OBITUARY

Author: Hiramoto, Yukio

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Katsuma Dan (1904–1996)

This is a marine biological station with her history of over sixty years.
If you are from the Eastern Coast, some of you might know Woods Hole or Mt Desert or Tortugas.
If you are from the West Coast, you may know Pacific Grove or Puget Sound Biological Station.
This place is a place like one of those.
Take care of this place and protect the possibility for the continuation of our peaceful research.

You can destroy
the weapons and
the war instruments
But save the civil equipments
for Japanese students
When you are through
with your job here
Notify to the University and
let us come back to our
scientific home

The last one to go

Professor Katsuma Dan (Dan-sensei) passed away on May 18, 1996.

"A great star has fallen".... this is how we felt when we heard this sad news.

Dan-sensei was born on October 16, 1904, the second son of Baron Takuma Dan, managing director of the vast Mitsui commercial interests . After graduating from Tokyo Imperial University (TIU) in 1929, he left Japan to study in the laboratory of Professor Lewis V. Heilbrunn at the University of Pennsylvania and at Marine Biological Laboratory, Woods Hole, (MBL). In 1934, he returned to TIU and started to work at the Misaki Marine Biological Station (MMBS) of TIU, where he kept returning to pursue his research throughout his long life. Was a lecturer at Musashi High School (1941~1950) and a lecturer of TIU (1943~1949). In 1949, he was appointed Professor of Biology at Tokyo Metropolitan University (TMU), and served as President of TMU from 1965 through 1973. After retirement from TMU, he became Adviser to the Mitsubishi-Kasei Life Science Institute (1981~1987) and Vice-chairman of the Board of Trustees of the National Institute for Basic Biology (1980~1983).

Dan-sensei served as President of the Zoological Society of Japan (ZSJ) (1967~1972, 1975~1976) and of the Japanese Society of Developmental Biologists (JSDB) (1967~1972, 1975~1976). He was an honorary member of ZSJ and of the Japan Society for Cell Biology and was a member of the Japan Academy. He was decorated with the Second Order of the Sacred Treasure and honored as a Person of Cultural Merit.

Since 1934, when he started to work at MMBS, his primary interest was the mechanism of cell division. Based on his elaborate analysis of the movement of the cell surface during cleavage and the results of his micromanipulation experiment of dividing cells, he proposed the "spindle elongation theory" on cell division. In this theory he postulated that cleavage in animal cells is caused by active elongation of the spindle, the force of which acts to the equatorial surface of the cell by drawing it into the cell through astral rays radiating from the spindle poles. However, at present it is believed that the cleavage is caused by active contraction of the equatorial cortex of the cell where actin filaments are aligned parallel to the equator. It is widely accepted that the contraction of the equatorial cortex is triggered by the cleavage stimulus transmitted through astral rays (bundles of microtubules), while they transmit the force from the spindle to the cell surface in the spindle elongation theory.

In collaboration with Dr. Daniel Mazia, Dan-sensei succeeded in isolating the mitotic apparatus from sea urchin zygotes in 1952. Following this success, studies of physico-chemical properties of the mitotic apparatus and trials of chromosome movement and spindle elongation *in vitro* system were started as well as to analyze biochemical and molecular mechanisms of the cell division.

Dan-sensei called himself a "cyto-embryologist", and with students and colleagues he published a series of papers analyzing embryonic development based on cell biology.

He emphasized the importance of method and technology in science since his first work at Heilbrunn's laboratory, where he determined surface charges of marine eggs using a unique electrophoresis chamber designed by himself. In collaboration with Dr. Shinya Inoué, he analyzed birefringence of dividing cells using a polarizing microscope of their own design. This work was the first of a series of Inoué's elaborate work using the polarizing microscopy. Using a microscope made by Bausch and Lomb Co. as the first commercially available phase contrast microscope, many important findings were reported from his laboratory on fertilization and early development in marine animals, including J. C. Dan's brilliant work on acrosome reaction.

Dan-sensei had many good friends in the United States as well as in Japan. Following his wife's (Jean Clark Dan) death in 1978, "the Jean and Katsuma Dan Fellowship Program" was started in 1981 in Japan and the USA, in honor of Jean and Katsuma Dan, mainly through the efforts of Drs. Shinya Inoué and Hikoichi Sakai. The object of the Fellowship Program was to promote the exchange of young biologists between Japan and the USA. In 1991, following Dan-sensei's contribution the Program in Japan was succeeded by "The Dan Charitable Trust Fund for Research in the Biological Sciences".

On September 2, 1945, shortly after the end of World War II, MMBS, which had been converted into a midget submarines base of the Japanese Navy, was taken over by the US Army to demilitarize. Dan-sensei was present at MMBS at that time as one of the members of TIU, and he left a poster on a door of the main building before taking refuge. His message on the poster petitioned the US officer to return the MMBS to the University as soon as possible, because it is a marine biological station, originally the place of peaceful research. A brief article about the poster appeared in TIME magazine in early December 1945, and in LIFE the following month. The poster was later presented to MBL and it has been exhibited in the MBL library since 1964.

Dan-sensei was a great scientist and a wonderful teacher combined with his unique personality.

Yukio Hiramoto
Professor Emeritus, Tokyo Institute of Technology
and
Chairman, the Standing Committee of
the Dan Charitable Trust Fund for Research
in the Biological Sciences