

Shōkichi Iyanaga (Tokyo, 1906 – Tokyo, 2006): Vice-President 1971–1974, President 1975–1978, Ex Officio Member of the Executive Committee 1979–1982

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Biography

Shōkichi Iyanaga was born on 2 April 1906 in Tokyo, as a son of a banker. He had his schooling in Tokyo. From 1926 to 1929, he studied at the (Imperial) University of Tokyo, where he attended the algebra lectures by Teiji Takagi, a well-known scholar in class field theory. In 1928, he published two papers in the *Japanese Journal of Mathematics* and the *Proceedings of the Imperial Academy of Tokyo*, before obtaining his undergraduate degree in 1929. In 1931 he completed his PhD in mathematics under the supervision of Takagi. In the same year, he went to Paris with a scholarship from the French government and to Hamburg, where he studied with the Austrian mathematician Emil Artin. In the 3 years spent in Europe, he met top mathematicians such as Claude Chevalley, Henri Cartan, Jean Dieudonné, and André Weil. In 1932, he attended the International Congress of Mathematicians in Zurich.

In 1934, Iyanaga returned to the University of Tokyo, where he was appointed assistant Professor until 1942 when he was promoted to full professor in this University until 1967. He spent the year 1961–1962 as a visiting professor at the University of Chicago. After he retired from the University of Tokyo in 1967, he was a professor at Gakushūin University in Tokyo until 1977 and was a visiting professor at Nancy in France from 1967 to 1968.

Iyanaga wrote many research papers in German, French and English. His works on mathematics were assembled in the book entitled *Collected Papers*, published by Iwanami Publisher in 1994. Besides his main scientific production in algebraic geometry, functional analysis and number theory, Iyanaga wrote some notes on the history of mathematics published in *Historia Scientiarum*, and in 1999 and 2002, he published two books on Evariste Galois. In 1954, he edited the *Encyclopedic Dictionary of Mathematics* (in Japanese), which

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had many editions, including the English translations published by the MIT Press in 1977 and 1980 (with co-editor Yukiyosi Kawada). Bass and Hodgson (2006) mention Iyanaga's autobiography published by the Iwanami Publisher in 2004.

Iyanaga had many honours and relevant positions. He was a member of the Science Council of Japan in 1947, and in this capacity, he was the main organizer of an International Symposium on Algebraic Number Theory held in Japan in 1955 where the Taniyama-Shimura conjecture originated. From 1965 to 1967, he was Dean of the Faculty of Science at Tokyo University. Several times between 1950 and 1971, he was elected president of the Mathematical Society of Japan. From 1952 to 1954, he was a member of the Executive Committee of the International Mathematical Union. In 1976, he was awarded the Rising Sun of Second Class from Japan. In 1978, he was elected a member of the Japan Academy. He received the *Ordre des Palmes Académiques* from France in 1979, and the *Ordre de la Légion d'Honneur* from France in 1980. In 1990, when the International Congress of Mathematicians was held in Kyoto the honorary president of the Congress Kiyosi Itō acknowledged that as early as the 1960s, Kawada and Iyanaga began campaigning for the Congress to be held in Japan. Iyanaga was appointed honorary member of the Organizing Committee of the Congress.

Until the age of 98 Iyanaga attended the seminar on number theory at Gakushūin University. His last mathematical paper was published in 2006 (*Travaux de Claude Chevalley sur la théorie du corps de classes: Introduction. Japanese Journal of Mathematics* 1: 25–85).

He died on 1 June 2006 in Tokyo.

Contribution to Mathematics Education

Iyanaga spent the final period of WWII in the countryside to escape the frequent bombardments of Japanese cities. At the end of the war, when Japan was having a hard time, he contributed to rebuilding the science and the culture of his country in a better form. He delivered courses and organized seminars for younger researchers. Moreover, he was the editor-in-chief of many mathematical textbooks in Japanese for schools, such as those on new arithmetic (I–VI, for primary schools, 1950–1974), new mathematics (I–III, textbooks for junior secondary schools, 1951–1975), general mathematics, etc. (textbooks for senior secondary schools, 1956–1961), published by the publisher Tokyo Shoseki.

At the international level, Iyanaga was one of the delegates of the Japan subcommission of ICMI (*L'Enseignement Mathématique*. 1957. s. 2, 3, pp. 308–309). In 1971–1974 he was vice-president of ICMI, president in 1975–1978 with his former student Kawada as ICMI secretary, and ex officio member in 1979–1982. Iyanaga's appointment is noteworthy because he was the first president from outside Europe and North America. This fact explains the perplexities about this appointment expressed by Otto Frostman, secretary of the International Mathematical Union (IMU), in a letter to ICMI President James Lighthill (7 December 1974):

I am a bit more dubious about Iyanaga, but I admit I don't know him very well. Now it is time for the Japanese to show that they are active and generous and prepared to pay a lot of money at least for their travel! You can't have all the meetings in Japan.

In his reply to Frostman (19 December 1974), Lighthill recalled that

He has made two important visits to Europe during this period, one to the ICMI Symposium in Bielefeld which was held in September when he took a lot of trouble to discuss our plans for the Third International Congress to be held in Karlsruhe in 1976, and the second visit in November when a large number of us who will be concerned with

the Karlsruhe Congress met together at UNESCO Headquarters (at the expense of UNESCO) to take the detailed planning of that Congress a stage further. Iyanaga's contribution during both these visits was important. In particular, he showed admirable tact in dealing with all the personalities from all the different countries and this is a quality of great value in the President of an international organization. I believe that you need have no anxiety and that he will prove to have been an excellent choice.

Iyanaga, as Japan delegate for long years (*L'Enseignement Mathématique* s. 2, 3: 308–309, 1957), was not new in the ICMI milieu. According to the list of participants provided to us by Erich Wittmann, he attended ICME-1 of 1969 in Lyon. He was vice-president of ICMI in 1971–1974. Iyanaga was aware of the different situations of mathematics education in Japan and other countries in Europe and America; in his report, written at the beginning of his mandate, he expressed the wish of continuing the work carried out in those countries (see Iyanaga 1975). In (Iyanaga 2001), he expressed some caution about the new math movement. In 1972 at ICME-2 in Exeter, he chaired the Working Group on “Algebra at School Level”, see (Howson, Albert Geoffrey. 1973. *Developments in Mathematical Education*. Cambridge: Cambridge University Press, p. 300). During Iyanaga's presidency, two important meetings were organized: ICME-3 in Karlsruhe (1976) and the ICMI Symposium organized during ICME-1978 in Helsinki with the cooperation of UNESCO and IDM (Institut für Didaktik der Mathematik) on “What Knowledge, Experience and Understanding of Mathematics Should a Mathematics Teacher Have?” (1978. *ICMI Bulletin* 11: 13–15). Moreover, ICMI-related symposia took place in Africa, Europe, India, Latin America, and Southeast Asia, as reported in the *ICMI Bulletin* issued in that period. Iyanaga delivered a plenary lecture at the first “Southeast Asian Conference on Mathematical Education” (1978. *ICMI Bulletin* 11: 5–10). The mathematicians and mathematics educators in the Philippines and Southeast Asia owe much to Iyanaga and Kawada. They connected them not only to the Japanese mathematics community but because of their position in ICMI and IMU, also to the international mathematics and mathematics education community.

As for the policy of ICMI, in his address, Iyanaga (1975) referred to the Terms of Reference of ICMI adopted at the Paris meeting of the Executive Committee of IMU in April 1960. He was trusting in communication and one of the points of his programme was to improve the issue of *ICMI Bulletin*. In his remembrances from the period of his presidency (Iyanaga 2001), he mentioned his visits to Bent Christiansen in Denmark, the invitation to meetings in India and the Philippines, and to the Institute of Bielefeld on the occasion of the ICMI-IDM Symposium on the teaching of geometry organized by Hans-George Steiner (Bielefeld, 16–20 September 1974), where he delivered a plenary entitled “Combined Geometry - Algebra Curriculum for Japanese Secondary Schools”. Iyanaga acted as co-chairman with Bernhard Neumann of the ICMI-JSME Regional Conference of Mathematics Education (Tokyo, 5–6 November 1974).

A valuable achievement of Iyanaga, together with the ICMI secretary Kawada, was giving visibility to ICMI at the International Congress of Mathematicians in Helsinki (1978). In the introductory chapter of the *Proceedings* of this Congress we read “Unofficial mathematical activities also included a three-day symposium organized by the International Commission on Mathematical Instruction” (Lehto 1980, p. 7, Vol. 1). ICMI was also mentioned in the chapter “Closing Ceremonies” (ibidem, p. 13), by stressing the fact that it has “a history antedating that of our [of mathematicians] Union. Under the able guidance of its chairman, Professor Iyanaga, and its secretary, Professor Kawada, it has continued and expanded its valuable role. Its activities ... are too varied to be described here: it is sufficient to remind you of the successful conference at Karlsruhe [he refers to the third ICME] two years ago”.

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