Tracing Yoshiaki Ozawa’s experience from foreign study and travel: A review of personal correspondence and other auxiliary material in the Cushman Collection of Foraminifera (National Museum of Natural History, Smithsonian Institution, U.S.A.)

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I. Introduction

Yoshiaki Ozawa, D.Sc. (1899–1929) is the geologist/paleontologist responsible for the dawn of Japanese foraminiferology (Uchio, 1967; Takayanagi, 1989, 2010; Tanaka, 1999; Omori, 2004). His legacy is yearly recognized by the Geological Society of Japan’s bestowing of the Yoshiaki Ozawa Award for Young Geoscientist. During the early academic career of his youth, Ozawa was hired by the Geological Institute, Imperial University of Tokyo as an assistant professor and then associate professor, and he completed a number of significant scientific contributions within a short period of time. Most remarkable among his achievements were the elucidation of the geologic structure of the Akiyoshi Limestone district based on fusulinid foraminifera, and reconstruction of the Paleozoic–Mesozoic tectonic development of Southwest Japan (e.g., Ozawa, 1925a, b). As a result of these benchmark works, Ozawa was awarded the Imperial Prize by the Imperial Academy, and was further selected as a researcher to study abroad, funded through the fellowship program of the Ministry of Education, which provided the means for travel and research in the United States and several European countries for about two years beginning in April 1927. At that time, the majority of Japanese paleontologists directed their attention to Europe, especially Germany (Takayanagi, 2010), yet Ozawa chose the United States as his primary base and accomplished excellent works on the taxonomy of smaller foraminifera with Joseph A. Cushman (1881–1949). Ozawa returned from overseas travel in August 1929, but he suddenly became ill (typhoid fever; Omori, 2004) in December of the same year, and passed away two weeks later on December 28, 1929 at the age of 31.

Soon after the news of his passing, words of mourning Ozawa’s premature death were presented by a number of authors in the Journal of the Geological Society of Japan (1930, vol. 37, no. 436 (January)) and Toyo Gakugei Zasshi (Honma, 1930; Ito, 1930; Kitaoka, 1930; Obata, 1930; Otani, 1930; Tsuboi, 1930a, b). These articles and subsequent reviews (see above) reveal much about the significance of Ozawa’s scholarly contributions and their influence on the scientific community, as well as his personal character. However, the articles about Ozawa mostly focused on his domestic academic contributions, whereas little has been known about his experiences abroad. Specifically, in a series of articles “Miscellaneous topics in geology” (Ozawa, 1929a, b, 1930), Ozawa himself described the updated knowledge that he gained regarding trends in the international geoscience community and new methodologies in paleontology. In addition, Otani (1930) and other authors commented on some of Ozawa’s overseas experiences shared with them directly. In any case, no documentation is available for what Ozawa actually experienced and contemplated while traveling through the United States and Europe, by which circumstances and means he determined the course of his travel, or how he influenced and was evaluated by foreign scientists.

Incidentally, Cushman, then the world authority on foraminiferal research and a collaborator of Ozawa, immediately published a memorial upon hearing of Ozawa’s sudden death (Fig. 1) (Cushman, 1930; reprinted in Jour. Geol. Soc. Japan, 1930, vol. 37, no. 442, p. 396–397). Notable and impressive is the elegance of Cushman’s condolences, which suggest a deep, cordial relation with Ozawa; isn’t it well beyond the level typical for a much younger colleague? Maintaining a favorable research environment abroad would not be easy even in this present era of highly developed information technologies, but how in the 1920’s did the young Japanese scientist, exceptional talent and the fame in his home nation notwithstanding, make this possible? Whether these questions are still answerable is of personal interest to the lead author as a specialist of foraminifera working abroad, but it could also be of potential interests for those who are curious about the history of progress in Japanese geosciences.

Cushman’s personal correspondence and other miscellaneous material, in association with the main specimen and literature collections of foraminifera, are archived in the Cushman Collection of Foraminifera, one of the important paleontological research collections of the National Museum of Natural History, Smithsonian Institution (Washington, D.C., U.S.A.). By looking into these archives, one can decipher in detail, from their own viewpoints, such things as the course of Ozawa’s foreign travel across the United States and Europe, and the styles of communication and collaboration between Ozawa and Cushman. Based on such secondary collections, this article attempts to piece together Ozawa’s foreign experience, which had not been documented because of his premature death soon after his return to Japan, and to add color to the history of Japanese modern geology during its infancy.

II. The Cushman Collection of Foraminifera

Joseph A. Cushman, who left an indispensable source of information on Ozawa’s foreign study and travel, is one of the world authorities of foraminiferology in the first half of
20th century. His name is familiar to all researchers specializing in foraminifera because of the international reach of the “Cushman Foundation for Foraminiferal Research,” the major academic foundation of this discipline that publishes the Journal of Foraminiferal Research. Cushman has been referred to as the founding father of modern foraminiferalogy, and his biography and scientific contributions are summarized in detail elsewhere (Waters, 1949; Todd, 1950, 1976, 1985; Henbest, 1951; Cifelli, 1990).

Of the two most outstanding aspects of his career, one was the successful application of foraminiferal bionstratigraphy to oil-field subsurface correlation, which led to the establishment of applied economic micropaleontology. Another was the founding at his own expense of the “Cushman Laboratory for Foraminiferal Research” in Sharon, Massachusetts, where he vigorously pursued his foraminiferal taxonomic study and published more than 550 short to voluminous publications. Results of his studies were synthesized in a renowned textbook “Foraminifera, Their Classification and Economic Use” (Cushman, 1928), which increased Cushman’s international stature. The establishment of the basis of modern foraminiferal systematics (e.g., Sen Gupta, 1999) was greatly facilitated through publication of revised editions of this text book (up to 4th edition). It is noteworthy that Ozawa contributed a chapter on the Family Fusulinidae in the first edition of this book (Cushman, 1928).

In compliance with Cushman’s will, the vast amount of specimens, sediment samples, and literature collection accumulated during decades of research in the Cushman Laboratory were transferred to the U.S. National Museum (now the National Museum of Natural History, Smithsonian Institution) after his death, forming the core of what is today called the Cushman Collection of Foraminifera. This collection is considered as the largest in the world, and it continues to grow with the addition of specimens associated with publications and studies from researchers not only in the United States but also from around the world.

Together with the Cushman Collection, miscellaneous materials from the Cushman Laboratory, such as personal correspondence, photographs, and other artistic works of Cushman are still archived. The volume of correspondence is enormous (Fig. 2), and the correspondents include researchers in academia and oil companies, as well as academic organizations. Outgoing letters written by Cushman himself are also present as carbon copies, allowing a complete understanding of the correspondence. These archives were utilized to track the history of progress in modern foraminiferal research (Todd, 1985; Cifelli, 1990; Richardson, 1990). We note that the second author has recently completed a website about Cushman(*). The contents include: Cushman’s full biographical timeline (with compilation of related published/unpublished documents by Ruth Todd (Low, 1985)); a summary of his contributions to the study of foraminifera and oil exploration; digital files of selected correspondence with his collaborators and the Marland Oil Company; and a gallery of photographs and a video (digitized 16 mm black-and-white home movie).

*URL: http://paleobiology.si.edu/cushman/index.html

III. Clues to Ozawa’s activity in the Cushman Collection

The Ozawa–Cushman correspondence amounts to a total of 37 exchanges from April 1927 to January 1930, of which 24 are from Ozawa to Cushman, and 13 from Cushman to Ozawa (Table 1). An additional two undated letters of Ozawa’s reprint requests are in the files, but these are not taken into consideration herein. Both Ozawa and Cushman specified the date and the origin/destination for almost every letter, thereby facilitating a time-series arrangement of their correspondence. Because Ozawa regularly sent Cushman detailed updates while he was traveling within the United States and across European countries, his exact course of foreign travel is well described, and it is summarized in the next chapter. For information, also found in the Cushman files are letters and/or post cards from the following Japanese researchers: Hisakatsu Yabe (1878–1969); Shoshiro Hanzawa (1896–1983); Jiro Makijama (1896–1986); Kiyoshi Asano (1910–1989); and Teiichi Kobayashi (1901–1996). Noteworthy is the case of Shoshiro Hanzawa (Tohoku Univ.), whose total exchanges count more than 20. Like Ozawa, Hanzawa had an opportunity of a long-term stay in the Cushman Laboratory during his foreign study and travel supported by a fellowship from the Ministry of Education beginning in February 1936 (Takayanagi, 2005a).

At present, a number of photographs of Cushman and other famous foraminiferal micropaleontologists, including Ozawa’s autographed one (Fig. 3), are on display in the room where the Cushman Collection is housed. Ozawa’s photograph is dated 1927/7/3 (year/month/day), which means that it was taken during the first term of his stay in the United States (June–July 1927). In this room, there still exists an old guest book that had been in use at 1928–1948, with many autographs and dates that were left by visitors. Ozawa signed this book with the date 1929/1/5, probably at the beginning of the second term of collaboration in the United States (January–July 1929) after one and a half years of the European travel.

Surprisingly, Ozawa submitted a Japanese article on 1927/8/18 entitled “A naturalist’s view on America (II)—Passing through the United States” (hereafter View on America (II)) to the Tokyo Nichinichi Shimbun (presently Mainichi Shimbun (= Mainichi Newspapers)) (Fig. 4). Entirely turned yellow, this clipping of newspaper was discovered among Cushman’s Memorabilia in the Cushman Foundation office. To the present authors’ knowledge, this article had never been referenced in any of previous articles on Ozawa. Via an inquiry to the Mainichi Newspapers, it was confirmed that the article is one of four serial articles. Ozawa presented his personal opinions on the trend in the U.S. scientific

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IV. Tracking Ozawa’s foreign travel by the personal correspondence

This chapter focuses on the ordering of Ozawa’s courses of foreign travel based on the personal correspondence. Selected topics in their exchange are presented in Chapter VI and thereafter. Specified in square brackets [ ] is the documentary source of information, either from the correspondence (including those of correspondents other than Ozawa) or from the miscellaneous material; italic numbers correspond to the consecutive numbers of the Ozawa–Cushman correspondence as listed in Table 1. The usage of square brackets [ ] is the same in the following chapters.

1) First term of stay in the United States

On April 14, 1927, Ozawa departed for San Francisco from Yokohama, sailing on the Steamship Tenyo Maru (Nippon Yusen Kaisha) [1]. He arrived in San Francisco on April 29 and then headed toward New York; during this transition, he visited several universities and institutions [2] (including the Scripps Institution (Dr. Vaughan) [1927/5: Vaughan → Cushman]). On May 28 he arrived at Washington, D.C. [2], and visited the U.S. Embassy of Japan [3, 4] and the U.S. National Museum [View on America (II)]. After leaving Washington, D.C. on June 3, he visited the Peabody Museum (Dr. Schuchert) [4], and arrived at the Cushman Laboratory, Sharon, Massachusetts on June 6 [View on America (II)].

Ozawa collaborated with Cushman at the Cushman Laboratory for about one month, and then moved on to Europe. At almost the same time, Cushman departed for 2.5 months of European travel for research; beginning on July 6 he temporarily closed the Cushman Laboratory [3]. Judging from the date (1927/7/3) on the aforementioned autographed photograph (Fig. 3), Ozawa should have left the Cushman Laboratory for Europe after the first several days in July.

2) European study and travel

Ozawa arrived in London on August 7, 1927, spending the first two weeks for sightseeing and book purchasing, and on August 22 he started examination of fossil collections in the Natural History Museum [5]. He met Cushman and his party again in London, and they spent time together for two weeks from late August to early September [1927/9: Cushman → Vaughan]. Ozawa secured desk space in the Sedgwick Museum, Cambridge and started examination of Carboniferous foraminifera (cooperation: Dr. Wood), and later went to Scotland for field collection of foraminiferal samples [5]. Through the fall season, he continued the preparation of foraminiferal slides for samples obtained from various U.K. localities [6, 7]. In winter, he vacationed at Bristol University, examining thin-sections of Lower Carboniferous limestones repositioned therein, and visiting the Avonian Limestone and the Isle of Wight for collection of foraminiferal samples [10].

On March 9, 1928, Ozawa left Cambridge for London [14], and on March 15 proceeded to the Netherlands and stayed there for one week, and then to various places in Germany [12]. In Germany, he first stayed in Berlin for two weeks and made observations of the Ehrenberg Collection and Richthofen Fusulina Collection (cooperation: Dr. Dietrich), and on April 4 visited bookstores in Leipzig [15]. On April 7 he headed toward Arnstadt, visiting Adolf Franke, and then stayed for one week in Munich [15].

Beginning on April 19, 1928, Ozawa had an opportunity for a long-term stay of a half year in Vienna, making observations of numerous fossil collections at the Paleontological Museum (cooperation: Dr. Schäffer), and collecting foraminiferal samples from the classic fossil localities in the Vienna Basin (such as Nussdorf) previously studied by Alcide d’Orbigny, Felix Karrer, and August E. Reuss [17, 18]. During this period, Ozawa once traveled through Italy. Starting on June 30, he first spent five days in Naples where he welcomed Mrs. Ozawa, next they spent one week in Rome, followed by three days in Bologna for field collection of Miocene and Pliocene foraminiferal samples (cooperation: Dr. Lipparini) [20]; they further extended their travels to Venice, Florence, and Genoa [18]. Afterwards, upon finishing the study in the Vienna Basin, Ozawa left for a field trip to the “Dolomiten” and Carnic Alps in Italy from September 10 to 16 for observation of the geologic structure of Alps (cooperation: Dr. Trauth) [21]. Additionally, he participated in a paleontological meeting and a field excursion (Eocene and Miocene foraminiferal sample collection) in Budapest, Hungary [22].

On October 21, 1928, Dr. and Mrs. Ozawa left for Switzerland [22], taking vacation at Locarno in late November [24], and arrived in Paris on November 28 [25]. During the course of this transition, Ozawa visited A. Tobler in Basel to collaborate on Greek and Sumatran fusulinid foraminifera [25] (Ozawa, 1929c; Ozawa and Tobler, 1929). In Paris he examined the type collections of d’Orbigny and others (cooperation: Dr. Donrillé). The Ozawas then sailed from Cherbourg on December 20 on the Steamship Ausonia, and arrived in New York on December 29 [26].

3) Second term of stay in the United States—Return to Japan

While Dr. and Mrs. Ozawa were staying in Boston in 1929, the Ozawa–Cushman correspondence had been interrupted due to the lack of necessity to correspond by mail. Nonetheless, during this period, Cushman often remarked on the collaboration with Ozawa in letters addressed to his major correspondents, and this provides indirect clues to their research activity.

On July 3, 1929, Dr. and Mrs. Ozawa departed the Cushman Laboratory, and on July 17 they sailed from San Francisco on the Steamship Tenyo Maru [1929/7: Cushman
→ Waters]. On their return travel, they had a brief stop at Honolulu [28], and arrived back in Japan on August 2 [Jour. Geol. Soc. Japan, 1930, vol. 37, no. 436].

V. Trend in U.S. geological community as witnessed by Ozawa

In the newly “discovered” newspaper article of View on America (II) in the Tokyo Nichinichi Shimbun, Ozawa wrote in an impressively frank manner that contrasts with his formal style of writing in academic publications (Fig. 4). The main topics include his admiration for the surrounding environment and research facilities of the Cushman Laboratory, Cushman’s career especially in petroleum exploration, his observation on the relationships among the U.S. research groups/factions, and his favorable impression on the U.S. researchers whom he met. For Cushman, Ozawa praised the very well-organized facilities, specimens and literature, mentioning that “this point was most impressive through my experience in the United States,” and he also remarked on his respect for Cushman’s initiative that made it possible to establish a private laboratory at his own expense.

Of the four serial articles, View on America (I) provides very specific introduction on “microscopic paleontology” that had become widely used in petroleum exploration. A part of the description is included herein. “As a matter of fact, at such oil fields as California, Mexico, Oklahoma, Texas and Venezuela, it is hardly believable regarding how big is the contribution of detailed foraminiferal research on oil exploration. It is needless to say that petroleum constitutes an important portion among the kinds of fuel currently in use, that many nations in the world are very eager to secure oil fields after the War, and that America does richly yield oil. Foraminifera are utilized to find the petroleum, and so one would readily imagine how intensive the foraminiferal researches are now. At present, U.S. petroleum geologists count more than 1600. Although recent recession has made it difficult for petroleum geologists to acquire the positions, the demands for foraminiferal researchers are very significant.” “Probably the sum number of American paleontologists would be less than 300, and two-thirds of them are foraminiferal researchers. The popularity of foraminiferal study is understood by the fact that each of oil field-based universities is providing a special course of microscopic paleontology, and that many recent graduates majored in this discipline.”

Owing to the efforts of Cushman and others, micropaleontology in the first half of 1920’s saw a complete shift in the long-held tradition that smaller foraminifera have very little value in stratigraphic correlation (e.g., Schuchert, 1924). Ozawa (1929a) introduced the detailed scholarly considerations on micropaleontology and foraminiferal biostratigraphy at that time, which are still inspiring today. By reading Ozawa (1929a) together with View on America (I, II), one can develop a lively image of the flowering age of foraminiferal biostratigraphy in the United States.

VI. Collaboration between Ozawa and Cushman

Regarding the collaboration between Ozawa and Cushman, there was an episode seemingly foreshadowing the achievement of fruitful results known today. In his paper entitled “An Outline of a Re-classification of the Foraminifera” (Cushman, 1927), Cushman entirely adopted the proposed fusulinid systematics by Ozawa (1925a), and this fact made Ozawa feel “unusually triumphant, beaming” (Otani, 1930). From this, one might imagine that Cushman was familiar with Ozawa’s research at that time, and that this fact might have facilitated their collaboration.

However, as outlined below, new information from the personal correspondence and View on America reveal that their collaboration, especially for taxonomy of the foraminiferal family Polymorphinidae (Cushman and Ozawa, 1930), was not pre-arranged, but was rather formed by accident through changing circumstances that eventually worked out for Ozawa.

1) Situations surrounding initiation of collaboration

Ozawa’s initial contact with Cushman, soliciting the possibility of collaboration during his foreign study and travel, was made by a letter sent out just four days prior to his departure for the United States (Fig. 5) [7]. In View on America (I), Ozawa expressed the actual situation whereby he originally intended to first sail to the U.K. and then visit the United States on his way back to Japan, but at the last minute he had to change his schedule due to the availability of a steamship and other logistical factors.

On his letter dated 1927/5/24, Cushman asked T. Wayland Vaughan (Scripps Institution) if he happened to know any means of contacting Ozawa. Cushman was much concerned because he was temporarily closing the Cushman Laboratory during that summer to go out of town for research-oriented European travel. At about the same time Ozawa sent a letter to Cushman from Washington, D.C., in which he explained for the first time that the purpose of his stay at the Cushman Laboratory was to study foraminiferal material brought from Japan, under supervision of Cushman [2]. In reply, Cushman gladly accepted Ozawa’s proposal in a letter directed to the Embassy of Japan, together with instructions on how to reach the nearest train station as well as his phone number [3]. Then, via a letter as of the earliest June, Ozawa notified Cushman that he was leaving for Sharon on the morning of June 5, and that he would telegram Cushman with the exact time of arrival [4].

2) First term of U.S. collaboration

During this period, the topics of Ozawa’s collaborative research with Cushman were new descriptions of the polymorphinid foraminifera from Japan, and the proposition of a revised taxonomic framework for the Family Polymorphinidae (Cushman and Ozawa, 1929a, b). The reason for
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choosing this group of foraminifera was probably that the Ozawa’s Japanese material was by chance suitable for the examination of this taxonomic group. From his letters sent to major correspondents at that time, it can be understood that Cushman had been considering the polymorphinid classification to have been very problematic, necessitating a comprehensive reevaluation. That the large-scale taxonomic reexamination of the Polymorphinidae would be possible with Ozawa seems to have occurred to Cushman at this time.

3) Collaboration during time of European travel

3-1) Sample collection and processing

While he was traveling around Europe, Ozawa energetically performed, at every place he visited, field sample collection at famous localities as well as sample processing and foraminiferal slide preparation in the laboratory (Fig. 6). From each place of his stay, Ozawa shipped all samples to the Cushman Laboratory, with repeated requests to Cushman to keep them until the next opportunity of stay in the United States. Cushman, too, wrote back to Ozawa to emphasize that the sufficient amount of samples and their processing are indispensable for two classic localities of d’Orbigny’s types in Vienna [11]. That Ozawa fulfilled this expectation is seen in the following note in the later publication: “In Vienna, for example, Ozawa washed down more than a quarter of a ton of clays from the type localities of Baden and Nussdorf, (…)” (Cushman and Ozawa, 1930, p. 2).

From these episodes, it seems certain that Ozawa had decided to work solely with Cushman on the study of smaller foraminifera, and that his sabbatical in Europe had become more likely the travel of field sampling for their U.S. collaboration afterwards. Ozawa’s other main purpose of staying in Europe was to observe foraminiferal research collections, especially fusulinids repositied in the major museums and institutions, as well as the personal collections of literature. In the correspondence, Ozawa’s frequent visits to bookstores are well documented at every place. In Vienna, he purchased a microscope and many books, and the latter were shipped to Japan [17]. Otani (1930) noted that one of Ozawa’s purposes in foreign travel was to thoroughly collect the literature on fossil corals.

3-2) Writing and publishing efforts

In addition to above, the Ozawa-Cushman collaboration continued with the preparation of publications during Ozawa’s European travel. In particular, Cushman was planning to complete “Foraminifera, Their Classification and Economic Use” (Cushman, 1928) in the next year, which was more likely a textbook for him rather than the place for describing new foraminiferal taxa. For this reason, Cushman was particular about making all the necessary taxonomic descriptions available in the academic publications prior to this book contribution.

First of all, Cushman asked Ozawa, at the time they met again in London in the late August–early September, to contribute the chapter of the Family Fusulinidae [1927/9/27: Cushman → Vaughan]. Ozawa favorably accepted the request, prepared the draft, and sent it out in late November (in Ozawa’s correspondence file of the Cushman Collection, there remain original sketches for illustrations of the fusulinids) [8]. In this letter, Ozawa notified Cushman for erection of a new genus Depratella. Then Cushman’s feedback was that, by the above reason, it is desirable to have a short note that independently provides a new description of Depratella [9]. In response to this request, Ozawa prepared the manuscript for systematic description of Depratella, which was then published as Ozawa (1928).

Subsequently, a subject of much concern had emerged on the publishing effort, which was a major delay in the printing of the aforementioned results from Ozawa’s first term in the United States, namely two preceding papers on the polymorphinid classification (later published as Cushman and Ozawa (1929a, 1929b) in Japan. Jour. Geol. Geogr.). As of November 1927, Ozawa wrote to Cushman that the figure preparation was getting more delayed because his assistant at the Imperial University of Tokyo became ill [7]. During the next January, Ozawa reported to Cushman that publication of these two papers was deferred further due to the shortage of a printing budget, and asked Cushman for a possible solution [10]. Upon receipt of this message, Cushman promptly prepared only the “outline” of revised polymorphinid taxonomy [11], sent out the proof to Ozawa three weeks later [13], and finally got it published in March as Cushman and Ozawa (1928). This was actually an unconventional way to introduce new taxa, because the establishment of certain new genera and species of this family were made without formal description and illustration. In any case, Cushman displayed his extraordinary capability, speed and enthusiasm for work.

4) Preparation and progress of second term of U.S. collaboration

In resuming the collaboration with Ozawa, Cushman suggested the specific ideas for the style of collaboration as follows: (1) Ozawa shall stay in Boston or Cambridge, securing a work space in the Museum of Comparative Zoology, Harvard University; and (2) on certain days in a week he would come to the Cushman Laboratory to perform the microscopic work and/or to check the state of each other’s progress [16, 19]. Cushman needed such arrangements because there were too many students coming to the Cushman Laboratory in the previous academic year, resulting in a shortage of microscopes and tables for study. Another reason was that the Museum of Comparative Zoology was a quiet place with a plenty of desks to be made available, and with an ample literature resource. On October 1928, Cushman notified Ozawa that the above arrangement was completed with Percy E. Raymond (Harvard University) [23].

Afterwards, Ozawa wrote from Paris, soliciting Cushman for finding a place to stay in the United States [26]. Having received this request, Cushman asked Raymond for the help with the search of an apartment room for the Ozawas,
which was unsuccessful [1928/12/14, 1928/12/26: Cushman → Raymond; 1928/12/21: Raymond → Cushman]. Cushman reserved an inexpensive hotel room for the Ozawas instead, at least for the beginning; meanwhile, Cushman drove around in Boston together with Ozawa, looking for a suitable property [27]. The following impressive sentence is found in his exchange between Raymond [1928/12/26: Cushman → Raymond]: “I want to do all I can for him because he is a really fine worker and a splendid man in addition, (...)”.

As mentioned above, the Ozawa–Cushman correspondence had been temporarily discontinued after Ozawa’s arrival in the United States, and hence there exists no information on the state of their collaboration from Ozawa’s own viewpoints. However, Cushman often noted to several main correspondents how things were going with Ozawa, and this fact helps indirectly indicate the progress of their collaboration. At least by February 1929, Ozawa was commuting to the Cushman Laboratory for three days per week, as originally planned [1929/2/27: Cushman → Waters], so it is certain that things eventually went well with Ozawa regarding the apartment search in Boston and setting up his research environment at the Museum of Comparative Zoology. In his letter addressed to W. Storrs Cole (then Cornell Univ.) on 1929/4/22, Cushman wrote that he and Ozawa were working hard to complete the Polymorphinidae monograph, and that now the Cushman Laboratory houses a large collection of this family of foraminifera, totaling several thousand specimens for all the Cretaceous and Tertiary species ever described.

The Ozawa–Cushman collaboration culminated in June 1929 as Ozawa’s departure from the United States approached. Toward the end of May when students had begun to disappear after final exams, Ozawa and Cushman immersed themselves in finishing the Polymorphinidae manuscript, working day and night. The work sometimes continued from 5 AM to 10 PM. Cushman noted this episode to a few of his major correspondents after Ozawa left Sharon [1929/7/6: Cushman → Schenck; 1929/7/8: Cushman → Waters], likely expressing his frank feeling of fulfillment and satisfaction.

Ozawa donated all the important foraminiferal type specimens described through their U.S. collaboration to the Cushman Laboratory and the U.S. National Museum. Cushman was particularly delighted with Ozawa’s generous act, and let several correspondents know about this (later on, Cushman also noted this in the footnote of Cushman and Ozawa (1930, p. 1)).

VII. Ozawa–Cushman exchange after Ozawa’s return

The Ozawa–Cushman correspondence after August 1929 was mainly for exchanging information on the Polymorphinidae monograph. It conveys well that the draft had nearly been complete and was in the process of final elaboration.

For things other than the proofreading of the manuscript, the topics of exchange from Ozawa were that he could hardly take time for the foraminiferal research by being overwhelmed with the preparation of lectures for the new academic term and the arrangement of European and U.S. specimen/literature collections; also he communicated that Mrs. Ozawa has not been in good physical condition since the return, and that he was delighted in having an enthusiastic student who had just started research on Tertiary smaller foraminifera [31, 32, 34]. In the late October, Ozawa wrote that things had finally settled down, allowing him to resume foraminiferal study [35] (Fig. 7). This is the last of existing correspondence from Ozawa.

Interestingly, Cushman’s style of writing to Ozawa from around this time were more like updates to a familiar friend, addressing this and that of the weather at Sharon, the Cushman Laboratory, and other research collaborators. A note that his beloved collie dog Bruce died was also included [36]. One of Cushman’s hobbies was stamp collection (Waters, 1949; Todd, 1950); knowing this, Ozawa gave some Japanese commemorative stamps to Cushman, and Cushman repeatedly thanked him for the gifts.

In the letter to Ozawa during late November, Cushman informed him that the Polymorphinidae monograph manuscript submitted to the U.S. National Museum one month before [1929/10/4: Cushman → Schmitt] had been referred to the committee of publication [36]. Of interest to note is that both of them were in agreement of developing their next collaboration on the taxonomy of the benthic foraminiferal Genus Frondicularia, and that they were about to start examination of the specimens [29, 30, 35, 36] (Fig. 7).

VIII. On the occasion of Ozawa’s death

The last correspondence was a letter in the late January of 1930 from Cushman to Ozawa [37] (Fig. 8). Clearly, Cushman was getting in touch with Ozawa without knowing his death. In this letter, Cushman started out with a delightful note that he received the news from the U.S. National Museum that their Polymorphinidae manuscript was going to print; following this were recent updates on the Cushman Laboratory, his trouble with new glasses, the warm winter, and so on. It concluded with empathetic words about Mrs. Ozawa who may have been ill. It is obvious that Cushman had never imagined anything regarding a health problem for Ozawa.

It was Hisakatsu Yabe (Tohoku Univ.) who promptly informed Cushman of the sudden death of Ozawa. In his letter dated 1929/12/30, Yabe made a terse notification of the sad incident as follows: “Dear Sir! It is to my great sorrow to send you a message about the too early death of my friend Dr. Ozawa, which happened early morning 29th Dec., after two weeks illness. He has done so many good works in his life as you know, and passed away too early!” This news reached Cushman on 1930/1/29, only five days after mailing the
above last letter to Ozawa on the acceptance of the Polymorphinidae monograph. For Cushman, Ozawa’s death should have felt like a bolt out of the blue.

In his reply to Yabe dated 1930/1/29, Cushman presented a series of words mourning the death of Ozawa, and let Yabe know, with gratitude for the prompt notice, that he prepared a short appreciation to Ozawa to be printed in the Cushman Laboratory’s periodical (Fig. 1), and also a letter of condolence to Mrs. Ozawa (Fig. 9). After a while, Cushman received two letters from Japan, one was from Mrs. Ozawa dated 1930/3/20, and another was from Teiichi Ito (Univ. of Tokyo) dated 1930/3/24.

Shortly thereafter, the benchmark study of taxonomy of the Family Polymorphinidae was finally published, as Cushman and Ozawa (1930), in which a footnote expressing Cushman’s regret on the loss of his splendid colleague was included. In his subsequent taxonomic works, Cushman established some scientific names of foraminifera after Ozawa (Ozawia tongensis Cushman, 1931a; Glandulina ozawai Cushman, 1931b; Marssonella ozawai Cushman, 1936), again with words of mourning his death.

From March 1938 to January 1939, Teiichi Kobayashi (Univ. of Tokyo) and Cushman had a total of five exchanges. Kobayashi solicited Cushman for his possible contribution to a commemorative volume of collected papers at the 10th anniversary since the demise of Ozawa, planned by the Geological Institute, Imperial University of Tokyo. Cushman pleasantly accepted the offer, and sent out the draft to Kobayashi on November 1938. This short article (Cushman, 1939; first appeared in Jour. Geol. Soc. Japan) was incorporated into “Collection of Essays on Geology and Palaeontology: Dedicated to the Memory of the Late Professor Yoshiaki Ozawa” (Kobayashi, 1985).

IX. Closing remarks

This article attempts to present a “vicarious experience” of Ozawa’s foreign study and travel by utilizing clues from personal correspondence and other auxiliary material in the Cushman Collection of Foraminifera. This clarifies for the first time exactly how Ozawa broadened his horizons and human interaction, and how he developed the overseas research collaboration.

On one hand, it is realized that Ozawa’s fruitful foreign experience was due to his talent and enthusiasm. His Japanese colleagues unanimously recounted that Ozawa strongly pursued his scholarly goals, even disliking having a rest (citations in Chapter I). It is very probable that such characteristic enthusiasm and devotion were fully displayed through his travels and influenced the people around him, and that this was candidly mentioned in the memorial from Cushman (Fig. 1). Cushman’s words of high praise for Ozawa were often found in letters addressed to his main correspondents, the most outstanding of which was that sent to Yabe (Fig. 9).

On the other hand, new insight reveals that Ozawa’s foreign study and travel materialized because of the fortunate circumstances that he encountered. If just one event went a different way, in such a case that Ozawa would have sailed straight to Europe as originally planned or that his first term of stay at the Cushman Laboratory was not made possible on account of Cushman’s schedule, the outcome of Ozawa’s foreign research would certainly not have been so fruitful. Although there was difficulty in international communication at that time, Ozawa’s arrangement for visiting the United States was rather haphazard, so it was fortunate for him that Cushman favorably accepted the belated request of stay. According to Ozawa himself, Cushman was “a mild-mannered man and, while working together, I felt as if I was spending time with a familiar elder brother, rather than another person” (Fig. 4) [View on America (II)]. As Ozawa was said to have been beset by the loneliness that is particular to genius personalities (Honma, 1930; Ito, 1930), presumably the best luck for him was having such a strong mental support in the United States.

If Ozawa had been alive and active longer, foraminiferal research and hence micropaleontology in Japan would have seen remarkable progress from the 1930’s on as a result of a close cooperation with the Cushman Laboratory. That this is not merely a speculation is evidenced by the following interesting notes found in Cushman’s letter to Hanzawa dated 1939/5/19: “It has been in my mind to suggest to you that there might be a closer cooperation between this laboratory and the Japanese workers on the foraminifera. Dr. Ozawa’s visit and yours have made me feel that we should be of mutual help to one another. If you could suggest the most appropriate place I should like to deposit somewhere in Japan paratypes of at least some of the new species that have been described here at the laboratory (…) In return I would like very much to have paratypes of species described by Japanese workers (…)”. At this time, Hanzawa shipped a set of foraminiferal paratypes described by Japanese researchers to Cushman. Further, during the post-World War II period when the latest publications from foreign countries were very scarce in Japan, Kiyoshi Asano (Tohoku Univ.; Takayanagi, 2005b) asked Cushman to exchange foraminiferal topotypes and reprints of Japanese workers with publications of the Cushman Laboratory; Cushman accepted Asano’s request with pleasure. Unfortunately, their exchanges did not continue and further collaboration did not develop, probably due to the influence of the War in the case of Hanzawa, and to the fact that Cushman was in his declining years in the case of Asano. At any rate, it seems certain that Cushman was willing to help Japanese researchers out as a result of such cordial relations with Ozawa.

Ozawa’s exceptionally high activity demonstrated during his travels across the United States and Europe is certainly difficult to repeat even today, which is deserving of...
great admiration and respect. Today, going abroad has become such an easy thing to do, but this is not a sole factor of facilitating international collaboration, and therefore it may be expected that we could learn a great deal from the pioneer who accomplished such a successful international achievement before the era of modern science and technology. Hopefully this article provides an inspirational example in this regard.

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Additional notes
Regarding the evaluation on Dr. Ozawa by foreign researchers, words from other persons than Cushman were not found in literature. Unexpectedly, Dr. Igo shared the following episode through the manuscript review. Here it is reprinted with permission. The person concerned herein is Carl O. Dunbar, who was then an authority of taxonomy of fusulinid foraminifera and contributed to the chapter on the Family Fusulinidae in the revised editions of “Foraminifera, Their Classification and Economic Use” (Cushman, 1928) on behalf of the late Dr. Ozawa. “When I was staying at Illinois State Geological Survey as a Special Associate Geologist in 1962, there was an occasion of visiting R.C. Moore (Univ. of Kansas) with my supervisor M.L. Thompson. At that time, I also had an opportunity to meet C.O. Dunbar who was then at Lawrence, Kansas. Probably at around the age of 70 then, Dr. Dunbar started off by proudly saying that he is one of few ‘relics’ who knew ‘Yoshiaki.’ After that, Dr. Dunbar had asked me a lot of questions and gave comments on the fossil fusulinid fauna from the Hida Mountains that I had described; upon our leaving, he made an impressive remark that he had learned many things about the taxonomy of the Fusulinidae from ‘Yoshiaki’.”
The National Museum of Natural History remains temporarily closed. To view the status of the Smithsonian’s other museums and the National Zoo, please visit si.edu/museums.

HISTORY OF THE CUSHMAN LABORATORY, as recalled by Alice E. Cushman who has seen it from the beginning - from the Cushman Memorial Volume. The Sharon Laboratory was a research facility designed and built by Dr. Cushman in 1923. When, in 1938, the Smithsonian National Museum of Natural History, in Washington, DC, decided it had run out of space, it began transferring part of its collection from the cramped attic and basement rooms where the specimens had been languishing to an out-of-town warehouse. Restoring those specimens to pristine condition was a monumental task. On the other, they are places of research and researchers are not interested merely in the big, showy things that curators like to reveal to the public. D Blythe House in West London, the Science Museum’s principal storage facility, has, as might be expected, cabinets full of early astronomical instruments such as astrolabes and celestial globes. The museum is also custodian to things that are dangerous.