

# Why did the bathyscaphe FNRS III come to Japan in 1958 ? The beginning of French-Japanese cooperation in the field of oceanography

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**Abstract:** This paper provides an overview of why the bathyscaphe FNRS III came to Japan in May 1958 and how it explored Japan Trench with Japanese and French scientists. Launched in Toulon in 1953, the FNRS III was the most advanced submersible in the world at the time. Professor Tadayoshi Sasaki of Tokyo University of Fisheries who had been conducting deep-sea research in Japan, spent seven months at the *Institut océanographique* of Paris from January 1956. Then, he met Professor Louis Fage of the *Museum National d'Histoire naturelle* and the *Institut océanographique* who was President of *Comité de Direction du Bathyscaphec et de la Calypso*. After some persuasion by Professor Sasaki, Professor Fage promised to send the bathyscaphe to Japan. Professor Sasaki with another Japanese organisations prepared to accept FNRS III in Japan. The bathyscaphe arrived in Japan in May 1958 and descended into the Japan Trench and surrounds to achieve valuable findings. Based on them, the Japanese-French Oceanographic Society (SFJO) was established in Japan in April 1960 to develop and deepen French-Japanese cooperation in oceanography and fisheries science. The SFJO has been promoting and contributing to cooperations between the two countries in the fields of oceanography and fisheries science since then.

**Keywords :** *bathyscaphe FNRS III, Japanese-French Oceanographic Society, Japan Trench, French-Japanese cooperation in oceanography*

## 1. What is a bathyscaphe?

A bathyscaphe is an underwater device for exploring the deep sea. Its name, derived from the

Greek words 'bathus' (deep) and 'skaphos' (ship) (ASAHI SHIMBUN, 1958). It was invented by Swiss Auguste Piccard, a professor at the Free

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**Fig. 1** Swiss Auguste Piccard (left: [https://en.wikipedia.org/wiki/Auguste\\_Piccard](https://en.wikipedia.org/wiki/Auguste_Piccard)), professor at the Free University of Brussels, who invented the bathyscaphe, Professor Beaker (centre: <https://comicvine.gamespot.com/professor-calculus/4005-67717/images/>), modelled on Professor Piccard in the Belgian cartoon "The Adventures of Tintin" and cover of "Red Rackham's Treasure" issue of "Adventures of Tintin" designed by Hergé, featuring Professor Calculus and the bathyscaphe (right: <https://ec.tintin.sc/shopdetail/003006000012/>)

University of Brussels, and perfected by his son Jacques Piccard. It descends to great depths using two principles:

- a) a spherical pressurised cabin built in thick steel, in which the air is renewed, where scientists or observers take place with a captain, the bathysphere,
- b) a reservoir filled with petroleum, supporting the bathysphere, all floating at the surface according to the principle of Archimedes. The 2–3-seater bathyscaphe descends by gravity and rises by releasing ballast.

Incidentally, Professor Auguste Piccard was the model for the Belgian cartoon "Professor Calculus (Tournesol in French and Beaker in Japanese)" in the Belgian cartoon "The Adventures of Tintin". In "Red Rackham's Treasure", one of "Adventures of Tintin" de-

signed by the designer Hergé, there is a bathyscaphe (Fig. 1) ([https://en.wikipedia.org/wiki/Professor\\_Calculus](https://en.wikipedia.org/wiki/Professor_Calculus) accessed on 1 June 2021).

FNRS III (Fig. 2) was the second bathyscaphe developed for deep-sea exploration after FNRS II. It was a French-Belgian collaboration since 1950, completed and launched in June 1953 at the naval shipyard in Toulon, France (SASAKI, 1958b). She was commanded by *Capitaine de Corvette* Georges Houot, with the assistance of marine Engineer in Chief Pierre Willm (Fig. 2).

At the sea surface, the water is fed into the air pipe through the seawater inlet shown in Fig. 3 and sinks due to gravity on the lead and steel ballast, the wire rope and the seawater in the air pipe (SASAKI, 1958b). The buoyancy of the petroleum in the float allows the boat to dive slowly. The FNRS III has one electrically driven propeller each to starboard and port, and can



Fig. 2 Picture of bathyscaphe FNRS III arrived at the Port of Yokohama in May 1958 (SASAKI, 1958b).

move forwards and backwards, left and right, at speeds of  $2\text{--}3\text{ km s}^{-1}$ . When the FNRS III discards the iron ballast, its buoyancy exceeds the force of gravity and the FNRS III rises from the seabed.

## 2. Encounter between the great French and Japanese oceanographers in Paris

Why did a French bathyscaphe come to Japan? The key to the success of this great undertaking of bathyscaphe's visit to Japan was the encounter between the great French and Japanese oceanographers at *Institut océanographique* of Paris in January 1956. One was Professor Tadayoshi Sasaki of Tokyo

University of Fisheries and the other was Professor Louis Fage, *Muséum national d'Histoire naturelle* (National Museum of Natural History) and *Institut océanographique* in Paris (Fig. 4) (SASAKI, 1958b).

Professor Sasaki graduated from the Faculty of Science at Hokkaido Imperial University. After working as a preparatory professor at Keijo Imperial University, he became a researcher at the Nishina Laboratory of RIKEN in 1944, and obtained his Doctor of Science degree from Hokkaido University in 1949 (<https://ja.wikipedia.org/wiki/佐々木忠義> accessed on 1 June 2021). At this time, he conducted deep-sea research using a suspended submersible called the Kuroshio (SASAKI, 1958a). In 1951, the Kuroshio, which recorded a depth of 208 m in Sagami Bay, was investigating the seabed shallower than around 200 m. In 1953, he became a professor at Tokyo University of Fisheries and a senior researcher at Ocean Physics Laboratory of RIKEN. From January 1956, he was an overseas researcher of the Ministry of Education, staying at *Institut océanographique* of Paris until August 1956.

Professor Louis Fage studied biology at Sorbonne University, where he obtained his PhD in 1906 (FOREST, 1964). He then spent 14 years working on Mediterranean fish research at the Marine Biology Laboratory in Banyuls-sur-Mer. From 1920 he worked in the zoological department of the *Muséum national d'Histoire naturelle*, where he was appointed professor of zoology in 1938.

A committee was set up in Paris to establish a coherent programme for the scientific exploitation of bathyscaphe from 1954. Professor Louis Fage, the most eminent French marine scientist of his time chaired the *Comité de Direction du Bathyscaphe et de la Calypso* (Bathyscaphe and Calypso Steering Committee). *La Calypso* is

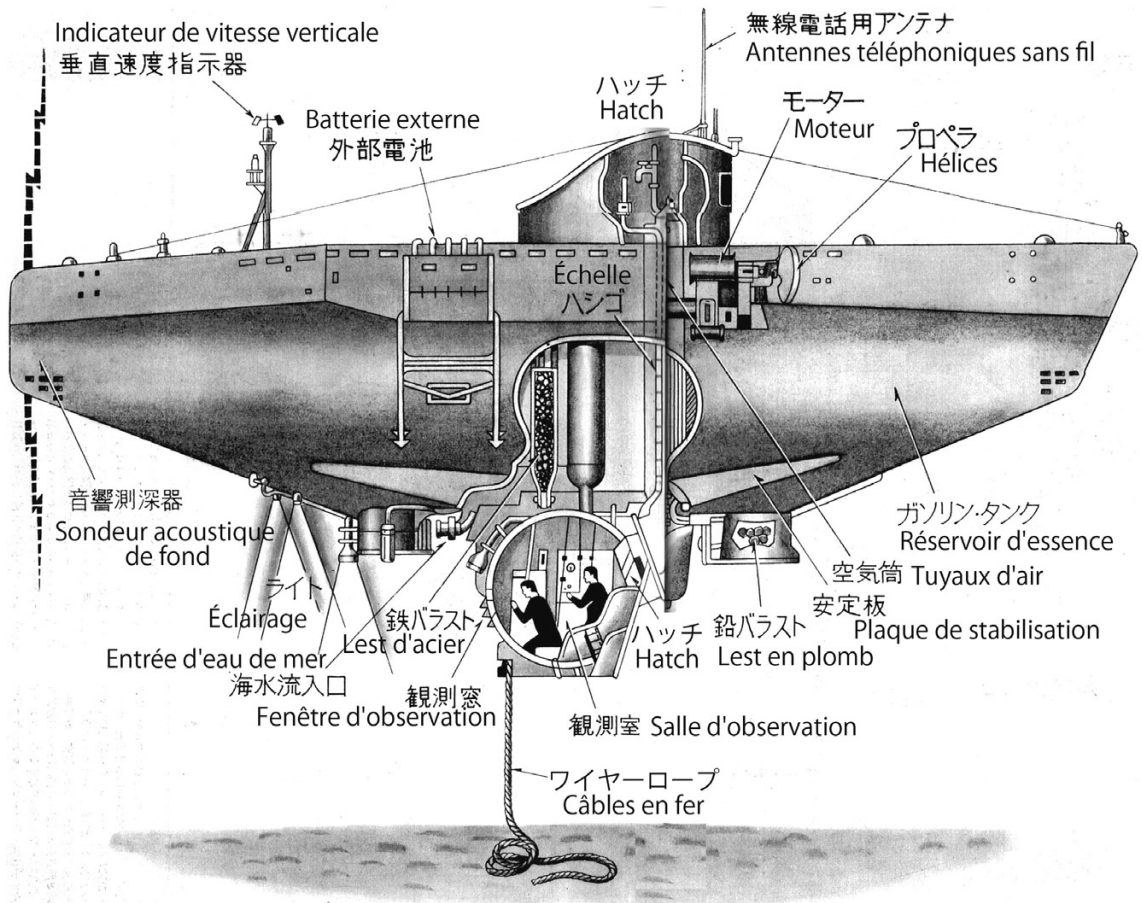


Fig. 3 Schematic diagram showing details of the bathyscaphe FNRS III (Source: ASAHI SHIMBUN, 1958).



Fig. 4 Tadayoshi Sasaki, Professor at Tokyo University of Fisheries (left: ASAHI SHIMBUN, 1958) and Louis Fage, Professor at the National Museum of Natural History and Oceanographic Institute (right: FOREST, 1964).

RV *Calypso* which is a former British Royal Navy minesweeper converted into a research vessel for the oceanographic researcher Jacques Cousteau, equipped with a mobile laboratory for underwater field research during 1950 to 1997 ([https://en.wikipedia.org/wiki/RV\\_Calypso](https://en.wikipedia.org/wiki/RV_Calypso) accessed on 1 June 2021).

### 3. Professor Sasaki's approach to Professor Fage

During Professor Sasaki's stay at *Institut océanographique* from January 1956 as an overseas researcher of the Ministry of Education, Professor Sasaki became acquainted with the

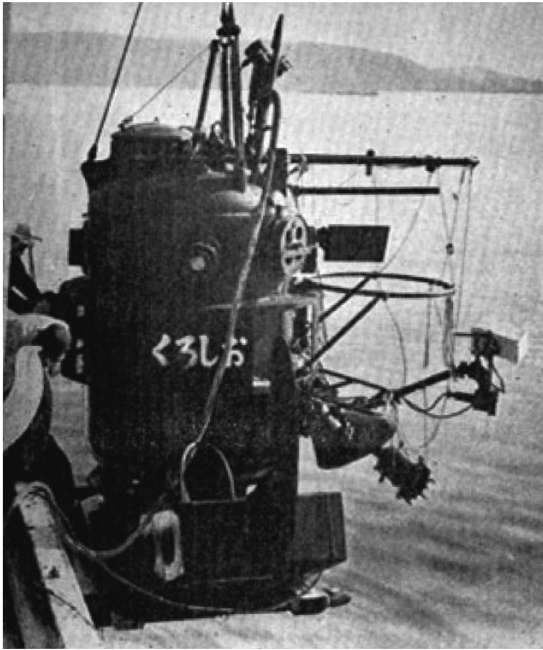


Fig. 5 Hokkaido University's suspended submersible Kuroshio (SASAKI, 1958a).

Director, Professor Louis Fage. It was then that he learnt that Professor Fage was President of the Bathyscaphe and Calypso Steering Committee. Two years earlier, on 15 February 1954, bathyscaphe FNRS III had successfully dived to a bottom depth of 4,050 m in Senegalese waters. Professor Sasaki then strongly wanted to bring bathyscaphe FNRS III to Japan to explore the Japan Trench at any cost.

Let us reproduce a conversation between Professor Fage and Professor Sasaki that took place at *Institut Oceanographique* in January 1956, based on Professor Sasaki's book (SASAKI, 1958b). According to his book, the discussions at the institute were lengthy.

Professor Sasaki: I would like to invite bathyscaphe to Japan and do deep-sea research in Japan.

Professor Fage: There is a bathyscaphe in

Japan, isn't there?

Professor Fage considered the small submersible Kuroshio to be Japan's bathyscaphe. The Kuroshio is a suspended type and can only dive to a depth of 200 m (Fig. 5). The French bathyscaphe FNRS III, on the other hand, had dived to a depth of 4,050 m in 1954. Professor Sasaki explained this to Professor Fage.

Professor Fage: Why don't you make one bathyscaphe in Japan?

Professor Sasaki: In Japan today, we cannot make an excellent bathyscaphe like in France. Due to the high cost and technical problems, the building of the bathyscaphe FNRS III is not feasible.

Professor Fage: There are rumours that the Soviet Union is going to make a bathyscaphe, so they are going to explore the seas around Japan. If such rumours spread, the Japanese Government will be motivated to make a bathyscaphe.

Professor Sasaki: I am well aware that the Soviet Union has been studying Japan's surroundings in great detail, with their magnificent ships and a wide range of highly sophisticated observation equipment. I also know that they are particularly focused on the Japan Trench.

Professor Fage: The Emperor is a great biologist, so if you ask him, you will get funding.

Professor Sasaki: No, no, it is not easy for me to talk to His Majesty the Emperor, and even if I do talk to His Majesty the Emperor, it is not easy for the Government to fund my research.

After a long discussion.

Professor Fage: I understand well. Agreed. As I am the chairperson of the French bathyscaphe and Calypso Steering Committee, it is safe to send the bathyscaphe to Japan as long as I agree. When you return to Japan, you should be in high spirits and be well prepared to accept the bathyscaphe in Japan.

In Professor Sasaki's retrospect (SASAKI, 1958b), at first Professor Fage was very reluctant to send the bathyscaphe FNRS III to Japan. However, Professor Sasaki's passion convinced him.

#### 4. Preparations for the reception of the bathyscaphe FNRS III in Japan

The Japanese side was to pay for the transport and research costs of the bathyscaphe FNRS III, the petrol to be put into the float of FNRS III and the accommodation of the French crew and scientist. For this reason, Professor Sasaki immediately looked for companies willing to fund the project after his return from France to Japan in August 1956. He approached film companies, fisheries companies and others, all to no avail (SASAKI, 1958b).

Finally, Professor Sasaki went to the Asahi Shimbun to ask for help. It was decided two days later after Professor Sasaki's visit that the Asahi Shimbun, one of the biggest newspaper companies in Japan, would bear the cost of inviting bathyscaphe FNRS III to Japan to explore the Japan Trench, because the Asahi Shimbun judged the expedition of bathyscaphe FNRS III in the Japan Trench as a very worthy task. The total amount of support, as a result of the estimates, came to 18 million yen, which the Asahi Shimbun would provide (SASAKI, 1958b).

The Japan Bathyscaphe Steering Committee was formed, chaired by Yoshikatsu Matsuike,

President of Tokyo University of Fisheries including the heads of divisions and departments of the Ministry of Foreign Affairs, Ministry of Education, Fisheries Agency and Japan Coast Guard, President of the Science Council of Japan, Director of Tohoku Regional Fisheries Research Laboratory, Director of the Asahi Shimbun, President of Scientific Research Institute Ltd. (formerly RIKEN) and professors from the University of Tokyo, Tokyo University of Fisheries, Nagoya University and Tohoku University (ASAHI SHIMBUN, 1958) (Table 1; Fig 6). The purpose of this committee was to consider where, who and what kind of studies should be carried out using the bathyscaphe FNRS III. Note that the Japanese Government was represented at this time by the Ministry of Foreign Affairs, the Ministry of Education, the Japan Fisheries Agency and the Japan Coast Guard, as well as the President of the Science Council of Japan. The list of members of this committee shows how high Japan's expectations were.

At the end of December 1956, Professor Sasaki informed Professor Fage that it would be possible to receive the bathyscaphe in Japan. However, plans for the 1957 bathyscaphe operation had already been decided, so the bathyscaphe was to come to Japan the following year, in May 1958.

Professor Sasaki attended international conferences in Germany and Norway in September-October 1957. Taking advantage of the opportunity, he went to France after the international conferences. He returned to Japan from France in February 1958, having agreed the terms of the contract to accept the bathyscaphe belonging to French Navy from France to Japan e.g. that it would be transported by Japanese cargo ship and that the costs of transporting it would be borne by the Japan Bathyscaphe Steering Committee.

**Table 1.** Members of Japan Bathyscaphe Steering Committee.

President	President, Tokyo University of Fisheries	Yoshikatsu Matsuike
Committee Member	President, Tokyo University of Fisheries	Jyunichi Anbara
	Dean, Faculty of Agriculture, Tohoku University	Takeo Imai
	Professor, Tokyo University of Fisheries	Michitaka Uda
	Director, Academic Affairs Division, University Academic Affairs Bureau, Ministry of Education	Sumi Okada
	President, The University of Tokyo	Seiji Kaya
	Director, Tohoku Regional Fisheries Research Laboratory, Fisheries Agency	Kinosuke Kimura
	Professor, Tokyo University of Fisheries	Itsuo Kubo
	Professor, Tokyo University of Fisheries	Takeharu Kumagori
	Professor, Tokyo University of Fisheries	Tadayoshi Sasaki
	Professor and Head of Department of Fisheries, Tokyo University of Fisheries	Takejiro Sasayama
	Director of Hydrographic Department, Japan Coast Guard	Kanji Suda
	Professor, The University of Tokyo	Takao Suehiro
	Professor, Nagoya University	Ken Sugawara
	Director, First Division, Research Department, Fisheries Agency	Toru Sone
	Director, First Division, European and Asian Affairs Bureau, Ministry of Foreign Affairs	Kenjiro Rikiishi
	Professor, Tokyo University of Fisheries	Hiroshi Niino
	Professor, The University of Tokyo, President of the Oceanographic Society of Japan	Kouji Hidaka
	Chief Editor, Asahi Shimbun Tokyo Head Office	Tomoo Hirooka
	Professor, The University of Tokyo	Yoshiyuki Matsusue
	Professor, Tokyo University of Education	Yasuo Miyake
President, Scientific Research Institute Ltd.	Takeshi Murayama	

In order to borrow the bathyscaphe FNRS III from France, the Japan Bathyscaphe Steering Committee signed an agreement with the French Bathyscaphe and Calypso Steering Committee (President: Professor Louis Fage) for the "FNRS III bathyscaphe Study Mission in Japan". The important points of the contract are as follows:

- a) The number of dives to be carried out is eleven. The allocation is eight dives with a crew nominated by the Japanese committee and three dives with French biologists;
- b) The duration is three months;

- c) The scientific results, as well as the photographic and film documentation, shall be the property of the French and Japanese organizations. The Asahi Shimbun shall have the exclusive right to publish all reportage, articles, photographs and films of dives made during the bathyscaphe's voyage and stay in Japan, except those in France and its overseas territories.

The Japan Bathyscaphe Steering Committee has often met to decide on studies, plans and other matters. It defined the research items as follows:



Fig. 6 Meeting of the Japanese Bathyscaphe Steering Committee held on 22 March 1958. The fourth from the left is the chairman of the committee, Professor Yoshikatsu Matsuike, President of Tokyo University of Fisheries (ASAHI SHIMBUN, 1958).

- 1) Study on the ecology of deep-sea swimming organisms,
- 2) Study on the ecology of deep-sea benthic and sedentary organisms,
- 3) Study on deep-sea luminescent organisms,
- 4) Study on deep-sea bottom bacteria,
- 5) Study on deep-sea fishing methods,
- 6) Study on fish reefs,
- 7) Study on DSL (acoustic false bottom image of ultrasound: so-called ghost seabed),
- 8) Study on marine optics such as attenuation polarisation and scattering of underwater light,
- 9) Study on deep-water currents,
- 10) Study on the chemical composition of deep seawater,
- 11) Study on trace elements in deep seawater,
- 12) Study on radioisotopes in deep seawater,
- 13) Study on the determination of the age of deep seawater by radiocarbon,
- 14) Study on ripple marks (striped pattern on the sand seabed),
- 15) Study on the topography and sediments of

the deep-sea floor,

- 16) Study on topographic and sedimentary changes caused by artificial blasting and
- 17) Study on the structure of the Kuroshio Branch Current.

In addition, enquiries were made to universities and research institutions across Japan and some requests were received, but the majority fell into these 17 research items. However, the details of implementation were finally decided with Captain Gorges Houot after his arrival to Japan on 14 May 1958.

##### 5. FNRS III's dives off Sanriku and surrounds

Bathyscaphe FNRS III finally arrived in Japan in May 1958, about two and a half years after Professors Lous Fage and Tadayoshi Sasaki had decided to bring bathyscaphe FNRS III to Japan in January 1956. The bathyscaphe FNRS III arrived on a trestle welded to the rear deck of NYK Atsuta Maru and securely tied down with ropes (Fig. 7). The members of the FNRS III crew and maintenance support were *Capitaine*



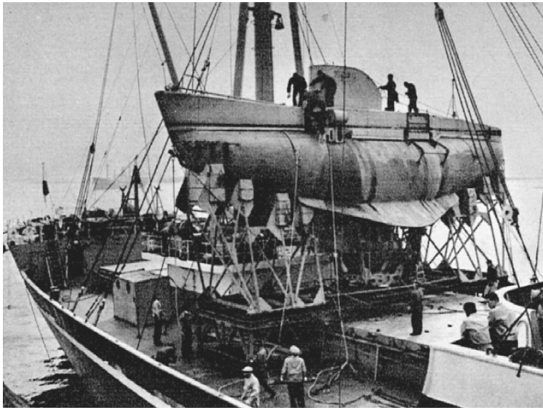


Fig. 7 Bathyscaphe FNRSIII arrives at the Port of Yokohama on a trestle welded to the rear deck of NYK Atsuta Maru and securely tied to a rope (ASAHI SHIMBUN, 1958).

*de Corvette Georges Houot, Enseigne de Vaissau Gabriel O'Byrne, Petty Officer Daniel Rost, Petty Officer Michel Thébault, Petty Officer Clément Serrant and Petty Officer Marcel Berthelot. The title "Six Samurai of bathyscaphe" was used in an article about the crew of the French Navy's FNRS III coming to Japan, in reference to Akira*

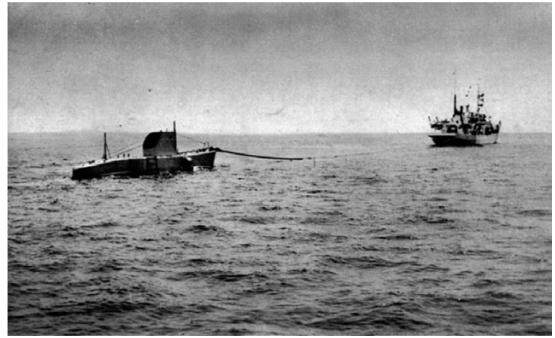


Fig. 9 FNRS III towed by TV Shinyo Maru from the Port of Yokohama to the Port of Onagawa on 1 June 1958 (ASAHI SHIMBUN, 1958).

Kurosawa's film *Seven Samurai*, which was released in 1954 and was highly acclaimed in Europe (Fig. 8).

On 1 June 1958, FNRS III was towed from Yokohama to Onagawa by TV Shinyo Maru of Tokyo University of Fisheries (Fig. 9), and on 7 June arrived at the Port of Onagawa, where the crew received a warm welcome (Fig. 10). FNRS III preparing to dive off Onagawa on 20 June 1958.



Fig. 8 A photograph of the crew welcoming bathyscaphe on the deck of NYK Atsuta Maru on her arrival at the port of Yokohama (left) and a scene from Akira Kurosawa's *Seven Samurai* (right: [http://blog.nc-net.or.jp/nc/2011/11/post\\_178.html](http://blog.nc-net.or.jp/nc/2011/11/post_178.html)). The photo on the left was published in a French newspaper and shows, from left, *Enseigne de Vaissau* Gabriel O'Byrne, *Capitaine de Corvette* Georges Houot, Chief Petty Officer Daniel Rost, Petty Officer Michel Théveaut, Petty Officer Clément Serrant and Petty Officer Marcel Berthelot.



Fig. 10 The crew of the FNRS III received a great public welcome when they arrived in the Port of Onagawa on 7 June 1958 (ASAHI SHIMBUN, 1958).

A total of six Japanese and French scientists conducted deep-sea research aboard the bathyscaphe FNRS III. Professor Sasaki, specialist in marine physics, Professor Jean-Marie Pérès, Professor of University of Aix-Marseille in marine biology, Professor Hiroshi Niino of Tokyo University of Fisheries in seabed geology, Professor Takeharu Kumagori, of Tokyo University of Fisheries in ocean acoustics, Professor Izu Kubo of Tokyo University of Fisheries in marine biology and Professor Takuo Chiba of Fisheries Training Institute, Ministry of Agriculture and Forestry in marine planktology (Fig. 11).

Some of the research results obtained by these professors are presented below. On 20 June, Professor Sasaki dived into the Japan Trench at a bottom depth of 3,000 m off Kinkasan (Fig. 12). He measured that the current on the seabed was  $2 \text{ cm s}^{-1}$ . Figure 13 shows Professor Sasaki attaching the current meter to the bathyscaphe.

Professor Pérès dived into the Japan Trench at a bottom depth of 1,000 m off Kinkasan on 26 June and at 1,650 m on 5 July to investigate the relationship between rapid changes in water



Fig. 11 French and Japanese scientists aboard bathyscaphe FNRS III during a diving expedition in Japan (ASAHI SHIMBUN, 1958). Top row, left to right: Professor Tadayoshi Sasaki, Tokyo University of Fisheries (physical oceanography); Professor Jean-Marie Pérès, Aix-Marseille University (marine biology); Professor Hiroshi Niino, Tokyo University of Fisheries (seafloor geology); bottom row, left to right: Professor Takeharu Kumagori, Tokyo University of Fisheries (ocean acoustics); Professor Izu Kubo, Tokyo University of Fisheries (marine biology); Professor Takuo Chiba, Fisheries Training Institute, Ministry of Agriculture, Forestry and Fisheries (marine planktology).

temperature and plankton species in the mixed zone between the warm Kuroshio and Oyashio currents. On the seabed, animals were sketched and observed (Fig. 14). Sketches of deep-sea animals observed by Professor Pérès are shown in Fig. 14.

On 20 June 1958, Professor Sasaki and *Capitaine de Corvette* Houot dived to a depth of 3,000 m in the Japan Trench. At this time there was a plan to dump nuclear waste into the deep sea. Based on this observation, Professor Sasaki considered that radioactive waste should not be dumped, even in deep water, because of the currents on the seabed (Fig. 15).

The map of bathyscaphe FNRS III dive sites

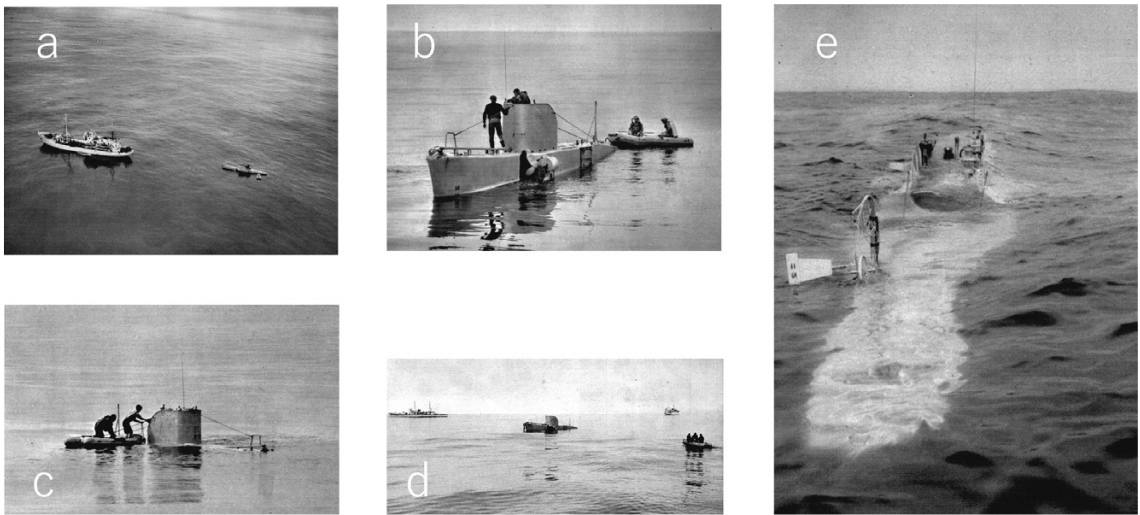


Fig. 12 Photos of FNRS III towed off Onagawa on 20 June 1958 (a), prepared to dive (b, c, d) and began diving (e) (ASAHI SHIMBUN, 1958).



Fig. 13 Professor Tadayoshi Sasaki, Tokyo University of Fisheries, attaching a current meter to the deck of the FNRS III just before diving (ASAHI SHIMBUN, 1958).

over a period of nine dives, with the exception of the first and seventh dives where one journalist of Asahi Simbun Mr Jitsuo Kusaka and one cinematographer of Nippon Eiga Shinsha Mr Shigeo Hayashida, respectively, were on board. Therefore, scientific dives were conducted at three sites in the Japan Trench off Kinkasan, three

sites off the Boso Peninsula and one site in Sagami Bay. The first dive off Kinkasan was to a depth of 3,000 m (Fig. 16).

On 27 August, the crew and bathyscaphe FNRS III returned to Toulon by sea from the Port of Yokohama (Fig. 17). On 31 August 1958, *Capitaine de Corvette* Houot, Chief Petty Officer Rost returned to Toulon by air from Haneda Airport. A number of Japanese could be seen seeing off the two on their return from Haneda Airport (Fig. 17). The Japanese were enthusiastic about the bathyscaphe FNRS III at this time and thanked France for its cooperation.

Professor Sasaki reported that, according to the original plan, Asahi Simbun was to provide 18 million yen in funding, but in the end paid 50 million yen (SASAKI, 1967). The transport of bathyscaphe FNRS III from the Port of Toulon to the Port of Yokohama and back alone cost 20 million yen, in 1958. The bathyscaphe FNRS III diary of stay in Japan is summarized in Table 2.



Fig. 14 Photos of marine animals on the deep-sea floor observed by Professor Jean-Marie Pères of Aix-Marseille University (left: the third dive; middle: the fourth dive) and recorded in his notebook (right) (ASAHI SHIMBUN, 1958).



Fig. 15 Front-page article in the 21 June 1958 issue of the Asahi Shimbun newspaper reporting that the bathyscaphe FNRS III had successfully made a dive to a bottom depth of 3,000 m in the Japan Trench. Professor Sasaki, who was on board the FNRS III, also reported a current speed of as much as  $2 \text{ cm s}^{-1}$  on the seabed. (ASAHI SHIMBUN, 1958).

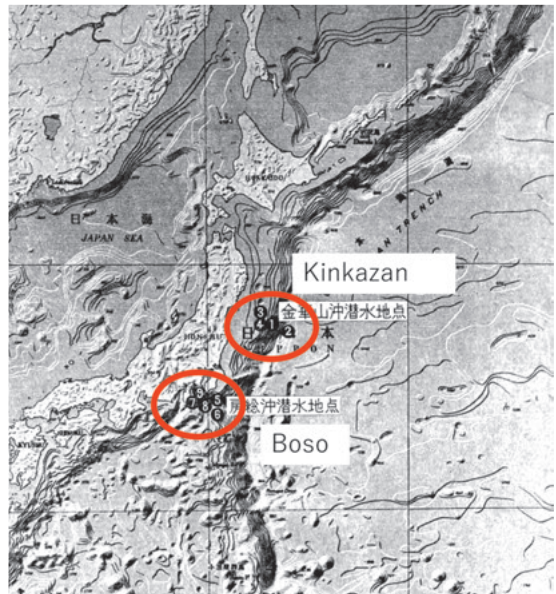


Fig. 16 Chart showing the dive locations of the FNRS III with Japanese and French researchers on board, with numbered dots 1 to 4 indicating dive locations off Kinkazan and dots 5 to 9 indicating dive locations off Boso (ASAHI SHIMBUN, 1958).

### 6. Impacts of the successful dives by the bathyscaphe FNRS III

The success of the bathyscaphe FNRS III dives led to the development of French-Japanese cooperation in oceanography. On 7 April 1960, the first general meeting was held by

Professor Sasaki and his colleagues at the Maison franco-japonaise to establish the Japanese-French Oceanographic Society. French-Japanese cooperation was further developed and in 1962 the newly built bathyscaphe Archimède came to Japan (Fig. 18).

On 25 July 1962, Henri-Germain Delauze, head



Fig. 17 NYK Suruga Maru (top and bottom left photos) departing from the Port of Yokohama for Toulon with bathyscaphe FNRS III on deck; *Capitaine de Corvette* Houot and Chief Petty Officer Rost (right photo) depart from Haneda Airport for Toulon, seen off by many Japanese (ASAHI SHIMBUN, 1958).

of the bathyscaphe laboratory at CNRS, *Lieutenant* Gabriel O'Byrne (Fig. 19) and Professor Sasaki reached a bottom depth of 9,545 m in the Kuril Islands Trench on the *Archimède* (Fig. 20). On 15 July, *Capitaine de Corvette* Houot and Engineer Pierre Willm (Fig. 19) dived to reach a diving record of a depth of 9,200 m. To celebrate this dive by French crew, a commemorative postage stamp was issued in France (Fig. 21).

"La mer", the journal of the Japanese-French Society of Oceanography, was launched in August 1963 and continues to be published (Fig. 22). The first article, of which Professor Sasaki was the lead author, was on the analysis of the chemical composition of seawater collected in a dive that reached a depth of 9,545

m off the Kuril Islands in 1962.

French-Japanese cooperation in deep-sea research continued in 1967 with the bathyscaphe *Archimède* visited Japan and surveyed the Kuril Islands Trench. Subsequently, Japan built its first manned submersible, the *Shinkai*, in 1969. The practical maximum depth was 600 m. In 1989, the *Shinkai 6500* was built to a practical maximum depth of 6,500 m. A new model, the *Shinkai 12000*, is currently under construction.

The development of French-Japanese cooperation in oceanography after the bathyscaphe expedition to the Japan Trench is briefly described. For example, the KAIKO-Project in 1984, led by Professor Xavier Le Pichon and Professor Kazuo Kobayashi, included the French research vessel "Jean Charcot". The KAIKO-NanTroSEIZE

**Table 2.** Bathyscaphe FNRS III Diary of stay in Japan (ASAHI SHIMBUN, 1958).

Month	Day	Event
May	15	Arrival of <i>Captaine de Corvette</i> Georges Houot, <i>Enseigne de Vaissau</i> Gabriel O'Byrne and Chief Petty Officer Daniel Rost to Japan via air. Arrival of NYK Atsuta Maru on which bathyscaphe FNRS III was loaded with three Petty Officers, Marcel Berthelot, Clément Serrant and Michel Thébault at the Port of Kobe.
	19	Arrival of NYK Atsuta Maru arrived at the Port of Yokohama and landing of FNRS III on the water.
	21	Welcome reception for the French FNRS III team by the Japan Bathyscaphe Steering Committee.
	26	Filling the FNRS III's float with petrol in the Port of Yokohama.
June	1	Departure of FNRS III pulled by R/V Shinyo Maru from Yokohama to Onagawa.
	3	Evacuation of FNRS III to the Port of Tateyama due to rough sea condition.
	4	Departure of FNRS III from the Port of Tateyama.
	7	Arrival of FNRS III at the Port of Onagawa.
	11	Departure of FNRS III for the first dive from the Port of Onagawa but return to the Port of Onagawa due to rough sea condition.
	13	Departure of FNRS III again for the first dive from the Port of Onagawa.
	14	Start of FNRS III dive at 37° 54' N, 143° 1' E at a bottom depth of 1970 m at 9:04 am piloted by <i>Captaine de Corvette</i> Houot. The Asahi Shimbun's Science Department reporter Jitsuo Kusaka on board for general observation. Surfacing of FNRS III at 10:35 am due to rapid ascent from a depth of 1,200 m by wrong button for ballast operation on the way.
	15	Return of FNRS III to the Port of Onagawa.
	19	Departure of FNRS III for the second dive from the Port of Onagawa.
	20	Start of FNRS III dive at 37° 46' N, 143° 7' E at a bottom depth of 3,000 m at 9:58 am piloted by <i>Captaine de Corvette</i> Houot. Professor Tadayoshi Sasaki on board to measure deep-sea currents and study the optical properties of seawater. Surfacing of FNRS III at 4 pm.
	21	Return of FNRS III to the Port of Onagawa.
25	Departure of FNRS III for the third dive from the Port of Onagawa.	
26	Start of FNRS III dive at 38° 7' N, 142° 16' E from the station at a bottom depth of 1,000 m at 6:23 am piloted by <i>Enseigne de Vaissau</i> Gabriel O'Byrne. Professor Jean-Marie Pérès on board to observe ecology of deep-sea fishes. Surfacing of FNRS III at 10:40 am.	
July	4	Departure of FNRS III for the fourth dive from the Port of Onagawa. Move to the Port of Uraga after the fourth dive.
	5	Start of FNRS III dive at 37° 55' N, 142° 52' E at a bottom depth of 1,650 m at 7:25 am piloted by <i>Enseigne de Vaissau</i> O'Byrne. Professor Pérès on board to observe ecology of deep-sea fishes. Surfacing of FNRS III at 11:03 am. Move of FNRS III to the Port of Uraga.
	6	Departure of Professor Pérès by air.
	8	Arrival of FNRS III at the Port of Uraga.
	17	Departure of FNRS III for the fifth dive from the Port of Uraga.
	18	Start of FNRS III dive at 34° 46' N, 140° 4' E at a bottom depth of 2,800 m at 7:15 am piloted by <i>Captaine de Corvette</i> Houot. Professor Hiroshi Niino on board to study geology of deep-sea floor. Surfacing of FNRS III at 0:30 pm.
	19	Return of FNRS III to the Port of Uraga.
	29	Departure of FNRS III for the sixth dive from the Port of Uraga.
	30	Start of FNRS III dive at 34° 46' N, 140° 7' E at a bottom depth of 2,860 m at 6:45 am piloted by <i>Enseigne de Vaissau</i> O'Byrne. Professor Takeharu Kumagori on board to study ghost seabed. FNRS III was swept down into a valley at a depth of 3,000 m by strong currents and struck rock. Surfacing of FNRS III at 10:46 am due to emergent ascent to avoid more damage.
	31	Return of FNRS III to the Port of Uraga.

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August	2	Departure of FNRS III for the seventh dive from the Port of Uruga.
	3	Start of FNRS III dive at 35° 10' N, 139° 27' E at a bottom depth of 1,000 m at 9:05 am piloted by <i>Captaine de Corvette</i> Houot. Mr Shigeo Hayashida, chief cinematographer of Nippon Eiga Shinsha, on board to take scientific film "Record of bathyscaphe". Surfacing of FNRS III at noon. Return of FNRS III to the Port of Uruga at 7:00 pm.
	6	Departure of FNRS III for the eighth dive from the Port of Uruga.
	7	Start of FNRS III dive at 34° 41' N, 129° 42' E at a bottom depth of 2,300 m at 9:00 am piloted by <i>Enseigne de Vaissau</i> O'Byrne. Professor Itsuo Kubo on board to study distribution and ecology of deep-sea animals. Surfacing of FNRS III at 2:38 pm.
	8	Return of FNRS III to the Port of Uruga.
	10	Departure of FNRS III for the ninth dive from the Port of Uruga.
	11	Due to an accident just before the dive, FNRS III was two tonnes short of ballast, so the Hayabusa Maru went to Uruga to retrieve ballast and replenish FNRS III. Start of FNRS III dive at 35° 7' N, 139° 30' E at a bottom depth of 750 m at 2:02 pm piloted by <i>Captaine de Corvette</i> Houot. Professor Takuo Chiba on board to observe ecology of plankton. Surfacing of FNRS III at 4:53 pm.
	12	Return of FNRS III to the Port of Uruga.
	14	Withdrawal of Uruga base. FNRS circumnavigates the Port of Yokohama.
	15	Gasoline draining operation from the float of FNRS III at the Yamashita Pier, the Port of Yokohama.
	16	Gasoline draining operation from the float of FNRS III at the Yamashita Pier, the Port of Yokohama.
	17	Flushing operation of FNRS III's tank.
	19	Cleaning work of FNRS III's hull landed at the Shinko Pier.
	24	Farewell party for the French FNRS III team by the Japan Bathyscaphe Steering Committee.
	25	Landing FNRS III on the sea and mooring at the Shinko Pier.
	27	Loading FNRS III onto NYK Suruga Maru.
	28	Departure of NYK Suruga Maru from the Port of Yokohama with three Petty Officers, M. Berthlot, C. Serrant and M. Thébault.
	31	Departure of <i>Captaine de Corvette</i> Houot and Chief Petty Officer Rost by air from Haneda Airport.
September	18	Departure of <i>Enseigne de Vaissau</i> O'Byrne by air from the Haneda Airport.

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Project in 2010, led by Professor Pierre Henry and Professor Juichiro Ashi.

A cooperation relationship has been established in the field of oceanography between the French National Oceanographic Institute (*Institut français de Recherche pour l'Exploitation de la Mer*) and the Japanese Marine Research and Development Organisation (JAMSTEC) and in the field of fisheries science between Ifremer and the Japan Fisheries Research and Education Agency (FRA).

A sister society, the Japanese-French Society

of Oceanography France, has been created since 1984, continuing the cooperation in scientific research between the two societies and the two societies work together and organized, since that date, 18 scientific meeting named "Japanese-French Oceanography Symposium", alternatively in Japan and in France. The 19th symposium is held in Caen, France in 2023. In this way, the cooperation between French and Japanese researchers in oceanography and fisheries science has developed since the cooperative surveys in Japan with the bathyscaphe FNRS III in



Fig. 18 Bathyscaphe named Archimède newly built in 1962 (photo on the left: [https://ja.m.wikipedia.org/wiki/%E3%83%95%E3%82%A1%E3%82%A4%E3%83%AB:bathyscaphe\\_Archimede.jpg](https://ja.m.wikipedia.org/wiki/%E3%83%95%E3%82%A1%E3%82%A4%E3%83%AB:bathyscaphe_Archimede.jpg)) and its diving support vessel Marcel Le Bihan (photo on right: [https://ja.m.wikipedia.org/wiki/%E3%83%95%E3%82%A1%E3%82%A4%E3%83%AB:bathyscaphe\\_Archimede.jpg](https://ja.m.wikipedia.org/wiki/%E3%83%95%E3%82%A1%E3%82%A4%E3%83%AB:bathyscaphe_Archimede.jpg)).



Henri-Germain DELAUZE - ARCHIMEDE



De gauche à droite : Willm, Delauze, Cdt Houot, O'Byrne à bord du Marcel Le Bihan 1962.

Fig. 19 Henri-Germain Delauze responsible of CNRS Laboratory of Bathyscaphes (left : DELAUZE *et al.*, 2010) and French members of the Archimede (right) who came to Japan in 1962 and embarked on board the Archimede's mother ship, Marcel Le Bihan. L-R: Engineer Pierre Willm, Engineer H-G. Delauze, *Capitaine de Corvette* George Houot and *Enseigne de Vaissau* Gabriel O'Byrne.

1958.

## 7. What bathyscaphe has left us

We have considered what bathyscaphe has left us.

- 1) Cooperation based on trust and friendship between the French and Japanese stakeholders,

- 2) Links between French and Japanese oceanographers with a passion for marine science and
- 3) Supports from French and Japanese governments and private sectors for marine research.

These led to the invitation of the bathyscaphe FNRS III to Japan and its successful dive to a





Fig. 20 Front page of the Asahi Shimbun newspaper that reported the Archimède had reached a bottom depth of 9,545 m in the Kuril Islands Trench on 25 July 1962 with Henri-Germain Delauze, head of the bathyscaphe laboratory of the CNRS, Enseigne de Vaissau O’Byrne and Professor Sasaki (ASAHI SHIMBUN, 1962).



Fig. 21 Engineer P. Willm (left photo: <https://www.meretmarine.com/fr/science-et-environnement/deces-de-pierre-willm-l-un-des-peres-du-bathyscaphe>) and Capitaine de Corvette Co G. Houot dived to reach a diving record of a depth of 9,200 m in Kurile Islands Trench. To commemorate this dive by French crew, a commemorative postage stamp was issued in France (right photo).

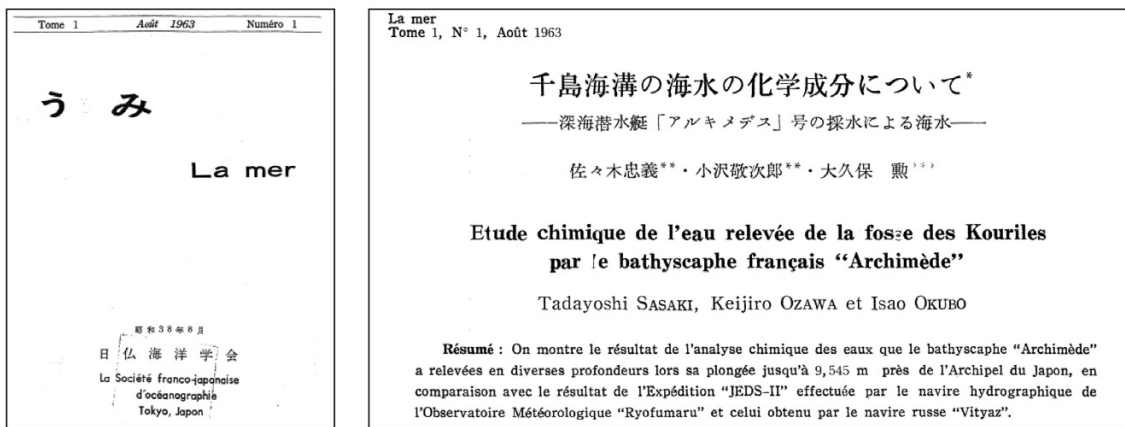


Fig. 22 La mer, the journal of the Japanese-French Society of Oceanography, was launched in August 1963 and has been published continuously. Its cover (pictured left) and the first published article (pictured right) reporting the results of an analysis of the chemical composition of seawater collected by the submersible Archimède on the bottom depth of 9,545 m in 1962.

bottom depth of 3,000 m in the Japan Trench in June 1958. This laid the foundations for subsequent French-Japanese cooperation in oceanography. Seawater and floating organisms in the ocean flow beyond territorial waters. Thus, international cooperation is necessary for the sustainable use of the marine environment and resources. And it is important that this cooperation between two countries is equal and can be approached from different perspectives. France and Japan have a different historical and cultural relationship with the sea, but we share the same enthusiasm for the ocean and marine sciences. In other words, both countries perfectly fulfil these conditions. We will further develop cooperation between France and Japan in the field of oceanography and fisheries science, while always respecting the achievements made by the bathyscaphes.

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#### References

- ASAHI SHIMBUN (1959): Bathyscaphe. Asahi Photo Book. Asahi Shimbun, Tokyo, 64 pp. (in Japanese).
- DELAUZE, H-G., J-C. CAYOL and H.J. CECCALDI (2010): Bathyscaphs, a Mediterranean adventure in marine dialogues between France and Japan. *In* Global Change: Mankind-Marine Environment Interactions. CECCALDI, H-J., M. DEKEYSER, M. GIRAUT and G. STORA (eds.), Springer, Cham, Switzerland, p. 239-244.
- FOREST, J. (1964): Louis Fage 1883-1964. *Crustaceana*, **9** (2): 212-219.
- SASAKI, T. (1958a): Challenge the deep sea -The Japan Trench and Bathyscaphe in the Deep Sea-. Tokyo Shuppan, Tokyo, 111 pp. (in Japanese).
- SASAKI, T. (1958b): Travels under the sea. Maki Shoten, Tokyo, 192 pp. (in Japanese).
- SASAKI, T. (1967): Conference given by Captain G. Houot at Maison franco-japonaise on 23 June 1967. *La mer*, **6** (3), 47-48. (in Japanese).

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