

NOBUO YONEDA
(1930 - 1996)

Professor Nobuo Yoneda passed away at 12:21 on Sunday, 21 April 1996, due to heart failure. He was attacked by acute pancreatitis in January in that year and had been in bed since then. The funeral took place at his house at 12:00 on Wednesday, 24 April 1996, in Shintoist style.

Through conversations with people in Euro-America-Australian community, I found that very little is known about Professor Yoneda himself although everyone who studies category theory more than knows his lemma in category theory. So, I will try to write what I heard from Yoneda. I must admit that there might be some inaccuracy since I am relying on my memory.

Prof. Yoneda was born on 28 March, 1930. He studied mathematics in the University of Tokyo; in the last year of his studies he followed the seminar of Professor Shokiti Iyanaga, where he became interested in algebraic topology. Soon after that, or maybe when he was still an undergraduate, Professor Samuel Eilenberg visited Japan, and Yoneda traveled around Japan with him, as a translator and guide. At that time, he was exposed to the Cartan-Eilenberg book, which was still in galley form. Later, he got a Fulbright scholarship and he visited Princeton, to study with Eilenberg. Those days, the Yen was very weak, so the scholarship was not enough to support a modest living in the United States. Therefore, he worked as a proofreader at a foreign publisher, to earn money for the study in the United States. Even 25 years later, he seemed to be proud of his professional skill as a proofreader, which he gained then.

Yoneda arrived in Princeton, but sooner or later, Eilenberg moved to France. So, Yoneda also went to France a year later. At that time, Saunders Mac Lane was visiting category theorists, apparently to obtain information to write his book, and he met the young Yoneda, among others. The interview started in a Café at Gare du Nord, and went on and on, and was continued even in Yoneda's train until its departure. The contents of this talk was later named by Mac Lane as Yoneda lemma. So, the famous Yoneda lemma was born in Gare du Nord. This must have been a good memory for Yoneda; I heard him tell this story several times. I do not know whether Mac Lane managed to leave the train before departure!

Yoneda's trip to America/Europe continued for two years. When he came back to Japan, his thesis advisor, Iyanaga, suggested him to begin studying computers, which he did. Some computer scientists know Yoneda as a member of Algol68 committee.

Until 1976, Yoneda was a professor of the department of mathematics at Gakushu-in University in Tokyo, and he took a professorship in 1977 at the newly established department of information science at the University of Tokyo, where he had fifteen MSc. students and five DSc. students, three of which are DSc. course students. He retired from the University of Tokyo in 1990, at the age of 60, as is custom there, and moved to Tokyo Denki University, where he worked as a professor until March 1996.

November 17, 1997

Yoshiki Kinoshita

THE YONEDA LEMMA

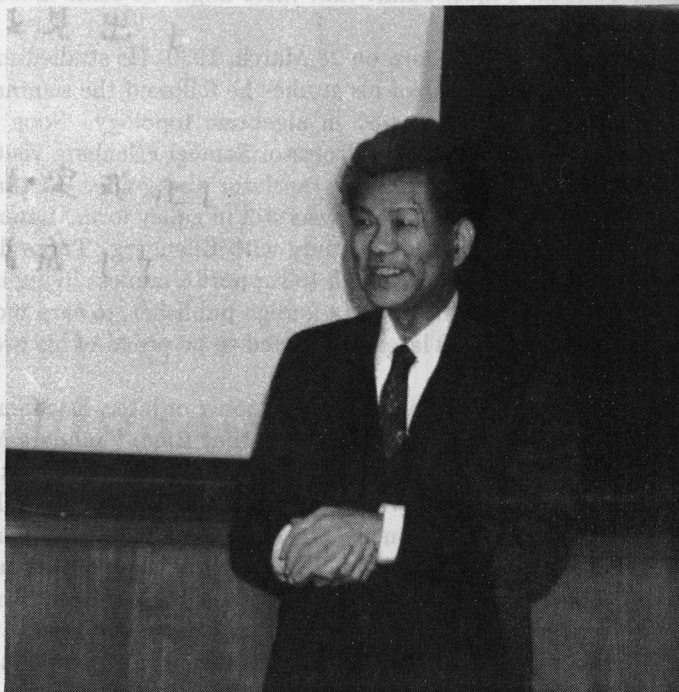
SAUNDERS MAC LANE

Received December 1, 1996

Noboru Yoneda is rightly honored for his well known lemma: if F is a functor from a category C to Sets, then the natural transformations from $\text{hom}(c, -)$ to F corresponds by a bijection to the set $F(c)$.

$$\text{Nat}(\text{Hom}(c, -), F) \cong F(c)$$

Yoneda enjoyed relating the story of the origins of this lemma, as follows. He had guided Samuel Eilenberg during Eilenberg's visit to Japan, and in this process learned homological algebra. Soon Yoneda spent a year in France (apparently in 1954 or 1955). There he met Saunders Mac Lane. Mac Lane, then visiting Paris, was anxious to learn from Yoneda, and commenced an interview with Yoneda in a café at the Gare du Nord. The interview was continued on Yoneda's train until its departure. In its course, Mac Lane learned about the lemma and subsequently baptized it.



Yoneda made other important contributions to homological algebra. The functor $\text{Ext}(G, A)$ had been defined in terms of short exact sequence $A \rightarrow X \rightarrow G$; In 1954, he showed that the related function $\text{Ext}^n(G, A)$ could be defined by long exact sequences (in the J. Fac. Sci. Tokyo, Sec. 1, 7 pp.193-227; subsequently he showed that the products here could be given by composition of such sequences. He was the first to formulate the notion of an "end" of a bifunctor, in a 1960 paper in the same journal (vol. 8, 507-526). This notion has been widely used, as by Day and Kelly and by Mac Lane. In Short, Yoneda has made decisive contributions to algebra.

We mourn his recent death.