

The Lost Theorems of Kakutani



Shizuo Kakutani, seen here as a young man

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Shizuo Kakutani died recently. If you have never heard of him, here are two reference points. The movie and book *A Beautiful Mind* was about the mathematician John Nash, who won the Nobel prize in economics. Nash's most famous concept, the Nash Equilibrium, is based on the Kakutani Fixed Point Theorem. The most influential book reviewer at *The New York Times* is Michiko Kakutani; she is Shizuo Kakutani's daughter.

Anywho, Kakutani was a Japanese mathematician. At the start of World War II, he was a visiting professor at the Institute for Advanced Study in Princeton. With the outbreak of war he was given the option of staying at the Institute or returning to Japan. He chose to return because he was concerned about his mother.

So he was put on a Swedish ship which sailed across the Atlantic, down around the Cape, and up to Madagascar, or thereabouts, where he and other Japanese were traded for Americans aboard a ship from Japan.

The trip across the Atlantic was long and hard. There was the constant fear of being torpedoed by the Germans. What, you may wonder, did Kakutani do. He proved theorems. Every day, he sat on deck and worked on his mathematics. Every night, he took his latest theorem, put it in a bottle and threw it overboard. Each one contained the instruction that if found it should be sent to the Institute in Princeton. To this day, not a single letter has been received.

[Editor's note: Professors Kakutani and Eigen collaborated on mathematical works over a long span of years.]