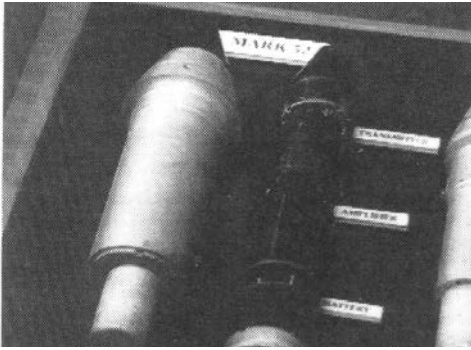


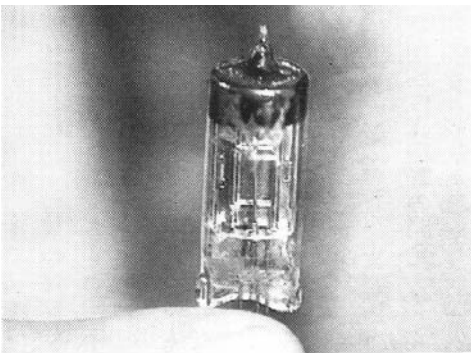
# Vacuum tube during the 2<sup>nd</sup> world war



VT (Vacuum Tube) fuse (Johns Hopkins Univ.)



Cannon ball with VT fuse (Johns Hopkins Univ.)



Vacuum tube for the VT fuse



Experiment of airplane shot-down  
(Recorded film in Johns Hopkins Univ.)

**VT (Vacuum tube) fuse** developed in Johns Hopkins Univ. 22million fuses were produced, 20 times higher hit rate, used since Jan. 1943, installed in all war ships since June 1944 (Battle of the Philippine Sea)

(NHK news crew ed. “Electronic weapon won Kamikaze”, Kadokawa library)

## Shimada laboratory in which many scholars participated for developing high power magnetron weapons (Z research project)

Shimada laboratory (total floor 6,600 m<sup>2</sup>) was built in May 1943. The director Prof.Yasushi Watanabe (part-time, Tohoku Univ.) with whom Mr.Yoji Ito (organizer) was in good contact. They were supported by the associate director Mr.Shoichiro Mizuma. Following full-time staffs participated.

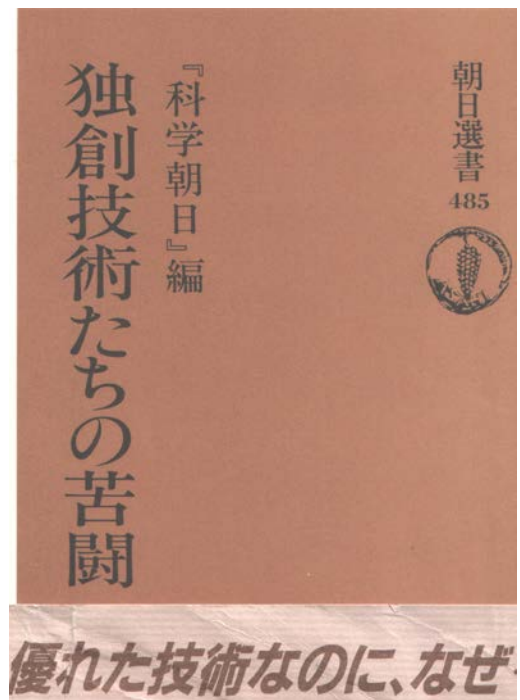
Masao Yanami (naval captain), Sozaburo Yamazaki (engineer from Japan Musen) and his many assistants.

From academia Associate prof.Minoru Watase (Kikuchi lab. in Osaka Imperial Univ.), Associate prof.Zenuemon Abe (Watanabe lab. in Tohoku Imperial Univ.), Prof. Iwao Takao (Ryojun Technical Univ.).

As advisors Prof.Masao Kotani (physics, Tokyo Imperial Univ.), Prof.Yusuke Hagiwara (astrophysics, Tokyo Imperial Univ.), Prof. Sabuichiro Mizushima (chemistry, Tokyo Imperial Univ.) and Prof.Shinichiro Tomonaga (Tokyo Culture and Science Univ.) participated with their staffs. Minoru Oda (later president of RIKEN) was the staff of the Watase lab. in Osaka Imperial Univ..

In addition many called up high school students of science and engineering course were assistants.

Following famous scholars participated in part time as Masashi Kikuchi (Osaka Imperial Univ.), Yoshio Nishina (RIKEN), Koji Fushimi (Osaka Imperial Univ.), Takeo Nagamiya (Osaka Imperial Univ.). Iwao Sato (Tohoku Imperial Univ.), Juichi Hino (Tokyo Imperial Univ., Medical).



In “Struggles of creative technologies” Seizo Nakagawa (1993), Asahi selected books 485 (in Japanese)