept of the Japanese Army" (Sanichi Shobo, 1991), which was later reprinted by Shakai Hyoronsha in 2010 and again by the company in 2018. In addition, the political process of the establishment of the total war system in prewar Japan was published in Issue 6 of this journal (September 2017) as "Total War and Japan: Reality and Limitation of the Establishment of the Japanese Total War System.

privatization of its munitions industry, which could respond to domestic and foreign arms orders.[29]

The military industrial mobilization system was to be based on a production and supply system centered on military arsenals and a requisition order (enacted in August 1882) for existing materials and personnel, and the establishment of an industrial mobilization system capable of mass production of military supplies during both peace and war. Therefore, the military industrial mobilization system was to be constructed not only by the army, navy, and business community but also by the bureaucracy, political parties, academia, and other forces as a whole. In this sense, WWI had a major impact on the expansion of the munitions industry and the state of postwar economic management. The government, business community, bureaucracy, political parties, and so on joined together and became keenly aware of the common task of preparing for the coming all-out war.

More specifically, the advent of modern weapons such as aircrafts, submarines, tanks, and poison gas, and the enormous consumption of ammunition and fuel led the domestic industry to move toward heavy and chemical industries. However, the business community was not aggressive in expanding the military industry from the beginning. Although the business community intended to enter the Asian market in the future while competing with Europe and the United States in the heavy and chemical industry sector, they did not necessarily have a clear idea of what kind of profits they could secure by doing so.

While the land, navy, and business worlds were in competition and confrontation over the military industrial mobilization policy in the process, the establishment of a military industrial mobilization system that could respond to the total war phase was a goal that could be shared and achieved. Finally, coordination between the land and naval forces was sought, and a relationship based on cooperation was established. From the end of the war, a considerable degree of consensus was formed between the military and the business communities, with the enactment of the Munitions Industrial Mobilization Law as one culmination. In other words, the military and the business world were forced to enter into a mutually complementary or cooperative relationship over the mobilization of the munitions industry, even though both sides had their own agendas.[30]

Total War System" in Issue 6 of this journal (September 2017).

29 When asked about the army's efforts to ease the manufacture of weapons in the private sector at the 37th session of the House of Representatives of the Imperial Diet, the "Committee on the Draft Law Concerning the Increase of Installed Operating Capital at the Tokyo Artillery Arsenal and Osaka Infantry Arsenal," Minister of War Oka said, "The government has not prohibited weapons manufacturing in any particular way (omitted). There is no law prohibiting the manufacture of weapons; that is the fact, but if there are people who can do it, they will do it, and I have just told you about it today and in the future." The 37th Imperial Diet Session, House of Representatives, No. 5, No. 1, Minutes of the Committee for the Draft Law Concerning the Increase of Installed Operating Capital for the Tokyo Artillery Arsenal and Osaka Infantry Arsenal, 2nd Session, December 22, 1915, p. 9), implying that preparations were underway within the army for the consignment of munitions industry to the private sector.

30 For example, Tatsudo (pen name) wrote, "Industrial mobilization has given a kind of benefit to our industrialists" ("Kogyo kinzoku kinin mobilization no michi to hikaku," Kogyo Zasshi, Vol. 48, No. 626, April 20, 1918, p. 411). Other articles of a similar nature include "Kogyo Sensen ni taisuru Nihon no Kanten (Japan's Position on the Industrial War)" by Raita Tomiyama (President of the Japan Chamber of Commerce and Industry) (Jitsugyo no Nihon, Vol. 21, No. 18, September 1918), "The Defects of Private Steel Industry and its Promotion Measures" by Kaichiro Imaizumi (Chairman of the Japan Iron and Steel Association) (Zaisei Jiho, Vol. 3, No. 5, May 1916), and "Kogyo Senso no Kikan ni taisuru Nihon no Kanten" by Ginjiro Fujiwara (President of Oji Paper Co. Fujiwara Ginjiro (President of Oji Paper Co., Ltd.), "Wartime Industry and Protection and Encouragement" (Kokusan Jiho, May 1918). In addition to those from the business world, there are also Eimitsu Kurakawa (Director, Industry Division, Ministry of Agriculture and Commerce), "Discussion on the Trends of Industry in Wartime" (Shoko Jiho, Vol. 5, No. 4, April 1919); Chikara Katsuta (Minister of Finance), "The European War and Our Finances" (Jiyu Hyoron, Vol. 5, No. 12); Tatsuo Morito (Assistant Professor, Faculty of Economics, Tokyo Imperial University), "Economic Nationalism and Economic Life" (Keizai Mochiron, Vol. 1, April 1919).

The army's urgent task during the general war phase was to establish a munition production system that could withstand the massive consumption of munitions (ammunition, gunpowder, weapons, military provisions, military clothing, etc.). The army had learned from its research and study of the wartime economic and political systems of the participating countries that this was an essential condition for victory in a total war. On December 27, 1915, the year after the outbreak of the war, the army established a temporary military investigation committee (chairman: Shoichi Kanno) within the Ministry of War to investigate and research the wartime domestic mobilization systems of the European countries involved in the war and to ascertain the actual status of Japan's domestic munitions production capacity.[31]

(2) "Weapons Independence" and "Public-Private Partnership"

The concept of the army's munitions industrial mobilization system for the period under review, on the basis of the results of various research organizations, is summarized in the "Industrial Mobilization Outline" prepared by the Provisional Military Research Committee. The fifth item in the outline stated that "in order to achieve complete weapons independence throughout the war, it is essential to secure basic raw materials, especially iron and coal, and to study and disseminate measures for joint government-private sector self-sufficiency."[32] The Japanese army and navy have been highly dependent on foreign weapons, from warships to rifles, and this has been a consistent concern. This is because it was thought that "weapons independence," or independence in arms production, was an indispensable condition for becoming a completely "weapons independent" country and therefore a matter of course. At the same time, securing weapons production technology through "weapons independence" was an issue directly related to the realization of military expansion. In this sense, the industrial mobilization was also an attempt to militarize the Japanese economy, that is, to transform it into an economic structure with national defense at its core (i.e., a national defense economy); to establish centralized control of each administrative agency under the command and order of the Supreme Command; to make arms production independent; to prepare for joint public-private self-sufficiency measures aimed at securing resources, among others; and to promote the military. The government and private sector will work together to prepare for self-sufficiency measures aimed at securing resources and to establish centralized control of each administrative agency under the command and direction of the Supreme Commander.

This concept was to be accomplished not only by the army but literally by the entire nation. Therefore, the army actively sought the support and cooperation of other organizations and forces. In January 1918, the army established an ad hoc military investigation committee to further investigate and grasp the level of munition production capacity as a practical task for the time being.

An indispensable issue in the development of the munitions industry mobilization system was the expansion of the base of the munitions production sector. Until the end of WWII, the munitions industry was based in government-owned factories, mainly army and navy arsenals, and production was outsourced to private factories and companies in extremely

(Keizai Mochiron, Vol. 1, No. 2, February 1917), and Kakutaro Miyake (Major in the Army), "The First Lesson of Our People Learned from the European War" (Dai Nihon, Vol. 5, No. 8, August 1918).

31 For more information on the Temporary Military Investigation Commission, see Koketsu, "Temporary Military Investigation Commission's Duties," in "Seiji Keizai Shigaku," No. 174 (February 1980).

32 Temporary Military Investigation Commission, "Temporary Military Investigation Commissioners' Second Annual Report" [Defense Agency Defense Training Collection] (January 20, 1918, p. 267).

small quantities. The possible reasons for this include the low level of civilian industry and technology in the munitions industry and the difficulty of transferring weapons manufacturing technology. However, the lessons of the Great War suggested the urgent need for the development of production technology for more advanced weapons and ammunition on a national scale, and the mass production and stockpiling of these weapons and ammunition. The army and navy were fully aware of the importance of a joint public-private all-out war system based on surveys and studies of the mobilization of munition industries in the countries that participated in the war.

On March 26, 1917, Colonel Toyohiko Yoshida gave the speech "Hopes for the Instrumental Industry from a Military Perspective" at a meeting of the Cabinet Economic Research Division's Special Committee on Industrial Proposal No. 2. I believe that it is essential for both the public and private sectors to devote all their energies to conducting in-depth research on how to find a point of harmony between defense and industry or, to put it another way, how to find a correlation between the military and civilian industries, and how to adapt to military requirements. I believe that it is most necessary for both the public and private sectors to devote all their energies to this task and carry out thorough research.[33] He also called for a "correlation between military industry and civilian industry." The reason for this was the recognition that total warfare would force the mass production and stockpiling of weapons.[34]

A year later, Yoshida wrote, "The difficulties in the manufacture of weapons, and the difference in demand between peacetime and wartime, is so great that it is difficult to imagine in peacetime, which is why I have heard of the promotion of privatization of weapons." The promotion of arms privatization was a countermeasure to the total war that was expected to erupt in the future, and he stressed the need for collaboration, technical cooperation, joint development, and research between private and government factories, even in peacetime, to improve Japan's industrial production capacity level.

Army Artillery Major Yoshikazu Suzumura, who was in the Ordnance Bureau of the Ministry of the Army, also shared Yoshida's view, stating that "the first and foremost requirement for industrial mobilization is to regulate the relationship between private factories and the government."[35] He believed that to implement a wide range of military industrial mobilization, it was necessary to improve the munition production capacity of private factories. In doing so, the government should establish a system of production management, control, and requisitioning of civilian factories under the authority of the government as a precondition. This was directly reflected in the Military Industrial Mobilization Law. From this point of view, it became clear that the main issue after the enactment of the law was the establishment of a system aimed at realizing a joint public-private partnership.[36]

For example, during the general war phase, Army Artillery Lieutenant Colonel Hyosaburo

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33 Documents of the Committee for Various Investigations [Speeches], *National Archives of Japan*, Vol. 36, p. 5.

34 Toyohiko Yoshida, "Hopes for Japanese Industrialists," *European War Facts*, No. 99, May 25, 1917, p. 67.

35 Yoshikazu Suzumura, "Kogyo Kikinzoku (Industrial Mobilization)," *Kaiyosha Kibo*, No. 524, Supplement, March 1918, p. 18.

36 Hyosaburo Kondo, "Kogyo kinzoku kinzoku no seidan no kyoryoku ni okeru kanryo ni tsuite (On the cooperation between the public and private sectors from the viewpoint of preparing for industrial mobilization in peacetime)" (same right, No. 537, Supplement, May 1919, p. 6). In addition, Kusuzo Tsujimura (Chief of Army Accounting), "Operation of the Industrial Mobilization Law and the Munitions Industry," wrote about the intent behind the enactment of the law: "It is based on the spirit of prompt and smooth implementation of the supply of munitions (goods) through united government and private sector cooperation" (*Kinyu Keizai Jiho*, Vol. 5, No. 4, April 1918, p. 30).

Kondo stated that "it is the most urgent time to privatize a part of the weaponry in peacetime." To overcome the low level of weapons production technology in private factories, which had been a concern when privatizing weapons, he advocated the secondment of engineers from the army and navy. This clearly showed that technological cooperation between the military and the private sector was indispensable for the mobilization of the munitions industry.

The navy, on the other hand, was also strongly interested in joint public-private partnerships and the privatization of weapons production.[37] For example, Lieutenant General Takeda Hideo, Commander of the Naval Agency, emphasized the creation of a public-private cooperative system, stating that "no matter how complete the mobilization laws are, they will never reach their great purpose unless the public and private sectors open their hearts to each other and believe in each other and work together in the cause of national defense". In the same vein, Kageyama Noboru (Director of Kogyo no Dainippon Sha) stated that "it is necessary to open up the private sector to the private sector and manage it."[38] There were many influential figures who advocated the improvement of civilian weapons production technology and the establishment of a production system during peacetime.

The momentum for the privatization of weapons as part of the public-private partnership was strong not only among the military and financial sectors but also among scholars who served on government committees as planners for the expansion of the iron and steel industry.[39] For example, Masatoshi Okochi, a professor at the Tokyo Imperial University of Technology (in charge of the first course in military engineering) and a member of the Committee on Steel Industry Research, stated that "we must realize that the privatization of weapons is a serious national defense problem that concerns the very survival and safety of the nation itself, which now touches the lives of the people." The business community's argument was that the promotion of the heavy and chemical industries was the catalyst for the privatization of weapons" and that it was necessary to place the enhancement of national defense as the fundamental factor in the privatization of weapons production.

It was the view that the goal and content of arms privatization should be defined by national and military considerations, such as the enhancement of national defense, and not by the primary pursuit of capitalist profit. Kakichi Uchida, Vice Minister of Communications, stated that "since this is a war of the people, the people should take the responsibility of manufacturing and supplying the necessary munitions themselves."[40]

In the process of establishing the military industrial mobilization system, the issues of self-sufficiency, resources, and the joint public-private sector, which were to become points of contention between the military and business, were defined by the political and economic structures of Japan during that period, but there was a great possibility that the military, business, and government would find a point of agreement on all these issues. The enactment of the Military Industrial Mobilization Law was indeed a legal expression of this.[41] The historical background for the establishment of the munitions industrial system,

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37 Hideo Takeda, "Impressions on Military Mobilization," *Dainippon*, Vol. 5, No. 11, November 1918, p. 22.

38 Noboru Kageyama, "Guns and Munitions Industrial Mobilization Bill" (*Kogyo no Dainippon*, Vol. 15, No. 4, April 1, 1918, p. 2).

39 Masatoshi Okochi, "Arms Privatization Aiding Theory," *Jiji Shinpo*, No. 11629, January 4, 1916.

40 Yoshikichi Uchida, "On the Military Industrial Mobilization Law" (*Jitsugyo no Sekai*, Vol. 15, No. 7, April 1, 1918, p. 12).

41 Masatoshi Okochi proposed the establishment of a Ministry of Industry, independent of both sides, as an organization that would coordinate and unify the production of munitions, with both military and financial sectors working together. See Okochi, "Preparations for Industrial Mobilization: The Greatest Urgent Need to

which was based on a variety of arguments, was, above all, the urgent domestic and international situation in which the production and export of arms had become an urgent policy issue since WWI.

3. Arms Export Issues Before and After WWI: The Role of Taiheiyo Kumiai

(1) Response to Arms Exports

The same situation had already emerged after the Russo-Japanese War, which preceded WWI, when Prime Minister Okuma was concerned about responding to "orders for military supplies." During that period, especially around the time of the Xinhai Revolution, China was attracting attention as a market for arms exports, and the Japanese government was also boldly working to establish a framework for arms exports. Therefore, on June 4, 1908 (Meiji 41), three years after the end of the Russo-Japanese War, Masatake Terauchi, then Minister of War, ordered the establishment of the Taihei Kumiai, a joint venture of Takata Shokai, Okura-gumi, and Mitsui & Co. The company was to take charge of the arms export business. During the Russo-Japanese War, Japan's arms production was financed by expanding the scale of its military arsenals in Tokyo, Osaka, and other cities. However, the end of the war left Japan with a saturated arms production and stockpile, and the country was looking to China and Thailand as its main arms export markets to maintain its weapons production and stockpile, and to secure working capital for its artillery arsenals.

As an indication of this, the Ministry of Foreign Affairs' historical document "Taiheiyo Kumiai ni Kansuru Koto" (April 1, 1925, Morishima) clearly states that it was established "for the purpose of exporting arms to other countries."[42] The association was then repeatedly extended for three more terms until the end of the Taisho era. Each contract was concluded in accordance with the terms and conditions of the orders of the Minister of War, indicating that the Taiheiyo Kumiai was in effect the "Imperial Retirement Organization" of the Japanese Army itself. This means that Japan's arms export business was placed under the control of the Japanese army. The document also stated that "from the end of 1917 to the spring of 1919, about 30 million yen in arms were supplied"[43] against the backdrop of the Terauchi Cabinet's aid policy to the Duan Qirui regime in China, especially during the second contract. After WWI, a decrease in arms exports became apparent. At the time, the Terauchi Cabinet's policy of supporting the Duan Qirui administration was manifested in the form of an increase in arms exports. In this sense, the increase or decrease in the amount of arms exports visualizes the actual state of diplomatic relations with the target country, and this, in itself, is an important approach to the study of the history of arms transfers.

In the Showa period (1926–1989), there was continuous communication between the army and the Taihei Kumiai regarding the continuation of the union. For example, in the "Regarding the Continuation of the Taihei Kumiai" (Mikiretsu No. 408, received June 18, 1930), an "application"[44] was submitted to the War Ministry under the joint names of

Establish the Ministry of Industry and Trade and Other Urgent Needs" (*Taiyo*, Vol. 24, No. 1, p. 109).

42 Japan Center for Asian Historical Records (hereafter, JACAR): Reference Code (Ref) B03030302100 REEL No. 1-0089 ("Records of the Ministry of Foreign Affairs in the Prewar Period," Ministry of Foreign Affairs Archives), p. 491. The number of pages at the end was added by JACAR for organizational purposes. The reference code beginning with B indicates that the item is owned by the Ministry of Foreign Affairs Archives, while C indicates that it is owned by the National Institute for Defense Studies, Ministry of Defense.

43 Ibid. p. 492

44 Same as that on the right, Ref. C01003813900 (in the collection of the National Institute for Defense

Morinosuke Mitsui, President and Representative Director of Mitsui & Co. The request for the continuation of Taihei Kumiai was made under circumstances in which the number of trading companies that participated in the association was not expected to increase, perhaps owing to the decline in the total amount of arms exports since the start of the Showa period. Although the letter is in the form of a "request" from Taiheiyo Kumiai, it cannot be taken at face value. Needless to say, the army's desire to advance its arms export policy was in the background. A material to prove this is entitled "Opinion"[45] in the "Reorganization of the Taiping Union," which was presented by the Ordnance Bureau of the Army Ministry on the same day. There was a statement indicating a strong sense of crisis about the current state of Taiheiyo Kumiai. This was at a time when party politics was gaining momentum, criticism of the military was developing, and momentum for disarmament was being fostered in public opinion. At this point, to break through the current situation, the establishment of a new organization to replace Taiheiyo Kumiai was beginning to be considered within the army, centering on the Ordnance Bureau. In addition, the text of the letter indicated a will to require a more thorough control by the army as a measure to leverage arms export trading companies.

Behind the call for the establishment of the new organization was the dissatisfaction of the army authorities with Taiheiyo Kumiai. This can be seen from the fact that while the reason for the dissatisfaction was due to the way weapons from foreign countries were ordered, it was also pointed out that "most orders from the union were not completed within one year of receipt, but many took several years" ("Reference for Explanation of Reorganization of Taiheiyo Kumiai").[46] As an example of this, the report states that it took one year four months from the start of the order to the completion of delivery of type 3 infantry rifles and bayonets, "weapons to be paid for by China." In Thailand, it took four years from the start of the order to the completion of delivery for the export of standard rifles and packets. From the perspective of arms export competition with other countries, these delays were considered a serious problem by the army authorities.

However, the situation was not conducive to proceeding at once to the establishment of a new organization. In a letter dated June 21, 1930, from the Vice Minister of the Army to the Director General of the Army Arsenal, with the subject "Concerning the Continuation of the Taiheiyo Kumiai," it was stated that the association would be continued for one year from the expiration date of the letter. The letter stated that the continuation of the union would be approved within one year of the expiration date. The document titled "Concerning the Sale of Weapons to Foreign Countries" (June 19, 1930, Firearms Division)[47] gives six reasons for the continuation. The content of the document was to confirm once again where the role of arms-exporting trading companies lies. It stated that arms-exporting countries, particularly Britain and France, are increasingly moving to export arms to China and that to keep up with them, it is essential to enhance arms export policies; for this reason, it is hoped that more trading companies will join Taiheiyo Kumiai.[48]

Studies, Ministry of Defense: "Secret University Diary" of the Ministry of the Army, 1928, Vol. 3, p. 1426).

45 Ibid. pp. 1428-2429

46 Ibid. p. 1430

47 Ibid. pp. 1452-1453

48 In "The Army and Weapons Production after the Russo-Japanese War," Noritaka Ikeda argued that "it can be said that the Taiheikumiai eliminated competition among domestic trading companies over the sale of weapons, unified the sales organization, and created a system to compete with German trading companies by bringing together the public (military) and private sectors" (*The Land System Historical Society*, Vol. 29, No. 2 [Vol. 114, No. 2], January 1987, p. 41), emphasizing that this was a measure to deal with export competition with German trading companies.

The document, which was presented the year before the outbreak of the Manchurian Incident, shows that while public opinion called for disarmament during the period in question, policies were being pushed forward to achieve results in arms exports. The document reveals the intention of trying to penetrate China's influence through arms exports and to strengthen the domestic arms production system, as if in defiance of public opinion for disarmament. In particular, it is thought that the Japanese army was accumulating a backlash against the anti-military stance of the Minsei Cabinet, encouraged by public opinion toward disarmament, which led to the Manchurian Incident, which could be described as a coup d'état abroad. This arms export policy was being leveraged as a measure to steer the country toward a course of military expansion.

Next, an overview of the actual situation of arms exports by major countries is given in the "Arms Export Prohibition Issue," prepared by the Second Division of the Research Department of the Ministry of Foreign Affairs in January 1935.[49] The figures are quoted from the "Arms Export Prohibition Issue," prepared by the Second Division of the Research Department of the Ministry of Foreign Affairs in January 1935. In 1930, the top 10 countries, led by the United Kingdom, accounted for 90% of the total world munition industrial output, and the top 10 countries accounted for 90% of total world exports. The following table shows the ranking and share. The rankings and percentages of shares are shown below: first place, the United Kingdom at 30.8%; second place, France at 12.9%; third place, the United States at 11.7%; fourth place, the Czech Republic at 9.6%; fifth place, Sweden at 7.8%; sixth place, Italy at 6.8%; seventh place, the Netherlands at 5.4%; eighth place, Belgium at 4.4%; ninth place, Denmark at 1.9%; tenth place, Japan at 1.9%. It is clear here that Japan's share of the world's tenth position was less than 2% of the world's total. This indicates the low level of Japan's munitions industry production capacity. It is assumed that this was the reason why the Japanese army in particular was keenly aware of the need to increase arms exports to revitalize the munitions industry.

(2) Arms Imports by the Japanese Navy Before and After the Manchurian Incident

In the course of summarizing the issue of arms imports and exports before and after the Manchurian Incident, we first introduce the actual state of arms imports by the Imperial Japanese Navy, a topic that has rarely been addressed in previous studies. To know what kind of arms imports Japan was carrying out during the relevant period, the document "Regarding the Prohibition of Arms Exports to the United States" (dated March 13, 1933, Navy Warship Administration Headquarters, General Affairs Department, Section 2)[50] is a good source of reference. The actual number of arms imports made by the Imperial Japanese Navy is listed in various versions of the document, some of which are quoted below.

First, the countries from which arms were imported and the amounts purchased for 1930, 1931, and 1932 are shown below. The following is the total import value, the top three countries, and the number of cases and value handled for each fiscal year. The figures in parentheses indicate the number of cases. and the value for each fiscal year: in FY1930, the total value was 2,412,670 yen, with the United Kingdom (22) accounting for 2,273,963 yen; Switzerland (3), for 35,918 yen; and Germany (4), for 21,999 yen. In FY1931, the total value was 2,246,656 yen, with England (18) accounting for 1,226,637 yen; France (6),

49 Same as above, Ref. B1007038030 (Diplomatic Archives of the Ministry of Foreign Affairs, "The Issue of the Arms Export Ban," prepared by the Research Department of the Ministry of Foreign Affairs [Chou No. 21/1935, pp. 017-018]).

50 Ibid. Ref. C05022716800 (Department of the Navy, "Official Remarks," 1933, p. 0170).

for 820,794 yen; and the United States (9), for 87,484 yen. In 1932, the total was 7,104,041 yen, with France (11) accounting for 3,090,869 yen; England (16), for 2,310,728 yen; and Germany (11), for 1,139,204 yen.

After the Manchurian Incident, the figures showed a sharp increase in imports in proportion to the increased use of arms and ammunition as the warfront expanded. The main import partners were the United Kingdom and France. The fact that France exceeded the United Kingdom in import value in the year following the Manchurian Incident can be interpreted to mean that the attitude toward Japan, which caused the Manchurian Incident, was also reflected in the import value. In other words, both countries, represented by the United Kingdom and France, which are permanent members of the League of Nations, took a tough stance toward the Manchurian Incident. Although the report of the so-called Lytton Inquiry, led by Lord Lytton of the United Kingdom, was conciliatory toward Japan, the United Kingdom was more cautious toward Japan than France, which also resulted in the following: This is also the reason why France ranked highest in terms of arms imports and exports. This point also shows that arms imports and exports were influenced by political relations with the countries to which the arms were exported during the relevant period.

Next, we introduce examples of arms import items. The following is a list of the types of weapons imported from the United Kingdom for use by the Imperial Japanese Navy in FY1931. (The numbers in parentheses are quantities, and the numbers below are prices in yen.)[51]

Ru-type 7.7-mm machine gun (3 guns)	5, 418
Ru-type 7.7-mm swivel machine gun (107 guns)	14,746.5
Aviation paanja machine gun (2 guns)	3, 358
Ru-type 7.7-mm machine gun (70 guns)	136, 293
Ordinary ammunition packets for the same (3,508,000)	174,519
Towing ammunition packet for the same use (402,000)	49,771
Ru-type 12.0-mm machine gun (23 guns)	169, 605
Ordinary ammunition packets for the same use (55,000 pieces)	20,600
Towing ammunition packets for the same use (5,000 pieces)	4,039
Ditto 40.0-mm machine gun (10 guns)	22, 346
Ordinary ammunition packets for the same (6,500 pieces)	7,023
Towing ammunition packets for the same use (3,500 pieces)	31,293
Projectile guns (shoulder-mounted) (35 guns)	8,081
Cardenroid light tanks (6 units)	61, 468
Ru-type C・T・A 10-mm copper plate (40 tons)	51, 634
High-voice telephone (9 pieces)	947
Lauderhoofon (a pair)	1, 034

The total amount of the items was 1,226,657 yen. From the contents of these arms, we can see how the Japanese Imperial Navy at that time focused on arms imports. These arms imports were ordered by the Imperial Japanese Navy, and it is unlikely that Taiheiyo Kumiai or Showa Tsusho were involved. This point will be discussed later.

Other historical data are quoted from the same document. From “Foreign Arms in Fiscal Year 1931,” the following are listed in order of import value by country: the United Kingdom (1,253,713 yen), followed by France (822,881 yen), the United States (209,245

[51] Ibid. p. 0110

yen), Germany (101,021 yen), Sweden (53,839 yen), Italy (28,000 yen), and Switzerland (5,626 yen). The total amount was 2,474,325 yen. Although the figures are slightly different from those in the aforementioned historical records, they are almost the same. It is safe to conclude that the amount of arms imports generally represents the actual situation.

The weapons included gun machine and machine-gun ammunition, pistols and pistol bullets, instruments, and airplane parts.[52] The types and values of the weapons for FY1930 are as follows: guns and machine gun ammunition, around 1,050,000 yen; main gun bullets, 500,000 yen; mines, 270,000 yen; aircraft parts and instruments, 400,000 yen; and others, 580,000 yen, for a total of around 2,800,000 yen.[53] Looking at imports alone, the position of the United Kingdom up to the outbreak of the Manchurian Incident was extremely large. The United Kingdom was the world's largest exporter of arms during that period, and by strengthening its economic and military relations with partner countries through its arms exports, it thoroughly promoted its hegemony and positioned itself as the leader of the international order. Arms exports were, in this sense, a visible political act that demonstrated the will and direction of the nation.

The Ministry of Foreign Affairs compiled "Miscellaneous Matters Related to Arms Export Control in Each Country on the Occasion of the Manchurian Incident"[54] to explain such Western attitudes. For example, the section entitled "Lifting of the Arms Embargo on Arms Exports to Japan and China," states that "When the British government announced on February 27 that it would lift the arms embargo on arms exports to Japan and China, some British newspapers expressed their approval of the government's measures, but many others stated that the measures were ineffective and that it was unfair that Japan and China were treated equally." However, many newspapers published criticisms against the government's measures on the grounds that they were ineffective and that it was unfair to treat both Japan and China equally. The main ones are as follows[55]: *The London Times* (February 28, 1932), *The Daily Express* (February 28, 1932), *The Morning Post* (February 28, 1932), *The Manchester Guardian* (February 28, 1932), *The Daily Telegraph* (March 3, 1932), *The Evening Standard* (March 3, 1932), and the *Daily Mail* (March 4).

The London Times, for example, introduced an argument that it was irrational to be complicit with one of the warring parties, saying, "It would be unfair to treat the victim, China, in the same way as Japan, but it is quite reasonable for the British Foreign Minister, who is now acting alone on this point, to admonish that it is difficult in practice to make a distinction between the belligerents. *The Daily Express* also introduced an argument that explained the irrationality of being complicit with one of the warring parties. It (February 28) also stated that "We are not a people who are averse to war, but we do not believe that an arms embargo will end the war. No matter what kind of arms embargo agreement is reached, it will not stop the conflict between Japan and China. The only effect of the government's embargo policy will be to further increase the number of unemployed people in the U.K." The argument against the embargo policy from the perspective of its effect on the economic life of the British people was that it would ultimately result in an increase in unemployment. The media in the United Kingdom were highly critical of the arms export ban adopted by the British government, with some arguing that it would have a negative

52 Ibid. p. 0111
53 Ibid. p. 0137
54 Same as above, Ref. B04010625000 (Records of the Ministry of Foreign Affairs in the Prewar Period, Military Section 9, Arms, Ammunition, Aircraft, Supplies, Arms Export Control in Countries on the Occasion of the Manchurian Incident, unpaged).
55 Ibid. p. 0368

impact on friendly relations between the United Kingdom and Japan.

Perhaps in response to these developments in British public opinion, the British government adopted a conciliatory attitude toward the arms transfer issue. The same explanation is given in the same Ministry of Foreign Affairs document 2.[56] In short, the British government stated that the temporary arms export ban was a kind of "gesture" in response to the anti-arms export movement and that its true intention was "not to damage friendly relations between Japan and China, and under no circumstances to get involved in the middle of a conflict, to the extent of avoiding it." In short, it was a decision to avoid getting involved in conflicts, which would be beneficial both for securing profits from arms exports and for preventing unemployment.

4. The Role of Showa Trade and the Japanese Army

(1) Establishment of Showa Trading Co.

During WWI, the Taiheiyo Kumiai exported more than 10 million rifles to the United Kingdom and Russia. However, when a downward trend in arms exports became apparent, Takata Shokai left the association and was replaced by Mitsubishi Shoji, which had Mitsubishi Heavy Industries, a manufacturer of aircraft and armored vehicles, under its umbrella. Takata Shokai took this opportunity to change its name to Showa Tsusho. Showa Tsusho (formally known as Showa Trading Co., Ltd.) was established on April 20, 1939, at the behest of Colonel Gao Iwakabe, Director of the Military Affairs Division of the Ministry of War. Unlike Taihei Kumiai, the Ministry of War took control of all aspects of the company's operations, including the authority to direct and supervise operations and personnel affairs, further strengthening its character as an arms export trading company under the direct control of the Ministry of War.

According to "Showa Tsusho Kabushiki Kaisha ni Kansuru Koto," the army issued a notice encouraging the aggressive export of arms overseas to thoroughly promote the role of Showa Tsusho. For example, Minister of the Army Seishiro Itagaki issued the "Instruction to the Showa Trading Corporation" on July 27, 1939, to all units concerned.[57] The letter clearly stated the purpose of establishing Showa Shoji: "In view of the current situation, we will aggressively develop the market for Japanese-made weapons overseas, so that we can maintain and achieve sound development of this type of heavy industry." This difference may be due to the difference in the period from the 1930s to the 1940s. The Taipai Kumiai were clearly aware that it was essential to secure a sustainable supply of arms exports to ensure the stable operation of the heavy industries that supported the munitions industry.

The "Memorandum of Understanding" included in this document provided a detailed description of Showa Tsusho's business activities. The memorandum listed as "the scope of business of the Company" (1) export of weapons, weapons parts, and munitions; (2) the import of the same; and (3) the import and export of special raw materials and machinery.[58] What is noteworthy here is the item, "3. To develop sales channels for weapons and raw materials, the Army shall, to the extent that circumstances permit, not only actively decline to pay for superior products but shall also, to the extent that circumstances permit, provide

[56] Ibid. pp. 0369-0372.

[57] Same as above, Ref. C01007723900 (Ministry of the Army, "Land Secretarial Grand Diary," 1939, Book 2, p. 0641).

[58] Ibid. p. 0649

cooperation in the manufacture of non-standard products if the other country so wishes."[59] The army's extremely aggressive and even offensive stance on arms exports is blatantly obvious. In short, it is not only waiting for orders for weapons purchase opportunities but also dispatching instructors to sell weapons and to use them. The difference from Taiheiyo Kumiai is highlighted here.

(2) Arms Exports to China and Thailand

First, I examined historical documents that provided examples of arms exports to China. For example, in the "Cabinet Secretariat Confidential No. 1364, Concerning Export of Aerial Weapons" (approved by the Supreme Court on June 5, 1935), the following observations were made in light of the fact that China and other countries have expressed interest in purchasing aircrafts. Three items that are considered particularly important are as follows:

1. We have recently received requests from the Republic of China and other countries to purchase military aircraft, as described in exhibits 1 and 2.
2. In Japan, demand for airplanes is almost exclusively limited to the military. If there is no demand for airplanes in Japan, let alone overseas, there will be great concern about maintaining industrial strength. In addition, it is a major cause of the high unit cost of aircrafts and a major hindrance to the progress of aircraft production technology. To eliminate these disadvantages, it is necessary to seek overseas sales channels for airplanes as soon as possible.
3. In view of the fact that all countries are trying to sell airplanes to the Republic of China, it is necessary to make a first move in this day and age when there are signs of a turnaround in Japan-China diplomacy.[60]

At this point, the government was also clear in its judgment that the reason for exporting air weapons was to seek overseas sales channels to revitalize the aircraft industry, which would also facilitate the execution of wartime mobilization plans and improve aircraft development technology. In addition, China had become a competing destination for exports from other countries, and the government recognized that an arms export policy was indispensable from the perspective of securing influence through aircraft exports to China.

On October 31, 1940, Showa Trading Co., Ltd. drafted a document titled "Concerning Export of Aircraft Weapons,"[61] which includes the following examples of aircraft exports to Thailand. First, an "Application for Permission to Export Aircraft Weapons" (dated October 19, 1930) was submitted to the Minister of War, Hideki Tojo, in the name of Mitsuya Hori, Executive Managing Director of Showa Trading Co. The contents of the application are as follows:

- Complete equipment for Type 97 light bombers (not including armament): with required equipment for all aircraft 24 units
- Type 89 fixed machine guns 24 guns

[59] Ibid. pp. 0650-065

[60] Same as above, Ref. C05034160500 (Department of the Navy, "Official Remarks," June 6, 1935, p. 0100).

[61] Same as above, Ref. C01002443600 (Ministry of the Army, "Dai Nikki [Army Ministry of the Army Large Diary]," Second Series, Class 2, 1940, Weapons, No. 3, p. 1066).

- Twenty-four type 89 swinging machine guns 24 guns
- Type 89 swivel fixed machine gun, with type 92 incendiary ammunition inserts and a paper box containing 100,000 bullets and type 89 swivel fixed machine gun, with type 92 incendiary ammunition inserts and a cardboard box containing 300,000 bullets
- Type 89 fixed machine gun with pieces of ammunition 25,000 bullets
- 50-kilogram drop bomb 2,000 bombs

We would like to export to the government of the Kingdom of Thailand in the following manner and would appreciate your permission to do so.

In response to this "request," a letter was sent to the Showa Shoji side in the name of the vice admiral on the same day of the same year, stating that permission had been granted. The vice admiral conveyed this to the chief of the Army Aviation Headquarters. Although this is an exchange of documents, it is a record of cooperation between the army and Showa Shoji.

Japan's export of aircraft to Thailand, a neutral country, continued to a certain extent even after the outbreak of the war against the United Kingdom, the United States, and the Netherlands. For example, in "Regarding Assistance in Assembly of Aircraft to be Transferred to Thailand," drafted by the Second Department of the Army Aviation Headquarters on April 9, 1942, the vice minister of the army sent a telegram to the chief of the general staff of the Southern Command, stating, "Please contact Showa Tsusho Corporation (Banya Branch) for assistance in assembling nine Type 99 advanced training aircraft being transferred to Thailand (six of which were shipped on the morning of March 14 by Showa Maru, the remaining three to be shipped shortly). Please contact Showa Tsusho Corporation (Banya Branch) for assistance."[62]

It is clear from many records that the purpose of the arms exports, including aircrafts, was to stabilize the military production system during peacetime and to ensure the improvement of military technology. This historical document also shows this to be the case. The "Draftsman, Firearms Division, Ordnance Bureau, Concerning Sales of Weapons," dated October 14, 1940, stated that "during the visit of the Thai goodwill delegation to the munitions industry, Minister Prom stated that the purchase of weapons would be dependent on the Imperial Government." The article stated that Japan's efforts to approach Minister Phrom, who was a powerful figure in Thailand, was successful and that the future of Japan's arms exports was opened up.

In addition, "Concerning Weapons Export to Thailand" (October 8, 1940, received by the Air Headquarters), a coded telegram from the vice minister to the military attaché at the Thai legation stated that type 38 infantry guns, type 30 bayonets, type 96 light machine guns, 10 type 95 light tanks (with 37-mm guns), 40 type 94 light armored vehicles (with machine guns), and aircraft were to be exported to Thailand by air. The agreement also stated that aircrafts would be exported by air. The export price was to be "within the range indicated in the Showa Trade Agreement."

As shown earlier, the Thai government was extremely proactive in importing arms from Japan, and this is indicated in a telegram (Secret Telegram No. 262) dated October 4, 1940,

62 Same as above, Ref. C01000204000 (Ministry of the Army, Aviation Headquarters, Second Department, "Rikuya Minkudai Nikki," No. 12, 1942, p. 0740).

from the Director General of the General Affairs Department to the military attaché at the Thai legation, which stated, "Due to the urgent situation between Thailand and France and India, Thailand is currently working to strengthen its military equipment, and the Royal Thai Air Force is urgently in need of two thousand light bombers. The Thai Air Force is urgently in need of 24 or 50 kilograms of light bombers and 2,000 bombs. The Thai Air Force has immediately obtained 2,000 bombs of 24 or 50 kilograms for light bombers."[63]

The Thai government was under pressure from foreign powers, led by France, and its ability to remain neutral was in jeopardy. Therefore, to maintain neutrality on its own, it was forced to rely on arms aid from Japan, which also extended its influence to the Indochina Peninsula. The Thai government, under the orders of its leaders,Luang Pibulsonggram(หลวงพิบูลสงคราม) [64], decided to import 50 light tanks from Japan as soon as possible.

In a telegram (No. 264) dated October 5, 1940, a military officer attached to the Thai legation addressed to the Director General of the General Affairs Department stated, "Piven has decided to ask Japan to supply all weapons used by the Thai army in the future, so that the Japanese side can take political considerations into account instead of commercial considerations." He added, "In view of the changes in the international situation, the military tie-up between Japan and Thailand is steadily progressing. At this time, it is necessary for us to strategically consider the issue of arms sales."[65]

The following documents provide an overview of the role of Showa Trading Co. First, "Regarding the Use of Showa Trading Company,"[66] a letter dated January 13, 1941, from the Undersecretary of the Army to the military attaché at the Embassy of Thailand, clearly shows the role of Showa Trading Co. The most noteworthy part of the letter is the part that read as follows: "I. Weapons-like items for military use (including items for civilian use that are similar to those for military use) ordered from Thailand are to be ordered from Japan through trading companies other than Showa, but this is not in the best interest of control, so all handling of weapons and weapons-like items is to be done through Showa Trading."

Although it is unclear whether the discussion here is limited to Thailand, it is indicated that the arms export trading companies would eventually be consolidated under the army's Showa Trading Co., although other arms export trading companies also existed. Although it would seem reasonable to mobilize multiple trading companies to establish a broad arms export system and put the army's intentions into practice, it was clearly stated that Showa Trading would be the sole trading company from the standpoint of control. The army focused on the export of aircraft through Showa Trading. The Japanese army was strongly aware of the existence of aircrafts as the next-generation main weapon. From the perspective of the advancement and mass production of aircrafts, the establishment of an export system was recognized as an urgent necessity for the enhancement and development of Japan's aircraft industry.[67]

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63 Same as above, Ref. C01004903700 (Ministry of the Army, "Secret University Diary," Vol. 15, October 1940, pp. 2001-2001).

64 Luang Pibulsonggram (July 14, 1897–June 11, 1964) was a Thai politician. He served twice as Prime Minister. He was a highly influential figure in Thai politics from the Constitutional Revolution to World War II and was nicknamed the "Prime Minister of Thailand" for many years.

65 JACAR, Ref. C01004903700 (Ministry of the Army, "Secret University Diary," Vol. 15, October 1940, pp. 2003-2004).

66 Same right, Ref. C04122944100, p. 0670-0672 (Ministry of the Army, "Rikushi-Kakudai Nikki," No. 18, January 21, 1941, pp. 0670-0672).

67 For more information on the overall activities of Japanese trading companies toward Thailand in the prewar period, see Junko Kawabe, "Prewar Activities of Japanese Trading Companies in Thailand | The Case of Mitsui

The army was not limited to Thailand as a destination for arms exports but was also trying to extend its reach to Europe. For example, in a telegram dated February 7, 1940, the Military Affairs Bureau's Military Affairs Division received a message from the Undersecretary of the Army to the military officers stationed in Japan, stating, "In view of the international situation, we are going to refrain from exporting weapons that we are going to resupply to Scandinavia. Also, weapons for the Balkans should be traded directly."[68] While urging caution so that arms exports would not become an international problem, the letter also urged the government to be proactive in its arms export policy.

As an example of this, in the "Draft of the Military Affairs Division of the Military Affairs Bureau Regarding the Export of Munitions," dated January 19, 1940,[69] the Military Affairs Division of the War Ministry sent a telegram (Rikumiten) to military officers stationed in Italy, Germany, France, England, the United States, the Soviet Union, Poland, Finland, Turkey, Latvia, Romania, Iran, Thailand, Brazil, Mexico, and other countries, stating, "Weapons and ammunitions to be exported are those that we can afford to export, especially those listed on the left. We can afford to export the following weapons, in particular ammunition. If weapons such as aircraft and tanks were added to this, a considerable amount of arms exports were made."[70] The "left weapons" shown here refer to type 88 anti-aircraft guns, type 94 anti-tank guns, heavy grenades, light grenades, ammunition, hand grenades, and various types of bombs.

Incidentally, the national budget for FY1940 was 10,982.75 million yen, and direct military spending was 7,947.19 million yen.[71] Although we must avoid making an immediate judgment, it is clear that arms exports amounting to 100 million yen (1.26% of direct military expenditures) were being carried out behind the scenes of Japan's war activities in the prewar period. The arms exports were carried out simultaneously with the war effort. This is one proof that the act of war normalizes arms transfers, that is, arms proliferation.

5. Conclusion and Remaining Issues

Following the issue set out at the beginning of this paper, we summarize our conclusions based on the discussion. First, Japan's arms production problems, which began in the early Meiji period, were not fully addressed by the Japanese government and the army and navy, especially during WWI, when Russia and other countries requested arms exports, which made the Japanese government and the army and navy keenly aware of the need to establish a military industrial mobilization system. This became a joint public-private sector effort to address the arms production problem and a policy issue.

Second, the privatization of the munitions industry, which ensured the independence of arms production and weaponry, was pushed forward, which also stimulated Japan's arms exports in the prewar period. The Taiheiyo Kumiai and Showa Trading companies were established under the control of the Japanese army as the direct players in this process and

& Co., Ltd.'s Bangkok Branch" (Josai University Management Bulletin, No. 4, March 2008).

68 JACAR, Ref. C01004879200 (War Department, "Secret University Diary," February 1940, p. 0289).

69 Same right, Ref. C01004878900 (Ministry of War "Secret University Diary," Vol. 15, January-February 1940, p. 0275).

70 On Japan's arms exports in the prewar period, Koketsu published "Prewar Japan's Arms Exports: The Military's Intentions and Specialized Trading Companies" (Sekai, No. 1, August 2018).

71 Akira Fujiwara, Military History, Toyo Keizai Shimpo, 1961, p. 272.

continued to be responsible for Japan's arms export system until Japan's defeat in WWII.

Third, although they were placed under the control of the Japanese army, it is undeniable that the autonomy of private trading companies was valued, and their activities were expected. This was because the military recognized, on the basis of the lessons learned from WWI, that if the military took the initiative, it would not be sufficient to respond to the new total war. However, in the international movement for disarmament in the 1920s, the military was forced to adopt a military-led expansion policy, and it is believed that this led to a demand for military leadership in arms production issues.

Fourth, the issue of arms imports, which has been rarely mentioned in previous studies, reveals the content of imported items, which proves the relatively low level of Japanese arms production technology. The arms imports shows Japan's efforts to acquire and develop production technology and to improve production through.

Finally, I would like to touch on the remaining issues. Showa Trading was literally guaranteed a "profit structure for arms exports" by its line of integration with the military, and no other options existed. Unlike the civilian arms industry in Europe and the United States, Japan's international arms export network from the 1930s onward was fragile, and there was a fundamental gap that was difficult to fill with the arms export trading companies in Europe and the United States, which developed independent arms export operations.

However, it is also true that Japan's war partner in the 1930s was basically China; therefore, its intention to produce and export weapons on par with those of the West was not necessarily strong. In other words, on the Chinese front, which was judged inferior to Japan in terms of weapons standards, emphasis was placed on infantry combat power, and there was not necessarily a high demand for tanks, artillery, and other weapons with enhanced firepower and mobility. However, this decision resulted in the defeat of the Japanese forces in the Zhang Gufeng Incident (1938) and Nomonhan Incident (1939). Furthermore, in the 1940s, with the prospect of war against the United Kingdom and United States, which possessed advanced weapons production technology, there was a rapid demand for more advanced military technology, including the lessons learned from the previous war against the Soviet Union.

In addition, we found no evidence at this time that the Japanese Imperial Navy, which, like the Japanese army, had embarked on arms imports and exports, had its own arms trading company comparable with Taiheiyo Kumiai or Showa Tsusho. The navy's official position, as quoted, is that there were no "intermediaries." This paper cites historical documents that show part of the actual situation of arms imports, but we intend to clarify the actual situation of arms imports by the Japanese Imperial Navy, especially from the 1920s onward, and who was responsible for such imports through further research of historical documents.

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An Examination of the Process of Corporate Reconstruction and Military Industrial Reconstruction in Post-World War II Japan: The Case of Mitsubishi Heavy Industries, Ltd.

By SHINICHI SHIRATO*

Since the formation of the second Abe administration in 2012, the Japanese government's "dexclusively defense-oriented" (Senshubouei) policy has undergone significant changes. Consequently, the nature of the defense industry may also be required to change. This paper focuses on the supply system for aircraft and guided weapons. The main equipment of the Japan Self-Defense Forces (JSDF) has been maintained by the Defense Agency and the Ministry of Defense. The top 20 companies with the largest procurement amounts account for approximately 70% of the central procurement. Among them, Mitsubishi Heavy Industries, Ltd. (MHI) is the largest arms manufacturer in Japan. As such, we examine the transition of MHI mainly during the period up to 1980s. During the late 1960s, more than 90% of the equipment used by the JSDF was procured "domestically". However, this does not necessarily indicate that the arms were domestically produced. An analysis of Japan's procurement of aircraft and guided weapons has indicated that the country relies on license agreements with US arms companies and "Foreign Military Sales." In this sense, Japan's defense industry is believed to be increasingly dependent on the United States.

Introduction

This essay is part of a study that traces the development process of Japan's defense industry and attempts to clarify how the Japanese defense industry is positioned in the development of international arms transfers and to examine the merits and demerits of the defense industry. Weapons produced by the defense industry constitute the material basis of defense capability based on the "right of self-defense" for national existence. Since the enactment of the Peace Constitution, successive Japanese administrations have developed defense policies based on the principle of "dexclusively defense-oriented" policy, and the domestic defense industry is thought to have been predicated upon such policies. However, since the formation of the second Abe Cabinet in 2012, there has been a shift in conventional defense policy, as evidenced by the easing of restrictions on arms transfers,[1]

* Professor Emeritus, Researcher, Institute for the History of Global Arms Transfer, Meiji University

[1] The policy development regarding arms exports includes: (1) a reference to the Three Principles on Arms

the acceptance of the exercise of the right to collective self-defense, and the enactment of security-related laws. Moreover, this shift has been further accelerated since Russia invaded Ukraine in February 2022. In other words, the following legislative developments have rapidly transpired: the enactment of the Economic Security Promotion Act (Act on the Promotion of ensuring National Security through Integrated Implementation of Economic Measures) in May of the same year;[2] the Cabinet decision regarding the so-called "Three Security Documents" by the Kishida Cabinet in December 2022;[3] the Act on Enhancing Defense Production and Technology Bases in June 2023 (a law to strengthen the infrastructure for the development and production of equipment procured by the Ministry of Defense(MOD)); a discussion about reviewing the three principles of defense equipment transfer (the key issue is whether or not to lift the ban on exports of deadly arms) among the ruling parties in June 2023. All of these developments can be viewed as representing a shift from the "dexclusively defense-oriented" approach of previous administrations and will likely lead to new developments in the defense industry.

To examine the future of the defense industry in the face of such a shift, it is necessary to examine the Japanese defense industry's trajectory to date. In this paper, we first explore the development of the supply system of defense equipment of the JSDF from the post-World War II period to the 1980s, focusing on aircraft and guided weapons (missiles, etc.), which have become increasingly important as conventional weapons since the end of World War II. In general, economic globalization in the production of civilian products has the

Exports by Prime Minister Sato at the House of Representatives Committee on Accounts in April 1967 (prohibition of arms exports to the Communist bloc, countries prohibited from arms exports by UN resolutions, and countries involved in international conflict or at risk of such conflict), and (2) the expansion of the scope of the ban (banning arms exports to areas covered by the Three Principles on Arms Exports, restricting arms exports to other areas and equating arms manufacturing-related equipment with "weapons") by the Miki Cabinet at the House of Representatives Budget Committee in February 1976 led to the recognition that arms exports from Japan were in principle impossible. However, this was followed by (3) the Nakasone Cabinet of 1983 making exceptions for arms technology transfers to the U.S., (4) the Noda Cabinet of the Democratic Party of Japan in 2011 making "comprehensive exceptions" under the "Standards for Overseas Transfer of Defense Equipment, etc.," and (5) the Abe Cabinet in 2014 making new principles under the "Three Principles for Defense Equipment Transfer" (with this cabinet decision, arms exports were liberalized from the previous principle of ban and exception approval to liberalization in principle and limitation of prohibited items, and the policy of banning exports of defense equipment, including weapons, has been greatly relaxed (see Kutsunugi [2015]).

[2] The purpose of this law was to formulate a basic policy to take economic measures in an integrated manner to ensure security. These economic measures included ensuring the stable supply of specified critical commodities and the stable provision of specified social infrastructure services, supporting the development of specified critical technologies, and establishing a patent application closed-door system. The background to this is perceived as (1) economic globalization = interdependence, which poses a threat to national security, and (2) the parallel progression of the development of advanced technologies for military and civilian use (dual use). Therefore, it is considered necessary to work on preventing the outflow of advanced technologies, securing daily necessities such as semiconductors and pharmaceuticals (strengthening supply chains), and fostering collaboration in the development of important future technologies such as AI and biotechnology. In other words, the security policy of only managing the transfer of lethal weapons is not sufficient, and the government is striving to secure and stably supply essential goods, maintain and strengthen specific social infrastructure, and become involved in the development of technologies that are pivotal from a security perspective.

[3] The "Three Security Documents" are as follows: 1. National Security Strategy, a long-term guideline for foreign and defense policy: Revision of the National Security Strategy formulated at the beginning of 2013, which aims to acquire an enemy base attack capability (counterattack capability) and increase defense and supplementary spending to 2% of GDP by FY2027; 2. National Defense Strategy, a revised version of the National Defense Program Outline 3. "National Defense Force Builup Program," which extends the period of the Medium-Term Defense Force Buildup Program to 10 years: The plan entails ensuring the multilayered possession of hypersonic guided missiles and submarine-launched long-range missiles and the establishment of a permanent joint command post. The plan also calls for 43 trillion yen in defense expenditures between FY2023 and FY2027 (see Tokyo Shimbun, December 17, 2022). Therefore, the possession of an enemy base attack capability ("counterattack capability") was regarded as an acceptable right of self-defense, and the Defense Force Buildup Program encompasses the multilayered possession of hypersonic, long-range missiles and other weapons.

potential to precipitate the transfer of technology from advanced countries and regions with advanced technology and high production capacity to less developed countries and regions, gradually eliminating economic disparities in the process and enabling a more affluent life for all mankind. However, globalization in the context of the defense industry leads to the proliferation of the production and consumption of weapons that rely on advanced technology, resulting in greater carnage among hostile nations and peoples. The use of nuclear weapons among hostile nations, for example, has the potential to culminate in the extinction of the human race. There are two ways to conceptualize the defense industry: critically, as a "merchant of death," and positively, as facilitating a relationship of interdependence between the state and defense industry firms due to the necessity of the defense industry or because it contributes to the development of science and technology and has a ripple effect on other industries as a whole. The argument that emphasizes dual use in science and technology and views the defense industry in a positive light also belongs to the latter category.[4] To determine which view is appropriate, it is essential to clarify the actual state of the defense industry.

1. The Defense Industry in Postwar Japan

The defense industry is responsible for the production and distribution of defense equipment such as fighter aircraft, naval vessels, guided missiles, communication and information systems, fuel, and food and clothing used by the JSDF to execute their missions. It also encompasses contractors who provide services related to the repair and maintenance of these items. The Acquisition, Technology and Logistics Agency (ATLA) acquires those items through central procurement. According to the ATLA's "*Overview of Central Procurement FY2022 Edition*," there are approximately 8,000 registered suppliers in the Kanto and Koshinetsu regions alone that are capable of manufacturing and selling defense equipment and providing maintenance services for these items, and the number of companies involved is even higher for more complex and sophisticated products.

What are the leading firms in the defense industry? Table 1 indicates procurement from the top 20 firms via central procurement contracts by the ATLA (Procurement Implementation Headquarters, Contracting Headquarters, Equipment Headquarters, etc. prior to 2014) within the MOD (Defense Agency prior to 2006). The top 20 companies consistently account for 60-70% of the total value of central procurement contracts, and these companies are the core of Japan's arms industry. The top three companies are almost uniformly represented, producing fighter aircrafts, anti-submarine patrol aircrafts, and other aircrafts, as well as naval vessels, submarines, guided missiles, and other important weapons. Of the three, MHI has the greatest supply capacity in the production of naval vessels and fighter aircraft, and as a result, it has maintained the No. 1 position in terms of supply capacity almost consistently. This is also the reason for this article's focus on MHI.

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[4] Yokoi (2022) introduces the "merchant of death" theory as a criticism of the civilian arms industry in Britain in the 1910s and 1930s. Sato [2015] traces the lineage of the "merchants of death" theory and critiques it, in conjunction with the "military-industrial complex" theory, as being influenced by "false images created by forces supporting the pacifist movement as threat targets," but because he views the state and arms companies as having an "interdependent relationship," the "false image" theory lacks persuasive power. As mentioned in Shirato [2023] regarding the statements of business people who argue for dual use, it appears that the high technology of civilian products expands the possibility that they will be diverted to military use.

Table 1: Ranking of Contract Amounts for Central Procurement of Defense Equipment by Contracting Companies in FY2021 and Other Fiscal Years
(Top 20 Contractors, Unit: ¥100 million)

Contract company	Amount of money 2021	Ratio % 2021	Main procurement items	Rank in each year								
				2021	2020	2019	1980	1979	1978	1969	1968	1967
Mitsubishi Heavy Industries, Ltd.	4,591	25.5	Escort vessels, submarines, next-generation fighter aircraft	1	1	1	1	1	1	1	1	1
Kawasaki Heavy Industries	2,071	11.5	P-1 fixed-wing patrol aircraft, C-2 transport aircraft, standoff electronic warfare aircraft	2	2	3	3	3	4	2		7
Mitsubishi Electric	966	5.4	Medium-range surface-to-air guided missile, non-penetrating periscope, multifunction radar	3	4	2	4	2	3	4	2	3
NEC (Nippon Electric Company)	900	5.0	Automatic Warning and Control System, Ministry of Defense OA System Infrastructure Borrowing, Field Communication System	4	5	4	6	6	7	5	8	6
Fujitsu	757	4.2	Defense Information and Communications Infrastructure Communications Electronics Borrowing, Integrated IP Transmission System	5	3	5		13		19	15	
Toshiba Infrastructure Systems	664	3.7	Surface-to-air guided missile for base air defense, on-board radio measuring equipment, search radar	6	6	8	5	5	5	6	3	5
IHI	575	3.2	Establishment of maintenance base for next-generation fighter aircraft and its engine system, engines for P-1, and F-35	7	8	21	2	4	2	3	6	4

SUBARU	417	2.3	Multi-purpose helicopter, UH-1J airframe scheduled repair – refurbishment, U125-A airframe scheduled repair	8	25	9	□	16	16	13	11	13
Hitachi, Ltd.	342	1.9	Cyber Protection Analyzer Borrowing, Minesweeper Sonar System	9	9	13	14		11	7	13	8
Oki Electric Industry	277	1.5	Projectile passive sonar, future submarine sonar equipment	10	13	16	16	11	15	20	17	22
Komatsu Ltd.	183	1.0	120mmM, JM1 munition, 155mmH, M107 munition	11	10	7	11	9	9	8	10	10
Daikin Industries	181	1.0	Type 00 120mm tank gun shells, Type 10 120mm wing-stabilized armor-piercing ammunition with loading tube	12	12	12	19		14	12	12	15
Airbus Helicopters Japan	175	1.0	Comprehensive contract for TH-135 airframe maintenance, special transport helicopter airframe maintenance – maintenance services	13	518	555						
Japan Aerospace Exploration Agency	174	1.0	Space situational awareness (SSA) satellite system (satellite and ground)	14	37							
ENEOS	141	0.8	Aviation turbine fuel JetA-1	15	21	11	8	10	17	24	21	20
The Japan Steel Works, Ltd.	138	0.8	62 caliber 5-inch gun, Type 19 armored wheeled self-propelled 155mm cannon	16	14	10	9	12	10	23	5	30
Nakagawa Bussan	133	0.7	Diesel oil No. 2 (for ships) (duty free)	17	16	14						

GS Yuasa Technology	130	0.7	Submarine main storage battery (SLH)	18	15	17						
Idemitsu Kosan	110	0.6	Aviation turbine fuel JetA-1	19	22	22				49	44	46
ShinMaywa Industries, Ltd.	107	0.6	US-2 rescue amphibian, routine aircraft repairs	20	76	88		17	8	32	9	50
Total amount of 20 companies and ratio to total amount	13,032	72.3		72.4	62.0	50.1	72.1	61.2	66.6	72.1	68.9	62.2

The total annual central procurement amount for FY2021 is 1,803.1 billion yen, and the ratio is a percentage of this total.

The ratio of the top 20 firms to the total annual central procurement amount for each year is also shown in the ranking section.

Before FY2019, the rankings of IHI as Ishikawajima Harima Heavy Industries, Subaru as Fuji Heavy Industries, Toshiba Infrastructure Systems as Toshiba, and ENEOS as JXTG and Nippon Oil Corporation are applied. Note that Kawasaki Aircraft Industries (merged with Kawasaki Heavy Industries in 1969) was ranked second in FY1967 and seventh in FY1968, and the total contract value of both companies in FY1967 was slightly higher than that of Mitsubishi Heavy Industries.

source: https://www.mod.go.jp/atla/souhon/ousho/pdf/2-06.pdf and "*Defense Yearbook*" for each fiscal year.

Furthermore, based on the results of central procurement in FY2021, the degree of the procurement of guided weapons and aero-engineering equipment is high, indicating the importance of supplying this defense equipment in the defense industry. As the technology for developing aircraft and guided missiles improved in Japan, the leading companies in the communications and electronics industries gradually rose to the top of the procurement companies list. The rise of Fujitsu and Oki Electric Industry is a representative example. The linkage between weapons and information and communications technology is likely to progress further in the future, given the role of unmanned weapons such as ballistic missiles, military satellites, and drones.

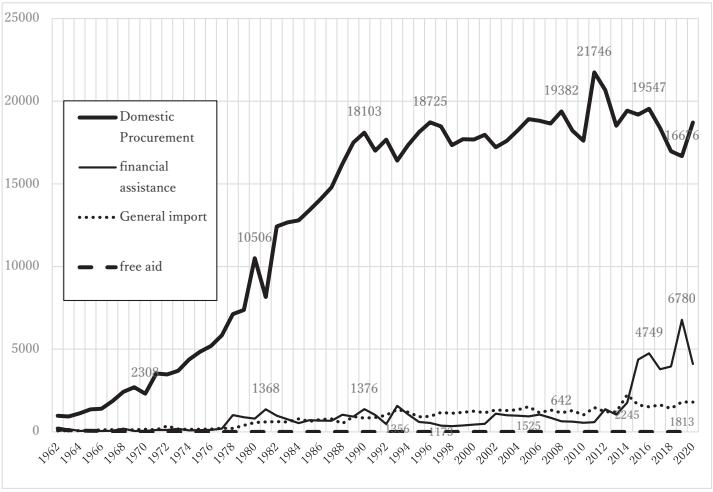
The JSDF's defense equipment (especially weapons) has been provided by the U.S. under the Japan-U.S. Security Treaty and the Japan-U.S. Mutual Defense Assistance (MSA) Agreement. Figure 1 illustrates the changes in procurement methods: In the early years after the establishment of the SDF in 1954, the JSDF relied heavily on grant aid from the U.S. Grant aid ended in 1969 and was replaced by paid aid (Foreign Military Sales [FMS]) and imports. On the other hand, domestic procurement increased rapidly. As a result, domestic procurement accounted for more than 90% of total procurement from 1967 to 1971, when the Third Defense Buildup Program was developed, and it appeared that "independence" in terms of arms supply had been achieved. However, as I have already noted in my article, this was far from independence in terms of equipment quality and technological dependence.[5] At any rate, it is evident that the amount of domestic procurement increased rapidly throughout the 1970s and 1980s. Subsequently, from the

[5] See Shirato [2023].

1990s onward, the amount of domestic procurement came to a standstill. This may be attributed to the collapse of the Soviet Union in 1989-91, the easing of military tensions following the end of the Cold War, and relatively positive Japan-China relations, which to some extent restrained further expansion of the SDF's equipment.

Figure 1: Procurement Contract Value by Procurement Method (Unit: ¥100 million)

(Figures from the Defense Yearbook were used for each year)



On the other hand, paid aid and general imports increased slightly from FY1978 to FY1982 and from FY1988 to FY1994. This will be discussed in more detail later, but a breakdown of the period when paid aid increased suggests that in FY1978-82, the F-15J fighter, P-3C anti-submarine patrol aircraft, and E-2C early warning aircraft were the subject of FMS, which may be related to the purchase of fighter aircraft and anti-submarine patrol aircraft from the United States that incorporate advanced technology. This is believed to be related to the purchase of highly technologically advanced fighter aircraft and anti-submarine patrol aircraft from the United States. In the 2010s, paid aid increased dramatically, and the domestic procurement rate fell below 90%. The U.S. has not yet determined whether it will procure classified aircraft. It is evident that the U.S. does not readily allow the licensed production in Japan of sensitive and highly capable fighter aircraft and other aircraft that cannot be procured by the general public.

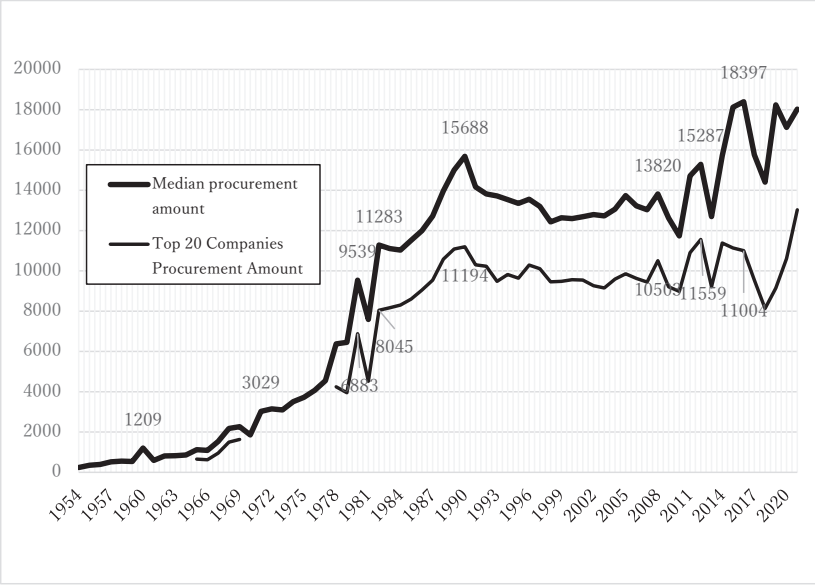
What is the difference between licensed production and paid assistance (FMS)? In licensed production, a license fee is paid to a foreign company, and the licensed company builds a production line to produce the product at its domestic factory. This requires an initial cost for the license fee and the construction of the production line. Conversely, FMS involves importing products produced by a foreign company; since the foreign company maintains the highly confidential technology, additional maintenance and servicing costs must be paid even after the acceptance of the product. The advantages of licensed production include the ability to increase production efficiency and repair parts domestically, thereby increasing the utilization rate and the wider scope of technological acquisition. From the recipient country's perspective, the advantage of paid assistance is

the ability to quickly use weapons with highly secretive capabilities and technologies without having to develop them in the recipient country. However, at present, the purchase price is high, and even if an excessive advance payment is made, it takes time for the weapon to be delivered, and unsettled amounts tend to accumulate.[6]

Let us return the discussion to trends in central procurement amounts. Central procurement includes the procurement of critical weapons, and Figure 2 illustrates the relationship between trends in central procurement amounts and the amounts procured from the top 20 suppliers. The trends in central procurement amounts are similar to the overall trends in domestic procurement amounts indicated in Figure 1, with the slight distinction that central procurement results have declined more from the 1990s to the 2000s. In the 2010s, the increase or decrease in each year was more pronounced, and the gap between the central procurement amount and the amount procured by the top firms seems to have widened a little. This point must be kept in mind when assessing the details of central procurement but will be left as an issue for the future. On a similar note, there was a sharp increase from the 1970s to the 1980s, reaching 1.57 trillion yen in FY1990. Although the procurement amounts of the top 20 firms were not captured for the entire period, they exhibit similar changes to the median procurement amount, accounting for almost 70% of the median procurement amount from the late 1970s to the first half of the 2010s. Therefore, by capturing the procurement details of these 20 companies, we can uncover what kind of equipment (weapons) the JSDF were equipped with at that time.

Figure 2: Central Procurement Results and Top 20 Procurement Amounts (Unit: ¥100 million)

(Figures from the Defense Yearbook and the Self-Defense Forces Equipment Yearbook were used for each year.)



6 See Tsuji [2022].

2. Trends of Prominent Private Companies as Leaders in the Defense Industry: The Case of MHI

This section examines the intentions and goals of companies engaged in the defense industry from the postwar reconstruction period to the period of rapid economic growth. However, it will focus on MHI, which was always at the top of the list in terms of central procurement performance.

(1) Restructuring of business activities under the Corporate Accounting Emergency Measures Act and the Corporate Restructuring and Improvement Act

In November 1945, General Headquarters, the Supreme Commander for the Allied Powers (GHQ) ordered the termination of wartime compensation for companies on the grounds that "it should be known that war is not profitable from an economic standpoint." The Japanese government was eventually forced to accept the order in July of the following year.[7] There was a strong possibility that leading companies would succumb to financial difficulties due to the loss of overseas assets and the deprivation of wartime compensation under the Act on Special Measures Concerning Wartime Compensation. As a remedy for this, the government issued the Act on Emergency Measures for Company Accounting, promulgated in August 1946, which made companies with capital of 200,000 yen or more eligible for special accounting companies if they had the right to claim wartime compensation or had overseas assets. They divided their assets into two accounts: a new account containing assets for business continuity and an old account containing other assets and special taxes and old debts equal to the wartime compensation. The old account was to be shelved to allow the companies to continue their business under the new account. Subsequently, in accordance with the Corporate Restructuring and Improvement Law promulgated in October of the same year, the company was required to submit a restructuring plan. If the extraordinary losses in the old account could be substantially reduced through increased valuation gains or profits, or if the old account could be liquidated at the expense of shareholders or former creditors, the new and old accounts would be merged and business could then continue. Otherwise, the government would have the special accounting company establish a second company, which would invest and increase the capital of the new account assets to continue the business. As of November 1948, there were 5,114 special accounting companies that had to submit development plans under the Corporate Restructuring and Development Law to obtain approval.[8] According to the remaining data, of the 4,695 special accounting companies as of the end of September 1952, 3,637 were still in existence and 1,058 had been dissolved. The special wartime compensation tax (= wartime compensation) was 37.6 billion yen, losses on overseas assets were 8.6 billion yen, total losses including these losses were 91.3 billion yen, total profits from old accounts and other accounts were 41.9 billion yen, and gains from asset valuation due to inflation and other factors amounted to 19.5 billion yen. After subtracting the total profits and valuation gains from the total losses, the extraordinary loss was 29.9 billion yen, which was calculated by subtracting the total profits and valuation gains from the total losses, most of which was borne by shareholders and creditors.[9] Furthermore, in December

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7 See SCAPIN337ESS/FI, "Removal of War Gains and Fiscal Reconstruction" (Ministry of Finance, Financial History Office [1981], pp. 517-519).

8 See Ministry of Finance Fiscal History [1983], p. 753.

9 See Ministry of Finance Fiscal History [1983], p. 903, Table 5-4.

1947, the Law for the Elimination of Excessive Concentration of Economic Power was promulgated, and large companies subject to the law had to first submit a "reorganization plan" for approval before submitting a restructuring and improvement plan. This also delayed the submission of restructuring and improvement plans, and it was not until 1948 that restructuring and improvement plans were submitted.[10] In addition, among the 499 major companies that accounted for 62.5% of the special losses among the above-mentioned special accounting companies, 21 companies in the aircraft and former weapons industries were included. This special tax on wartime compensation was 3.93 billion yen, the highest amount, accounting for 17% of the total 22.47 billion yen, and the amount of extraordinary losses after deducting profits and valuation gains was also the highest (5.2 billion yen) of the total 18.7 billion yen.[11] In this regard, the continuation of the aircraft industry and other businesses entailed great sacrifices. In addition, according to the balance sheet tabulation of the special accounting companies separated into new and old accounts as of August 1946, the distribution of total capital and assets among the major companies in the entire industry (266 companies) was 36% in new accounts and 64% in old accounts, while the ratio of new accounts in the aircraft and old weapons sectors (11 companies) was extremely small (7% for the former and 93 %).[12] This would indicate that it was extremely difficult for the Aircraft and Old Weapons Division to continue with new business in relation to the occupation policy of dismantling the munitions industry.

For instance, MHI, which was the largest munitions company before the war, exemplifies such a restructuring process. When munitions production was banned by General Order No. 1 of the GHQ in September 1945, MHI amended its articles of incorporation at an extraordinary shareholders' meeting in October of the same year, removing weapons-related businesses such as naval vessels, aircraft, and mines from its business objectives and shifting to the peace industry. In addition, the number of operating facilities was reduced to 13: the Nagasaki, Kobe, Shimonoseki, Yokohama, Wakamatsu, and Hiroshima Shipyards & Machinery Works; the Mizushima, Kyoto, Tokyo, Kawasaki, and Ibaraki Machinery Works; the Mihara Car Works; and the Hiroshima Machine Tool Works. From January 1946 onwards, factories were designated for reparations one after another, with only four, including the Nagasaki Shipyard & Machinery Works, escaping designation, but this designation was eventually lifted due to a change in US policy toward Japan. However, due to financial difficulties, the number of employees was reduced to over 40,000 in 1949 as a result of several reorganizations. The plants that had produced aircraft, tanks, and other equipment "made makeshift products at a moment's notice," such as pots, kettles, weighing equipment, farm machinery, and even tractors, trucks, refrigerators, and bicycles.[13] In August 1946, the company was designated as a special accounting company under the Corporate Accounting Emergency Measures Law, and corporate losses resulting from the termination of wartime compensation were recorded in the old account and separated from the new account. However, as a large Zaibatsu-affiliated company, it was designated as a holding company by the Holding Company Consolidation Committee in December 1946, and 68% of its securities had to be transferred to the committee. In February 1948, MHI was declared a company subject to the Law for the Elimination of Excessive Concentration of Economic Power, and it was split up. In April 1946, MHI had already prepared and presented to GHQ a plan to split up the company into three separate companies by industry

10 See Ministry of Finance, Fiscal History, [1983], p. 881.
11 See Ministry of Finance Fiscal History [1983], p. 905, Table 5-5.
12 See Ministry of Finance Fiscal History [1983], pp. 762-773, Table 2-5.
13 See MHI [1967a], p. 19.

(shipbuilding, machinery, and rolling stock), an eight-company plan in August of the same year, and a plan in July 1947 to make all 23 plants independent companies in consideration of the dissolution order of Mitsubishi Shoji. However, as the East-West confrontation became more apparent, the U.S. policy toward Japan began to change, and in April 1948, the plan was changed to a six-company plan. MHI argued strongly to the Deconcentration Review Board, which came in May of the same year, that subdivision was not possible, and in November of the same year, it submitted a restructuring plan to the Holding Company Reorganization Committee with a single, non-divisional company plan. As a result, GHQ eventually ordered a three-company split, and in April 1949, the Holding Company Reorganization Committee issued a directive to decide on a three-company restructuring plan with three regional divisions (Kanto, Chubu, and Seibu) so that the three companies could compete independently in the shipbuilding and other machinery industries. In response, MHI drafted and applied for a restructuring plan under the Corporate Restructuring and Improvement Act, which was approved in November of the same year. In January 1950, Higashinihon Heavy Industries, Ltd. increased its capital to 700 million yen (Yokohama Dockyard, Nanao Dockyard, Tokyo Machinery Works, and Kawasaki Machinery Works), and Nakanihon Heavy Industries, Ltd. increased its capital to 1.3 billion yen (Kobe Shipyard & Machinery Works, Nagoya Works, Mizushima Works, Kyoto Works, and Mihara Railway Vehicles Works), and Nishinihon Heavy Industries also increased its capital to 900 million yen (Nagasaki Shipyard & Machinery Works, Shimonoseki Shipyard & Machinery Works, Hiroshima Shipyard & Machinery Works, Nagasaki Precision Machinery Works, and Hiroshima Precision Machinery Works).[14]

(2) Resumption of military production due to Korean special procurement and "new special procurement"

The outbreak of the Korean War in June 1950 brought special demand to Japanese companies and gave Japanese industry, which had been languishing under the Dodge Line, an opportunity to revive itself. Japan's "machine industry production index doubled from prewar levels between 1951 and 1952, and during this period, Nakanihon Heavy Industries also improved its corporate structure and gained a foothold for future development."[15] Special procurement in US dollar terms amounted to $2.37 billion from 1950 to 1953, and since Japan's exports during the same period were worth $5.23 billion, special procurement contributed approximately 45% of export revenues.[16] In August 1950, the US Far East Command established the Japan Logistics Command (JLC) in Japan, and the special procurement began in earnest. Nakamura [2012] and others have noted that special procurement demand for Korea lasted until July 1951 and that the period after that is distinguished as "new special procurement demand." However, since special procurement demand by the US military exceeded 20 billion yen until the US fiscal year 1954 (July 1953 to June 1954) but declined sharply in the following year; this period is the subject of this study. In 1952, when the production and repair of weapons and aircraft became possible with the permission of GHQ, the U.S. Military Procurement Department in Japan (JPA) placed the first order for mortars with Osaka Kikou, and by June 1957, the value of U.S. military special arms orders was approximately 52 billion yen. Table 2 indicates what

14 The former Mitsubishi Heavy Industries was dissolved in January 1950, and settlement operations were completed in September 1957, with overseas obligations and other unfinished business transferred to Ryoju Corporation (established in March 1957) (see MHI [2014a], p. 21).

15 See MHI [1967a], p. 26.

16 See Nakamura [2012], p. 569, and Asai [2002-2003].

types of weapons are being procured for use or preparation in the Korean War and which companies are responding to them. Of these, firearms and ammunition orders were by far the largest at 45.5 billion yen, and the Keidanren even called it "special demand for ammunition."[17] Eighteen companies, including Komatsu, Kobe Steel, Osaka Metal Industries, Sumitomo Metal Industries, and Asahi Kasei, had established production systems with capital investments totaling more than 4 billion yen by the end of 1954.[18] In some of these cases, facilities and equipment from the former arsenals were disposed of: Komatsu Manufacturing was disposed of by the former Osaka Army Arsenal Hirakata Works, and Osaka Metal Industries was disposed of by the former Army Arsenal Iwami Works and Kokura Army Arsenal.

Table 2: U.S. Military Orders for Weapons (Unit: ¥100million)

U.S. FY	Contract amount	Ordnance	Party receiving or accepting an order
1952	55	Mortars, mortar shells, mortar flares, smoke shells	Osaka Kikou, Osaka Metal Industries, Komatsu Ltd.
1953	207	Shrapnel, mortar shells, recoilless shells, rockets, grenade, bazookas, bayonets, grenade launchers, anti-tank mines, and bullets	Kobe Steel, Komatsu Ltd., Osaka Metal Industries, Daido Steel Co. Nippon Kentetsu, Howa Kogyo, Nippei Sangyo, Nippon Steel Corporation, Sumitomo Metal Industries
1954	228	Mortars, recoilless artillery, bullets, mortar smoke grenades, howitzer smoke grenades, rocket smoke grenades, smoke grenades, grenades, etc.	Howa Industry, Nippon Steel, Asahi Okuma, Toyo Seiki, Komatsu, Nippon Kentetsu, Kobe Steel, Osaka Metal

The U.S. fiscal year is from July of the previous year to June of the current year.

Source: Figures from Keidanren Committee on Defense Production [1964], pp. 77-79.

Following the lifting of the ban on arms production in March 1952 and the decision by MITI in April of the same year to reinstate the use of zaibatsu titles and emblems, the above three companies, which were created by splitting the former Mitsubishi Heavy Industries, changed their articles of incorporation in May and June of the same year, restored Mitsubishi in their company names and renamed them Mitsubishi Nihon Heavy Industries (formerly Higashinihon), Shin Mitsubishi Heavy Industries (formerly Nakanihon), and Mitsubishi Shipbuilding (formerly Nishinihon); furthermore, those companies restored the manufacture and repair of naval vessels and weapons (Mitsubishi Shipbuilding and Mitsubishi Nihon Heavy Industries) and naval vessels, aircraft, and weapons (Shin Mitsubishi Heavy Industries) to its business purposes.

During this period, the U.S. Far East Command also ordered the repair and modification of vehicles and aircraft. First, for vehicles, in the U.S. fiscal year 1954, it ordered the repair and modification of 10 companies, including Fuji Motors, Shin Nihon Aircraft, Victor

17 See Keidanren Committee on Defense Production [1964], p. 14.

18 See Japan Weapons Industries Association [1983], pp. 108, 109 for the amount of U.S. military orders, and Keidanren Committee on Defense Production [1964] and Sawai [2018] for the business offices.

Auto, Bridgestone Tire, Mitsubishi Nihon Heavy Industries, and Hino Diesel. In the area of aircraft, as shown in Table 3, it first ordered overhauls of light liaison aircraft from Showa Aircraft in 1952, followed the next year by orders for P-51 reciprocating fighters and T-6 reciprocating trainer aircraft from Kawasaki Aircraft, B-26 and C-46 aircraft from Shin Mitsubishi Heavy Industries, and ship-based aircraft from Nippon Aircraft. In 1953 and 1954, it ordered the overhaul of F-86 jet fighters and T-33 jet trainer aircraft, and in 1955, a contract was concluded with Nippon Aircraft for the overhaul of the F-86D all-weather fighter and with ShinMaywa Kogyo for the repair of twin-engine aircraft and airships for the US Navy. Those orders led to the domestic manufacture of vehicles and aircraft.[19]

Table 3: U.S. Military Orders for Repair of Aircraft and Related Equipment

(unit: $10,000)

U.S. FY	Contract amount	Model	Party receiving or accepting an order
1953	164	Light liaison aircraft, P-51 reciprocating fighters, T-6 reciprocating trainer aircraft, B-26 light bombers, C-46 transport aircraft, shipboard aircraft	Showa Aircraft, Kawasaki Aircraft, New Mitsubishi Heavy Industries, Nippon Aircraft
1954	559	F-86 jet fighter, T-33 jet trainer	New Mitsubishi Heavy Industries, Kawasaki Aircraft
1955	403	F-86D all-weather fighter, naval twin-engine aircraft and flying boats	Nippon Aircraft, ShinMaywa Industries, Ltd.

The U.S. fiscal year was from July of the previous year to June of the current year. Thereafter, the contract amount gradually increased to $6.27 million in FY1956, $7.33 million in FY1957, and $7.42 million in FY1958.

After June 1953, the contractors for repairing equipment included Tokyo Aviation Keiki, Tokyo Keiki, Japan Radio, Shinko Denki, Japan Aviation Electronics Industry, and Kayaba Industry.

Source: Figures from Keidanren Committee on Defense Production [1964], pp. 86, 87.

Since the former MHI-affiliated companies received large orders here, the section below examines procurement from them and how the companies responded.

First, Higashinihon Heavy Industries (renamed Mitsubishi Nippon Heavy Industries in June 1952) was centered on its shipbuilding division based at Yokohama Dockyard and Nanao Dockyard, but it also had Tokyo Works and Kawasaki Works, which manufactured the Army's main tanks, large buses, and high-speed diesel engines before the war, and during the postwar occupation, it was engaged in rebuilding and repairing vehicles for the occupation forces. This company appears to have been extremely busy when the Korean war broke out. As characteristic examples, it "manufactured bulldozers using its tank production technology early in the postwar period" and increased production of construction machinery, or it partnered with an American export company to assemble the "Henry J" passenger car on a knock-down basis and established the Fuso Motor Sales Company in 1949 to boost its business performance.[20]

Nakanihon Heavy Industries (renamed Shin Mitsubishi Heavy Industries in May 1952)

19 See Keidanren Committee on Defense Production [1964], pp. 76-87.
20 See MHI ed. [1967b], pp. 87-102, and ibid. [2014a], p. 24.

was established with 40% of the facilities and personnel of the former Mitsubishi Heavy Industries. Immediately after its establishment, however, the company fell into the red due to the reconstruction of war-damaged plants and damage from Typhoon Jane, and it closed the Tsu Plant of the Nagoya Works and the Shizuoka Plant of the Mihara Railway Vehicles Works. In its first year of operation, the company's sales by division were 37% shipbuilding, 40% machinery, and 23% automobiles. However, the company developed its own technology and aggressively introduced advanced overseas technology to launch new businesses such as chemical fiber machinery, diesel engines for locomotives, silk spinning machines, steam turbines, and boilers. The company had five offices. The company's five business units were as follows: Kobe Shipyard & Machinery Works, which built and repaired ships; Nagoya Works, which switched from prewar aircraft manufacturing to bus bodies, textile machinery, and scooters; Mizushima Works, which switched from aircraft to small tricycles; Kyoto Works, which switched from aircraft engines to automobile engines and small general-purpose engines; and Mihara Rolling Stock Manufacturing, which manufactured rolling stock. With the outbreak of the Korean War, the company received large orders to manufacture bus bodies and trailers for jeeps for the U.S. military, as well as repair work for trucks and passenger cars. In 1950, the company received an order from the Japan Coast Guard for two patrol boats.[21]

Furthermore, Nishinihon Heavy Industries (renamed Mitsubishi Shipbuilding in May 1952) differed from the other two companies in that it had three shipyards in Nagasaki, Hiroshima, and Shimonoseki, and its shipbuilding business was significantly more important than theirs. Since the company's business was heavily dependent on shipbuilding, the postwar period was heavily affected by developments in the shipping industry, which had lost its military presence. The number of new shipbuilding permits received between 1950 and 1951 doubled from 310,000 tons to 610,000 tons, which can be attributed to the special demand from Korea. Orders not only for newbuildings but also for ship repairs increased, and although the company was in the red in the first half of FY1950, when Nishinihon Heavy Industries was established, it was in the black from the second half, and in the second half of the next fiscal year, orders for boiler and turbine projects for power development were active.[22] Taking these factors into consideration, it is thought that the special demand for Korean War was also a factor for the company.

(3) Full-scale production of fighter aircraft

In 1954, the Japanese Self-Defense Forces (JSDF) were organized, creating a stable domestic demand for defense equipment, which is believed to have formed the foundation for the existence of the defense industry. Although much of the equipment used by the JSDF at the time of its establishment was provided by the U.S. military, it was necessary to update this equipment and to equip it with sufficient performance to accommodate evolving weaponry. In this sense, the defense industry will be required to domestically produce and stably supply equipment that can handle new weapons. Domestic production of defense equipment is considered to be a process to realize, in terms of equipment, a defense capability that can withstand initial attacks quantitatively and qualitatively. The full-scale production of defense equipment is considered to be the stage at which Japan can maintain self-sufficiency in equipment for an adequate defense capability. In this regard, it is necessary to clarify the meaning of "domestic production" when examining whether Japan

[21] See MHIed. [1967a] pp. 24, 25, 41, 88.
[22] See MHI ed. [1967c], pp. 59-68.

can achieve self-sufficiency (i.e., domestic production) in what corresponds to its existing weaponry capabilities. Conventionally, the term "domestically produced" has been employed to include all purely domestic production, licensed domestic production, and international joint development and production.[23] This section will focus on the aircraft field, which required extremely advanced and cutting-edge technology among defense equipment, and will examine MHI's activities during the period from the establishment of the JSDF to the time when its equipment was being prepared under the Defense Force Buildup Program. The Korean War triggered a resurgence in the defense industry and the production of complete weapons, but as we have already discussed, this was an unstable market that mainly consisted of consumables such as guns and ammunition, and the repair and replenishment of equipment. The creation of the JSDF, with its three domains of land, sea, and air, and the need for continuous reinforcement, has established a stable domestic market, and the need to respond to the evolution of weaponry has provided the basis for the development of the defense industry.

Table 4 outlines trends in domestic aircraft production since 1953, when the armistice agreement for the Korean War was signed. Three main examples of the spread of aircraft production in Japan are noted there. The first is the introduction and production of the F-86F jet fighter, the second is the introduction and production of the F-104J jet fighter, and the third is the production of the YS-11 medium transport aircraft. The first two were the introduction of U.S. jet fighters, while the third was aimed at the independent production of commercial aircraft.

Table 4: Development of Aircraft Production at Mitsubishi Heavy Industries

y/m	Related Matters
1952.3	Nakanihon HI received order to overhaul Pratt & Whitney R-2000 Engines ordered by Northwest Airlines.
1953.5	First contract with the U.S. Air Force: repaired Curtiss C-46 transport aircraft and Douglas B-26 light bombers.
1954.2	Shin Mitsubishi HI repairs U.S. F-86F Jet Fighter.
1954.6	**Aircraft Manufacturing Business Law: amended to "coordinate" the disorderly and business activities of small companies.**
1954.7	Shin Mitsubishi HI has entered into a technical tie-up with North American for parts production and repair of the F-86F. A Japan-U.S. inter-agency agreement has been established for the domestic production of the T-33A jet (Keidanren Committee on the Defense Production negotiated directly with the U.S. side to make this happen).
1954	Shin Mitsubishi HI began assembly and repair work on the Defense Agency's S-55 helicopter.
1955.3	Cabinet meeting decided to produce jet aircraft domestically on a Japan-U.S. joint sharing basis → 55.6 Japan-U.S. agreement reached on production of **F-86F** and **T-33A** (by Kawasaki Aircraft).

[23] Study Group on Defense Production and Technology Infrastructure [2012] Final Report of the Study Group on Defense Production and Technology Infrastructure - Toward the Construction of a "Living Strategy"https://www.mod.go.jp/atla/soubiseisaku/soubiseisakuseisan/2406 See houkoku.pdf.

1955.6	The first Japan-U.S. agreement for domestic production of the F-86F was signed between the U.S. Department of Defense and the Japan Defense Agency. Shin Mitsubishi HI became the primary contractor for the F-86 fighter, and the U.S. government provided equipment, etc. for 70 planes at no cost. Kawasaki Aircraft became the primary contractor for the T-33 trainer, but only domestic production of some parts for the first 67/97 planes was completed.
1955.8	The Defense Agency informally announced the production of 70 F-86F jet fighters to Shin Mitsubishi HI → Technical tie-up with North American for complete production. (An inspection and training mission was sent to the U.S. and accepted a technical delegation from North American.) → Assembly of Japan's first jet fighter began in March 1956.
1955.9	Shin Mitsubishi HI delivered the first F-86F. 1955-1957 jet production plan: 300 F-86Fs and 210 T-33As Japan's budget share was 54% each, but the first year was largely dependent on the U.S. → The domestic production rate in 1957 was 48% for the F-86F and 43% for the T-33A.
1956.9	New Mitsubishi HI Nagoya Works completed the first F-86F fighter for the Japan Defense Agency → 1961.2 delivered the final aircraft and produced a cumulative total of 300 aircraft.
1956.10	New Mitsubishi HI spun off the Aircraft Division of Nagoya Works and established Nagoya Aircraft Works.
1956	The **first flight of the T-33A, a jet trainer aircraft** manufactured by Kawasaki Aircraft, was successfully **completed**. (the previous year, Kawasaki had entered into a technical agreement with Lockheed Aircraft Company for the production of the T-33A).
1957.4	The third Japan-U.S. Arrangement for the production of F-86F and T-33A was signed.
1957.5	With the full support of the aerospace industry, the Foundation for Transport Aircraft Design and Research was established, and research into the design of a mid-size transport aircraft was initiated with a subsidy from MITI and financial and technical cooperation from six companies involved in aircraft (Shin Mitsubishi HI, Kawasaki Aircraft, Fuji HI, NIPPI, ShinMaywa Industries, and Showa Aircraft).
1957.9	The National Defense Council decided to domestically produce the P2V-7 anti-submarine patrol aircraft.
1958.1	**The first domestically produced jet trainer aircraft, the T1F2, successfully made its maiden flight at** Fuji HI's Utsunomiya Works**.** The Japanese and U.S. governments signed a joint production arrangement for the domestic production of the P2V-7 anti-submarine patrol aircraft (42 aircraft were to be manufactured by March 1963 at a total cost of 30.7 billion yen (15.1 billion yen for Japan and 15.6 billion yen for the U.S.).
	Primary Defence Buildup Program (1958-60) (54% aircraft in budget)
1958.4	New Mitsubishi HI and United Aircraft Corporation entered into a technical tie-up for the repair and parts production of the F-86F. The National Defense Council Members' Advisory Panel informally offered Grumman's F11-1F, but the proposal was subsequently disputed and the matter was put back on a blank slate to be reconsidered.
1958.5	The Law for the Promotion of the Aircraft Industry was promulgated.
1959.3	The Defense Agency and Kawasaki Aircraft were contracted to produce the P2-v anti-submarine patrol aircraft. Kawasaki began domestic production with ShinMaywa as a production partner, reassembling two aircraft and knocking down production of 12 aircraft, and by March 1963, the delivery of 42 aircraft was completed. However, the number of aircraft produced was small and the rate of domestic production of parts was extremely low.

1959.6	Nihon Aircraft Manufacturing Co.,Ltd. established as a public-private joint venture, succeeding to the projects and research results of the Transport Aircraft Design and Research Association→Promoted domestic production of the YS11 medium-size transport aircraft
1959.11	National Defense Council **decides on Lockheed's F-104J as the next fighter** (F-104C converted for Japanese use), with Shin Mitsubishi HI as the main contractor and Kawasaki Aircraft as a partner company.
1960.1	The Cabinet decided to adopt the F-104J, with 200 aircrafts to be procured at a unit cost of 484 million yen, with the Japanese side sharing 69.8 billion yen and the U.S. side 27 billion yen.
1960.4	The U.S. and Japanese governments formalized an exchange of official documents for the joint U.S.-Japan production of the F-104J.
1960.5	The first flight of the T-1B jet trainer, a purely domestic aircraft, was successful (development of the aircraft began in 1958, and FHI received the order. Shin Mitsubishi, Kawasaki Aircraft, and other companies cooperated in the prototype development. The engine was developed by Japan Jet Engine Co.).
1960.6	The U.S. and Japanese governments signed a detailed agreement for joint production of the F-104J. The main contractors were Shin Mitsubishi HI (airframe) and Ishikawajima-Harima HI (engine).
1960.7	Shin Mitsubishi HI entered into a technical tie-up with Lockheed of the U.S. for the production of the F-104J.
1961.2	All F-86Fs were delivered from Shin Mitsubishi HI. The domestic production rate of the final 300th aircraft was 60%.
1961.3	Shin Mitsubishi HI received an order for 180 F-104J fighters and 20 F-104DJ jet trainers, for a total of 200 aircrafts. 21 F-104J aircrafts were domestically produced starting with the F-104J, and were produced jointly with Kawasaki Aircraft, with Shin Mitsubishi HI responsible for the central fuselage and main wings, and Kawasaki Aircraft for the forward and aft fuselage and tail wing. The aircraft was equipped with domestically produced engines manufactured by Ishikawajima-Harima HI.
1961.7	Shin Mitsubishi HI formed a technical alliance with Lockheed for F-104J production.
1962	Shin Mitsubishi HI repaired the F-102 supersonic jet fighter, the U.S. Air Force's first-line aircraft at the time. With the progress of the Defense Buildup Program, the company mainly repaired Defense Agency aircraft rather than U.S. military aircraft.
	The second Defense Buiup Program (1962-1966) was established.
1962.3	Shin Mitsubishi HI delivered the first unit. Of the first 20 planes, three were reassembled as completed planes, and 17 were assembled with parts, with domestic production beginning with No. 21. (The final aircraft was delivered in December 1967, for a total of 230 aircrafts, with jet engines manufactured in Japan by Ishikawajima-Harima HI starting with the No. 21 aircraft).
1962.8	The first prototype **YS-11 twin-engine turboprop medium transport** aircraft successfully made its first flight (discontinued in 1973).
1963.9	The first MU-2 twin-engine turboprop multi-purpose aircraft, "a small multi-purpose aircraft developed completely on its own" by Shin Mitsubishi HI since the fall of 1959, successfully made its first flight.
1964.6	**New Mitsubishi HI is renamed MHI and becomes the surviving company; Mitsubishi Nippon HI and Mitsubishi Shipbuilding are dissolved.**
1965	MHI completed production of 200 F-104J aircrafts.

1966	Kawasaki Aircraft successfully completed the first flight of the P2V-Kai (P-2J) anti-submarine patrol aircraft.
	Thrid Defense Buildup Program(FY1967-71) 1966.11National Defense Council determined outline of Third Defense Buildup Program (1967.3 Cabinet determined major items)
1967.2	MHI was named the prime contractor for the development of the domestically produced T-X supersonic advanced trainer aircraft. In the same year, production of an additional 30 F-104J aircrafts was completed (total of 230 aircrafts produced).
1967.7	MHI Nagoya Aircraft Works took delivery of the first MU-2 Liaison Reconnaissance Aircraft (LR-1) for the Defense Agency (last aircraft delivered in 1987.1, total 762 aircrafts).
1968.11	Japan Defense Agency **Selects McDonnell Douglas F-4EJ to Replace F-104J** MHI was named the prime contractor and signed a license agreement.
1969.1	The National Defense Council decided on a basic policy of producing 104 F-4EJs under license by the end of FY1977. The main contractor was MHI, with Kawasaki HI as a partner, and the engines were to be manufactured by Ishikawajima-Harima Heavy Industries.
1971.1	MHI **successfully completed the first flight of the XT-2 supersonic advanced training plane** (T-2 from 1974) and delivered it to the Japan Defense Agency in the same year. In the same year, mass production of the F-4EJ fighter began.
	Fourth Defense Buildup Program (FY1972-76; Cabinet approved changes to major items in the Program in December 1975)
1972.10	At the National Defense Council meeting, the PXL and AEW anti-submarine patrol aircraft were returned to the drawing board for domestic production (Kawasaki HI had already been commissioned to conduct a technical study on domestic production in FY1971).
1972.10	Nagoya Aircraft Manufacturing Komaki-Kita Plant was completed, and an assembly plant for JT8D jet engines and liquid rocket engines for C-1 transport aircraft and a test cell for engines for JT8D and other large aircraft were constructed.
1976.7	Former Prime Minister Tanaka arrested in the Lockheed case (Bribery for selling Lockheed's Tristar. However, the next anti-submarine patrol aircraft was determined to be Lockheed's P3C as opposed to being domestically produced).
	(1976.10 51The Cabinet approved the National Defense Buildup Program Outline)
1977.1	Defense Agency **selects F-15J/DJ as successor to F-104J; MHI** becomes **prime contractor** and licenses it to McDonnell Douglas, 1978.6. National Defense Council officially decides to adopt the P-3C as the next anti-submarine patrol aircraft.
1978	Contracted with Boeing Co. to jointly develop Japan's first commercial transport aircraft, the Boeing 767. In charge of manufacturing the rear fuselage; first aircraft shipped in 1980; 1,000 aircraft shipped in 2010.
1979.1	**Douglas Grumman case: Hachiro Kaifu, vice president of Nissho Iwai Corporation, bribed and sold Grumman's E-2C early warning aircraft to Japanese government officials, 1979.9 FMS procurement decision.**
1987.10	The Japanese and U.S. governments have hastily decided to jointly develop the **FS-X next-generation support fighter** based on the U.S. General Dynamics **F-16**.

1988.1	MHI was selected as the main contractor for the next-generation support fighter, while General Dynamics (which later sold its military aircraft business to Lockheed Martin), Kawasaki HI, and Fuji HI were selected as partner companies (MHI had begun research and prototype development of a carbon fiber composite main wing with the Defense Agency's Technical Research and Development Institute in 1981, based on the assumption that the next-generation support fighter would be developed in Japan). (MHI had begun research and prototype development of a carbon fiber composite wing for the next-generation support fighter in Japan).
1989.11	**Delivered the first F-4EJ modified fighter for** the Japan Defense Agency (last aircraft delivered in March 1999; cumulative total of 89 aircrafts).
1995	The first flight of the FS-X (**F-2**) was successful. Continued improvements were made thereafter. **(1995.11 07 Defense Program Guidlines approved by Cabinet)**
1996	Fighter developed as the next-generation FS-X support fighter was formally adopted as the F-2. Officially deployed in 2000.
2003.9	MHI has officially decided to be in charge of the wing of Boeing's next-generation 7E7 (787) aircraft. **(2004.12 16 Cabinet Approval of the National Defense Program Outline)** **(2010.12 22 Cabinet Approval of the National Defense Program Outline)**
2011.1	Government decides to adopt the F-35A as FX's next mainstay fighter (final assembly and inspection also started at MHI's Nagoya Aerospace Systems Works on 2015.12).

・Mainly only the aircraft production in which the new and merged Mitsubishi Heavy Industries (MHI) was involved is covered. It also includes a few unconfirmed items in the description of the schedule.

Sources: Keidanren Committee on Defense Production [1964], Kondo and Osanai [1978], MHI [1967a], MHI [2014a], MHI [2014b], etc.

Shin Mitsubishi Heavy Industries, which frequently appears in Table 4, was the company that had the highest potential in the aero-engineering field among the three former Mitsubishi Heavy Industries companies and had positioned aircraft as its business objective. After the GHQ memorandum lifting the ban on weapons manufacturing, including aircraft production, was issued in 1952, the articles of incorporation were amended at the general shareholders' meeting in May of the same year to add the manufacture, sale, and repair of naval vessels, aircraft, and weapons to the company's business objectives. In August, in accordance with the Aircraft Manufacturing Law enacted in July (amended to the Aircraft Manufacturing Business Law in September 1954), an Aircraft Business Committee was established at the Shin MHI Head Office when the Temporary Aircraft Plant Construction Department was established at the Nagoya Works, and construction of an aircraft plant (Komaki Plant) began on a site adjacent to Komaki Airfield, and an aircraft engine Aero Engine Repair Plant was also established in the Daiko Plant of Nagoya Works. In 1953, the company established an Aircraft Department in the Nagoya Works, and in 1952-1959, the company made a capital investment of 3.8 billion yen for the aircraft business, and Nagoya Aircraft Works was spun off as a separate company in 1956. On the management side, this Works established its management base with the production of the F-86F jet fighter and began to post profits from around 1961-62,

when it started producing the F-104J and YS-11.[24]

First, with the introduction of the F-86F, repair work by the Shin Mitsubishi Heavy Industries began in 1954. As Table 4 shows, U.S. military personnel were quick to pay attention to MHI's Nagoya Works and ordered overhauls of aircraft engines and repairs to the fuselage. This aircraft had served in the Korean War and was introduced to Japan as its first major postwar fighter. During the same year, Shin Mitsubishi Heavy Industries concluded a technical agreement with North American, the manufacturer, regarding parts production and repairs.

The agreement was signed between the U.S. and Japanese governments for the production of the F-86F and the T-33A (awarded by Kawasaki Aircraft) between 1955 and 1957, and over a three-year period, the domestic production rate of parts and other items was increased to 48% for the F-86F and 43% for the T-33A. Both the 300 F-86Fs and 210 T-33As were planned to be borne 54% by Japan (22.6 billion yen for the F-86F and 8 billion yen for the T-33A) and 46% by the U.S. (19.3 billion yen for the F-86F and 6.7 billion yen for the T-33A), which means that they were still dependent on the U.S. for a significant amount.[25] In August 1955, Shin Mitsubishi Heavy Industries concluded a technical agreement with North American for complete manufacturing, dispatched engineers to the U.S. to inspect the manufacturing process, accepted a technical delegation from North American to prepare for the project, and delivered completed aircraft to the Japanese Defense Agency starting in September of the same year.

This was followed by the introduction of the F-104J, a supersonic aircraft that heralded the arrival of a new era in the aircraft industry.[26] In 1959, the National Defense Council selected the F-104J as the next fighter, with Shin Mitsubishi Heavy Industries as the main contractor and Kawasaki Aircraft as the subcontractor. The following year, at a cabinet meeting, the two governments exchanged official letters of intent, specifying that the number of aircraft to be procured would be 200, with Japan sharing 69.8 billion yen and the U.S. 27 billion yen, and that, similar to the F-86F, the aircraft would be jointly produced by the U.S. and Japan. After the intergovernmental agreement, a technical cooperation agreement was concluded with Lockheed, the manufacturer. The actual assembly of the first 20 aircraft began in 1962, with the first three being reassembled as completed aircraft, the remaining 17 being assembled from parts, and the 21st aircraft to be domestically produced, with production shared with Kawasaki Aircraft Industries. Kawasaki was in charge of the front fuselage, rear fuselage, and tail wing. The jet engine was also domestically produced by Ishikawajima-Harima Heavy Industries starting from No. 21.[27]

In both of the above two cases, Shin Mitsubishi Heavy Industries was the main contractor for the introduction of fighter aircraft from U.S. airlines as Self-Defense Forces aircraft. The company with experience in repairing the same type of aircraft for the U.S. military was selected as the main contractor after the introduction agreement and joint production decision by the two governments and then began production through technical cooperation with the manufacturer. The actual production method was a carefully planned licensed production method, whereby aircraft completed in the U.S. were first disassembled and

24 See MHI [1967a] pp. 140, 221, 481, 558.

25 See Keidanren Committee on Defense Production [1967], p. 127.

26 According to Fujiwara [1987], p. 86, as the U.S. military entered the missile age and refrained from purchasing fighter aircraft, U.S. fighter aircraft manufacturers were frantically trying to sell their products to Japan, and the so-called "Grumman Riot" also occurred.

27 See MHI[1967a], pp. 483-486.

brought to Japan for reassembly, assembled from U.S.-made parts, and finally assembled from the next stage, using a certain amount of licensed Japanese parts. In 1968, the McDonnell Douglas F-4EJ fighter jet was selected as the successor to the F-86J, and Mitsubishi Heavy Industries was the primary contractor, delivering 140 aircraft from 1971 to 1981.[28]

The third case of the YS-11 is a famous example of domestic production. This aircraft was developed as a twin-engine turboprop medium-sized transport aircraft, and the first prototype successfully made its maiden flight in 1962. The company that developed this aircraft was Japan Aircraft Manufacturing Corporation (established in 1959), a joint venture between the public and private sectors, but as already mentioned, its starting point was the Transport Aircraft Design and Research Foundation, which was established in 1957 with the full support of the aviation industry. The Keidanren Committee on Defense Production called for national measures to foster the aircraft industry for homeland defense, transportation, and as an export industry, as was the case in other developed countries (see Table 3 for 1957 and 1958 requests). As this was the first independent development of aircraft after the war, six companies involved in the aircraft industry, including Shin Mitsubishi Heavy Industries, Kawasaki Aircraft, Fuji Heavy Industries, NIPPI, ShinMaywa Kogyo, and Showa Aircraft, cooperated in providing funds and technology, including the designers of the "Zero-sen," "Hayabusa," and "Shiden Kai." The aircraft's fuselage was manufactured by Nippi for the auxiliary wings and flaps, Kawasaki Aircraft for the main wings and nacelles, Shin Mitsubishi Heavy Industries for the front and middle fuselages and overall assembly, ShinMaywa (which changed its name in 1960) for the rear fuselage, Showa Aircraft for the honeycomb structure, and Fuji Heavy Industries for the tail wing. However, most of the engines and electronics had to be imported. Nevertheless, the fact that the original design was put to practical use in less than five years of development must have been a source of immense confidence for the participating companies.

In addition to fighter aircraft, there have been strong demands for the domestic production of trainer aircraft to cope with the jet age and anti-submarine patrol aircraft to respond to the development and threat of submarines. The Keidanren Committee on Defense Production requested the domestic production of trainer aircraft as well as fighter aircraft immediately after the establishment of the Air Self-Defense Force, and the Defense Agency also aimed for the domestic production (firstly, licensed production) of economical and superior jet intermediate trainer aircraft. In February 1955, the Defense Agency requested cooperation from Shin Mitsubishi Heavy Industries, Kawasaki Aircraft, Fuji Heavy Industries, and ShinMaywa Industries for the development of a trainer aircraft. The following year, Fuji Heavy Industries, ShinMaywa, and Kawasaki submitted basic design plans, and Shinmaywa's plan was highly evaluated; as a result, a prototype was ordered. In 1957, the company completed the T1F2, a domestically produced jet trainer plane using engines from Bristol of England, at Fuji Heavy Industries' Utsunomiya Works, and the first flight was successfully completed in January 1958. This model was renamed T-1B with domestic engines from Ishikawajima Harima Heavy Industries starting with the 21st model, and a total of 66 aircraft were delivered.[29] As for anti-submarine patrol aircraft, it was determined at the 1957 National Defense Conference to domestically produce the Lockheed P2V-7, and in 1959, the Defense Agency contracted with Kawasaki Aircraft Industries, Ltd. to begin licensed production. However, as already noted, the Defense Conference of 1972 resulted in a blank piece of paper, and confusion ensued.

The case of the government's sudden decision in 1987 to jointly develop a Japan-U.S. aircraft based on the U.S. General Dynamics F-16 over the development of the FS-X next-

[28] See MHI [2014b], p. 246.
[29] See Fuji Heavy Industries [1984], p. 90.

generation support fighter is somewhat different from the conventional trend of MHI to produce fighter aircraft under license from U.S. companies. Regarding the development of the next-generation support fighter, MHI had taken the lead in initiating the development of the domestically produced F-2A/B as a successor to the domestically produced F-1 support fighter. However, due to the trade friction between Japan and the U.S. at the time, this was changed to a Japan-U.S. joint development project based on the F-16. The process of reaching a manufacturing contract was quite difficult due to these circumstances, but it was finalized as a licensing technical assistance agreement, and a design team for the next support fighter was formed with MHI as the main contractor, General Dynamics (later to become Lockheed Martin) as the US partner, and Kawasaki Heavy Industries and Fuji Heavy Industries as Japanese partners. The F-2 was born, using composite materials researched in Japan to reduce the weight of the fuselage.[30]

Furthermore, for the introduction of the F-35, which was selected in 2011 as the successor to the Air Self-Defense Force's F-4EJ, the company was awarded the FMS contract and will purchase the aircraft from Lockheed Martin. The final assembly and functional testing were to be performed by MHI, but the cost to the nation's finances will be significant, at around 11 billion yen per aircraft.[31]

(4) Trends in the production of guided weapons

As a guided missile that captures and shoots down targets by radar, the Nike was developed in 1953 as a surface-to-air missile to intercept high-altitude bombers. The Hawk was developed in 1954 as a surface-to-air missile to shoot down low-altitude intruders. The Nike Ajax (with a non-nuclear warhead) was deployed in Japan in 1963, followed by the Hawk in 1965. As indicated in Table 5, their introduction was considered early on by the Defense Agency and the Keidanren Defense Production Committee (renamed Committee on Defense Industry in 2015), and interest was high from the outset. Interest in the domestic production of these expensive and destructive missiles was also high at the corporate level, and from around 1955, Shin Mitsubishi Heavy Industries (renamed from Nakanihon Heavy Industries in 1952, which became MHI in 1964 through a merger) was engaged in the development of surface-to-air guided missiles (SAMs) in accordance with the research and development policy of the Defense Agency and was in charge of the development of SAMs and their accessories in general. From 1961, MHI was also engaged in research and development regarding an air-to-air guided missile (AAM). In doing so, MHI also collaborated with NEC for the infrared homing device and NIHON Yushi for the solid-fuel rocket.[32]

Table 5: Guided Missile Production in Japan

Y/m	Related Matters
1953.9	Fourteen companies including Toshiba, NEC, Hokushin Electric, Hitachi, and Shin Mitsubishi HI established a guided missile subcommittee within the Keidanren Defense Production Committee. 11. GM (guided Missile) was reorganized as a Roundtable Meeting.

30 See MHI [2014b], p. 246.
31 See MHI [2014b], p. 248.
32 See MHI [1967a], pp. 493-494.

1954.1	Guided Missile Research Committee established within the Defense Agency.
1958.6	Proposal to establish Keidanren Defense Production Committee and Defense Industry Study Group; Keidanren Defense Production Committee and Japan Weapons Industry Association, Aircraft Industry Association, and GM Council formed.
1963.1	The Ground Self-Defense Force deployed surface-to-air guided missile Nikes (non-nuclear warhead type) to the 1st Nike Battalion in the Tokyo area as U. S.-provided equipment in the second phase of defense.
1964.5	The GM Council was reorganized and the Japan Rocket Development Council was established.
1965.3	The Ground Self-Defense Force deployed a battalion of Hawk surface-to-air missiles at Chitose for the purpose of intercepting low-altitude intruder aircraft.
1966.3	Air Self-Defense Force organized the 2nd Nike Battalion.
1967.10	Foreign Minister Miki and U.S. Ambassador to Japan Osborn exchange a "U. S.-Japan Memorandum of Understanding for the Acquisition of Nike Hawk" under the U.S.-Japan Mutual Defense Assistance Agreement.
1968.3	Government approves "Technical Collaboration Agreement for Design and Manufacturing of Nike Hercules Missile"between MHI and McDonnell Douglas, and "Technical Collaboration Agreement for Manufacturing of Hawk System" between Mitsubishi Electric Corporation and Raytheon Company of the U.S. → Nike and Hawk are now domestically produced.
1968	MHI and others developed the AAM-1 air-to-air missile and began mass production for use aboard the F-104J.
1970.3	Nagoya Aircraft Works took delivery of the first domestically produced Nike J surface-to-air guided missile for the Defense Agency. In the same year, development of the air-to-air guided missile (AAM-2) proceeded at the Oe Works of Nagoya Aircraft Manufacturing Co.
1970-71	The Air Self-Defense Force deployed the Nike Battalion to Chitose and Naganuma as the 3rd Anti-aircraft Group under the 3rd Defense Buildup Program.
1972	Raytheon and Mitsubishi Electric began domestic production of the air-to-air missile, Sparrow III (AIM-7E), through a technical tie-up between the two companies.
1973	The U.S. approved the export of the **AIM-4D** "Falcon" to Japan. The Air Self-Defense Force suddenly decided to introduce the same missile → **Development of the AAM-2** under development at MHI was cancelled. At the end of the same year, development of the Type 80 **Air-to-Ship** Guided **Missile** (**ASM-1)** for the JASDF began (a high-performance missile that hits its target by active radar guidance when it gets close to the target).

1977.2	The third launch of the N-1 rocket was successful. Kiku-2 became Japan's first geostationary satellite. Five of the eight Hawk units of the Japan Ground Self-Defense Force began converting to the improved Hawk, which has twice the capability of the basic Hawk.
1979	The development team for the Type 88 **Surface-to-Ship** Guided **Missile (SSM-1)** for the Japan Ground Self-Defense Force (main contractor: MHI; development cooperation: Kawasaki HI, Fuji HI, etc.) began research and prototype production; technical testing was completed in 1986, and after practical testing in the United States in 1987, the weapon was formally adopted and deployed in 1988.
1981.2	The first launch of the National Space Development Agency of Japan's N-II rocket (the largest domestically produced rocket) was successful.
1982	MHI began licensed production of the U.S. AIM-9L → 1986 saw the development of its successor, the Type 90 air-to-air guided missile (AAM-3), a purely domestic missile, was started. 1990 saw its formalization and mass production.
1983	A missile assembly plant was built at the Komaki North Plant to serve as a production base for engines and missiles for Nagoya Aircraft Manufacturing Co.
1988	MHI formalized the Type 88 surface-to-ship guided missile (SSM-1) as the first step in the development and conversion of the ASM-1 and began mass production → Delivered the first model in 1990 and deployed in SSM regiments nationwide → Began mass production of the SSM-1 successor, the Type 12 surface-to-ship missile (12SSM), in FY2012.
1989.7	Nagoya Guidance & Propulsion Systems Works was established by separating and spinning off the Komaki-Kita Plant of Nagoya Aircraft Works. Nagoya Aircraft Works was renamed Aerospace Systems Works. Delivered the first mass-produced surface-to-air guided missile, the Petriot, to the Japan Defense Agency.
1990.12	Delivered the first Type 88 surface-to-ship guided missile (SSM-1) for the Japan Defense Agency (→ final delivery in 2014.1)
1992.11	MHI manufactured the Type 90 ship-to-ship guided missile (**SSM-1B**) as a successor to the Harpoon based on the SSM-1 (design: Technical Research and Development Institute, MHI), and delivered the first model. In the same way, the Type 91 **Air-to-Ship Guided Missile (ASM-1C**) was manufactured (design: Technical Research and Development Institute, MHI) for use on P-3C fixed-wing patrol aircraft in 1994.3, and the first unit was delivered.
1993.3	Japan's first Aegis ship "Kongo" (7,200 displacement tons) was delivered to the Defense Agency.

2003	Government decides to introduce ballistic missile defense (BMD) systems → Air Self-Defense Force begins procurement of surface-to-air guided missiles, Petriot PAC-3; Maritime Self-Defense Force begins procurement of SM-3 for Aegis ships.
2004	The Air Self-Defense Force began procurement of PAC-3 (surface-to-air guided missile Petriot. Procurement of PAC-3 began licensed production in Japan) . The Maritime Self-Defense Force began procurement of SM-3 Block IA missiles for Aegis ships. The Japanese government made exceptions to the Three Principles on Arms Exports for projects related to ballistic missile defense systems.
2009.2	MHI took delivery of the first PAC-3 for the Ministry of Defense.
2012	The surface-to-ship guided missile (SSM-1(Kai)/12SSM, mass production started by MHI), the successor to the SSM-1, has a longer range than the SSM-1 and improved hit accuracy due to its data lin0k function with ground equipment.

Sources: MHI [1967a], [1967b], [1967c], [2014a], [2014b], *Equipment Yearbook* [1982], [1985], *Defense Yearbook* [1976], [2022], etc.

In October 1967, based on the MDA Agreement, Foreign Minister Miki and Ambassador Osborn exchanged a "Memorandum of Understanding between Japan and the United States for the Acquisition of the Nike and Hawk," and in 1968, the Japanese government authorized MHI and McDonnell Douglas & Company to enter into a "technical cooperation agreement between MHI and McDonnell Douglas for the design and manufacture of the Nike Hercules missile (an improved version of the Nike)" in 1968. In addition, the Japanese government approved a technical cooperation agreement between Mitsubishi Electric and Raytheon Company of the U.S. for the production of the Hawk system. The Japanese government also approved a technical tie-up agreement between Mitsubishi Electric and Raytheon Company for the production of the Hawk system. After the Third Defense Buildup Program (FY1967-71), domestic production began to be used, with Mitsubishi Electric in charge of guided missile launchers and Toshiba in charge of pulse acquisition radars, etc.[33] As for Nike, MHI was the prime contractor in charge of domestic production, and in a technical alliance with McDonnell Douglas, NEC was responsible for the guidance section, Asahi Kasei and Nippon Oil & Fat for propellant, and Daicel for warheads; additionally, ground equipment such as radar was dependent on imports from the United States.[34] As a result of such domestic production, MHI's Nagoya Aircraft Works took delivery of the first domestically produced Nike J (4.5 tons in weight, 130 km range) for the Defense Agency in 1970.[35]

As described above, the development and production of the Nike and Hawk were also initially provided by the U.S., and eventually, as with fighter aircraft, were replaced by domestic production through technical tie-ups with U.S. companies and licensed production. The Type 80 Air-to-Ship Guided Missile (ASM-1) for the Air Self-Defense Force, which began development in 1973, exemplifies such a case. This missile was to be the primary weapon for the F-1 support fighter, which was under development in parallel. It was being developed primarily by MHI, based on a design by the Defense Agency's

[33] See *Equipment Yearbook* [1982], p. 52.
[34] See *Equipment Yearbook* [1982], p. 369, and *Defense Yearbook* [1985], p. 540.
[35] See MHI [2014b], p. 427.

Technical Research and Development Institute, with the cooperation of engineers from Kawasaki Heavy Industries and Fuji Heavy Industries. On the other hand, the development of a similar anti-ship guided missile, the Harpoon (range 90 km), had been underway since 1971 for the U.S. Navy with McDonnell Douglas Astronautics as the prime contractor. The Maritime Self Defense Forcehad had already decided to introduce it under an FMS contract from the United States. The original development in Japan tended to be expensive due to the large cost burden on the company and the limited market, and there was a possibility that the Air Self-Defense Force would switch to Harpoon. Therefore, while pursuing thorough cost reduction and high performance, they produced it with considerations regarding versatility and future potential for conversion to surface-to-ship and ship-to-ship applications, and as a result, "eventually succeeded in significantly reducing mass production costs compared to the 'Harpoon'" and was deployed in the F-1 support fighter from 1980 as planned.[36] The development and conversion of the ASM-1 was designed by the Defense Agency's Technical Research and Development Institute and produced by MHI, and the first step, the Type 88 surface-to-ship guided missile(SSM-1), was formalized in 1988 and started mass production. The first model was delivered in 1990 and deployed in SSM regiments of the Japan Ground Self-Defense Force nationwide. The Type 90 ship-to-ship guided missile (SSM-1B) based on the SSM-1, the Type 91 air-to-ship guided missile (ASM-1C) for P-3C fixed-wing patrol aircraft, and the Type 12 surface-to-ship missile (12SSM, 200 km range), the successor to the SSM-1, have also been in mass production since 2012. As technological improvements have progressed, the Type 12 guided missile has a longer range than the SSM-1, and its accuracy has further improved due to data links with ground equipment.[37]

Conclusion

At the outset, I noted that Japan's defense policy will soon undergo a major change, and I described the significance of clarifying the current state of achievement by reviewing the trajectory of Japan's defense policy and defense industry since the end of World War II. I aimed to examine this particularly from the perspective of the history of the defense industry. As criteria for judging the "right of self-defense" and "dexclusively defense-oriented policy," it is important to consider what kind of weapons Japan retains and what type of diplomatic relations it has established, along with its policy philosophy.

Therefore, we first examined the bearers of the defense industry. Focusing on the top 20 companies in central procurement announced by the Ministry of Defense, we confirmed that the leading companies in heavy industry and telecommunications, led by Mitsubishi Heavy Industries, Kawasaki Heavy Industries, Mitsubishi Electric, NEC, Fujitsu, and Toshiba, are almost consistently at the top of the list. However, we also found that over the past 40-plus years, electronic equipment and information and telecommunications companies have gradually been ranked higher. In the 1970s, aircraft accounted for about 40% of procurement by item, and the territorial defense capability by aircraft increased. In the 1990s, the percentage of guided weapons, communications, electro-acoustic equipment, radio surveillance systems (radar and communication networks), and electronic equipment increased. The development and performance of guided weapons has improved remarkably

[36] See MHI [2014a], p. 384.
[37] See MHI [2014a], p. 387, and ibid. [2014b], pp. 253-254.

worldwide, and competition for such powerful weapons is developing, and in this regard, the performance of electronic equipment, communications equipment, communications satellites, radar, etc., is a major factor, making this a business opportunity for companies in these industrial areas.

In addition, when central procurement results are examined by contract type, domestic procurement accounted for 90% of all procurement around 1970. This is considered to be the"domestic production" of arms, but when technology transfers such as licensed production are taken into consideration, it cannot be regarded as domestic production in a self-sustaining sense only in terms of the numerical ratios. Furthermore, the recent increase in paid-for assistance (FMS), as represented by high-tech fighter aircraft, and the rise in general imports do not necessarily mean that independent domestic production of arms is progressing. Rather, it should be regarded as a deepening of U.S. dependence in high-tech arms. Of course, as we have already noted, a state of potential competition with U.S. firms has arisen, as evidenced by the relatively short-range guided missiles, and it should be considered that there is some technological catch-up to be made. Furthermore, it would be necessary to examine the possibility that the recent increase in the defense budget has been linked to an increase in licensed production of arms and FMS contracts.

It should be noted that many of the leading companies in the top 20 survived the postwar corporate restructuring process and took advantage of the growth opportunities presented by the Korean War and the resumption of arms production. Komatsu Ltd., Daikin Industries (Osaka Metal Industries), and ShinMaywa Industries are representative examples of companies that took advantage of this period to make a leap forward. This paper focuses on special procurement demands, the establishment of the JSDF, and MHI's business development during the process of defense force enhancement. The special procurement demands and the establishment of the JSDF provided an unparalleled business opportunity for Japanese heavy industry in the postwar reconstruction process. The formation, expansion, and sustained demand for the domestic market for weapons resulting from the creation of the JSDF is not a small market for companies in this area. However, the ban on munitions production and aircraft production, the disappearance of wartime compensation, and the forced corporate divestitures caused management difficulties and technological delays, and even if they were able to enjoy the special demand, the technological gap was not easily filled. The paper is limited to the aircraft sector and guided missiles, and because it is limited to MHI, it is far from a complete picture of the defense industry and only examines a narrow range of business development; however, it is possible to identify some characteristic business development methods. During this period, Shin Mitsubishi Heavy Industries (later MHI) was in charge of producing two types of jet fighters as the prime contractor, but both were produced under license, and their business development process was as follows: repair and inspection of weapons → intergovernmental agreement (Japan-U.S. joint production) → selection of Japanese prime contractor company → technical tie-up between Japanese company and U.S. manufacturer → reassembly in Japan of finished products assembled by the U.S. manufacturer → knockdown production of manufacturer's produced parts →licensed production using some parts manufactured by the Japanese company. As for guided weapons, while Japan's own research and development was underway, licensed production of U.S.-made missiles, as seen in the Nike J, was conducted, and so-called domestic production was promoted. Through such licensed production, Japan acquired the latest technology, but in many cases, specific parts were supplied by the manufacturer without being disclosed, and not all parts could be replaced

by those made in house. When the rate of domestic production is indicated, it is the ratio of parts and equipment in monetary terms; thus, it does not necessarily reflect independence in terms of technology, contracts, etc. On the other hand, however, sustained contracts allow production facilities to be set up, parts production and assembly operations to be repeated, and technological mastery to be achieved. Given that MHI became the main contractor for the F-104J and then the F-4EJ after the F-86F, it is believed that the company was able to accept the order based on its well-equipped facilities and proficiency in fighter aircraft manufacturing.

In the area of guided weapons production, we have highlighted the case of Nike J acquiring technology through licensed production, and the case of MHI, etc., seizing the opportunity of domestic production using Japan's own technology and capturing the market while creating a potentially competitive situation with U.S. firms. These and other examples suggest that the Japanese defense industry has reached a point where it can catch up with and even compete with leading U.S. firms.

It is necessary to consider another reason why MHI has been able to remain such a leader in the defense industry. Tetsuya Senga, secretary of the deliberative office of the Keidanren Committee on Defense Production and later executive director of Keidanren, stated the following: "It is difficult to be a prime contractor in the defense industry unless a company is able to make capital investments with its own funds. Technological accumulation is also necessary, of course. As a result, the prime contractor in the defense industry was decided mainly by large companies."[38] In the case of MHI, it is indeed a large company with strength in terms of capital size, business development areas, and technological capabilities, as noted. Furthermore, in the case of defense equipment, there are many confidential matters, so even if the bidding process is open to general competitive bidding, participation qualifications may be limited, and in the end, it is highly likely that the number of contractors will be limited.

Furthermore, in the case of defense equipment, the order is placed only with the Defense Agency (now the MOD), and even if MHI were to win an order, there would be concerns about the scale of the order in terms of profitability. Even in the case of MHI's aircraft manufacturing division at that time, profitability was enhanced by applying the technology acquired through aircraft production to civilian products, such as small gas turbine generators, ships, and construction equipment, and hydraulic equipment to various industrial machines and vehicles. In addition, the arms manufacturing division was a small part of MHI's overall management; thus, while it may have been able to withstand fluctuations in orders, its position in the overall management of the company will have to wait for another day.

As mentioned above, there are many issues that remain to be addressed. These include whether the performance of recent fighter aircraft and guided weapons (missiles, etc.), which are becoming increasingly important as defense equipment, can remain within the framework of "dexclusively defense-oriented policy," verification of the recent increase in paid aid and licensed production of weapons consisting of high-tech technologies, expansion of the companies to be examined, and the ideal state of the Peace Constitution and Japan's defense policy. The Peace Constitution and Japan's defense policy are all important issues to be considered. These are also issues that should be considered in the future.

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38 See Kondo and Osanai [1978], p. 265.

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Anti-Smoke Pollution Technology and Its Conversion to Military Use in the Royal Navy in the Mid-19th Century

By MASAHIKO AKATSU*

This paper discusses two cases in which civilian knowledge and technology for preventing air pollution caused by coal smoke from factories, which was becoming a serious problem in 19th-century British cities, were applied and converted to military use (the improvement of the performance of steam-powered vessels, which were still in their infancy) by the Royal Navy in the mid-19th century. The background and processes that led to the technology's conversion to military use are also examined in this paper.

Introduction

The rapid increase in coal consumption by factories in Britain after the Industrial Revolution aggravated the problem of air pollution caused by smoke from coal combustion, which in 19th-century Britain was regarded mainly as soot (carbon) left over from inadequate coal combustion. The air pollution was mainly blamed for economic damages (defacing property, lowering land prices, wasting fuel, etc.) rather than for health hazards. Legal responses to the damages caused by soot and smoke continued to be strengthened throughout the 19th century, beginning with the enactment of the Smoke Nuisance Abatement Act of 1821. This legislation was driven by increased knowledge and technological advances to prevent or reduce smoke from coal combustion in industrial furnaces or fire chambers used to heat steam-engine boilers.[1]

Using two case studies, this paper examines the background and processes of the transformation of civilian knowledge and technology concerning smoke control (which had been created, accumulated, and used for the peaceful purpose of helping victims of smoke pollution) into military technology in the Royal Navy in the mid-19th century. As discussed later, the Royal Navy faced various problems regarding the efficient operation of steamships, which had just begun to be used at that time. In this situation, knowledge and technology related to smoke-pollution prevention for civilian use were applied to the improvement of steamships for military use. How did knowledge and technology used for smoke-pollution control become military technology? This paper aims to clarify the background and processes of such conversion and diversion.

The ambivalence regarding the use of scientific knowledge and technology for not only peaceful purposes but also military purposes is an age-old problem. Recently, however, the

* Associate Professor, School of Political Science and Economics, Meiji University

1 See Akatsu [2003, 2005, 2010] for a discussion of smoke-pollution problems and countermeasures in 19th-century Britain.

global leakage and transfer of knowledge and technology that can be used for military purposes have emerged as particularly serious problems, and the appropriate responses to these challenges and the management of such knowledge and technology have become urgent issues.[2] Environmental knowledge and technology for the prevention of air pollution, such as those discussed here, seem distant from military activities; therefore, such knowledge and technology tend to be actively transferred to developing countries for international assistance and exchange.[3] However, as these also comprise scientific knowledge and technology, it cannot be claimed that it is not possible for them to be diverted to the military. The transfer of environmental knowledge and technology from developed to developing countries will likely be promoted more actively in the future. The author hopes that this report will help readers think about how this transfer should be done.

Historical research on the ambivalence of science and technology and on the conversion of military technology to civilian use and vice versa has advanced rapidly in recent years, with abundant results.[4] However, to the best of the author's knowledge, there is no prior research on the military conversion of civilian knowledge and technology for smoke pollution prevention in the Royal Navy in the mid-19th century, which is the subject of this paper. It would be the author's great pleasure if this paper could add new knowledge to the growing body of historical research on both military and civilian diversion of scientific knowledge and technology in recent years.

1. Use of knowledge and technology for smoke pollution prevention in the selection of fuel (coal) for naval steamships

(1) Lyon Playfair as a politician of science

The first example of the above-mentioned military applications in mid-19th century Britain is the diversion of civilian knowledge and technology related to smoke control for the selection of fuel (coal) for naval steamships. The chemist Lyon Playfair (1818–1898) played an important role in this process.

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[2] For example, in recent years, the Japanese Ministry of Economy, Trade and Industry (METI) has been strengthening its measures against the outflow of technology (sensitive technology management related to security trade) that can be diverted from universities and research institutes to military use, including dispatching advisors to universities and research institutes, holding guidance and briefing sessions, and distributing leaflets and various other materials. For more information, see the "Security Trade Control" page on the METI website (https://www.meti.go.jp/policy/anpo/daigaku.html, viewed August 17, 2019).

[3] For example, in December 2013, industry, government, and academia experts from Japan, China, and South Korea held a forum in Xianghe, Hebei Province, to discuss measures to deal with air pollution and other environmental problems. The Japanese participants introduced their country's anti-pollution measures since the 1970s and proposed cooperation with their Chinese colleagues in the field of environmental technology (*Nihon Keizai Shimbun*, December 15, 2013, morning edition, p. 5). In July 2013, the 8th China-Japan-South Korea Witenagemot was held in Toyako Town, Hokkaido, Japan, to discuss cooperation among Japan, China, and South Korea in the economic, political, and academic fields. Prime Minister Yasuo Fukuda, the head of the Japanese delegation, stated that ''cooperation on cross-border environmental problem is an urgent issue,'' bearing in mind the worsening air pollution problem caused by fine particulate matter in China. Additionally, in response to the many calls for stronger technological collaboration in the environmental field at the conference, he stated, ''There are many areas where industry, government, and academia can cooperate in the development of environmental technology.'' (*Nihon Keizai Shimbun*, July 8, 2013, evening edition, p. 2). In March 2013, the Japan Bank for International Cooperation, in collaboration with Sumitomo Mitsui Banking Corporation, decided to provide $90 million in loans to the Indian steel industry, with the aim of promoting the transfer of Japanese environmental technology to Indian steel mills and other facilities (*Nihon Keizai Shimbun*, March 27, 2013, evening edition, p. 1).

[4] See, for example, Yokoi and Onozuka [2012], Yokoi [2016], Ikeuchi [2016], and Kawamura [2018].

Born in India and the son of George Playfair (a medical superintendent of the East India Company and a member of an old Scottish family), Lyon studied medicine and chemistry at the universities of St. Andrews and Edinburgh. In the 1830s, he worked under the tutelage of Thomas Graham, the famous inventor of the law of gas diffusion and the dialysis membrane, and the German organic chemist Justus Freiherr von Liebig.[5] Around 1843–1845, as an honorary professor at the Royal Manchester Institution, he worked with the chemist Robert Angus Smith, who would later become famous for his efforts in countering the problem of toxic fumes from copper refineries and chemical plants.[6] Around this period (1844), he also collaborated with Robert Wilhelm Eberhard Bunsen, a prominent German chemist and burner improver, on the combustion of coal (coke) and its efficiency in blast furnaces.[7] Although Playfair's specialty appears to be organic chemistry, his joint research with Bunsen suggests his initial expertise in the combustion of coal and other materials. He also collaborated with Josiah Parkes, a worsted manufacturer who developed the early smoke-control furnaces with the help of Sir Humphry Davy, a developer of safety lamps for coal mines and one of the leading figures in science and technology, and probably with Prime Minister Robert Peel. He became acquainted with Parkes around 1845, probably through his friendship with Peel.[8]

Notwithstanding Playfair's career as a scientist, he was deeply involved in politics; his biographer later described him as one of the "statesmen of science" in the 19th century.[9]

First, he had a fairly close relationship with Peel, although it is unclear how this came about. He was often invited to meetings at Drayton Manor, Peel's residence in Staffordshire, and his acquaintance with Parkes was made during these meetings. He also served on government committees. As mentioned later in this paper, from 1843 to 1845, he was a member of the Commissioners for Inquiring into the State of Large Towns and Populous Districts.[10] Furthermore, during the Irish potato famine, as a chemist, Playfair was asked by Peel to advise him and was said to have had some influence on policy decisions.[11] At the Great Exhibition of the Works of Industry of All Nations in 1851, he was a member of the organizing committee and played an important role as a liaison between the committee and the government.[12] In his capacity as Secretary of the Science Department of the Privy Council, he also advocated the use of poison (cyanide) and phosphorus incendiary shells to the government during the Crimean War of 1853–1856.[13]

He became a member of the House of Commons for the constituency of the universities of Edinburgh and St. Andrews (1868), Postmaster General and Privy Councillor in Gladstone's cabinet (1873), Deputy Speaker of the House of Commons (1880), and in 1892, he was knighted and became the first Baron Playfair of St. Andrews.[14]

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5 Crowther [1965], pp. 109–116; Reid [1899], pp. 28–52.

6 Reid [1899], p. 56.

7 Reid [1899], pp. 62–63.

8 House of Commons Parliamentary Papers (hereafter, HCPP), Report from the Select Committee on Smoke Prevention, 1843, pp. 158, 165; Crowther [1965], p. 132.

9 Crowther [1965].

10 Crowther [1965], pp. 128–130.

11 Reid [1899], p. 87; Crowther [1965], pp. 132–133.

12 Crowther [1965] pp. 134–135.

13 Crowther [1965], pp. 140–142. Thus, Playfair was an active advocate of the military use of science (chemistry). He was also involved in the restoration of the honor of Thomas Cochrane, 10th Earl of Dundonald, a Scottish nobleman, inventor, and naval admiral, who had advocated the military use of chemistry in the Napoleonic Wars but lost his honor due to a false charge of fraud in connection with stock trading. Playfair is said to have supported in principle the use of science to improve military weapons (Crowther [1965], p. 149).

14 Crowther [1965], pp. 144–154; Reid [1899], p. 218.

(2) Playfair and De La Beche's research on smoke pollution problem

Here is how Playfair, a chemist with close ties to politics and considerable knowledge of coal combustion, became involved in the smoke pollution problem and the smoke preventing technologies.

As previously mentioned, Playfair became a member of the Commissioners for Inquiring into the State of Large Towns and Populous Districts established by Peel's cabinet in 1843. The commission members were the chairman of the commission and Lord Privy Seal, Walter Francis Montagu Douglas Scott (5th Duke of Buccleuch); First Commissioner of Woods and Forests, Henry Fiennes Pelham-Clinton (the Earl of Lincoln); geologist Sir Henry Thomas De La Beche (1796–1855); biologist and comparative anatomist Richard Owen; engineer and "Father of the Railroad" George Stephenson; and Playfair. Playfair, an emeritus professor at the Manchester Royal Institution, was responsible for researching and reporting on the living and sanitary conditions of the metropolis of Lancashire, with the previously mentioned Smith as his assistant.[15]

Incidentally, in the very same year that the Commissioners for Inquiring into the State of Large Towns and Populous Districts was established, the Select Committee on Smoke Prevention was formed by William Alexander Mackinnon, a member of the House of Commons. The committee conducted a fairly thorough inquiry into the air pollution caused by coal smoke in British cities and the technical and legal responses for its prevention or reduction. Based on his findings, Mackinnon submitted the Bill to Prohibit the Nuisance of Smoke from Furnaces or Manufactories to the House of Commons in 1844 and 1845. However, the bill was repealed due to differences and conflicts of interest among the various industries that were required to take measures against smoke pollution.[16] Recognizing the importance of the issue, Peel's cabinet decided to proceed with a government investigation of the problem of smoke pollution in large British cities, independently of Mackinnon and his committee.[17]

In August 1845, Sir James Robert George Graham (Home Secretary) instructed the Earl of Lincoln (First Commissioner of Woods and Forests) to investigate the matter. Based on this directive, the Earl of Lincoln appointed De La Beche and Playfair to conduct the actual investigation.[18] At the time of the request, De La Beche was the director of The Geological Survey and the director of The Museum of Economic (or Practical) Geology, and Playfair had just moved to London from Manchester to work as an appointed chemist under De La Beche, through Peel's arrangement.[19] They were chosen as investigators because they were not only experts in coal and its combustion as a source of air pollution but had also worked together on the Commissioners for Inquiring into the State of Large Towns and Populous Districts. According to the Earl of Lincoln's request for research, Playfair "was known to have already directed [his] attention" to smoke pollution issues. Playfair's and De La Beche's investigation reports were submitted in March 1846 to Viscount Charles John Canning, First Commissioner of Woods and Forests, who had replaced the Earl of Lincoln

15 Crowther [1965], pp. 128–130.

16 For more information, see Akatsu [2005].

17 In debating on Mackinnon's bill, Peel asked, "all persons connected with the manufacturing districts, and who were anxious for the health of the towns with which they were connected, would turn their attention to the subject [of smoke pollution]." He also stated that if Mackinnon would withdraw his bill in the meantime, he [the government] would present it in a better form in the next session (Parliamentary Debates, July 3, 1844, c. 285).

18 HCPP, Report by Sir Henry Thomas De La Beche and Dr. Lyon Playfair on means of obviating evils arising from smoke by factories and works in large towns, pp. 1–2.

19 Crowther [1965], p. 130.

at the end of the term of Peel's cabinet.[20]

In their report, Playfair and De La Beche first theoretically explained the mechanism of smoke generation as follows: coal smoke is basically carbon, which is released from the chimney when coal is only partially combusted due to insufficient oxygen supply in the furnace or fire chamber, caused by improper management, among other reasons. They then conducted a series of coal combustion experiments and concluded that smoke control was possible only through complete combustion of coal. They suggested the installation of furnaces, flues, and chimneys designed to ensure sufficient ventilation or air supply to the furnaces, as well as appropriate guidance and education for furnace managers. If these measures were properly implemented and sufficient air was supplied to the furnace or fire chamber to ensure complete combustion of coal, it would not only theoretically and practically eliminate smoke but also improve combustion efficiency and conserve fuel. They then studied the law enforcement situation in localities such as Derby, Leeds, Huddersfield, and Manchester, which had already implemented local acts containing smoke clauses, and found that smoke pollution in large cities was not adequately prevented for technical reasons, but mainly due to inadequate laws and lack of enforcement.[21]

(3) Naval steamship fuel (coal) survey by Playfair and De La Beche

In June 1845, shortly before Playfair and De La Beche were asked by the Earl of Lincoln to investigate the problem of smoke pollution in the city and its countermeasures, Joseph Hume, a member of the House of Commons, proposed to the Admiralty that a study of the steam-generation capacity and combustion efficiency of various types of coal produced in Britain be conducted. Hume had doubts that the Admiralty had previously awarded a supplier's (Mr. Grants') artificial fuel (e.g., perhaps coal briquettes) as suitable fuel, presumably for naval steamships. Probably, he was concerned about using such artificial fuel, which was problematic in terms of stable supply and cost, for steamships. Believing that the quality of fuel was crucial for the efficient operation of steam warships, Hume cited a similar study conducted in the United States earlier, claiming that the results would be of "great national importance ... at a moment when the greatest interests of the country may be at stake."[22]

In making the proposal, Hume appointed Playfair and De La Beche to conduct the study. Hume's reason for doing so is unclear; however, he was a Scottish physician and chemist before he was a member of the House of Commons. Possibly, he had some connection with Playfair, whom Hume described as "one chemist of eminence".[23]

The Admiralty granted Hume's request and asked the Earl of Lincoln to act as intermediary to De La Beche. De La Beche accepted the request on condition that the Admiralty pay £600 in aid for the survey up to the end of March 1846.[24] De La Beche and Playfair were undertaking two government-related jobs related to coal burning at about the same time.

Their protracted investigation of coal for naval steamers lasted until around March 1851. The reports were submitted in triplicate to Viscount Morpeth (George William Frederick Howard), the Earl of Carlisle (the same Viscount Morpeth mentioned above), and Lord

20 HCPP, Report by Sir Henry Thomas De La Beche and Dr. Lyon Playfair on means of obviating evils arising from smoke by factories and works in large towns, pp. 1–2.

21 HCPP, Report by Sir Henry Thomas De La Beche and Dr. Lyon Playfair on means of obviating evils arising from smoke by factories and works in large towns, pp. 2–6.

22 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair, p. 3.

23 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair, p. 3.

24 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair, p. 4.

Seymour (Edward Adolphus Seymour), all successive First Commissioner of Woods and Forests after the Earl of Lincoln.[25] The following is a summary of their research that can be gleaned from the reports, which total a considerable number of pages.

For its experiments, they borrowed a boiler and a furnace at the College for Civil Engineers in Putney, which were installed there by John Willson, Principal of the Royal Agricultural College of Cirencester. With Willson, John Arthur Phillips, a student at the École des Mines of Paris, and others as assistants, the team produced 110 major types of coal (including artificial fuels) from all over the United Kingdom, including 37 from Wales (mainly South Wales), 18 from Newcastle (Durham, Northumberland, and other northeastern counties), 8 from Derbyshire, 28 from Lancashire, 8 from Scotland, 1 from Ireland, 4 from other England countries, 6 artificial fuels. The experiments were conducted by burning the coal in a furnace and generating steam (in a boiler). They also analyzed the chemistry of the coal with the assistance of others, including Francis Wrightson, who, like Playfair, was Liebig's student.[26]

In selecting the preferred fuel for naval steamships, the following factors were of particular importance, in the order listed in the report: "a quick production of steam", "large evaporative powers", "a smokeless combustion", "a capacity for stowage in small bulk", "the power of resisting attrition", and "a freedom from the qualities that tend to produce spontaneous combustion".[27] The fuel (coal) should have good performance on these research items to enable the efficient operation of naval steamships at that time.

During the survey period, the main propulsion device of naval steamships was the outer paddle wheel, not the screw propeller as seen in the picture of the paddle sloop *HMS Driver* (Figure 1). As also shown in Figure 1, these ships had sails and were driven not only by steam power but also by wind power. As the very first steam warship, it naturally faced various operational problems that differed from those of sailing ships.

First, such steamships required heavy steam engines and boilers, as well as coal, a bulky and costly type of fuel. This was a major disadvantage in ship operation that sailing ships did not have, and to operate effectively, military advantages, including long-distance sailing in no-wind conditions and high-speed sailing during combat, needed to offset the disadvantage. There is no doubt that the survey items that reflect these factors are "a quick production of steam" and "large evaporative powers". Combustion efficiency, which is an economic (fuel cost) issue in the civilian world, also became a challenge to the freedom of military action by the Royal Navy. The improvement of combustion efficiency (adoption of coal with high combustion efficiency) brought military advantages to steamships that sailing ships lacked (more freedom of military action, not restricted by winds) and had the potential to solve the problems of steamships.

A major problem peculiar to steamships that was not found in sailing ships was the emission of coal smoke. The fact that "smokeless combustion" was listed as the third most important survey item, following "a quick production of steam" and "large evaporative powers", clearly indicated its recognition as an important issue for steamship operations in the Royal Navy. Why then was smoke emission a problem for naval steamships, and why was smokeless combustion necessary? The stated reason was "as to betray the position of

25 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair; HCPP, Second report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair; HCPP, Third report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair.

26 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair, p. 6.

27 HCPP, Third report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair, p. 3.

ships of war when it is desirable that this should be concealed."[28] Unlike sailing ships, steamships emit smoke, making them more susceptible to detection by the enemy. In the civilian world, smoke is harmful to others and therefore must be prevented, but in the navy, smoke control is required to ensure secrecy during steaming. If a less smoky fuel (coal) could be found, it would solve a major problem in the military operation of steamships.

In summarizing the results of their experiments and investigations, De La Beche and Playfair did not state their findings explicitly but presented various figures (tables) and remarks and generally gave high marks, especially to South Welsh coal, among many other coals.[29] South Welsh coal had a variety of characteristics, ranging from bituminous coal (but most of South Welsh bituminous coal contained less bitumen than other general bituminous coal) to anthracite (which had very little bitumen and was highly carbonized). Anthracite was not highly valued because despite its steam-generating power, it was difficult to ignite and had major problems in the speed of its steam generation.[30] Highly regarded South Welsh coals, such as the "Aberaman Merthyr" from the Aberaman Valley in Glamorganshire (very high combustion efficiency and very little smoke)[31], "Thomas' Merthyr" from Letty Shenkin in Glamorganshire (which burned very efficiently, and although not specifically mentioned, seemed to have produced very little smoke as there was very little soot in the flue)[32], and "Nixon's Merthyr" from Werra near Merthyr Tydfil in Glamorganshire (which burned efficiently and was almost smokeless)[33] were not anthracite.

South Welsh coal, which was considered the best fuel for naval steamships because of its high combustion efficiency and low smoke emission, became an important fuel for the Royal Navy in practice. According to "The Supply of Welsh Steam Coal for Naval Use", a document distributed to Balfour's cabinet in 1905, "smokelessness" and "general efficiency of steam raising" were important requirements for the Navy when purchasing coal. No other coal satisfied these requirements as well as coals from South Wales (Glamorganshire and Monmouthshire). The stable supply of South Welsh coal had been threatened by depletion and by foreign (German, American, etc.) syndicates' attempts to acquire coal mines, which was why that document had been prepared for the cabinet.[34] South Welsh coal had become a strategic commodity of such "national importance" that its stable supply was discussed at cabinet meetings.

It is well known that South Welsh coal (also called Cardiff coal) became an important strategic commodity for Japan as well. During the Russo–Japanese War, the United Kingdom provided Cardiff coal to Japan (their ally) but restricted its supply to Russia, as it was already in demand by navies worldwide as fuel for steamships. It was reported that the Baltic Fleet, which lacked access to sufficient Cardiff coal, chose the shortest route from Kamran Bay to Vladivostok over the safer Pacific route, the Sea of Japan, which would have led to a major defeat in the Battle of the Sea of Japan.[35]

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28 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair, p. 17

29 HCPP, Third report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair, pp. 3–10.

30 HCPP, First report on the coals suited to the steam navy by Sir Henry de la Beche & Dr. Lyon Playfair, p. 17.

31 HCPP, Third report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair, p. 26.

32 HCPP, Second report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair, p. 37.

33 HCPP, Second report on the coals suited to the steam navy by Sir Henry De La Beche and Dr. Lyon Playfair, p. 41.

34 National Archives (CAB 1/6/1), The Supply of Welsh Steam Coal for the Navy, pp. 1–7.

35 Yamazaki [2008], pp. 51–75.

Playfair and De La Beche's knowledge and the technology of coal and its combustion were used (as described above) for the peaceful purpose of combating the problem of smoke pollution from coal smoke, as well as for the military purpose of improving the performance of naval steamships. On one hand, these knowledge and technology were employed to demonstrate the improved combustion efficiency (fuel savings) associated with smoke control in order to prevent smoke pollution in the civilian world and to achieve smoke pollution control that would not be too burdensome on manufactures. On the other hand, it was used in the Royal Navy to enable long-distance navigation in no-wind conditions and high-speed navigation during combat, increase freedom of military action, and ensure secrecy during steaming. The same knowledge and technology were applied for both civilian and military purposes by changing their objectives and meanings and by undergoing a military semantic shift.[36]

3. Use of smoke-preventing fire chamber in naval steamship

(1) Navy and smoke-preventing furnace

The second example of the transfer of knowledge and technology (related to smoke pollution control) to military and naval applications involved the fire chambers used to heat boilers for naval steamships. In the mid-19th century, the Royal Navy researched various types of smoke-preventing furnace (it was called at that time "smoke consuming furnace", "smoke consuming apparatus", "smoke preventing furnace", etc.) for civilian use, as well as for military purposes, mainly for preventing smoke to ensure secrecy during steaming. In particular, some of these smoke-preventing furnaces and apparatuses were actually employed in the Navy arsenal.

Perhaps the first historical record that shows the Royal Navy's involvement in the smoke-control furnaces or fire chambers is the transcript of the testimony in the Report from the Select Committee on Smoke Prevention, as cited in the previous section. At that committee hearing, Sir William Edward Parry, a Navy Captain and Comptroller of Steam Machinery for the Navy, and Thomas Lloyd, Chief Engineer and Inspector at Woolwich Dockyard, were asked to testify about their experiences in the Navy's steam industry. Lloyd provided much testimony about the smoke-suppressing furnaces or fire chambers being tested and installed on naval vessels and at naval arsenals.

Many witnesses (mainly manufacturers engaged in the textile industry) who were subpoenaed for this committee hearing and were using smoke control furnaces and boiler chambers testified about the effectiveness of these furnaces in controlling smoke and in saving fuel.[37] However, the naval engineers' testimonies here mainly focused on the smoke-control effects of the furnaces or fire chambers, and it can be inferred that the purpose of their trial and introduction was mainly for smoke control rather than fuel savings.

John Chanter's smoke-control fire chamber was the first to be introduced to naval vessels. Based on the theory at that time, smoke was generated by partial combustion of coal

[36] The Playfair and De La Beche reports on the naval steamship coal survey are preserved not only as parliamentary documents (HCPP) but also as government files at the National Archives. The repository comprises the archives of the Ministry of Railways (RAIL1059/2), originally housed at the Great Western Railway's archive center. This suggests that the results of Playfair and colleagues' survey on fuel (coal) for naval steamships may have been used to study fuel for steam locomotives. It is also possible that the military knowledge was already being used for civilian purposes.

[37] For more information, see Akatsu [2005].

without sufficient oxygen supply to the furnace or fire chamber. Chanter's boiler fire chamber had additional air inlet points to supply more air to the fire chamber, aside from the fire bars (fire-grate), which were the original air inlet points to the fire chamber. Many of other similar smoke-control furnaces were based on the same principle. His smoke-preventing fire chamber was installed on *HMS Pluto*, a paddle gun navy vessel. It successfully prevented smoke but was considered difficult to handle and install in the required space.[38] According to Chanter himself, in civilian vessels, it had been used on *the Enterprise*, *the Avon*, and *the Severn* to high acclaim.[39]

Next, mention was made of Joseph Williams' smoke-preventing fire chamber (with a tube for preheating incoming air as a not-so-common feature). The same fire chambers were introduced in the Navy, on *HMS Urgent* (2-gun paddle packet), *HMS Merlin* (2-gun paddle packet), *HMS Driver* (paddle sloop), and *HMS Shearwater* (2-gun paddle packet). As with Chanter's newly designed fire chamber, it seemed to have successfully prevented smoke, but Parry stated that he received reports of various difficulties, including melting of the tubes for air preheating.[40] Next, he introduced the newly designed fire chamber by Samuel Hall (which also had a pipe for preheating incoming air). The fire chamber was installed at *HMS Megaera* (paddle sloop) and *HMS Shearwater* and had been generally successful in controlling smoke.[41]

The above was the smoke-control fire chamber actually introduced in naval vessels, but there was also mention of the smoke prevention fire chamber by Charles Wye Williams (c.1780–1866), which was generally highly regarded for both land and shipboard uses by the Select Committee on the Smoke Prevention. There was also a reference to Parry, who described Williams as the most knowledgeable man in England, both theoretically and practically, on the subject of smoke control for marine steam engines, and also presumed that his boiler fire chamber was excellent. At this point, however, the Royal Navy had not tried Williams' boiler fire chamber.[42] Nonetheless, as discussed in more detail in the next section, his new design for the boiler fire chamber was later tested by the Navy.

Testimonies on furnaces that were tried and used on land-based steam boilers at the Woolwich Dockyard included Richard Rodda's newly designed furnace and George Godson's smoke-prevention furnace. The principle of Godson's furnace was quite different from that of the other newly designed furnaces. Although Godson's furnace was designed to supply sufficient air inside it, the fire-grate was the air inflow point, which was the original one. The fire-grates were often clogged due to the large amount of coal burned on them, which prevented sufficient air from flowing into the furnace, causing partial combustion and smoke generation. Therefore, a device was installed in Godson's furnace to provide a stable supply of coal to the fire-grate and to pretreat (coking) the coal being fed so that the fire-grate would not become clogged and the coal would burn more easily.[43] Other similar furnaces that were not tested at Woolwich Dockyard but were examined onsite included Ivison's newly designed grate (with the unusual feature of allowing high-pressure steam from the boiler to flow into the fire-grate) and John Juckes' revolving grate (a certain amount of coal is dropped from a hopper onto a gently rotating caterpillar-like fire-grate). All of these furnaces successfully prevented smoke but required a large space

38 HCPP, Report from the Select Committee on Smoke Prevention (1843), p. 108.
39 HCPP, Report from the Select Committee on Smoke Prevention (1843), pp. 121–122.
40 HCPP, Report from the Select Committee on Smoke Prevention (1843), p. 110.
41 HCPP, Report from the Select Committee on Smoke Prevention (1843), p. 111.
42 HCPP, Report from the Select Committee on Smoke Prevention (1843), p. 110.
43 Mudie [1841], p. 109; HCPP, Report from the Select Committee on Smoke Prevention (1843), pp. 95, 112.

for installation, were complex in design, and had durability problems, making them unsuitable for application to steamships.[44]

The stable coal-feeding furnaces and newly designed furnaces with some complicated mechanisms, which were used on land and probably required considerable installation space, were also difficult to employ in steamships. However, many other newly designed furnaces, believed to be originally intended for land use, appeared to have been easily converted for steamship use without any mention of major modifications. The probable reason was that marine boilers at that time were fire-tube boiler with high water retention capacity and low atmospheric pressure, and unlike the later-generation water-tube boilers with high temperature and high atmospheric pressure, the installation space was as large and the mechanism was not as complicated as those of land-based boilers used in factories, among others. It was believed that unlike the later-generation water-tube boilers, there was no major difference in installation space or mechanism between the marine boiler and the land-based boiler used in factories. It was thought that because steamships, marine steam engines, and marine steam boilers were still in their infancy, the land-use smoke-suppressing furnaces to prevent smoke pollution were converted directly for application in steamships as a temporary measure. Undeniably, this also served as an important background for the military conversion of civilian-use smoke-preventing furnaces during this period.

As described above, the Royal Navy had been testing many of the furnaces or fire chambers developed for the purpose of preventing smoke pollution, mainly for smoke control, and some of them had even been introduced to naval steamships. The reasons behind their trial use and introduction in the first place were not clear from the testimonies. One possibility was that first of all, the Navy might have been sued for smoke nuisance. In fact, in 1859, the City of Liverpool complained to the Admiralty about smoke from Navy (Coast Guard) steamer (*HMS Sea Mew*) navigating on the River Mersey.[45] However, this incident occurred long after the Navy's trial and use of the smoke-preventive fire chambers described above, and no such complaints or lawsuits can be found in the main historical records prior to 1859 and probably never even existed.

Another possibility involved an experiment to prevent smoke on the Queen's yacht, which was *HMY Victoria and Albert*, launched in 1843. Managed by the Navy, she was the first paddle royal yacht. However, the prevention of smoke and soot emitted from her huge funnel (chimney) was a major problem in the Navy, probably about the soot falling on the dressed royals.[46] However, this problem would be addressed by the use of the Llanelly coal from South Wales, which produced less smoke. This issue was tackled not only in the studies by Playfair and De La Beche (cited in the previous section), but Woolwich Dockyard had also conducted combustion tests on nearly 50 different types of coal as of 1843.[47]

The most probable explanation is that smoke-preventing fire chambers were tried out and introduced for the military purposes of preventing the generation of smoke and ensuring secrecy during steaming. The trial use and introduction of the smoke-suppressing fire chambers occurred at around the same time as Playfair and De La Beche's coal surveys that

44 HCPP, Report from the Select Committee on Smoke Prevention (1843), pp. 109, 111–112.

45 National Archives (TS18/80), As to Smoke from Her Majesty's Steamers on the Mersey.

46 HCPP, Report from the Select Committee on Smoke Prevention (1843), pp. 112–113.

47 HCPP, Report from the Select Committee on Smoke Prevention (1843), p. 126. Lloyd, Chief Engineer and Inspector at Woolwich Dockyard, who testified to this, also emphasized that the Llanelly coal was South Welsh coal but not anthracite coal, noting that the latter was difficult to burn. He also stated that the Llanelly coal had a higher carbon content and lower bituminous content than those of common coal.

emphasized the importance of smoke suppression (which would ensure secrecy during steaming) in selecting coal suitable for naval steamers (as already mentioned). It is probably reasonable to assume that the survey and trial use of the smoke-control fire chamber by the naval arsenal engineers were also conducted for this military purpose. Smoke-control technology, which had been applied to prevent smoke pollution, was converted to military use here as well. In the same period, an engineer who recommended the use of Steven's patented smokeless furnaces on naval steamers noted that the funnels could be made smaller (less conspicuous) by reducing the generation of smoke. This would lead to ball-proofing, and he explained that for this reason, it would be necessary to introduce a smoke-preventing fire chamber.[48] At this time, because smoke control was clearly found to have military utility, the smoke-suppressing fire chamber, which had been used in civilian applications to prevent smoke nuisance, was being tried out and introduced in the Royal Navy.

(2) Charles W. Williams' smoke-control fire chamber

There is another example of the Royal Navy's involvement in the civilian use of smoke-preventing furnace for smoke pollution control in the mid-19th century. Charles W. Williams' smoke-preventing fire chamber (which was mentioned in the previous section) was put to use by the naval arsenal in 1858.

Williams was the Managing Director of the City of Dublin Steam Packet Company and Director of the Peninsular and Oriental Steam Navigation Company, P&O, when he was called as a witness at the Select Committee on Smoke Prevention hearing in 1843. The committee highly evaluated his new design of the fire chamber for its effectiveness in controlling smoke and saving fuel, as mentioned earlier. His new design had been used on *the Hindostan* and *the Prince* in the private sector, but as of 1843, it had not been applied in any naval vessel or naval arsenal.

In 1858, Williams' new design for a boiler fire chamber would be tried by R. Taplin, Assistant Inspector of Steam Machinery at Woolwich Dockyard and T. W. Miller, Assistant Chief Engineer at Portsmouth Dockyard, and with the cooperation of "the Steam Collieries Association of the North of England" and "the Association for consuming the Smoke of Bituminous Coal when used in Tubular or other Marine Boilers", at Elswick, Newcastle-upon-Tyne, a prosperous coal trading town in the coalfield region of northeastern England.

The trial smoke control was conducted on Williams' boiler fire chamber (Figure 2), which was partly modified by the above-mentioned association. As shown in the figure, Williams' newly designed fire chamber had numerous air passages. The boiler for steamship used in the experiment is shown in Figure 3. As already mentioned, at that time, marine steam boilers were fire-tube boilers or tubular boilers with high water retention capacity but low atmospheric pressure, as shown in the above association's name and in Figure 3; water-tube boilers with high temperature and high atmospheric pressure had not yet made their appearance. In this trial experiment, the feed water preheater, probably an advanced technology at that time was also attached to the boiler and used. Forced draught using a steam jet was also attempted.

As shown in Table 1, the main factors investigated during the trials involved combustion efficiency, such as steam generation speed and steam generation volume and power, and smoke generation as seen in "REMARKS". As mentioned, the combustion efficiency was clearly a matter of not only fuel efficiency but also freedom in military operations (i.e.,

48 Dunbar [1854], pp. 53–54.

long-distance navigation in no-wind conditions and high-speed navigation during combat). It goes without saying that smoke generation were not investigated for the prevention of smoke nuisance but for military purposes (i.e., to ensure secrecy during steaming). Williams' smoke-control fire chamber, which was highly evaluated as a technology for smoke pollution control by the Select Committee on Smoke Prevention, was recognized for its military significance and tried for military purposes in the Royal Navy.

During trials in Newcastle, Williams' newly designed fire chamber received very high marks for smoke control and fuel efficiency. The trial of the new fire chamber was conducted using South Welsh coal, such as "Powell's Dufferyn" and "Blaengwarn Merthyr", and North England coal, such as "West Hartley Coal", "Buddle's West Hartley Coal", and "Lambton's Wallsend Coal". However, Williams' newly designed boiler fire chambers proved that bituminous coals from the northern countries could also be used to prevent smoke, and some of these coals could be burned more efficiently than South Welsh coals. It was also found that while South Welsh coal was relatively brittle, North England coal was more cohesive, and it was even stated that the latter was better suited for steamships when considering long-distance transportation, among others, since the problems of combustion efficiency and smoke were no longer issues.[49] It was also observed that the stoker's labor and ability to feed the coal into the fire chamber were no more demanding than when using South Welsh coal.[50]

The naval engineers were also guided by the association's engineers in visiting the mines where Williams' newly designed fire chamber, which they had refurbished, was installed and in use (the Cramlington West Hartley Collieries and the Bedlington Collieries), and in visiting the steam tug *Expert*. In both visits, Williams' fire chambers demonstrated near-perfect smoke control.[51]

Thus, the trial tests and inspection of Williams' newly designed fire chamber revealed that improved combustion efficiency and smoke control on steam vessels were possible, not only by relying on South Welsh coal but also by using a smoke-control fire chamber. It became clear that bituminous coal from the northern countries would be sufficient to meet the Royal Navy's requirements (high combustion efficiency and smoke control) if smoke-control fire chamber were used. However, matters subsequently took a turn for the worse, and the experiment's results almost lost their validity.

As noted, the experiments were led by the Northern England coal interest groups ("the Steam Collieries Association of the North of England" and "the Association for consuming the Smoke of Bituminous Coal when used in Tubular or other Marine Boilers"). As mentioned, South Welsh coal had come to be highly regarded as the fuel of choice for naval steamships as a result of various experiments up to that time,[52] and Cardiff was no longer considered to be in a position of monopoly in the supply of fuel to the Royal Navy. It would not be a stretch to speculate that the northern coal suppliers in Newcastle resisted this situation and set up this trial to promote the northern countries' bituminous coal to the

49 HCPP, Copy of the report of Messrs. Miller and Taplin on the Evaporative Power and Economic Value of Hartley coal, p. 6.

50 HCPP, Copy of the report of Messrs. Miller and Taplin on the Evaporative Power and Economic Value of Hartley coal, p. 4.

51 HCPP, Copy of the report of Messrs. Miller and Taplin on the Evaporative Power and Economic Value of Hartley coal, p. 5.

52 From the time of Playfair and De La Beche's studies on coal for naval steamships until shortly before Williams' fire chamber experiments at Newcastle, the naval arsenals at Woolwich and Portsmouth continued to conduct experiments comparing the burning efficiency and smoke production of South Welsh coal with those of coal from mainly the northern countries. The test results were generally positive for South Welsh coal (HCPP, Return of all coals tried at Woolwich and Portsmouth dockyards).

Navy.

However, a short time later, when the South Wales side learned of that experiment's results, their group naturally responded by inviting Taplan and W. Lynn, Assistant Inspector of Steam Equipment at Portsmouth Dockyard, to Cardiff to conduct a comparison experiment between South Welsh coals and North England coals under the leadership of "the South Wales Collieries Association". The South Welsh coals and the North England coals were burned in a standard fire chamber and in Williams' newly designed one, respectively. The results of the Cardiff experiment were the exact opposite of those obtained in Newcastle, shown to be inferior to South Welsh coals.[53]

Clearly, Northern England (Newcastle) and South Wales (Cardiff) each had a strong "spirit of rivalry actuating the parties concerned", as noted in Taplan's final report on the results of the experiment. Fearing that the rivalry might further escalate, the naval arsenal decided to take the side of South Wales in defusing the situation. For various reasons, the arsenal rejected the Newcastle experiment, which used the South Welsh coals that had been shipped from Woolwich Dockyard's coal yard and constituted a mixture of old and poor quality coals. The experimental boiler tried out at Newcastle had a larger heating space than the normal steamship boilers and were better in burning bituminous coal, and so on.[54]

As a result of the intensifying conflict of interest between the South Welsh coal suppliers and the Northern England coal suppliers, and as a result of its subsidence by the naval arsenal, the presence of Williams' newly designed fire chamber in the Navy was probably greatly reduced. After trial tests at Newcastle and Cardiff, Williams' smoke-control fire chamber could not be found in the main naval archives, to the best of the author's knowledge. It is believed that the combination of Williams' newly designed fire chamber and northern bituminous coal as a smoke-control measure adopted by the Royal Navy vessels never saw the light of day.

However, it was clear that smoke control continued to be recognized as an important military issue in the British steam navy in the mid-19th century, when it was still in its infancy. At that time, there was not much difference between land-use and ship-use smoke-control furnace or fire chamber. Under such circumstances, regardless of whether individual fire chambers were adopted or not, smoke-suppression fire chamber for the purpose of smoke pollution control could be converted into an important military technology relatively easily by changing the meaning and purpose of the fire chambers.

Conclusion: Transfer of smoke-control technology to Japan

The smoke-control technology for preventing smoke pollution (smoke-control fire chamber), which could be a military technology, was not necessarily British. However, since many of the steam boilers mainly used in early 20th-century Japan were of British types, such as Cornish, Lancashire, and Scotch, it is possible that in response to these types, many British fire chambers were introduced (and perhaps even imported) to Japan but without any special regulations.

In 1896, Iwato Kimura published *Shouen Gentan Kikanro* (Smoke Control and Saving Fuel Boiler Furnaces), which introduced smoke-preventing furnaces (newly designed ones

53 HCPP, Copy of the report of Messrs. Miller and Taplin on the Evaporative Power and Economic Value of Hartley coal, pp. 12–15.

54 HCPP, Copy of the report of Messrs. Miller and Taplin on the Evaporative Power and Economic Value of Hartley coal, pp. 16–22.

and stable coal-feeding types) with design drawings, mainly from the United States, for the purpose of preventing smoke nuisance for consumer use. However, many of these American smoke-preventing furnace designs were highly similar to those developed in early- and mid-19th-century Britain.[55] Additionally, "Baien Boushi Kenkyukai" (the Society for Smoke Control Research), established in Osaka in 1911, investigated and reported the state of smoke control in the West and held exhibitions to introduce to the public the inventions and foreign products related to smoke prevention.[56]

The relation between the Imperial Japanese Navy and the above-mentioned smoke-control technology brought to Japan for the purpose of preventing smoke pollution is unclear. The Imperial Japanese Navy, which had access to South Welsh coal from the United Kingdom, probably had no interest in smoke-control fire chambers. However, if the Imperial Japanese Navy had faced a situation where South Welsh coal was unavailable before the interwar period, when the fuel shift from coal to oil was underway, it could not be ruled out that the smoke-suppression fire chamber would have been converted and utilized as an important military technology. In Britain in 1905, a document distributed at a meeting of Balfour's cabinet referred to the possibility of using oil as an alternative to South Welsh coal if it became unavailable. The document also mentioned the possibility of using more bituminous coal "with improved furnaces, &c., fittings" had been suggested.[57]

As discussed, smoke-control knowledge and technology used for the purpose of smoke pollution control, which at first glance may not seem to have much to do with the military but is considered peaceful knowledge and technology, may well be used for military purposes. On one hand, the smoke-control effect of the technology was sought by civilians to prevent smoke pollution. Another effect of the technology, namely improved combustion efficiency (fuel savings), was pursued to realize smoke pollution control that would not place too much burden on manufactures. On the other hand, in the Royal Navy, such technology was required to increase the freedom of military operations to enable long-distance navigation in no-wind conditions and high-speed navigation during combat, and the smoke-control effect was necessary to ensure secrecy during steaming. Knowledge and technology related to smoke control, which had been developed in the civilian sector for the prevention of smoke pollution, were utilized in the Navy by changing their purpose and meaning, thereby achieving a military semantic shift.

This conversion took place at the dawn of the British steam navy, when it was first confronted with a variety of problems—unique to the first steam warships—that had not been encountered in the case of sailing ships. It was also a time when steam engines and steam boilers for land use and for ship use still shared a certain degree of commonality. Of course, it was precisely because it was the dawn of naval steamships that knowledge and technology, developed for the purpose of preventing smoke pollution in the civilian world, were especially used for military purposes and that the fire chambers for land-based boilers were applied almost to the same extent as they were to naval steamships. In other words, it is undeniable that the cases discussed here were peculiar to the beginning of the development of certain military technologies. However, as the speed of technological progress has increased significantly at present compared to the mid-19th century, and the cycle of new military technologies and weapons has accelerated, more opportunities for civilian and consumer technologies are expected to be used at the early stages of development of many new military technologies and weapons. Air pollution (smoke

[55] Kimura [1896].
[56] Adachi [1933], p. 1468.
[57] National Archives (CAB 1/6/1), The Supply of Welsh Steam Coal for the Navy, p. 4.

pollution) control technologies and environmental knowledge and technologies, such as those discussed in this paper, can be transferred relatively easily for international aid and exchange. It would be undesirable for technology that is transferred as an important tool for building peace to become a threat to that peace. The ambivalence of the technology to be transferred and the possibility of its military diversion seem to require more careful consideration than ever before.

Figure 1: Mid-19th-century Royal Navy wooden steamship (*HMS Driver*) (Winfield [2014], p. 321)

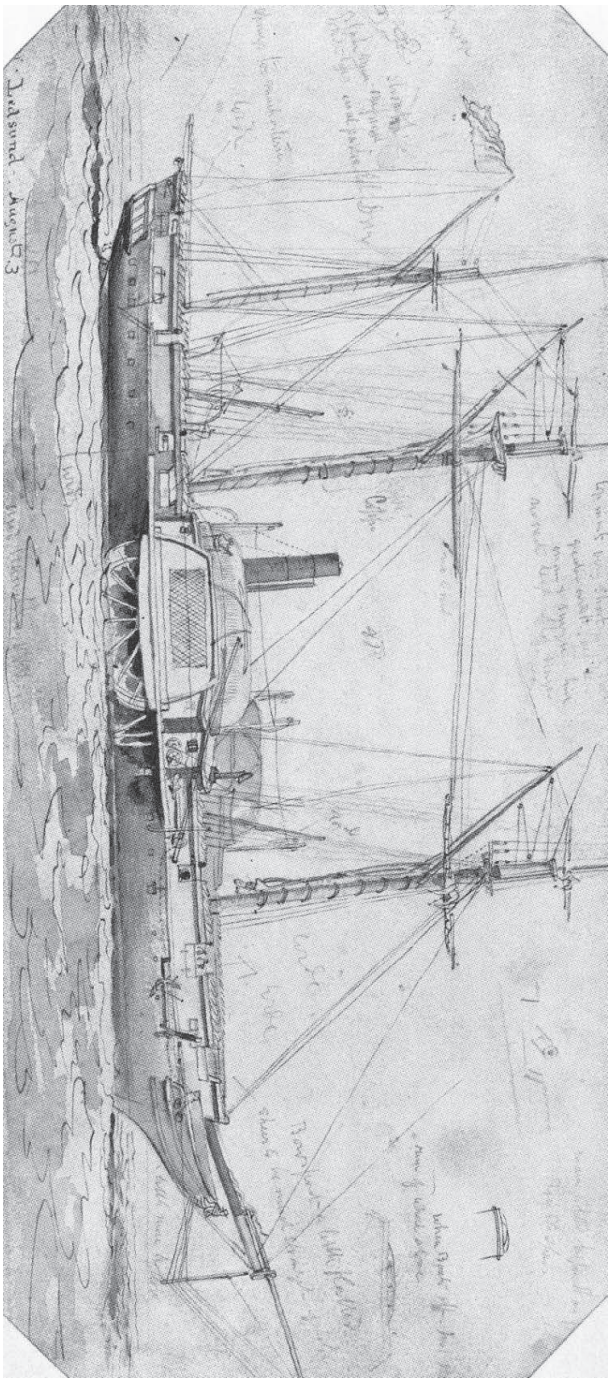


Figure 2: Charles W. Williams' smoke-control fire chamber

(House of Commons Parliamentary Papers, Copy of Messrs. Miller and Taplin's report on the Evaporative Power and Economic Value of Hartley coal, tracing B [from ProQuest online edition])

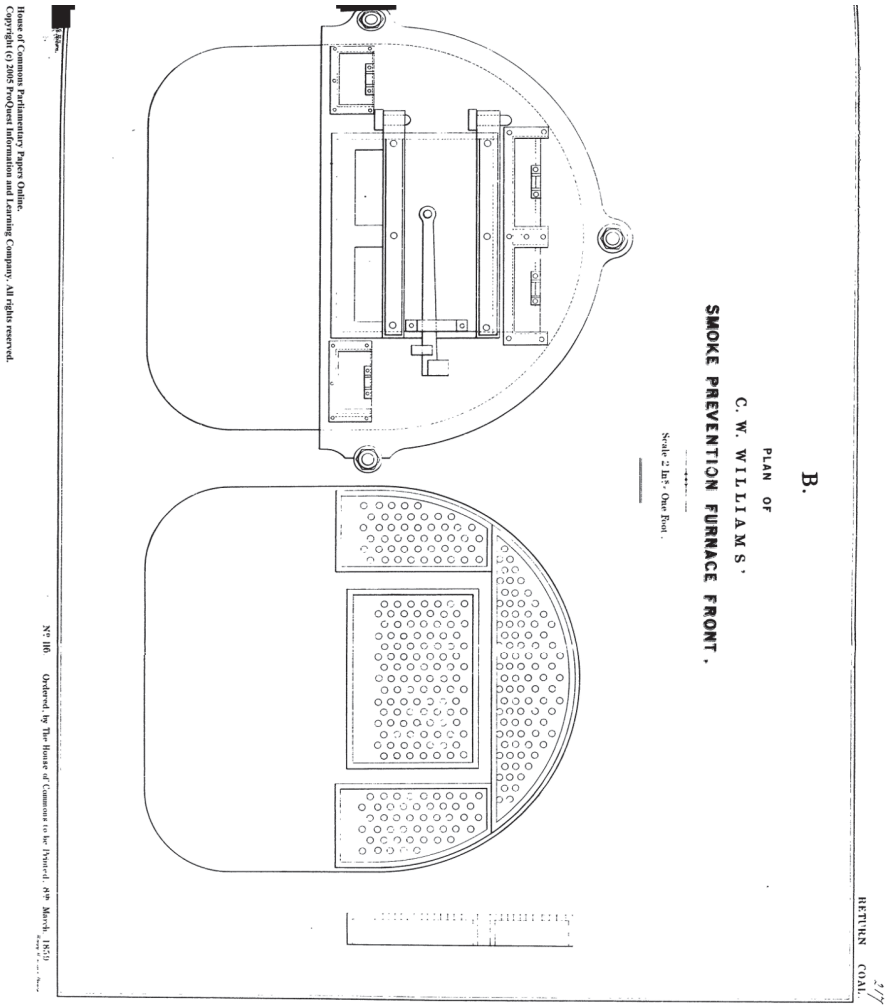


Figure 3: Experimental boiler used in the 1858 fire chamber and coal test by the naval arsenal

(House of Commons Parliamentary Papers, Copy of Messrs. Miller and Taplin's report on the Evaporative Power and Economic Value of Hartley coal, tracing A [from ProQuest online edition])

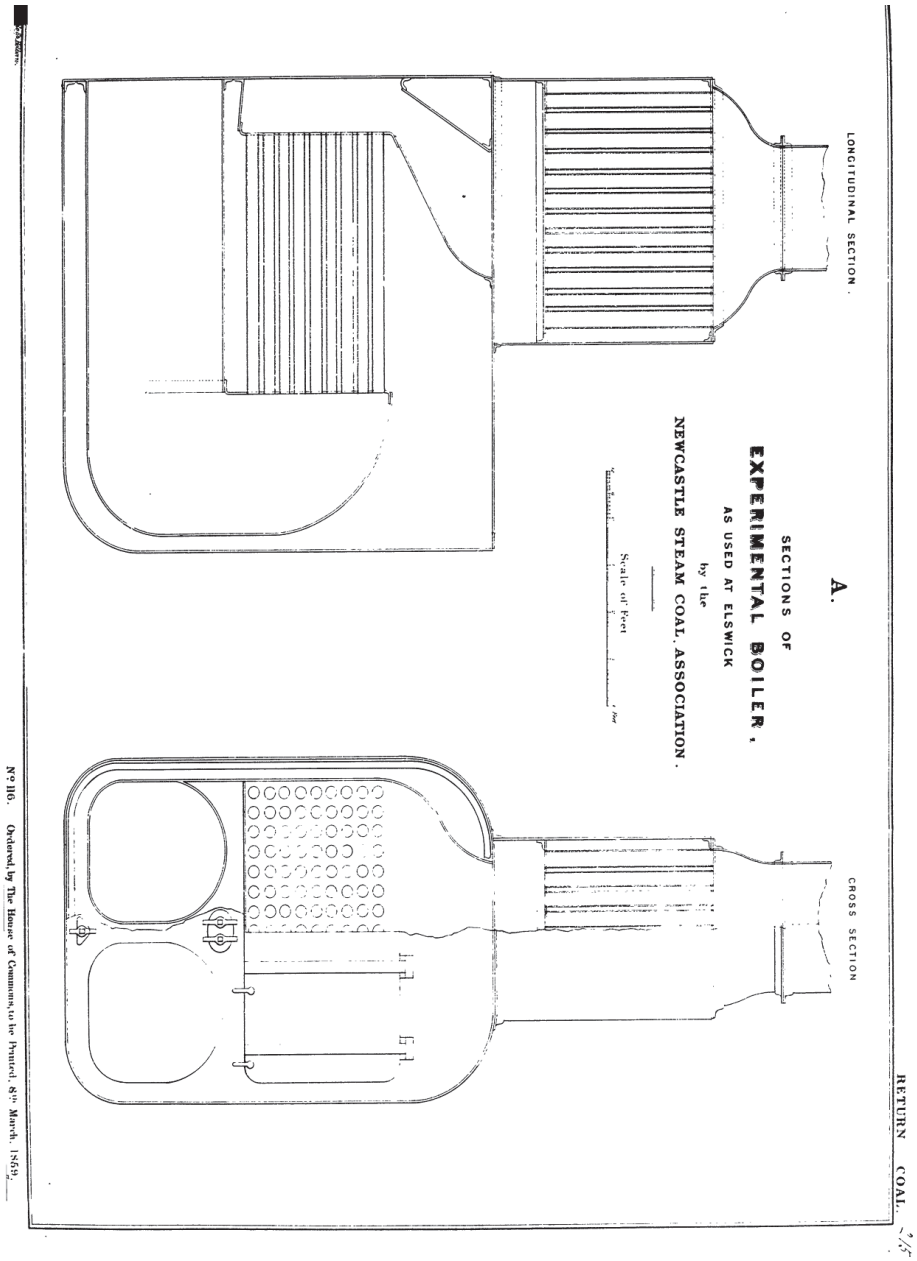
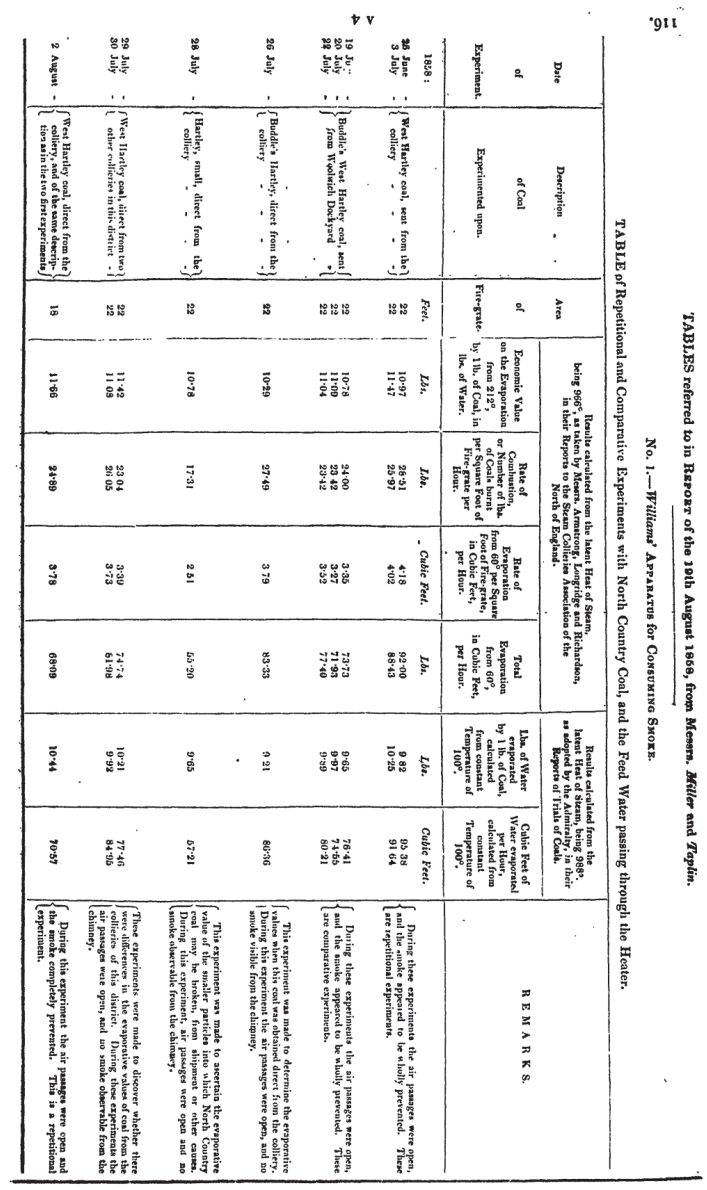


Table 1: Some results of the 1858 fire chamber and coal tests by the Navy arsenal

(House of Commons Parliamentary Papers, Copy of Messrs. Miller and Taplin's report on the Evaporative Power and Economic Value of Hartley coal, Table No. 1, p. 7 [From ProQuest online edition])



911.

TABLES referred to in REPORT of the 19th August 1859, from Messrs. *Miller* and *Taplin*.

No. 1.—*Williams'* APPARATUS for CONSUMING SMOKE.

TABLE of Repetitional and Comparative Experiments with North Country Coal, and the Feed Water passing through the Heater.

Date of Experiment.	Description of Coal Experimented upon.	Area of Fire-grate.	Results calculated from the latest Heat of Steam, being 966°, as taken by Messrs. Armstrong, Longridge and Richardson, in their Reports to the Steam Collieries Association of the North of England: Economic Value on the Evaporation from 212°, lbs. of Water, by 1 lb. of Coal, in	Rate of Combustion, or Number lbs. of Coals burnt per Square Foot of Fire-grate per Hour.	Rate of Evaporation from 60° per Square Foot of Fire-grate, in Cubic Feet, per Hour.	Total Evaporation from 60°, in Cubic Feet, per Hour.	Results calculated from the latest Heat of Steam, being 988°, as adopted by the Admiralty, in their Reports of Trials of Coals: Lbs. of Water evaporated by 1 lb. of Coal, calculated from constant Temperature of 100°.	Cubic Feet of Water evaporated per Hour, calculated from constant Temperature of 100°.	REMARKS.
		Feet.	*Lbs.*	*Lbs.*	*Cubic Feet.*	*Lbs.*	*Lbs.*	*Cubic Feet.*	
1858:									
26 June	West Hartley coal, sent from the	22	10·97	26·31	4·18	92·00	9 89	89 38	During these experiments the air passages were open, and the smoke appeared to be wholly prevented. These are repetitional experiments.
3 July	colliery	22	11·47	25·97	4·02	88·43	10·25	91 64	
19 July	Beddie's West Hartley coal, sent	22	10·78	24·00	3·85	73·73	9·65	78·41	During these experiments the air passages were open, and the smoke appeared to be wholly prevented. These are comparative experiments.
20 July	from Woolaich Dockyard	22	11·09	23 42	3·97	71·93	9·97	74·55	
28 July		22	11·04	23·12	3·92	77·40	9·59	80·21	
26 July	Beddie's Hartley, direct from the colliery	22	10·29	27·49	3·79	83·33	9 21	86·36	This experiment was made to determine the evaporative value of the coal when the air passages were open, and no smoke visible from the chimney.
28 July	Hartley, small, direct from the colliery	22	10·78	17·31	2 81	55·20	9·65	57·21	This experiment was made to ascertain the evaporative value of the coal when the air passages were closed. The coal may be broken, from shipment or other causes. During this experiment, air passages were open and no smoke observable from the chimney.
29 July	West Hartley coal, direct from two	22	11·42	23·04	3·69	74·74	10·21	77·46	These experiments were made to discover whether there were differences in the evaporative values of coal from the collieries of this district. During these experiments the air passages were open, and no smoke observable from the chimney.
30 July	other collieries in this district	22	11 03	20 05	3·73	64·98	9·39	84·05	
2 August	West Hartley coal, direct from the colliery, and of the same description as in the two first experiments	18	11·66	24·99	3·78	69·09	10·44	70·57	During this experiment the air passages were open and the smoke completely prevented. This is a repetitional experiment.

OF HARTLEY AND WELSH STEAM COAL.

7

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Controversy over Injunction against Publication of Official Wartime Economic History in the United Kingdom

By KEI OTA*

This paper examines the case of Postan's *British War Production*, published in 1952, which became the subject of an injunction dispute involving the British Joint Intelligence Committee. The book described Britain's military industrial base during World War II, but its publication was met with resistance in the context of rising tensions between the Soviet Union and the West. In several meetings, economic historians and cabinet secretaries advocated the importance of building a nation-state narrative and making it available to civil society. Conversely, the military opposed the release of information related to the conduct of total war. The Ministry of Foreign Affairs and the Scientific Advisory Board argued that advancements in weaponry and the regular release of economic data rendered information secrecy increasingly obsolete. Although the debate was ultimately resolved somewhat forcefully when Prime Minister Churchill authorized publication, the discussions remain instructive. They include deliberations on the nature of future warfare and the potential benefits of making recent history publicly available.

Introduction

This paper focuses on the controversy over the injunction against the publication of *British War Production* (London: H. M. Stationary Office, 1952, xvi + 512pp.), written by Postan (1898–1981). It aims to clarify the nature of the conflict between economic logic and military logic as highlighted in the deliberations of the Joint Intelligence Committee (hereafter JIC). The controversy over the injunction against publication was triggered by the compilation of an official government-issued military history depicting wartime production in the United Kingdom during World War II. This official war history, which dealt extensively with British wartime production during World War II, including resource management, production structures, and means of production, was authored by an economic historian rather than by the military or government agencies. The controversy over whether the book should be distributed to the public occurred during the Korean War in 1951, at the height of the Cold War. Three distinct groups emerged in this controversy: the military and related government agencies, which argued that publication should be suspended to prevent the spread of important information; the Cabinet Secretariat's Historical Compilation Department, which wanted to prevent the suspension and publish

* Research Associate, School of Business Administration, Meiji University.

the history book; and various government agencies, which examined the information and analysis of both parties.

Although the controversy lasted only five months, it raises important points in several respects. First, it centered on whether priority should be given to information control or to the writing of history by civilians. Public documentation of history by civilians was important in terms of preserving the results of industrial mobilization and management methods, and it also served as a means of disclosing information to the public. Moreover, hiding all mobilizable economic resources and corporate information as military secrets would impede economic activities. On the other hand, unrestricted disclosure of key wartime economic information would be tantamount, in the case of the British during the Korean War, to disclosing military weaknesses to the enemy, especially the Soviet Union. The injunction controversy over this public disclosure clashed between the "logic of the economy and civil society" and the "logic of military and total war." The controversy also revealed the importance of wartime economics and economic intelligence to government officials of the time. In an era when scientific and technological advancements, including jet warplanes, missiles, and nuclear weapons, were already anticipated, the controversy revealed a conflict between the military, production authorities, the Ministry of Foreign Affairs, and the Science and Technology Advisory Board. This raised broader questions: In this new era, does it really make sense to control industrial intelligence? Fundamentally, can total war and total mobilization continue to exist in a world with nuclear bombs? These questions were exposed in the injunction controversy.

This paper examines these issues using the JIC's regular meeting reports (*J.I.C. Meeting*) and a report submitted to Prime Minister Churchill (*Official History of British War Production by Professor H.M. Postan*, *Report by Joint Intelligence Committee*). Chapter 1 presents the history of the wartime economic history's compilation, which became the subject of the injunction, and the decision-making processes within the Intelligence Division that led to concerns about its publication. Chapter 2 analyzes the origins of the controversy, drawing on archival records of the JIC's regular meetings. Chapters 3 and 4, along with the conclusion, review the final report submitted to the Prime Minister and summarize the JIC's conclusions.

1. Compilation of Official Wartime Economic History and M.M. Postan

Before delving into the details of the injunction controversy, we will first examine the JIC—the setting for the controversy—and provide an overview of the wartime economic history at the center of the debate.

(1)Postan's Career, Wartime Cooperation, and Civilian Historiography

Postan, the author of *British War Production*, is widely known as a historian of British medieval economic history. Born in Bessarabia (now the Republic of Moldova) in 1898, Postan became a lecturer in history at London University in 1927, a lecturer at Cambridge University in 1935, and a professor at Cambridge University in 1939, a position he held until his retirement in 1965. After his retirement, Postan published many works on medieval economies. He also organized an international conference on economic history with Braudel and others in 1960 before his retirement. He is also credited with the internationalization of the *Economic History Review*, a prestigious British economic

journal.[1] In addition to his career, Postan's research also included aspects of wartime cooperation, particularly the economic analysis of enemy intelligence.

British War Production was one of a number of government-sponsored official war histories by university researchers that summarized the British wartime production system, resource rationing, research and development, labor allocation, and other aspects of the broader British war effort.[2] This compilation of official military history[3] began in the early 20th century as a project of the Cabinet Office. In 1923, it became a project of a subordinate organization of the Imperial Defense Committee but was reconverted to a Cabinet Office project at the time of World War II. After the war started, K. Hancock took over as the supervisor of this program. A total of 99 volumes of the official military history of World War II were planned, of which 85 were published. Postan's was part of the Civil History (30 volumes), which was separate from the Military History (35 volumes) and the Medical Series (20 volumes) and concerned the area of the civilian sector. The civilian sector covers a wide range of events in the civilian field, from agriculture[4], studies of overseas supply, and financial policy, to supply and production in rear production areas, to civilian air defense and defense forces. It also dealt with a wide range of civilian issues in the context of total war, from supply and production in rear production areas to civil defense, including civilian air defense and defense units. Postan had been responsible for organizing and analyzing information on Germany's economic mobilization since the war, and the decision to compile an official war history was delegated as a result of such work. At least as of July 1945, Postan was involved in the compilation of the official war history, together with Hancock and others.[5] When the British government collected wartime economic information on the Nazis in occupied Germany, meetings were held on whether to send staff from their historiography department, which excelled in analyzing economic information.

(2) Exchange of Opinions at Joint Information Committee Meetings

The British counterintelligence community, which began in the 1880s as a police intelligence unit monitoring terrorist activities by the Irish, evolved into a variety of intelligence agencies that conducted surveillance and intelligence activities inside and outside the empire.[6] In particular, from the turn of the century to the beginning of the 20th century, intelligence agencies were established by region and type, from the Secret Service Branch (established in 1909, hereafter SSB) to the Secret Intelligence Service (hereafter SIS), which was in charge of gathering information abroad, and MI5, which was in charge of domestic intelligence. The JIC, established in 1936, was an organization designed to unify the flow of information among the various bureaucratic and military organizations that governed the British Empire. Although it was under the command of the Chief of Staff Committee (hereafter CoS), its role, according to Kotani [2019], was to collect and analyze foreign intelligence, operate intelligence organizations, coordinate intelligence with the CoS and other committees, make intelligence recommendations to the Cabinet and the Prime Minister, and make centralized consolidation and recommendations. During World

1 Postan, translated by Hosaka and Sato [1983] p. 346.

2 TNA (The National Archives), CAB 158/13: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee: Memoranda (JIC Series), July–December, 1951.

3 Higham [1964] pp. 240–248.

4 Winkler [1957] pp. 901–903.

5 TNA, CAB 176/7: War Cabinet, Ministry of Defense and Cabinet Office: Joint Intelligence Sub-Committee, later Committee: Secretariat: Minutes (JIC(SEC)), July 7–October 5, 1945.

6 See Okuda [2012]; Kotani [2019] for explanations on JIC.

War II, the Churchill Cabinet was in charge of the intelligence and intelligence organization of the country. During World War II, under Churchill's cabinet, it occupied an important position in wartime decision-making. Okuda [2012] evaluated the JIC's centralization role in the intelligence community and argued that it was a good balancer against "colligiality," which is a cooperative relationship among peers. In the 1950s, when the injunction controversy arose, the JIC was under the control of Cabinet Secretary Norman Brook, who took office in 1946, with Prime Ministers such as Attlee and Churchill as his direct superior. Therefore, the JIC's writings were recommendations to the Prime Minister, as described below, and were devoted to the consolidation and evaluation of the opinions of the mandated agencies; it was important that the Prime Minister's decisions, not to mention those of the CoS, were always uppermost in the minds of the JIC.

(3) The Korean War and the Start of the Rearmament Program

The period from late 1951 to 1952, when the controversy over the compilation of military history took place, coincided with a critical period when the United Kingdom embarked on a full-scale renewal of its military forces in response to the Cold War. Over-All Strategic Plan-47 (hereafter OSP-47) clearly stated that the United Kingdom would work with the U.S. military, which possessed nuclear weapons, to secure maritime transportation and defend Europe, while Global Strategy Paper-1950 (hereafter GSP-50) added the following to the OSP-47 and GSP-50 specified that a global strategy would prevent war with the Soviet Union. The Korean War began in June 1950, one month after GSP-50 was issued, and in August 1950, British troops landed on the Korean Peninsula as part of the UN forces, and the United Kingdom was again placed in a state of war.[7] The Soviet Union's successful nuclear bomb test in 1949 also led to the relative devaluation of the means of relying on the American atomic bomb for defense in 1947. These were significant events for the heads of the armed forces that created the GSP, the Army, Navy, and Air Force, so much so that in 1952, they revised their overall strategy as the Global Strategy Paper-52 (hereafter GSP-52) in light of the Korean War. Even so, there were disagreements over whether conventional war after nuclear war, the so-called "broken backed warfare" advocated by the Navy, would occur or whether the war would end with a nuclear attack,[8] and the three armed services (Royal Navy, British Army, and Royal Air Force) were not in complete agreement over an all-out conflict with the Soviet Union during this period. The three armies were not in complete agreement over a full-scale conflict with the Soviet Union during this period. Since the dilemma between all-out nuclear war and conventional war had been realized to some extent by the Korean War, the Attlee administration had no choice but to be as conscious of mobilization and control of industry as it had been of nuclear war. The rearmament program, which included these general economic matters, was naturally bloated, especially during Attlee's tenure, when he planned to spend more than 10% of GNP(Gross National Product) for three years.[9]

The third and tenth reports of the Government Sub-Committee on Rearmament, from November 1950 to March 1951, listed agendas dealing with rearmament.[10] The main topics discussed included the rationing of raw materials and resources, the expansion of machine

7 Clark [2004] p. 227.

8 The debate, centered on the Air Force Chief of Staff, was divided on whether there would be a prolonged conventional war after nuclear war; Baylis [1995] p. 19.

9 Clark [2004] p. 227.

10Third Report [with Evidence taken before Sub-Committee B, and Appendices] (1950 Committee B, and Appendices), (178). Tenth Report of the Commissioners for the Exhibition of 1851 (Exhibition of 1851), 1950–51, Cmd. 8348.

tools in the domestic industry, and the allocation of human resources. From these agendas, it is clear that the Attlee administration's "rearmament" program was based on the premise of large-scale mobilization, a "two-war" type of mobilized economy that even took industrial mobilization into account.[11] Although the Attlee administration was defeated in the general election of October 1951, plans for rearmament and strategic planning continued to be formulated, even after the transfer of power to Churchill. Churchill tried to limit the amount of Attlee's spending decisions for rearmament from one year to the next and instead tried to limit the budgetary damage by doing so over a longer period of time, but the basic policy remained the same.[12]

The protest from the military and intelligence services regarding the publication of government documents on the total war economy occurred against the backdrop of the years 1951–1952, during which the United Kingdom was implementing its rearmament policy and transforming its military strategy. The country was also facing the threat of war in the near future. In particular, the military had to be sensitive to the review of military strategy, as it determined the overall mobilization plan and was an ongoing issue during the period of the injunction controversy. The question was how valid it was, and the JIC was in a heated debate over this point.

2. The Beginning of the Injunction Controversy

The previous chapter provided an overview of the compilation of official military history and the position of the British imperial intelligence community, particularly the JIC. We also discussed the British government's predictions of war against the Soviet Union in the background of the injunction controversy. Based on the above, we will now discuss how the two sides became actors in the controversy.

(1) Discussion at the 128th Regular Meeting

At the 128th regular meeting of the JIC, held on November 30, 1951. At this meeting, it was raised that the contents of *British War Production* might contain information that could measure Britain's war potential. The need for an investigation was emphasized.[13] Specifically, there was opposition to the publication of the book from the military services, the armed forces, and their respective service ministries, as well as the so-called functional offices of the Ministry of Supply. Given that the official war history itself had been given the go-ahead before the Churchill administration took office, Churchill attempted to resolve this issue by having the CoS and JIC hold discussions and submit a report in an attempt to consolidate their views. The JIC report also mentioned some of the smaller discussions that took place during the day's meeting. Group Captain C. V. Mears, dispatched from the Air Force, argued that if the Soviets produced a similar official war history, it would be an extremely effective source of information for the British, and he feared a leak of information from the British side. Captain W. A. F. Hawkins of the Navy and Colonel T. E.

[11]Third Report [with Evidence taken before Sub-Committee B, and Appendices] (1950 Committee B, and Appendices), (178). Tenth Report of the Commissioners for the Exhibition of 1851 (Exhibition of 1851), 1950–51, Cmd. 8348.

[12] Baylis [1995] p. 6.

[13]TNA, CAB 159/10: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee: Minutes (JIC Series). Joint Intelligence Committee, July–December, 1951.

Williams of Army Intelligence agreed. H. R. Gardner, a representative of the Ministry of Supply, argued that while some of the information was important, most of the information in Postan's book was outdated, but he was cautious about such information being leaked. G. L. Turney, Director of Scientific, also pointed out that disclosure was not a wise decision, while Brigadier General E.R. Sword, Joint Intelligence Bureau, did not find Postan's book of much importance. Sword also cited a letter sent by M. Y. Watson, a member of the Joint Intelligence Bureau, to A.B. Acheson in the Cabinet Office's official historiography department as a well-composed argument.[14] In the letter, he pointed out his impressions of the Postan manuscript, its utility, and its problems. G. A. Carey Forster, who was seconded from the Foreign Ministry and chaired the meeting, stated that most of the information here was already open source and that he was comfortable with its release. R. H. Hollos of the Security Service argued that Postan's manuscript only released statistics up to 1944 to avoid information leaks and that it is doubtful that these statistics can be connected to current data. While officers dispatched from the military and bureaucrats from the Ministry of Supply found problems with the publication of information itself, staff from the Ministry of Foreign Affairs and the Joint Intelligence Breau did not find problems with the publication itself based on how much information itself had already been published. This stance of the military and the Ministry of Supply against publication and the stance of the Ministry of Foreign Affairs and the Joint Intelligence Breau in favor of publication, saying that the information itself to be released was already available to government agencies and the media, would continue until the report was prepared.

Based on these minor discussions, the following decisions were made at the 128th regular meeting regarding Postan's writings:

1) The competent authorities should prepare a memo before the next meeting.
2) Attach a letter from Watson to Acheson.
3) Atchison continues to call Gardner from the Ministry of Supply to the next meeting.

(2) Watson's Letter and the 132nd Regular Meeting

In a letter from Watson to Acheson dated November 28, 1950, cited by Sword, Watson was consistently favorable to publishing Postan's work.[15] He begins his letter by calling the criticism of Postan by the Ministry of Duties an "invalid assumption." Watson praised Postan's book as a writing about ever-changing supply situations and touching on issues of labor, production technology, and resources. Addressing the Ministry of Duties' sense of crisis over the next war, Watson argued that if the same problems recurred in a future conflict, it would indicate either a failure to improve production facilities, such as machine tools, or an inability to learn from history—both scenarios he deemed unlikely. He further concluded that the various wartime economic factors mentioned in Postan's book, such as lack of information on business management, changes in the war situation, military estimates of weapons requirements, demands for new weapons, and supplies from the United States, would occur in the next war, "expecting a kaleidoscope to produce the same pattern every time you shake it." He emphasized that wartime economic history was shaped by the industrial structure of our country and various factors specific to the time period. In his discussion of economic intelligence, Watson also expressed the opinion that economic information is available through other means and that this work was talking about the past.

[14]TNA, CAB 176/33: War Cabinet, Ministry of Defense and Cabinet Office: Joint Intelligence Sub-Committee, later Committee: Secretariat: Minutes (JIC(SEC)), November 9–December 31, 1951.

[15]TNA, CAB 176/33: War Cabinet, Ministry of Defense and Cabinet Office: Joint Intelligence Sub-Committee, later Committee: Secretariat: Minutes (JIC(SEC)), November 9–December 31, 1951.

Watson also praised the case study of the British wartime economy presented in Postan's book as an excellent one, and even said that if a hypothetical enemy read it, they would think it was a lie. Watson, who did not indicate any problems with strategic disclosure, however, found several problems with operational and tactical disclosure. One was the concern that some of the information in Postan's book about electronic equipment and weapons factories was still in operation after the war as bases for the production of similar products and that this information could be reflected in the enemy's strategic bombing plans.

At the 132nd regular meeting on December 7, 1951, in response to Watson's letter, Acheson first discussed the origins and importance of official military history.[16] He argued that Postan's work was an official war history approved by the Cabinet, as noted above, and that it was also a history book published by an authority, in demand by the private sector and the public. He added that the publication of such a history book was important in responding to U.S. historical writing about wartime economy and that the publication of Postan's economic history of the war economy would have an impact on the injunction against other official histories of the war. In light of these arguments, Acheson argued that the Cabinet should keep the discussion to whether or not to publish Postan's work in limited release, rather than whether or not it should be enjoined. Navy's Wahlworth suggested delaying the publication of Postan's writings for a couple of years. His opinion was that if there were to be a war with the Soviet Union the next year or the year after, it would be detrimental to the war effort to have the entire World War II industrial mobilization plan published at the same time. The Army and Air Force concurred with the Navy's response, while R. E. Mceuen of the JIB and Carey Forster of the Foreign Ministry countered, as in the previous meeting, that Postan's book did not directly represent the contemporary situation. At the meeting, it was decided to continue to delegating the preparation of documents to the relevant ministries. An important point of this discussion was that the opinion of Acheson, a staff member from the Cabinet Office, was respected, and the emphasis was not on the publication itself but on regulating or manipulating the contents of the book and the date of publication. This forced the military to take up the option of delaying the year of publication. On the other hand, what characterizes the military's opinion is a sense of urgency about an all-out war with the Soviet Union. In fact, as discussed in Chapter 1, the British military had already undertaken a comprehensive revision of its strategic documents in response to the Korean War. Against this backdrop, Postan's book, which vividly depicted the real picture of munitions production five years earlier, was regarded as dangerous because it would provide information to the Soviet Union, a hypothetical enemy nation (named "Russian" in the document).

3. 1951 Report (1): Economic Intelligence and Protests on the Part of Economic Historians

In Chapter 3, we will examine the report prepared by the JIC on the injunction controversy. This was a report dated December 14, 1951, prepared by the JIC to conclude its two regular meetings. It was prepared by synthesizing the opinions of the armed forces, the supply

16 TNA, CAB 159/11: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee: Minutes (JIC Series). Joint Intelligence Committee, January–June, 1952.

offices, Postan himself, who was in the history department of the Stationary Office, and Professor Hancock, head of the civil history compilation, and integrating analytical documents from the JIB. The report was prepared by the JIC and distributed to the CoS, where it was then made available to Cabinet Secretary Bullock for approval or disapproval by Prime Minister Churchill. The report (Appendix A) includes the following documents: a protest and discussion by Professor Hancock, supervisor of Postan and civil history (Appendix B); a letter from Atchison to Watson (Appendix C); and a letter from the Office of Regulatory Advocacy and the Intelligence Committee pointing out problems in the manuscript (Annex A). Appendix C has already been mentioned. See Table 1 for Annex A. Before looking at the summary and its conclusions, this chapter looks at Annex B and Appendix B. The conceptual explanation regarding economic intelligence can be seen as the logic of the proponents of publication injunctions, while the logic from the historians' side can be seen as the opinion supporting the publication.

(1) Annex B: Concept of Economic Intelligence

First, Annex B provides a detailed explanation of the concept of economic intelligence.[17] In the United Kingdom, there are two main categories of economic intelligence abroad. These two are strategic and operational, and it is clearly stated that there is no strict boundary line between them. Therefore, the information collected can serve only one of two purposes, either strategic or operational.

From Annex A: Section of the manuscript written by Postan that was found to be problematic.

Page	Main theme of the section
74–75	Gun mountings
75	Fire control system
77–78	Armor capacity
93–94	Requirements of escort vessels
97–100	Naval repair work
103–104	Naval construction
104	Vessel repairs and conversion
105	Gun mounting
107–108	Light alloys for aircraft production
110	Aircraft programme
116	Army programme
152	Labour shortages in ship building
165	Production for A. A. defences
199–202	Aircraft programme in 1941
208–216	Army requirements

[17]TNA, CAB 158/13: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee. Memoranda (JIC Series), July–December, 1951.

236-242	Labour controls and shortage
242–246	Crisis of the drop forgings
259	Fatigue of labour
260–262	German air raids and their influence for production
263	Shortage of aircraft engines
267–274	Statistical methods of measuring the output of aircraft
272	Production of fabricated alloys
275	Ministry of Supply index of production
279–286	Royal Ordnance Factories and individual factories
309–323	Solution for the shortage of machine tools
324–336	Raw materials and the import programmes
336–348	Labour famine
348 et seq	Relation with the United States
378–409	Establishment and functions of the Ministry of Production
438–458	Naval construction after Pearl Harbour
464–484	Aircraft programmes after Pearl Harbour
492–494	Army programmes, war office and Ministry of Supply
501–508	Radio and valve production
512–519	Valve production
Supplement on aircraft repair and spares	Aircraft production line and spare parts line

Source: TNA, CAB 158/13: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee. Memoranda (JIC Series), July–December, 1951, Annex A.

Strategic economic intelligence infers a nation's military intentions, degree of readiness for war, ability to conduct it, weaknesses, human and raw materials, industrial production, economic mobilization plans, requirements for wartime and peacetime imports, stock quantities, industrial infrastructure, etc. These are national and total warfare in character. In contrast, operational economic intelligence translates strategically developed assessments into operational plans, gathering and utilizing information primarily for use in air attacks. These are specific, individualized, and local in character.

In turn, Britain's own information controls had been improved since 20 July 1945 to make public economic information, including that which had been subject to censorship during the war. These improvements included the monthly submission of key statistics and even the collation of views on the publication of records by ministries. However, Annex A says that this decision itself may be overly open-sourcing. It also states that, apart from the authorities' concern for economic intelligence, the control of records is fraught with difficulties given the public's anger over the control and censorship of information during

the war. Furthermore, in a highly industrialized country such as the United Kingdom, governments and economies can only be well-run if facts and statistics are reliably published. This is also the case for public authorities and business operations. However, given Britain's similar strategic bombing investigations against Germany in the last war and the importance of intelligence at the operational level, he concluded that more intense pinpoint bombing, sabotage, and attacks on maritime commerce were likely in a war against the Soviet Union.

(2) Annex C: Opinion of an Economist

Let's now look at the opinion of Hancock.[18] The protest letter, jointly signed by Hancock and Postan,[19] made clear their concern about the possibility that not only the content of economic intelligence but also civilian military history might be kept from public view. The subject of economic intelligence itself was also, according to them, information that was already publicly available and was therefore meaningless.

The opinion first presented the fact that Postan had already circulated the first part of the contents of his work within the government as early as June 1950 and had already voluntarily reduced the contents of the second part as well. He then mentioned the possibility that the entire series of military history compilations by civilian historians could be subject to future publication as a result of this injunction. Hancock then offered a detailed critique of each chapter of the memorandum summary. First, in response to the section "What the Services Want," Hancock clarified that the criticism of the Office of Professional Responsibility was based on a serious misunderstanding. Based on the fact that Britain's industrial potential for waging war in the interwar period had increased to the level it was in 1945, Hancock pointed out that the military believed it was necessary in the Cold War period to make the same effort to increase the very small "current" scale of production to a level that could withstand a total war effort. Hancock pointed out that there was a misconception: Britain's industrial potential, weapons development, and production efficiency had increased to such an extent in 1952 that we would not repeat the process of building up from the extremely low level of industrial production in the interwar period to the current level. Regarding weapons development, he concluded that the progress made in weapons development during the five years of World War II would not be repeated at the same rate. Regarding production efficiency, he also stated that there had been a 40% improvement over 1938 and a 70% improvement in some sectors (metalworking, machine production, electronics, and chemistry) and that Postan's work did not reflect the current state of the United Kingdom with these advances in means of production and capacity, and therefore it was acceptable to disclose this information. Regarding the publication of information, he stated that the statistics published monthly by *The Times*, *The Economist*, and ministries were more important when it came to showing current potential and that it was not reasonable to ignore them and to withhold Postan's writings. He added that forming a military history has the utility of demonstrating our strength to our enemies and making our allies recognize our value.

Next comes the criticism of "Weaknesses in U.K. War-Making Capacity," and here again Hancock argued that current ministry-issued materials more accurately present weaknesses to the enemy. In response to the military's argument that the inclusion of the damage to

[18]TNA, CAB 158/13: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee. Memoranda (JIC Series), July–December, 1951.

[19] From a contemporary perspective, Postan is an economic historian, but in the original report he is referred to as an economist. For this reason, he is referred to here as an economist.

workers caused by air strikes in the war history would benefit the enemy's air campaign, Hancock argued that the U.S. Strategic Bombing Survey circulated to the Allied governments in 1946 told in greater detail the damage caused by the massive bombing of Germany, and that it would not be a problem to publish the British air strikes damage now. Hancock argued that it would not be a problem to disclose the damage caused by British air strikes now.

Finally, in "The Dissemination of Experience," Hancock again emphasized the significance of compiling a military history. He argued that intelligence services were concerned only with leaking information to the enemy and underestimated the benefits of knowledge dissemination that the publication of military history would provide to the public and allies. He again pointed out that it was doubtful that the British experience could be applied to the Soviet Union as a communist state and concluded that Postan's book was the first in a series on military history and that withholding it would have a major negative impact on their publication.

4. Conclusions and Controversies of the 1950 Report

Based on the above discussion, what conclusions does the main body of the report reach? This section reviews the finalized information.[20]

(1) Organizing the Discussion in the Preface

The report begins with a list of the organizations represented by each committee member who spoke at the JIC meeting, roughly grouped into two categories and juxtaposed within one page. The groups are (i) the military and the supply authorities and (ii) the Foreign Ministry, the Intelligence Bureau, and the Directorate of Scientific Intelligence. The former may be simply indicated as the publication control group, and the latter as the publication permissive group. The Ministry of Supply and the armed forces based their argument on the fact that the weapons and production capacity base to be used in the 1939–1945 period and in any war that might occur within the next five years would not change in principle. On this basis, from Postan's work, the hypothetical (Soviet Union) enemy could

a) know the peak of our industrial capacity and the lead time to get there,
b) derive solutions to the economic problems necessary for Soviet industrial mobilization, and
c) know the capabilities and weaknesses of the war effort and derive peacetime and wartime sabotage and bombing targets.

Therefore, the JIC recommended that the Cabinet Committee should control the information in Postan's writings with the cooperation of the press, industry, and other organizations.

On the other hand, the tone of the recommendations of the Joint Intelligence Bureau (JIB, Ministry of Defense), the Scientific and Intelligence Advisory Board, and the Ministry of Foreign Affairs, listed next, were as follows.

a) From economic monthly reports and digests of wartime statistics, the Soviet Union had already drawn the necessary information.
b) Our production had undergone major changes since the last war.

[20]TNA, CAB 158/13: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee. Memoranda (JIC Series), July–December, 1951.

c) The Soviet Union's industrial system was significantly different from ours, so it was doubtful that they would be able to make use of our production experience.
d) Professor Postan has previously agreed to certain modifications and integrations and has therefore already removed information that could be used by the Soviet Union. Arguing this way, he opposed any injunction against the publication or regulation of the content.

As noted in Chapters 2 and 3, there was no significant difference in their basic attitudes toward the content of the publication or the issues discussed. What was important was that the military clearly stated that the war between the Soviet Union and the West could begin "within five years" and that information control and regulation could be carried out "in cooperation with the media in general." The fact that the negative aspects of economic intelligence can, to some extent, be ignored by the military and the competent authorities is clearly indicated here.

(2) Summary and Discussion Points

With the major authorities now in agreement, the JIC then moved on to a summary of the Memorandum of Security Concerns on the Publication of Economic Information.[21] The memorandum is divided into a total of 20 sections, from "the basic position of Postan's work" (paragraphs 1–7), to Postan and the JIC's points about "the differences between the British wartime economy and the current war effort" (paragraphs 8–11) and "the weaknesses of the war effort in Britain" (paragraphs 12–18), "diffusion of experience" (paragraphs 19–20), and the conclusion.

In the section about the basic position of Postan's work, the position of *British War Production* in the military history series was described. It is important to note that in 1945, the publication of wartime economic history was not considered problematic. Here, it is noted that in 1945, the British leaders thought they had established peace, and that the short-lived threat of another war was completely unexpected. The argument for or against publication was based on the expectation of a future outbreak of war in 1951–1952, the time when the report was prepared.

With the basics in mind, the first thing to be pointed out was the fact that Postan's book was the first product of a civil history series. The summary acknowledged the difference between the time when the production of the book was sanctioned and the current situation but warned that an injunction against the publication of the book would have a significant impact on the later series. On the other hand, he stated that publishing the book as was could expose the British's ability to conduct the war. The summary then went on to mention how much progress has been made in the current British war effort compared to the past. First, the summary divided the elements of wartime production into two categories. What does the army want? The first was broadly based on strategic and tactical decisions, and the second depended on the basic industrial structure.

Regarding the first, they further pointed to Soviet air strikes, sabotage at key sites and production centers, and damage to maritime traffic. Regarding the second, he said that the basic structure of weapons production had not changed and that future weapons would include guided weapons, atomic bombs, nuclear propulsion, HTP engines (Valter engines), and BC weapons. The major weapons developed during the war, however, would not appear until the end of the war. He also stated that the main technologies developed during

[21]TNA, CAB 158/13: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee. Memoranda (JIC Series), July–December, 1951.

the war were jet engines for airplanes, small arms firing rates, and sonar but argued that jet engines were not much different in production structure from piston engines, that the development of small arms firing rates would increase ammunition consumption, and that sonobuoys would place a burden on the electronics industry. It was concluded that the minor differences and the lack of change, if any, in the basic structure between industry and the military increased the importance of the outflow of wartime economic history as packaged experience.

"Weaknesses in the U.K. war-making capacity" to prosecute the war were analyzed in line with this basic thesis that the basic production structure could remain the same. The problems mentioned in Postan's manuscript, such as the shortage of skilled workers in the shipbuilding industry, the munitions production load on the electronics industry, and engine production, could increase the efficiency of air strikes and sabotage and subversion against these critical points, the summary stated. In particular, the concentration of incitement and sabotage on production sites was expected to cause more severe damage in the electronic components sector, where production has expanded since the end of the war due to the threat of component shortages. Concerns were also raised about how a democratic nation would respond to the demoralization and disruption of its skilled workforce exposed to air strikes. The report also included several paragraphs of commentary on the navy and shipbuilding industries. It argued that the development of block construction and the resulting flexibility of existing labor organizations were important, given that the production capacity of fire control systems, gun mounts, and engines could determine the number of ships produced in the naval program. The report also pointed to the growing demand for armor plate production not on warships, but on tanks. They also argued that the focus on small naval vessels (e.g., frigates) could continue. Other areas mentioned by name only included raw material shortages, drop forging, and tank production. This appeared to be a page-by-page citation of a point made in the appendix.

In the section on "Diffusion of Experience," in light of these British war-making capabilities as of 1951, Postan's work was presented as the packaged experience of six years of wartime mobilization of a major industrial nation, the United Kingdom. JIC stated that the managerial experience, important in the task of efficient allocation of resources, was a valuable idea and experience to be absorbed not only by Great Britain but also by the Soviet Union, a major industrial nation, and that disclosure of Postan's manuscript to the Soviet Union would risk significantly strengthening the Soviet Union's war effort. As for the discussions contemplated in the manuscript, such as whether to maintain repair lines for old aircraft or to start new production lines for new aircraft, it was concluded that it would not be desirable to disclose the content of these discussions to the Soviet Union, which was facing similar problems. The concluding section warned that Postan's writings could more conveniently and authoritatively convey to a hypothetical enemy the contours of the British war effort and effective bombing and sabotage targets, thus leaking experience. It also reminds us that this in itself is evident from the fact that Postan himself admitted that his experience of industrial mobilization in 1914–1918 contributed to the industrial mobilization of 1939–1945.

(3) Discussion Points and Subsequent Actions

Overall, the JIC research report was critical of the publication of Postan's work. This is evident from the fact that the concluding section of the report generally traced the ideas and thinking of regulators. Although Hancock's protests provided a response to the

regulators' views, as we saw in Chapter 3, the military and intelligence community's conclusion that Postan's work should be withheld to prevent the "dissemination of experience" and the leakage of statistical information was adopted. However, as noted above, this report was an advisory report, so to speak, prepared for the perusal of the CoS and the Cabinet, and Churchill in particular, and was not intended to have a decision-making capacity. This is evidenced by the fact that Churchill gave his permission for publication after having read the report, and in his report of April 25, 1952, he presented the guidelines for economic intelligence in this series of incidents stemming from Postan's writings and Churchill's authorization.[22] Although the issue of *British War Production* was ultimately resolved with the Prime Minister's approval, Mitchell of the Security Service argued that it was an overrule by the Prime Minister and that it was not persuasive from a security policy standpoint. Mitchell concluded that the Prime Minister's intervention was overrule and unconvincing from a security policy standpoint. Carley Foster of the Ministry of Foreign Affairs (MOFA), on the other hand, stated that the JIC's role was essentially advisory and that the Postan case was the result of other considerations since the JIC provided security guidance to government agencies, including the JIC. The meeting also concluded that there would be no particular change in the policy on censorship. In fact, censorship was not limited to Postan's work, as the minutes of the March 21, 1952, committee meeting showed that J. Hurtsfield's *Control of Raw Material* had been mentioned on the same grounds as Postan's. It was listed on the chopping block for the same reason.

British War Production was subsequently published in 1952 by the British National Press (HMSO). However, in the preface to the 52nd edition, Postan mentions that the chapter "quality of weapons, dealing with the problems of design, development, research and innovation" was discarded because of "interest of security demand,"[23] but this is believed to be the result of self-imposed restrictions.

Conclusion

The final decision in the injunction dispute rested with Prime Minister Churchill, and it is therefore questionable to what extent the fact that the JIC made the military-leaning argument that restrictions should be placed on publication and content, or the substance of the arguments leading up to it, influenced Churchill's decision to permit publication. Nevertheless, there are some aspects of the JIC's argument itself that are worth examining.

The first point raised was the debate on the extent to which the idea of economic intelligence and total warfare-type intelligence regulation applies to democracies. It is particularly interesting to note that the military, bureaucrats, and academics clashed over the experience of wartime production operations, information about factories, and production know-how essential to the conduct of the war, as well as simple statistical indicators to estimate the war potential itself. The military did not hesitate to oppose the

[22] TNA, CAB 159/11: Ministry of Defense and Cabinet Office: Central Intelligence Machinery: Joint Intelligence Sub-Committee, later Committee: Minutes (JIC Series). Joint Intelligence Committee, January–June, 1952.

[23] Postan's original work could have contained far more information than it does today. The preface to *British War Production* states that it has been revised due to changes in current conditions, and the number of pages of items censored by the Ministry of Supply does not match the order of the contents and table of contents of the book as it was published in 1952.

release of information related to the conduct of the war itself, such as Soviet incitement to sabotage and strategic bombing of key production sites, and the timescale for maximum production of mobilized munitions industries. This opinion can be said to be based on the fact that the strategic bombing of important production sites in Germany occurred during World War II. The military also had a sense of crisis about production control, which itself could be used as a reference by the enemy, regardless of differences in production methods. On the other hand, the Ministry of Foreign Affairs and the Scientific Advisory Board mentioned that the information itself was always made public and that it was significant to make public the overall economic indicators for the execution of the total war. They took issue with the fact that this information was already publicly available and that to block it in the first place would be to interfere with the system as a capitalist and liberal state. They also mentioned the possibility that the development of new weapons, increased production efficiency, and advances in production systems could transform warfare, presenting a scenario in which confrontations based solely on conventional military power, as in the two World Wars, would become a thing of the past. In this view, future wars might share some of the same aspects but would be fundamentally different from those of the past. The historian and the Cabinet Office have presented a forecast of the future of the nation-state. Historians and the Cabinet Office emphasized the importance of building a narrative (i.e., a history book) to counter the United States as a nation-state and make it available to civil society. According to them, the propagation of their people's activities through history books was not compatible with the Soviet Union's socialist mode of production, and the significance of the former outweighed the dangers of the latter, even if disclosing their military historical achievements to society would have led to information leaks. In these disagreements between the military, historians, and other ministries, one can see in a nutshell the dilemma of disclosure and the difficulty of regulating information in a liberal state. The report eventually came to the point of arguing that Postan's work itself should be regulated as a packaged experience, excluding the macro disclosure of information, but Postan and other historians also succeeded in publishing their own works on the basis of self-regulation.

Second, the controversy offers a glimpse into the outlook of various ministries, historians, and the military on the future shape of warfare. The historians and the military differ in their perspectives on this issue, with the military insisting that it was still important to envision total warfare with conventional weapons, albeit with different nuances among the armed forces. On the other hand, historians and the Foreign Ministry were of the view that the advent of nuclear weapons and new types of weapons would render existing conventional forces and production structures a thing of the past. To conclude preemptively, both views were partially realized and partially unrealized. Nuclear weapons and new types of weapons appeared to threaten conventional forces and to replace them in reality, while their production, as the report pointed out, was something that required mass production in numbers, and conventional forces, in addition to nuclear weapons, were also needed in the national defense program. On the micro level, the need for conventional forces made the military right, and on the macro level, the advent of nuclear weapons made historians and foreign ministries right, but the result was a flexible reaction strategy and a "New War" by irregular forces in the Third World, both of which were not fully anticipated. It will be said that neither of them fully predicted this.

As for Postan's work, there is room for research on what he was thinking and what was subtracted from *British War Production* in completing the manuscript. Also, the discussion

of what items should be kept secret in the overall military history of JIC would be interesting to examine in areas other than wartime economics. This is a topic for future research.

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研究ノート

19世紀イギリス国民経済における情報通信・電気関連産業の実態 ―ロンドン商業会議所電気関連セクション設立に注目して ―

里見　柚花*

The Reality of the Information, Telecommunications and Electrical Industries in the British Economy in the 19th Century : Focusing on the Establishment of the Electrical Section of the London Chamber of Commerce

By YUZUKA SATOMI *

This essay attempts to clarify the actual situation of the information, telecommunications and electrical industries in the British economy in the 19th century by analyzing the trends of the industry at the time of the establishment of the Electrical Section in the London Chamber of Commerce (LCC) in 1888. Since the 19th century, the international information and telecommunications network has expanded rapidly. British telegraph companies led this expansion and the British electrical industry, including telegraph companies, experienced rapid growth during this period. In this essay, we analyze the intention and process of establishing their own section in the LCC at this time, based on reports in the *Telegraphic Journal and Electrical Review*, and the results reveal the following. Then, the information, telecommunications, and electrical industries were unstable and lacked a sense of unity. As a result, they faced many problems, such as inconsistencies in product prices and standards, and disputes over patents. Therefore, the section was established in the LCC to share information, exchange views across the industry, and secure a basis for favorable negotiations with the government or local authorities.

1　問題の所在

19世紀中葉から20世紀初頭にかけて、ヨーロッパを中心とするグローバル化の第一段階が急速に進展した。このグローバル化の進展を支えたのが、鉄道・蒸気船の発明をはじめとする交通分野における技術革新と、電信・電話技術の発明に端を発する情報通信分野における技術革新であった[1)]。ここで筆者が関心を抱いているのが情報通信技術の発展で

＊明治大学国際武器移転史研究所研究分担者・明治大学商学部助手（Researcher, Research Institute for the History of Global Arms Transfer, Meiji University / Research Associate, School of Commerce, Meiji University）

1）Levinson [2020] pp.24-34（レヴィンソン［2022］17-32頁）.

ある。

これまでの筆者の研究では、電信インフラの拡充という点に着目し19世紀中葉から20世紀初頭にかけてのイギリスを中心とした国際海底電信網の敷設の過程を概観するとともに、これらの通信設備を活用した情報収集配信サービス、特にイギリスのロイター通信社(Reuters)の活動に注目してきた。その成果として、この時期の国際海底電信網の拡大が圧倒的な経済力と海運力・海軍力を背景に、イギリスの民間電信会社によって進められてきたという事実を検証することができた。また情報の収集・配信という観点から見ると、1851年に設立されたロイター通信社が海底電信網の拡大と並行してインドや東アジア、オーストラリアへも進出し、最終的にはフランスのアヴァス通信社(Agence Havas)とドイツのヴォルフ通信社(Wollfs Telegraphisches Bureau)とともに1870年に国際通信社協定を締結し、国際ニュース市場の寡占状態を形成していたことが明らかになった[2)]。この情報通信分野のハード・ソフトの両面における優位性の確保が、19世紀末から20世紀初頭にかけてのイギリスの情報覇権[3)]の確立につながっていたのである。

しかしその一方で、これまでの筆者の研究では軍事史・戦略史や技術史的な視点からの先行研究と同様に、グローバルに展開する19世紀末の国際海底通信網と、イギリスの国民経済との「繋がり」を実証的に検討することは、その重要性にもかかわらずほとんどできていない。この「繋がり」を解明するためには、これまでの研究で論じてきた(a)情報通信インフラの提供者、(b)通信インフラを利用した情報収集・配信サービスの提供者のみならず、(c)イギリス国民経済(とりわけ巨大都市ロンドン)の基盤を構成する要素の一つである情報通信・電気関連産業の実態にも着目する必要がある。そこで、本論文では1888年のロンドン商業会議所(1881年設立、London Chamber of Commerce：以下LCCと略記)における電気関連セクションの設立に注目し、セクション設立に至るまでの経緯と当時の情報通信・電気関連事業者の動向を分析することで、国際情報通信ネットワークの形成とイギリス経済利害の対応を明らかにしていく。

2　分析視角と分析資料

LCCにおける電気関連セクションの分析を行うにあたって、まずは前提となる19世紀後半の商業会議所の特色を確認する。

商業会議所とは、商工業者によって地域ごとに設立された経済団体であり、主に2類型

2）里見［2022a］；里見［2022b］；里見［2024］。

3）情報覇権について明確な定義はないが、有山輝雄は情報覇権を「世界規模もしくは一定地域の情報の生産・流通などを支配し、その域内の住民の認識や思考に影響力を持つ権力」としている（有山［2013］5頁）。

に分類される。第１の類型として挙げられるのは、国家の庇護の下で発達し、行政の補助的・諮問的な性格を有する商業会議所で、これは主にフランスやドイツ、日本などでみられる(大陸ヨーロッパ・日本型商業会議所)。これに対し、イギリスに見られる商業会議所は個人会員と同業者組合からなる会員制の任意団体であり、各地域経済に根差した商工業者の利益団体・圧力団体として政府などへの陳情を行うものである(英米型商業会議所)[4)]。

LCCはイギリスの商業会議所の中では比較的遅くに成立している。しかし、設立当初から規模は大きく、1884年段階ですでにイギリス国内の商業会議所の中で最大の会員数を誇るまでに成長していた。またLCCは後発の団体でありながらも、1860年に創設された全英商業会議所連合会(Association of Chamber of Commerce of the United Kingdom：以下ACCと略記)において中核的な役割を担っていた。

加えて、LCCの特色としては多種多様な利害を包摂していたという点が挙げられる。LCCの利害構成としては、まず①銀行協会(Institution of Bankers)、外債保有者協会(Corporation of Foreign Bondholders)、ロイズ船級協会(Lloyd’s Registers of Shipping)などに集中した金融利害と、②マセソン商会(Jardine, Matheson &Company)やデント兄弟社(Dent Brothers’and Co.)、P&O汽船会社(Peninsular and Oriental Steam Navigation Co)などの貿易・海運利害などが挙げられる。これらの利害に加え、LCCには③業種別セクションを構成する中小の都市商工業者利害も含まれていた。LCCはその多面的な性格により、しばしば意見対立が生じるという問題を抱えていたが、対外政策に関しては一貫した対応を見せている。LCCは多様な利害関係者を包摂しながらも、帝国統合と海外市場の保護・開拓を政府に要請する立場を取り続けていたのである[5)]。

以上のように、LCCはシティの中核を担う金融・貿易利害と密接に関わり、イギリス国民経済に影響力を持つ経済団体として機能していた。このLCCにおける情報通信・電気関連産業の動向を分析することにより、イギリスの国民経済における情報通信・電気関連産業の実態を解明することが可能であると考えられる。

そこで、本論文では情報通信・電気関連事業者がどのような意図をもって自らのセクションを設立するに至ったのかを分析することにより、当時のイギリス国民経済における情報通信・電気関連産業の動向を明らかにする。ここでは、電信事業者を中心に電気関連製造業者や電力供給会社などを含む各種電気関連事業者を情報通信・電気関連産業とする。

4）横井［2006］76-77頁；佐々木・藤井［1997］203-205頁；桑原［1999］25-26頁；商業會議所聯合會事務局編［1924］18-53頁。

5）横井［2006］74-80頁。

第３・４節では19世紀後半の情報通信事業の概況を示し、第５・６節では電信会社を含む情報通信・電気関連産業が新規に独自のセクションを設立した際の経緯と目的を分析する。この点について分析するにあたり、19世紀末のロンドンにおける情報通信・電気関連事業者らが共有していた利害や諸課題を読み取るための資料として、*Telegraphic Journal and Electrical Review*を活用する。同誌は1872年に創刊されたイギリスで最も長い歴史を持つ電気関連雑誌である。1872年当時においてイギリスは全世界の電信機器・海底ケーブルの製造や運営において極めて大きな影響力を有していたにもかかわらず、電気通信技術に特化した専門的な定期刊行物は存在していなかった。そのため、電気関連事業者や技術者の間で各種情報共有・課題共有・意見交換を行う場が不足していたことから、同誌が創刊されるに至ったのである[6)]。

３　イギリス主導の国際情報通信網の形成

19世紀後半には電信による国際通信網が急速な拡大を見せた。この時期における主要な海底電信ケーブル敷設事業は［表１］および［図１］の通りである。

19世紀後半から20世紀初頭にかけて急速に進展した海底ケーブル事業はイギリスの民間電信会社によって牽引された。1892年時点での全世界のケーブルの保有状況を距離ベースでみると、全世界の電信ケーブルのうち約89.58％が民間会社所有のケーブルであり、そのなかでもイギリスの民間電信会社保有のケーブルは全世界のケーブルの約66.28％を占めるなど、圧倒的なシェアを誇った[7)]。このイギリス主導での国際海底ケーブルの敷設に特に大きく貢献したのがジョン・ペンダー(John Pender)である。スコットランド出身の実業家であるペンダーは、磁気電信会社(Magnetic Telegraph Company)の設立時に出資者になったことから電信事業に関心を持ち、大西洋ケーブル事業を皮切りに海底ケーブル敷設事業に参入して多数の中小電信会社を敷設地域ごとに設立した。これらの電信会社はイースタン電信会社(Eastern Telegraph Company)とイースタン・エクステンション・オーストラレーシア・中国電信会社(Eastern Extension Australasia and China Telegraph Company)を中核としてイースタン・グループ(Eastern and Associated Telegraph Companies)と呼ばれる巨大な電信会社グループを形成し、これが世界各地に海底ケーブルを敷設した。その結果、1892年の段階で全世界のケーブルのうち約45.66％を、そしてイギリスのケーブルのうち約68.89％をイースタン・グループが保有するまでに至ったのである[8)]。

6）*Telegraphic Journal and Electrical Review*, vol.1-No.1, p.1 ; Electrical Review, “About Us”, https://electricalreview.co.uk/about-us/,（参照：2024-10-05）

7）Headrick[1991] pp.38-39（ヘッドリク［2013］47-48頁）

8）Headrick[1991] pp.38-39（ヘッドリク［2013］47-48頁）

［表１］19世紀後半における海底電信ケーブル敷設の主要な取り組み

	敷設ルート・方面：敷設年	敷設会社	敷設者
1850年代	ドーヴァー～カレー：1850 失敗	English Channel Submarine Telegraph Company	John Watkins Brett（英） Jacob Brett（英）
	ドーヴァー～カレー：1851	Submarine Telegraph Company	John Watkins Brett（英）
	アムステルダム・ロッテルダム方面：1852	Electric Telegraph Company	William Fothergill Cooke（英） John Lewis Ricard（英）
	アイルランド方面：1850s	Magnetic Telegraph Company	John Pender（英） Charles T. Bright（英） John Watkins Brett（英）
	アメリカ東海岸・英領カナダ沿岸：1850s	Western Union Telegraph Company	Jason Jay Gould（米）
	第1次大西洋ケーブル：1857-58 失敗	Atlantic Telegraph Company	Cyrus West Field（米） Charles T. Bright（英） John Watkins Brett（英）
	紅海海底ケーブル：1853-57 失敗	Mediterranean Electric Telegraph Company Mediterranean Extension Telegraph Company Europe and Indian Junction Telegraph Company	John Watkins Brett（英）
	コンスタンティノープル～ボンベイ：1860 失敗	Red Sea and India Telegraph Company	Fredrik Newton Gisborne（英）
1860年代	北アメリカ方面		
	第2次大西洋ケーブル：1866	Anglo-American Telegraph Company	John Pender（英）
	ブレスト（仏）～ダクスベリー（米）：1869	Société du Câble Transatlantique Français	（仏）
	南アメリカ方面		
	キー・ウェスト～ハヴァ：1868	International Ocean Telegraph Company	James Scrymser（米）
	バタバノ～ジャマイカ：1870	ブレットがIndia Rubber, Gutta Percha and Telegraph Works Ltd.と契約を結び敷設	John Watkins Brett（英） Matthew Gray（英）
	インド・東アジア方面		
	地中海およびスエズ～ボンベイ：～1870	British Indian Submarine Telegraph Company ※1 Anglo-Mediterranean Telegraph Company ※1 Falmouth, Gibraltar and Malta Telegraph Company ※1 Marseilles, Algiers and Malta Telegraph Company ※1	John Pender（英）
	マドラス～ペナン～シンガポール：1870	British Indian Extension Telegraph Company ※2	John Pender（英）
1870年代	インド・東アジア方面		
	シンガポール～ダーウィン：1871	British Australian Telegraph Company ※2	John Pender（英）
	シンガポール～サイゴン～香港～上海：1871	China Submarine Telegraph Company ※2	John Pender（英）
	北アメリカ方面		
	北大西洋ケーブル：1873, 74, 80	Anglo-American Telegraph Company	John Pender（英）
	北大西洋ケーブル：1870s	Direct United States Cable Company	（英）
	ブレスト（仏）～ケープコッド（米）：1879-80	Compagnie Française du Télégraphe de Paris à New York	（仏）
	南アメリカ方面		
	《西インド諸島》		
	セント・トーマス～トリニダード：1871		John Watkins Brett（英）
	トリニダード～ジョージタウン（ギアナ）：1871		John Watkins Brett（英）
	サンフアン（プエルトリコ）～ジャマイカ：1872		John Watkins Brett（英）
	コロン～ジャマイカ：1873		John Watkins Brett（英）
	《南アメリカ大陸》		
	リスボン～レシフェ：1873-74	Brazilian Submarine Telegraph Company	John Pender（英）
	ベレン～リオ・デ・ジャネイロ：1873	Western and Brazilian Telegraph Company	John Pender（英）
	リオ・デ・ジャネイロ～モンテビデオ：1874-75	Western and Brazilian Telegraph Company	John Pender（英）
	モンテビデオ～ブエノスアイレス：1870s	River Plate Telegraph Company	John Pender（英）
	バルパライソ～チョリージョス：1875-76	West Coast of America Telegraph Company	John Pender（英）
	アフリカ大陸東部		
	アデン～ダーバン：1879	Eastern and South African Telegraph Company	John Pender（英）

1880年代以降	アフリカ大陸西部		
	カディス～カナリア諸島：1883	Spanish National Submarine Telegraph Company	Matthew Gray（英）
	ダカール～ロアンダ：1886	West African Telegraph Company	Matthew Gray（英）
	プリンシペ島～ボニー：1889	West African Telegraph Company	Matthew Gray（英）
	シエラレオネ～ボニー：1886	African Direct Telegraph Company	John Pender（英）
	サンティアゴ島（カーボ・ヴェルデ諸島）～バサースト：1888	African Direct Telegraph Company	John Pender（英）
	サンティアゴ島（カーボ・ヴェルデ諸島）～シエラレオネ：1888	African Direct Telegraph Company	John Pender（英）
	ボニー～カメルーン：1893	African Direct Telegraph Company	John Pender（英）
	アフリカ大陸東部		
	ケープタウン～ロアンダ：1889	Eastern and South African Telegraph Company	John Pender（英）
	北アメリカ方面		
	コーンウォール～ハリファクス：1881	Western Union Telegraph Company	（米）
	イングランド～ハリファクス：1880s	Commercial Cable Company	（米）
	南アメリカ方面		
	ガルヴェストン～ベラクルス：1880	Mexican Telegraph Company	James Scrymser（米）
	南アメリカ西岸部：1880s	Central and South American Telegraph Company	James Scrymser（米）
	インド・東アジア方面		
	フエ～ハイフォン～香港：1884	フランス海軍・植民地省がEastern Extension Australasia and China Telegraph Companyと契約	
	インド洋		
	ザンジバル～セーシェル：1893	Eastern and South African Telegraph Company	John Pender（英）
	ザンジバル～モーリシャス：1893	Eastern and South African Telegraph Company	John Pender（英）
	ケープタウン～アセンション：1898	Eastern Telegraph Company	John Pender（英）
	ランズエンド～シエラレオネ：1901	Eastern Telegraph Company	John Pender（英）
	モーリシャス～アデレード：1901-02	Eastern Extension Australasia and China Telegraph Company	John Pender（英）
	太平洋		
	バンクーバー～クイーンズランド：1902	Pacific Cable Board Telegraph Construction and Maintenance Company	(英)

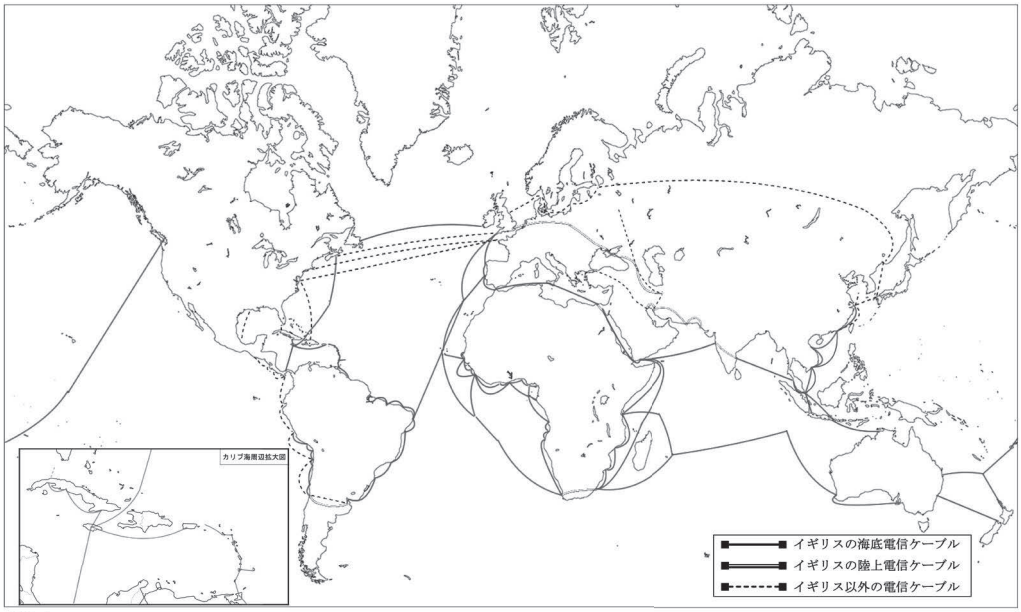
出典：Baglehole [1970]pp.1-9, 11-14 ; Headrick[1981]p.163（ヘッドリク［1989］196頁）; Headrick[1988]pp.104-110（ヘッドリク［2005］100-105頁）; Headrick[1991]pp.14-15, 17, 19-20, 24, 33-36, 40-41, 53-58, 62-66, 75-78, 93-98（ヘッドリク［2013］15-16, 20, 22-23, 28, 40-43, 49-51, 66-73, 76-82, 96-101, 121-128頁）; Kennedy[1971]pp.734, 736 ; Standage[2007]pp.74-84（スタンデージ［2011］79-89）; Winseck & Pike[2007]pp.19-22, 25-29, 37 ; 石井［1994］76-77頁 ; 大野［2018］27頁 ; 西田［1971］14, 17-19, 21, 24-28, 31-35, 44頁 ; 星名［2006］402-403頁

※1 1872年に4社を統合してEastern Telegraph Companyが設立されている。
※2 1873年に3社を統合してEastern Extension Australasia and China Telegraph Companyが設立されている

以上のように、ペンダーのイースタン・グループは海底電信ケーブルの敷設において絶大な影響力と貢献を残した。その功績もあって、LCCにおける電気関連セクションの評議会には電信会社部門の代表としてイースタン電信会社からはペンダーを含めた2名が選出され（［表３］参照）、ペンダー自身は電気関連セクション議長の候補にまで名が挙げられている。この点に関しては第6節にて詳述する。

このように19世紀における電信事業は民間主導で進められ、特に1870年代ごろまでは商業的・個人的利用での需要が大きい路線が敷設された。その中でイギリス政府は、敷設海域の海底調査や国際ケーブル敷設のための外交交渉などは行っていたものの、補助金などのような資金的援助はほとんど行っていなかった。しかし1870年代末にはアメリカやドイツをはじめとする欧米諸国の工業化が進展し対外進出を強めたことで政治的・軍事

図１：イギリスを中心とした国際電信網の形成(1851-1902)



参照元：K. C. Baglehole, A century of service: a brief history of Cable and Wireless Ltd., 1868-1968, Welwyn Garden City, 1970　筆者作成
Daniel R. Headrick, The invisible weapon：telecommunications and international politics, 1851-1945, New York, 1991

的な緊張が高まり、イギリスのすべての植民地・海軍基地を結ぶ通信網への需要が高まった。そのためこの時期からは、イギリス政府がケーブル敷設事業に補助金を支出し戦略担当者がケーブル敷設のルート設定などに関与するようになるなど[9)]、ケーブル敷設事業にイギリス政府の意向が反映されるようになった。そして1902年の太平洋ケーブル敷設をもって「オール・レッド・ルート」と呼ばれる自国領土・植民地のみを通過する地球規模の電信ケーブル網が完成したのである。このような地球規模の海底ケーブル敷設は帝国統合を目指すイギリスの国家的な政策の一環であり、LCCの対外政策とも合致したものであった。

その一方で、新興の情報通信・電気関連産業への政府の支援や制度的な整備は低調であった。フランスやドイツなどの大陸ヨーロッパ諸国の電信事業は政府が積極的に関与し主に国有ケーブルとして運営されていたが、イギリスの電信事業は民間事業者が電信の敷設・運営を担っており、主要な国有の海底電信ケーブルは1902年の太平洋ケーブルが初めてであった。19世紀末にロンドンの上記の関連産業の事業者たちがLCCに電気関連セ

9）イギリスのケーブル戦略に特に強い影響力を持ったのが1885年に設置された植民地防衛委員会（Colonial Defence Committee）である。19世紀後半に生じたロシアとのグレート・ゲームをはじめとする対外危機の下で設置された同委員会には海軍省・陸軍省・外務省・植民地省・インド省の代表が参加した（Headrick[1991] p.77（ヘッドリク［2013］98頁））。

クションを設立して政治的交渉力の強化を追及したのには、こうした背景があった。

4　イギリス国内の電信国有化

国際海底電信ケーブル事業が展開を見せ始めた1850年代は、各国で国内陸上電信網の敷設が進んだ時期でもあった。大陸ヨーロッパ諸国が政府主導での電信敷設を進めていた一方、イギリスではウィリアム・フォザギル・クック（William Fothergill Cooke）が設立した電気電信会社（Electric Telegraph Company）と、チャールズ・T・ブライト（Charles T. Bright）やジョン・ワトキンス・ブレット（John Watkins Brett）、ペンダーが設立した磁気電信会社の２社を中心とする民間電信会社によって電信事業が展開されていた。1865年時点ではすでに、イギリス国内には2,040か所の電信局と総延長124,709kmの電信ケーブルが設置され、年間で約4,662,687通のメッセージがやり取りされるなど、電信サービスは国民経済へと定着しつつあったのである[10)]。

しかし、この時期の電信設備は主にイングランドの都市部に集中し、また料金も他国のものと比べて割高であるなど、新聞社やトレーダー、商工業者といった利用者からの不満が高まっていた。そこで、通信サービスのより円滑な提供のために電信サービスをすべて国有化することが議論されるようになった。この電信国有化に対して民間電信事業者は反対の立場を示していたが、最終的に1868年には電信国有化法(Telegraph Act 1868)が制定され、イギリス国内の電信設備・サービスがすべて郵政省(General Post Office)の管理下に置かれることとなった。一種のインフラ設備として機能しつつあった電信サービスの公共性を民間事業者が保障できないのであれば、経済的自由主義を留保することになったとしても国家がこれを保障するべきだと考えられたのである[11)]。

このように、1860年代末の時点で電信サービスは一種の公共財と考えられるほど、イギリス国民経済にとって不可欠なものとなりつつあった。その中で、法律の制定において電信事業者は当事者でありながら影響力は限定的なものであり、国内で保有していた事業をすべて失うなど多大な不利益も被ることになったのである[12)]。

5　ロンドン商業会議所における電気関連セクションの設立

前節で述べたように、情報通信・電気関連産業、とりわけ電信事業は19世紀中葉に登

10）Winseck & Pike [2007] pp.17-18; Hansard. Vol.191 ; HCPP [1867-68](202) Appendix D, Ⅲ

11）松波［2021］131-133, 136-137頁 ; 松波［2012］180-182頁 ; HCPP [1867-68](202) ; HCPP[1867-68] (435)(435-Ⅰ) ; Hansard. Vol.191 ; Hansard. Vol.192 ; Hansard. Vol.193

12）その一方でイギリスの民間電信会社には総額5,861,579ポンドの購入費用が支払われており、この売却益国際海底ケーブル敷設の資金源になったと考えられる。

場して以来急速な発展を遂げた新興産業であった。この急成長期にあった1888年において、LCCで電気関連業者の業種別セクションが設立されたのである。本節では*Telegraphic Journal and Electrical Review*の記事を参考に、この時期にLCCで電気関連セクションが設立された経緯を検証する。

[表２]セクション設立に関するTelegraphic Journal and Electrical Review 記事一覧

日時	出来事	掲載号
1888. 6.29	セクション設立に関する記事が初めて掲載される	Vol.22-No.553（1888/6/29発行）
7.13	LCCにおけるセクション設立に関心のある会員による会合を実施	Vol.23-No.555（1888/7/13発行）：告知 Vol.23-No.556（1888/7/20発行）：報告
7.27	電気関連セクション設立のための会議を実施	Vol.23-No.557（1888/7/27発行）：告知 Vol.23-No.558（1888/8/3発行）：報告
8.21	電気関連セクション設立のための組織化委員会会合を実施	Vol.23-No.561（1888/8/24発行）：報告
10.22	電気関連セクション設立のための全体会議を実施	Vol.23-No.569（1888/10/19発行）：告知 Vol.23-No.570（1888/10/26発行）：報告
11.09	電気関連セクション評議会の最終的な人員構成が報告される	Vol.23-No.572（1888/11/9発行）：報告

*Telegraphic Journal and Electrical Review*においてはじめてLCCでのセクション設立の話題が取り上げられたのは、1888年6月29日に発行された第22巻553号でのことだった。ここではLCCにおいて電気関連セクションを設立することの利点と設立するにあたっての課題を提示したうえで、読者である情報通信・電気関連事業者からの更なる意見を募集している[13)]。この記事が掲載された直後の7月13日には、LCCでの電気関連セクション設立に関心を持った事業者らによって会合が開かれ同月27日にセクション設立に向けての会議を開くことが決定されるなど、当時の情報通信・電気関連事業者らにとっても非常に関心の高い話題であったことは明らかである[14)]

この7月27日にはクロンプトン(Rookes Evelyn Bell Crompton)を議長とするセクション設立に向けた会議が実施された。ここではLCCにおける電気関連セクションの設置を推進することと、代表者14名からなる組織委員会を設置してセクション設立に向けた準備を進めることが決定された[15)]。この組織委員会による会合は8月21日に実施され、ここで

13）“Electrical Trades and the London Chamber of Commerce”, *Telegraphic Journal and Electrical Review*, vol.22-No.553, 1888-06-29, pp.702-703.

14）“The Gaulard and Gibbs Case”, *Telegraphic Journal and Electrical Review*, vol.22-No.555, 1888-07-13, pp.29-31.

15）“The London Chamber of Commerce Electrical Section”, *Telegraphic Journal and Electrical Review*, vol.23-No.558, 1888-08-03, p.124.

は電気関連セクションの構成について具体的に議論が行われている。その結果として、①電気関連セクション内には情報通信・電気関連業界における各分野を代表する5つのサブセクションを置くことと、②これらのサブセクションから選出された代表者33名によって構成される評議会を設置すること、③通常の年次総会に加えてセクションの全体または一部を招集した会合を実施することが決定された[16]。

この組織委員会の会合の報告を受け、電気関連セクションを設立するための全体会議を実施することとなり、*Telegraphic Journal and Electrical Review*でも当該会議への参加が情報通信・電気関連事業者全体に呼びかけられた。そして、1888年10月22日にはロンドンのイーストチープで全体会議を実施するに至った。この全体会議では、前述の組織委員会の報告の採択とLCCの電気関連セクションが扱うべきテーマについての検討、セクションの正・副議長および評議員の選出が行われた。最終的にこの全体会議の議事録は10月26日に発行された*Telegraphic Journal and Electrical Review*の第23巻570号[17]に、そして正式に集計されたセクション議長・副議長・評議員の名簿は11月9日発行の第23巻572号[18]へとそれぞれ掲載され、LCCにおける電気関連セクションの設立が周知されたのである。

以上のように、LCCにおける電気関連セクションの設立は、1888年6月末に議題として取り上げられて以降わずか4か月の間で議論が展開され設立に至ったのである。このようにセクションの設立が急速に決した背景としては、当時の情報通信・電気関連事業者らが事業を展開していくにあたって業界全体で情報を共有し意見形成を行う場を持つことの必要性を強く認識していたことが考えられる。そこで、次節では電気関連セクション設立時の人員構成と設立時に認識されていたセクションで扱われるべき課題の分析を通して、電気関連セクション設立の目的を明らかにする。

6　電気関連セクションの実態分析

（1）電気関連セクション設立時の評議会構成

LCCにおいて電気関連セクションが設立されるにあたり、特に重要な論点となったのがセクションの議長および評議員の人員構成であった[19]。電気関連セクション設立当時の人

16）“Dynamo Variations”, *Telegraphic Journal and Electrical Review*, vol.23-No.561, 1888-08-24, pp.193-195.
17）“London Chamber of Commerce”, *Telegraphic Journal and Electrical Review*, vol.23-No.570, 1888-10-26, pp.474-475.
18）“The Electrical and Allied Trades Section of the London Chamber of Commerce”, *Telegraphic Journal and Electrical Review*, vol.23-No.572, 1888-11-9, p.516
19）*Telegraphic Journal and Electrical Review*, vol.22-No.553, pp.702-703；*Telegraphic Journal and Electrical Review*, vol.23-No.570, pp.474-475

員構成は［表３］の通りである。

この電気関連セクションには5つのサブセクションが置かれ、各サブセクションの代表から成る評議会が設置された。当時の評議会の内訳は、電信会社（Telegraph Company : 5名）、電話会社（Telephone Company : 3名）、電力供給会社（Electricity Supply Company : 6名）、電気関連製造会社（Electrical Manufactures and Constructors : 13名）、電気技師コンサルティング会社（Consulting Electrical Engineers : 4名）の5つのサブセクションと2名の一般会員の総数33名であった。この評議会の総数33名はLCCの規則に従って設定されたものであり、設立当初から拡大していくことが想定されていた。この少ない人員を5つのサブセクションへどのように割り振っていくかがセクション設立時の論点の１つとなったのである[20]。

［表３］セクション設立時に選出された評議会委員

Telegraph Company （5名）	
Sir John Pender	(Eastern Telegraph Company)
The Marquis of Tweeddale	(Eastern Telegraph Company)
Mr. J. H. Tritton	(Indo-European Telegraph Company)
Mr. C. W. Earle	(West India and Panama Telegraph Company)
Mr. R. K. Gray	(Spanish National Submarine Telegraph Company)

Telephone Company （3名）	
Mr. J. Brand	(United Telephone Company)
Colonel R. R. Jackson	(National Telephone Company)
Mr. H. Grewing	(Oriental Telephone Company)

Electrical Manufactures and Constructors （13名）	
Mr. R. E. Crompton	(Crompton & Co.)
Mr. Alex Siemens	(Siemens Bros. & Co.)
Mr. Moritz Immisch	(Immisch & Co.)
Mr. E. Garcke	(Anglo-American Brush Electric Light Corporation)
Mr. F. L. Rawson	(Woodhouse & Rawson)
Mr. B. Pell	(Johnson & Phillips)
Mr. C. J. Wharton	(Laing, Wharton & Down)
Mr. W. O. Callender	(Callender & Sons)
Mr. Drake	(Drake & Gorham)
Sir Daniel Cooper	
Mr. W. T. Golden	(W. T. Golden & Co.)
Major S. Flood Page	(Edison and Swan United Electric Light Company)
	(Messrs. Verity Bros.)

Electricity Supply Company （6名）	
Major – General Webber	(Chelsea Electric Supply Company)
The Earl of Crawford	(London Electrical Supply Corporation)
Mr. J. E. H. Gordon	(Whitehall Electric Light Company)
Mr. R. Wallace	(Kensington Court Electric Light Company)
Mr. M. Parker	(Chatham, Rochester and District Electric Light Company)
Mr. R. S. Erskine	(Kensington Court Electric Light Company)

Consulting Electrical Engineers （4名）
Mr. W. H. Preece
Mr. H. Sherley Price
Mr. G. Kapp
Mr. W. H. Snell

General （2名）
Sir David Salomons
Mr. M. Heaphy

"The Electrical and Allied Trades Section of the London Chamber of Commerce", Telegraphic Journal and Electrical Review, vol.23-No.572, 1888-11-9, pp.516　より作成

ここで、電気関連セクション設立時の評議員の配分において重点が置かれていたのは、電信会社や電話会社、電気関連製造会社であった。これはセクションが設立された当時は情報通信・電気関連産業の中でも電信・電話といった通信分野の成長が著しく被雇用者が多かったことや、各種電気機器を製造する電気関連製造業の重要性が大きかったことによるものだと考えられる。一方で、今後の急成長が予想されていた電力供給会社にわずか6

20）*Telegraphic Journal and Electrical Review*, vol.22-No.553, pp.702-703；*Telegraphic Journal and Electrical Review*, vol.23-No.570, pp.474-475

人しか配分されていないが、12か月以内には人員の増加が期待される状況にあった。また、電気技師コンサルティング会社もわずか4名という少ない割合でしか評議員を割り当てることができないなど、設立時の人数配分には課題を残していた。

加えて、この電気関連セクション評議会の構成において特筆すべき点として挙げられるのは、5つのサブセクションに加えて2名の一般会員を評議会のメンバーに選出しているという点である。この一般会員は情報通信・電気関連産業の当事者ではないLCCの会員、すなわち情報通信・電気関連産業にとってのユーザーである。ここで電気関連セクションに一般会員が参加することによって、事業者らはLCCに加盟するような大口のユーザーから直接意見を収集し自身らのビジネスへと反映することができ、自らの事業を活性化させることが期待できたのである[21)]。

このように配分された電気関連セクションの評議会には、ハノーヴァー出身の電気技師で当時はジーメンス兄弟社(Siemens Brothers & Co.)のイングランドにおける代表を務めていたアレクサンダー・ジーメンス(Alexander Siemens)や、郵政省の電気技師でのちには無線通信実験にも携わったウィリアム・ヘンリー・プリース(William Henry Preece)、海底ケーブル事業で絶大な影響力を持ったイースタン・グループのペンダー（[表１]および[表３]参照）など、情報通信・電気関連産業における各種事業の有力者が数多く選出されている。

この中で、セクション全体の代表者となる議長に誰を選出するのかは、評議会における人員配分と同様に重要な議題となった。その背景としては、当時の情報通信・電気関連産業は急成長期にあり、業界内でも熾烈な競争が展開されていたことが挙げられる。このような情勢の情報通信・電気関連産業において取引上での無用な対立を避けるようにしてセクションの代表を選出することは極めて重要な問題であった。セクションの代表の候補者としてはプリースやペンダーなども挙げられていたが、前者は公的な立場からLCCの同業者セクションで議長を務めることが難しいという理由で、後者は彼の事業が電気関連分野において電気通信という一分野に特化したものであり業界全般にかかわっていたわけではなかったという理由から、どちらも議長へと選出されることはなかった。最終的には10月22日の全体会議において、議長にはクロンプトンが、副議長にはクロフォード伯(James Ludovic Lindsay, 26th Earl of Crawford)とフラッド・ペイジ少佐(Major Flood Page)が選出された。

ここで議長に選出されたR.E. クロンプトンはヨークシャー出身の電気技師・実業家である。若いころはイギリス陸軍に属しライフル旅団に招集されてインドに駐在していたが、

21） *Telegraphic Journal and Electrical Review*, vol.23-No.570, pp.474-475

1875年に退役した後はデニス社(T. H. P. Dennis & Co.)の共同経営者を務めるかたわら、1878年にクロンプトン社(R. E. B. Crompton & Co.)を設立して取締役に就任している。クロンプトン社は、アーク灯や発電機、電気測定器などのの開発・改良・製造や、電気照明設備の提供、電力供給事業など、電気関連分野における多種多様な事業を展開しており[22]、クロンプトンは特定の分野のみに判断が偏りにくい人物として、議長に選出されるには最適であったといえる。

以上のように、電気関連セクションの正・副議長の選出やサブセクションごとの人数配分は、セクション設立時における重要課題として取り扱われ慎重に決定されたのである。情報通信・電気関連事業者らは自身が属する分野に特化して利益実現を目指していたというのではなく、情報通信・電気関連産業というより大きな枠組みを構築し業界全体の基盤を拡大させることを目指していた。

ここに、当時の情報通信・電気関連事業者らの姿勢を読み取ることができる。いまだ急成長の途上にあった情報通信・電気関連分野では、電信をはじめとする各分野の事業者は著しい成長を遂げていた一方で、後述の通り産業全体としての基盤は未熟な状態にあった。その中で求められていたのは、同業者はもちろんのこと様々な利害関係者やユーザーと情報共有・意見交換を行うことができる場を設けることで業界全体を活性化させ、産業の基盤を確固としたものとすることであった。この目的においても、多様な金融・貿易・商工業利害が集まるLCCに同業者セクションを設立することは大きな意味を持ったのである。

（2）電気関連セクションで扱われるべき議題の検討

前項で論じたように、LCCの電気関連セクションは情報通信・電気関連産業全体での基盤の構築と利益の拡大を目的として設立された。ここで、電気関連セクションに期待されたことは、各種事業者間や技術者間、さらには消費者と情報を共有し議論を展開することで業界内の課題を解決することであった。そこで、本項では*Telegraphic Journal and Electrical Review*の記事をもとに、当時の情報通信・電気関連事業者らが業界の課題をどのように認識していたのかについての分析を試みる。

①セクション設立の提言より ― *Telegraphic Journal and Electrical Review*　vol.22 - No.553

*Telegraphic Journal and Electrical Review*の第22巻553号に掲載された電気関連セクションの設立を提言する記事では、同セクションで取り扱われることが望ましいとされる議題

22） クロンプトンの事績に関しては、Bowers [1969]が詳しい。

として以下の9点が示されていた。

1. 議会提出法案 (Bills before Parliament)
2. 外国関税問題 (Foreign Tariffs)
3. 通商条約についての問題 (Treaties of Commerce)
4. 関税分類に関する問題 (Customs Classification)
5. 仲裁 (Arbitration)
6. インドおよび植民地での事業の拡大 (Business Extension in India and Colonies)
7. 電灯法制についての問題 (Electric Lighting Legislation)
8. 火災保険規則についての問題 (Fire Insurance Rules)
9. 電話・電信に関する事柄 (Telephone and Telegraphic Matters)

ここで取り上げられたLCCの電気関連セクションで扱うべき課題の特徴としては、まず対外的な事業の展開に関する議論の多さが挙げられる(2・3・4・6)。同セクションが設立された1880年代末はアメリカやドイツをはじめとする欧米諸国でも工業化が進展し、特に製造業分野での競争が激しくなっていた。そのため、競合国と同程度の条件下で海外市場へと参入し事業を展開できるような環境を整えるために、LCCの同業者セクションを通してイギリス政府へと働きかけることが求められたのである。

このように対外事業に関する議題が多数掲げられていた一方で、議会提出法案や電灯法制や火災保険規則など、情報通信・電気関連事業を国内で展開する上で不可欠な法制度の整備も、重要議題として取り上げられている(1・7・8)。19世紀のイギリスでは国内陸上電信網や公共の照明が整備される中で、利便性の向上や安全性の観点から各種規制や法律の整備が進められていた。これらの法案が国会で審議される中で、当時の電気関連事業者は個別に意見を陳情することはできたものの、その効果は限定的なものであった。そのため、LCCの同業者セクションという場を利用し業界全体での意見を取りまとめたうえで政府に働きかけることで、自身らの事業にとってより有利な制度の構築を試みていたのだと考えられる。

これらの対外事業・国内法整備に関する議題で共通しているのが、いずれもLCCの電気関連セクションで議題化することによりイギリス政府へ強く働きかけようとしていた点である。当時の情報通信・電気関連産業では不足していた発言力・交渉力をLCCの同業者セクションを利用することで補い、自らの事業展開の極大化を図っていたと考えられる。

②全体会議報告より ― *Telegraphic Journal and Electrical Review* vol.23 - No.570

1888年10月22日に開催されたセクション設立のための全体会議では、セクションの人員構成の設定と議長の選出を行うと同時に、同セクションで扱うべき議題についても出席

者らによる意見交換がなされた。ここでは同セクションの重要課題として前述の法制度に関するもの以外では、情報通信・電気関連業界内での各種習慣の統一や、業界内での紛争の仲裁等が挙げられている。

技術革新が急速に進展し様々な事業が勃興しつつある一方で、産業全体の基盤が未だ未成熟な状態にあった情報通信・電気関連産業では、ビジネスを展開する上での障害が数多く存在していた。その例として挙げられるのが、業界内の商習慣の不統一性である。当時の情報通信・電気関連産業では製品の品質や販売価格、原料の価格などで製造業者ごとにばらつきがあり、事業を拡大する上での妨げとなっていた[23]。そのためLCCに電気関連セクションを設置し議論の場を設けることで、各種電気関連製品に均一性を持たせるための基準や業界内での競争を阻害しない範囲での標準価格を設定し、産業全体での統一性を持たせ事業の円滑化を図ることが求められていたのである。また、この時期には急速な技術革新に伴う特許紛争や、労働環境や賃金の基準が十分に整えられていないことによる労使問題の発生など、様々な紛争が頻発していた。従来これらのトラブルは法廷での訴訟という形での解決が図られていたが、これは多大な時間とリスクを要したため、LCCの仲裁機能を利用することでより迅速で公平な解決が求められたのである。

ここで取り上げられた業界内における基準の統一や各種紛争の解決は、いずれも彼らのビジネスを円滑なものとし利益を最大化していくために必要とされたものであり、当時の情報通信・電気関連産業における最重要課題だったのである[24]。

（3）電気関連セクション設立の目的

LCCにおいて電気関連セクションが設立された目的は一体どのようなものであったのか。ここで改めて確認しておく。

第一にあげられるのが、商業的観点からの情報共有・意見交換を行う事である。電気関連セクションに参加している事業者の最大の目的は、自らのビジネスを奨励し活性化させることである。多種多様な商工業者が集まるLCCでは、科学的・学術的な会議や学術誌では取り上げることが難しい、より実学的な議論を行うことが可能であった。そこで、LCCにセクションを設立することにより、情報通信・電気関連業界の実業家や技術者らによって議論ができるのはもちろんのこと、ユーザーの視点からの意見を取り入れることも可能となり、自身らの事業の改善へとつながることが期待されたのである。

第二にあげられるのが、情報通信・電気関連業界全体での政治的交渉力の強化である。セクション設立以前の情報通信・電気関連産業は各個別事業の成長が著しかった一方で、

23） *Telegraphic Journal and Electrical Review*, vol.23-No.570, pp.474-475
24） *Telegraphic Journal and Electrical Review*, vol.23-No.570, pp.474-475

産業全体でのまとまりがなく基盤が脆弱という欠点を抱えていた。そのため、対外的な事業の展開や各種法制度の整備の際には、各個別企業がそれぞれ独自に政府や自治体と交渉する必要があり、極めて煩雑である上に自身らの主張や要求に強力な発信力を持たせることはできなかったのである。そこで、LCCで自身らのセクションを設立することで、情報通信・電気関連業界全体の意見を取りまとめ業界としての交渉力を獲得することが可能になると考えられたのである。

以上のような商業的観点に基づく意見交換と政治的交渉力の強化という２点において、LCCという場は最適な手段であった。LCCには金融・貿易・各種都市商工業者などの多種多様な利害関係者が包摂されており、多方面の議論や情報と接することが可能であった。また、交渉力の強化という面では、シティの中核を担う金融・貿易セクターと密接にかかわるLCCのイギリス国内における発言力を利用することにより、情報通信・電気関連産業としての交渉力を強化させることができたのである。

7　結論

本論文では1888年にロンドン商業会議所内に電気関連セクションが設立された際の情報通信・電気関連事業者らの動向を分析することを通して、当時の情報通信・電気関連産業の実態を明らかにすることを試みた。19世紀中葉から電信会社をはじめとする電気関連産業は急成長を遂げていた一方、業界全体としてのまとまりには乏しく産業の基盤も脆弱であった。このような状況において情報通信・電気関連業者らは、業界内での特許紛争などの頻発や品質・価格の不統一状態、さらには政府や自治体などに対する交渉力の不足などといった課題をいくつも抱えていた。これらの諸課題に対応していくためにも、情報通信・電気関連産業の実業家や技術者は情報共有・意見交換を行うことができる場を構築し、産業全体をまとめることが必要だったことから、多種多様な利害関係を内包しイギリス国民経済において強い影響力を持つLCCを利用して、自身らの業界の基盤となる業種別セクションを設立するに至ったのである。

以上のように、本論文では19世紀末の情報通信・電気関連事業者らがLCCにおいて電気関連セクションを設立した経緯と目的を明らかにしてきた。しかし、LCCの電気関連セクションが設立された後には実際にどのような課題が議論されていたのか、その議論にはどのような利害関係者がかかわっていたのか、そしてどのような課題が実際に解決され、産業基盤の強化につながったのか。これらの点に関しては、具体的な分析を十分に行うことができなかった。セクション設立後の情報通信・電気関連事業者の活動およびLCCが行使した影響力の程度の分析は次回への課題としたい。

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［付記］最後になりましたが、貴重なご助言をくださった匿名査読者の方々に感謝申し上げます。

『国際武器移転史』第19号（2025年1月），111-115頁

書評

田嶋信雄『ドイツ外交と東アジア1890 ～ 1945』（千倉書房、2024年、ｘ＋394頁）

木畑　洋一

ドイツ外交史研究、とりわけドイツ-東アジア関係史研究の牽引者として、田嶋信雄氏の名前をあげることに異論を唱える者はいないであろう。氏個人としての研究もさることながら、共同研究の組織者としての活動もめざましい。工藤章氏と共同編集した『日独関係史1890 ～ 1945』（東京大学出版会、2008）、『戦後日独関係史』（東京大学出版会、2014）、熊野直樹氏、工藤章氏と共同編集した『ドイツ＝東アジア関係史1890 ～ 1945　財・人間・情報』（九州大学出版会、2021）などがすぐ念頭に浮かぶ。

その田嶋氏個人の近年の研究（最も古い初出は2005年、最も新しい初出は2022年）を集めた論文集が本書である。上記の共編著のタイトルと比べてみれば分るように、本書が扱っている時代は、田嶋氏がこれまで研究を組織してきた対象期間であり、力を込めた論文がならんでいる。以下、各章を簡単に紹介しつつ、適宜コメントを加えていきたい。

まず序章「ドイツ外交と東アジア」では、第一章以降の前提として、対象期間の東アジアにおけるドイツ外交の様相が、日本、中国、ロシア（ソ連）との関係に主として即しながら概観され、諸国間での連携構想が変転、錯綜していく過程が、なめらかな筆致で描かれる。

第Ⅰ部「ドイツ外交と中国への武器輸出」は、20世紀初頭から1930年代初めまでを扱う第1章「中国武器市場をめぐる日独関係」と、1930年代中葉から後半を対象とする第2章「第三帝国の軍拡政策と中国への武器輸出」とから成る。

第1章では章題に示されるように、中国への武器供給をめぐる日独の競合、駆け引きが分析される。20世紀初めにはドイツに押されていた日本は、辛亥革命後巻き返し、第一次世界大戦期の「対華21か条要求」では日中間の「兵器同盟」とも呼べるものの結成を中国に求めた。その構想は、大戦後の軍縮期を経て1920年代末に再浮上したが、満洲事変によって最終的に実現可能性を奪われることになる。その間、敗戦国ドイツは、19年に結ばれた対中国武器禁輸協定の局外に立ちつつ、中国への武器輸出を続け、日本側を苛立たせた。この状況をめぐる、輸出の実施主体であるドイツ商人と、中国国内の批判にさらされて輸出を抑えようとする駐華代表部、および微温的な外務省本省との関係は、軍部が主張する「軍の論理」および軍需産業の利害を反映して商務省が唱える「産業・企業の論理」（以上二つは武器輸出規制に対抗する）と、第一次世界大戦以降の外交における

軍縮基調に沿って外務省が体現していた「外交の論理」（武器輸出規制を進めようとする）の相剋を示すものとして興味深い[1)]。

この論点は、続く第2章で、ナチ政権下のドイツ国防省とその下にある軍需産業による積極的な対中国武器輸出と、それに消極的な外務省、その対立のあおりをくう既存権益の在中商社という構図のなかでも、明確に示される。これに対応する形で中国側では南京国民政府と西南派の間の競合が展開するが、結局1936年に南京政府とナチ政府の間に中独条約が結ばれることになり、ドイツの対中武器輸出は、日中戦争開始後も、独日関係の強化によって停止されるまで続けられていったのである。

第Ⅱ部「ドイツ外交と東アジア航空連絡」では、航空機問題、航空路問題が扱われているが、それについても軍用と民用の区別は微妙であり、第Ⅰ部と明確につながっている。

第3章「日中戦争までのドイツ＝東アジア航空連絡」では、まず、ドイツの航空輸送企業ルフトハンザの東アジアにおける航空路開発への意欲のもとで、1931年に中国側との間で「欧亜航空公司」が設立された経緯が紹介される。その目論見は満洲事変で大きく揺らぐが、日本が「満洲国」とともに設立した満洲航空株式会社は、欧亜航空路実現のため、ルフトハンザと同公司に接近し、36年12月に日独「満」航空協定が調印されるに至る。ただしこの計画実現のためには中国側の了解が必要であり、日本側が「華北分離工作」などを進めているなかでその可能性が薄かったことはいうまでもない。日中戦争開始に至る30年代中葉は、戦争と平和をめぐるさまざまな選択肢が錯綜していた時期であり、本章のテーマもそうした問題の一つと考えられるが、そこで鍵となる中国側の要因について今少し知りたいという感が残った。

日中戦争開始後、1944年に至る期間の日独航空連絡をめぐる交渉経緯は、第4章「戦争期のドイツ＝東アジア航空連絡」で扱われる。航空連絡の実現可能性は、日中戦争から第二次世界大戦の全面展開に至る戦局の曲折を背景に、シベリア経由、中央アジア経由、北極回りといったルート選択と関わりつつ、変化をみせていく。ドイツ側におけるリッベントロップ、日本側における大島浩という、日独協調の鍵となった二人が、一貫してそのために動きつづける様相は印象的である。航空大臣ゲーリングは、42年以後否定的な姿勢をとるが、賛否両論の間で揺れ動いたヒトラーの姿も描かれており、著者はそれを彼の「弱い独裁者」としての性格発露として捉えている。

第Ⅲ部「諜報・謀略をめぐるドイツ＝東アジア国際関係」の主題は、第Ⅱ部から転じているように一見思われるが、第5章「アフガニスタン謀略をめぐるドイツ＝東アジア関係」

1）この論点は、横井勝彦編『軍縮と武器移転の世界史－「軍縮下の軍拡」はなぜ起きたのか』（日本経済評論社、2014）で強調されていた。

では、第4章で取りあげられた中央アジア経由航空路計画で鍵を握っていたアフガニスタンが舞台となっており、ここでも前章からの連続性が見られる。

ただ、第5章の中心テーマは、30年代中葉の日本軍部によるアフガニスタンでの諜報活動（対ソ謀略活動）であり、ドイツは、同じように対ソ諜報・謀略に強い関心をもっていたことが指摘されるものの、本章では脇役の座に退いている。その日本の活動は、宮崎義一という武官によるものであったが、彼の行動は当のソ連にも、アフガニスタンをめぐって歴史的にソ連と対抗してきたイギリスにも、さらにアフガニスタン政府にも、筒抜けになっていた。本章では、そうした失態と、日中戦争勃発後の国際関係の緊張によって、この地での日本の諜報・謀略構想が破綻するに至る様相が、浮き彫りにされている。日本側の他の諜報活動についてソ連側がどれほど知っていたかということについての説明もなされており、「まさしく日本の謀略将校たちは、スターリンの手の中で踊っていたのである」（p.194）とまで表現されている。なお、イギリスの日本に関わる諜報活動について研究したアントニー・ベストは、宮崎（ベストはMiyazawaと誤記）の「うさんくさい活動」は日本の体面を汚してしまったと論じている[2)]。

ドイツは、第6章「満洲謀略をめぐるドイツ＝東アジア国際関係」で主役の座に復帰する。この章の前半では、日本にとってドイツが敵国であった第一次世界大戦期を対象として、満蒙を舞台に東清鉄道の破壊をねらったドイツ人武官の活動が紹介され、後半では、日独が同盟国関係にあった第二次世界大戦期の日本、「満洲国」を舞台とするドイツの諜報活動がリスナーという人物を軸として描かれる。後者は、ソ連の諜報員であったゾルゲの動きと絡み合ったものとしても興味深い。前半、後半とも特定の人物に焦点をあてた検討で、分りやすい叙述となっているが、ドイツの諜報活動のより大きな構図がどのように描けるものか、描けるとすれば、ドイツと東アジア政策のなかでそれがどれほどの意味をもったのか、といった点はより知りたいものである。

最後となる第Ⅳ部では「東アジア国際秩序をめぐる諸構想とドイツ外交」が対象とされる。第7章「孫文の「中独ソ三国連合」構想と日本1917 ～ 1924年」では、第一次世界大戦で中国が対独参戦した後も親ドイツ的姿勢をとり続けた孫文が、ロシア革命後、中独露の連合形成を提案したこと、その姿勢が大戦後も一貫して追及されて対独工作が繰り返しなされたことが、まず述べられる。この動きに対してはドイツ側でも呼応する部分が存在したが、列強の反発を当然予想するドイツ政府がすぐに乗れるものではなく、孫文としては「連ソ」工作の方を優先せざるをえなかった。こうした孫文の計画は、ヨーロッパでの

2）Antony Best, *British Intelligence and the Japanese Challenge in Asia, 1914-1941*, Basingstoke: Palgrave Macmillan, 2002, p.154.

被圧迫国としてのドイツ・ソ連とアジアでの被抑圧民族としての中国との連合という、ヴェルサイユ-ワシントン体制に対抗する国際秩序構想を体現するものであった、と著者は見る。本章の最後では、孫文案に響き合う考え方が、ソ連（コミンテルン）やドイツ側にも見られたこと、日本でも後藤新平がそれに親和的な構想（日独中ソの連携）を抱いていたことが、紹介されている。1924年に神戸で行われた有名な「大アジア主義」演説の背景となる孫文の国際秩序論が彼の具体的な外交活動と結びつけられる形で提示されているのである。

第８章「日本の枢軸同盟政策と対ソ政策」では、日独防共協定から日独伊三国同盟・日独伊戦時同盟を経て、戦争末期のソ連を経由しての終戦工作に至る過程が検討される。ここでの論点は、「反ソ防共」を性格とする防共協定と対米同盟としての性格をもった三国同盟の間の非連続性、独ソ不可侵条約とノモンハン事件以後日本陸軍のなかに生まれた「連ソ容共」姿勢の継続性である。これ自体は当然重要な論点であるが、それに加え、第３章、第４章で取りあげられた日独「満」航空協定や日独航空協定がもった意味や、第６章で扱われた満洲での日独の諜報戦・謀略戦の意味が、日独ソ関係のなかに改めて位置づけ直されてより鮮明になっていることに注意したい。

本書の掉尾を飾る形となっている「おわりに」は、本書の内容を改めて丁寧に要約したものであり、それなりに有用ではあるものの、今述べた点も含め、本書各部分の連関がもう少し分るような叙述にした方がよかったのではないだろうか。

それはともあれ、本書は全体として、当該時期の「ドイツ外交と東アジア」の姿を読者が考えていく上での手がかりを豊富に提供してくれている。各章で中心的位置を占める国は、日独（第1章）、独中（第2章）、独日（第3-6章）、中独ソ（第7章）、日独（第8章）であるが、当然のことながら、ドイツの位置と姿勢は全体を貫く糸であり、それに日本の動きが絡み合う構図のなかに、中国とソ連が配される形となっているのである。この構図を、イギリスや米国がどう見て、どう対応したかという問題は常に残るものの、それは他の研究者の課題である。

本書が取りあげている外交の具体相が、武器輸出問題、航空・航空路問題、諜報・謀略問題であるということは、軽い驚きを誘う。独中関係のなかで従来もよく着目されてきた武器輸出問題はさておいて、航空・航空路問題にせよ、諜報・謀略問題にせよ、「ドイツ外交と東アジア」を論じようとする時にすぐに念頭に浮かんでくるような素材ではないと思われるからである（少なくとも評者にとってはそうであった）。しかし、ドイツ外交の全体像に通暁した著者ならではの着眼点からこうしたテーマに切り込んでいくことで、東アジア国際関係のなかでのドイツの役割を浮上させることに、著者は成功している。な

お、こうしたテーマが扱われる背景として、明治大学国際武器移転史研究所の共同研究が存在していることにも注意する必要があろう。

本書を読んで改めて強く感じたのは、著者の叙述が常に豊富な一次史料の解読・分析の上に成り立っていることである。一次史料に立脚した分析・叙述が重要であることは当然だが、本書ではとりわけドイツ史料の博捜ぶりが目立つ他、日本側史料に加えて、中国側史料、さらにソ連の史料にも眼が及んでおり、その徹底性は群を抜いている。概論的といってよい序章も広く一次史料に基づいた叙述となっているのである。

一点のみ、ないものねだり的感想を述べておきたい。著者は「はじめに」で、本書の序章は政治・外交レヴェルの概観であって、通商政策や文化政策などに言及することはできない、と述べており（p.vi）、確かに序章でもその後の各章でも、文化的要因については明示的に触れられることはない。しかし人種的要因については、日本の真珠湾攻撃時のヒトラーの有名な反応（p.53）、第6章の中心人物リスナーのユダヤ人要因問題、といった若干の示唆がある。こうした点について、本書の分析の枠内でもっと言及する余地がなかったのだろうかという点が、読後の感想として残ったのである。

（東京大学・成城大学名誉教授）

編　集　後　記

第 19 号をお届けします。本号は論説 3 本、研究ノート 2 本、書評 1 本で構成されています。論説はいずれも本誌に掲載された論説の英語版です。纐纈論文は本誌第 8 号（2019 年 7 月刊）に掲載の「戦前期日本の武器生産問題と武器輸出商社―泰平組合と昭和通商の役割を中心にして―」、白戸論文は同号掲載の「第 2 次大戦後日本における企業再建整備及び軍事工業再建過程の検討―三菱重工業の事例を中心として―」、そして赤津論文は第 9 号（2020 年 1 月刊）に掲載の「19 世紀中葉のイギリス海軍における煙害防止技術の軍事的意味転換」です。この企画は英語版を掲載することにより、本研究所の成果を広く海外に発信することを目的としています。研究ノート 2 本は本研究所の若手研究員によるもので、太田［英語］論文は M.M. ポスタンの著作 *British War Production* に着目し、戦後冷戦下のイギリスで展開した公式戦時経済史の出版差し止め論争を詳細に分析した労作です。里見論文は業界誌を素材として分析し、19 世紀後半イギリス国民経済における情報通信・電気関連産業の実態を解明しようとした意欲的作品です。今後のますますの活躍が期待されます。最後に木畑洋一氏には、本研究所メンバー田嶋信雄氏の近著『ドイツ外交と東アジア 1890 ～ 1945』（千倉書房）の書評を執筆していただくことができました。

ところで、現在、本誌掲載論文等を J-STAGE に登録・発信する作業を進めているところです。インターネットによる発信は、既に研究所のホームページや明治大学学術成果リポジトリでも行っていますが、J-STAGE を加えることで読者層のいっそうの拡大が期待されます。夏季休業明けに J-STAGE への申請を済ませ、11 月から登録のための最後の準備作業に取り掛かっています。この作業は、2016 年 1 月の創刊号から本号までの研究所員の研究成果とピアレビューの足跡をたどる機会を与えてくれました。本誌がここまで来られたのも横井編集委員長（前所長）を中心とする研究所メンバー、編集委員の皆様の高い研究意欲と努力の成果であったと再認識したところです。次号（第 20 号）は大きな節目となる記念号であるとともに、次の 10 年の始まりでもあります。

今春（2025 年 1 月）、研究所はグローバルフロント 16 階から 17 階に移転しました。これもまた節目の出来事となることでしょう。

（須藤　功・すとう　いさお）

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代表者　須藤　功

連絡先住所　〒 101-8301　東京都千代田区神田駿河台 1－1
明治大学グローバルフロント 16 階
明治大学国際武器移転史研究所
Email: rihgat_journal@meiji.ac.jp
URL: http://www.kisc.meiji.ac.jp/~transfer/

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