

CHEMICAL HERITAGE FOUNDATION

MASAO HORIBA

Transcript of Interviews
Conducted by

David C. Brock

at

HORIBA, Ltd.
Kyoto, Japan

on

19 and 20 November 2004

(With Subsequent Corrections and Additions)



Courtesy of HORIBA, Ltd.

Masao Horiba

ACKNOWLEDGMENT

The Chemical Heritage Foundation initiated this oral history on behalf of HORIBA, Ltd. It documents the personal perspective of HORIBA, Ltd.'s founder and aims to record the human dimensions of the company's growth.

This oral history is made possible through the generosity of HORIBA, Ltd.

CHEMICAL HERITAGE FOUNDATION
Oral History Program
FINAL RELEASE FORM

This document contains my understanding and agreement with Chemical Heritage Foundation with respect to my participation in a tape-recorded interview conducted by

David C. Brock on 19 and 20 November 2004.

I have read the transcript supplied by Chemical Heritage Foundation.

1. The tapes, corrected transcript, photographs, and memorabilia (collectively called the "Work") will be maintained by Chemical Heritage Foundation and made available in accordance with general policies for research and other scholarly purposes.
2. I hereby grant, assign, and transfer to Chemical Heritage Foundation all right, title, and interest in the Work, including the literary rights and the copyright, except that I shall retain the right to copy, use, and publish the Work in part or in full until my death.
3. The manuscript may be read and the tape(s) heard by scholars approved by Chemical Heritage Foundation subject to the restrictions listed below. The scholar pledges not to quote from, cite, or reproduce by any means this material except with the written permission of Chemical Heritage Foundation.
4. I wish to place the conditions that I have checked below upon the use of this interview. I understand that Chemical Heritage Foundation will enforce my wishes until the time of my death, when any restrictions will be removed.

Please check one:

a. _____

No restrictions for access.

NOTE: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to obtain permission from Chemical Heritage Foundation, Philadelphia, Pennsylvania.

b. _____

Semi-restricted access. (May view the Work. My permission required to quote, cite, or reproduce.)

c. _____

Restricted access. (My permission required to view the Work, quote, cite, or reproduce.)

This constitutes my entire and complete understanding.

(Signature) _____

Masao Horiba

(Date) _____

11 Aug '05

This interview has been designated as **Free Access**.

One may view, quote from, cite, or reproduce the oral history with the permission of CHF.

Please note: Users citing this interview for purposes of publication are obliged under the terms of the Chemical Heritage Foundation Oral History Program to credit CHF using the format below:

Masao Horiba, interview by David C. Brock at HORIBA, Ltd., Kyoto, Japan, 19 and 20 November 2004 (Philadelphia: Chemical Heritage Foundation, Oral History Transcript # 0305).



Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106



MASAO HORIBA

1924 Born in Kyoto, Japan on 1 December

Education

1946 B.S., physics, Kyoto Imperial University
1961 Ph.D., medicine, Hyogo Prefectural School of Medicine

Professional Experience

1945	Horiba Radio Laboratory Founder
1953	HORIBA, Ltd. Founder
1953-1978	President
1978-1995	Chairman
1995-2005	Board Chairman
2005-present	Supreme Counsel
1988-2002	Advanced Software Technology & Mechatronics Research Institute of Kyoto Chairman
2002-present	Supreme Advisor
1985-2003	Japan Electric Measuring Instruments Manufacturers Association Vice Chairman
2003-present	Advisor
1978-present	Kyoto Scientific Instruments Association Chairman
1999-present	Japan Association of New Business Incubation Organizations Director General
2001-present	Kyoto Chamber of Commerce and Industry Vice Chairman

1997-1998	Kokoro Wa Venture, Television Program Host
1974-1995	HORIBA STEC Co., Ltd. [HORIBA STEC] President
1996-2005	Honorary Chairman
2005-present	Supreme Counsel

Honors

1982	Blue Ribbon Medal, National
2004	Establishment of the Masao Horiba Award, HORIBA, Ltd.
2006	Pittcon Heritage Award, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy and the Chemical Heritage Foundation

ABSTRACT

Masao Horiba begins the interview by discussing his childhood experiences in Japan during the 1920s and 1930s. Horiba suffered from juvenile rheumatoid arthritis and spent much of his childhood listening to music, and building models and radio receivers. As the youngest child of chemistry professor Shinkichi Horiba, Horiba had the privilege of seeing the inner workings of various Japanese chemical plants and laboratories while accompanying his father as he visited his former university students. These visits, coupled with his education from Konan Boys' High School, increased Horiba's interest in science and made him feel at ease in the research laboratory. As Horiba matured, he cured his rheumatoid arthritis by working through his pain. Soon he was able to play sports, rugby in particular, and participate in extracurricular activities, such as the ham radio club. The looming presence of World War II forced Horiba to graduate from high school early, much to his dissatisfaction, as he was unable to study organic chemistry. Too young to join the military, Horiba decided to continue his education at Kyoto Imperial University, studying nuclear physics under Bunsaku Arakatsu.

After earning a B.S. in physics, Horiba decided to join the Japanese army's research center, to develop a radar system for the Shusui aircraft. However, the war ended before the Shusui's engine was completed, so the capability of Horiba's radar system was never demonstrated in combat. When the American occupation of Japan began in 1945, Horiba established his own private research laboratory, called the Horiba Radio Laboratory. His laboratory produced emergency power outage lamps, high-speed counters, electric-pulse oscillators, and high-quality capacitors. During the Korean War, Horiba modified the laboratory's products to meet the agricultural needs of the country by building a pH meter better suited to Japan's humid environment.

In 1953, Horiba incorporated his laboratory and renamed it HORIBA, Ltd. The new company continued to improve the Model H pH meter, and began developing inorganic single crystal windows. The company began producing infrared-based gas analyzers in 1958. They also began producing all of Hitachi, Ltd.'s analytical instrumentation under the double brand name of HITACHI-HORIBA. The Japanese government's interest in HORIBA, Ltd.'s work was peaked in the early 1960s, and they suggested that HORIBA build an analyzer for automobile emissions testing. Masahiro Oura, then a young employee but who eventually became the second president of HORIBA, developed the MEXA analyzer for testing automobile emissions. The MEXA analyzer soon became the world standard for testing emissions.

The Osaka and Kyoto Stock Exchanges listed HORIBA, Ltd. as a public company in 1971, much to the joy of the company's original investors. Over a decade later, the Tokyo Stock Exchange listed the company. Horiba was quick to strengthen bonds with other countries and established a subsidiary in the United States. The company also has affiliates throughout Europe and Asia. In 1978, as the company celebrated its twenty-fifth anniversary, it adopted the simple yet highly effective corporate motto, "Joy and Fun." That same year, Masao Horiba retired as president and assumed the office of chairman. Currently, Horiba's son, Atsushi

Horiba, is president of the company. Horiba concludes the interview with reflections on his innovations in corporate management and the importance of venture capitalism.

INTERVIEWER

David C. Brock is senior research fellow at the Chemical Heritage Foundation. In 1995 he received his M.A. in the history of science from Princeton University, and in 1992 he earned an M.Sc. in the sociology of scientific knowledge from the University of Edinburgh.

TABLE OF CONTENTS

- 1 Family History and Early Life Experiences
Father's interest in physical chemistry and music. Childhood experiences in the 1920s and 1930s. The effects of juvenile rheumatoid arthritis. Early interest in science and technology. Shadowing his father on visits to chemical companies and former students. Attending the Konan Boys' High School. The cure for rheumatoid arthritis. Life lessons learned while playing rugby. Career aspirations and the decision to attend Kyoto Imperial University.
- 22 Kyoto Imperial University and World War II
The effects of World War II. Professor Bunsaku Arakatsu as a teacher and researcher. The academic excellence of Kyoto Imperial University. The university's influence on the formation of the Kyoto Consortium of Schools. Decision to join the Japanese military. Meeting and marrying Mikiko Horiba. The Horiba System and the war effort. Thesis work on the digital counter circuit. The effect of American occupation on Japanese research. The decision to leave Kyoto Imperial University and start a private laboratory.
- 38 Horiba Radio Laboratory
Reasons for establishing the laboratory. Early products: power outage emergency lamp, high-speed counter, and medical products. Quality concerns and the need to mass-produce high-quality capacitors. The search for investors and the financial burdens of the Korean War. A new business. Japan's need for a better pH meter. Comparison to the competition: the Beckman pH meter. Reflection on the opinions of family, friends, and clients on the establishment of Horiba Radio Laboratory.
- 63 HORIBA, Ltd.: the Company
The incorporation of Horiba Radio Laboratory into HORIBA, Ltd. Continued development of a commercial pH meter. Partnership with Kitahama Works Company, Ltd. Inorganic single crystal windows and the infrared gas analyzer. Assistance from Kyoto Imperial University in the form of a graduate student, Masahiro Oura. Reflection on the importance of Japanese instrumentation over the past fifty years. Manufacturing of infrared gas analyzers and encouragement from the president of Applied Physics Corporation. Relationship with Hitachi, Ltd. and the double brand name HITACHI-HORIBA. Medical applications for infrared technology. Interest in medical science and motivation to earn a doctorate studying blood serum. The Ministry of International Trade and Industry's interest in HORIBA technology. Oura's work on the MEXA analyzer. Listing on the Osaka Stock Exchange. Venturing into the American market with Olson-HORIBA Inc. The importance of making quality instruments. As the world standard in emissions

testing. The importance of companies working together to produce standardized instrumentation. The formation of STEC Inc. and the mass flow controller. Listing on the Tokyo Stock Exchange.

- 116 HORIBA, Ltd.: the Corporate Philosophy
 The importance of a corporate motto in Japan. Motto contest among employees. The meaning of “Joy and Fun.” The need to “let the nail stand out.” The ultimate goal. Retirement is like the passing of a rugby ball. Atsushi Horiba’s evolving role in HORIBA. Oura’s retirement.
- 131 Conclusion
 Current interests. Opinion on the state of Japanese society and the need for change. Reflection on personal innovations in corporate management. The importance of venture capitalism.
- 139 Notes
- 140 Index

NOTES

1. Paul McKnight Deeley, *Electrolytic Capacitors: Theory, Construction, Characteristics and Applications* (New Jersey: The Cornell-Dubilier Electric Corp., 1938).
2. Masao Horiba, *Joy and Fun* (Japan: “Joy and Fun” Publication Project, 1995).
3. See Note 2.

INDEX

A

Adachi Seisakusho Manufacturing, 52
American Cultural Center, 48-49
 establishment of Kyoto branch, 40
American Motors Corporation, 100
Applied Physics Corporation, 79-80
Arakatsu, Bunsaku, 25, 27, 38
 as a professor, 25
 cyclotron work, 30-31, 34-35
 effect of World War II American occupation on, 35

B

Beckman Instruments Company, 56
 pH meter, 56-58
 problems with, 58, 62-63, 71

C

Caelus, Carl, 6
Cary, H. Howard, 80
Cyclotron, 30-31, 34-35

D

Detroit, Michigan, 108
Doshisha University, 37

E

Electrolytic Capacitors, 48
ENIAC computer, 38
Environmental Protection Agency [EPA], 108-110
 work with HORIBA Instruments Incorporated, 110
EPA. *See* Environmental Protection Agency

F

Ford Motor Company, 100

G

General Dynamics Corporation, 82
 zero-power reactor, 82
General Motors Corporation, 100
Genzo Shimadzu Battery, Inc. [GS Battery], 42-43
GS Battery. *See* Genzo Shimadzu Battery, Inc.

H

- Harshaw Chemical Company, 73
- Hewlett Packard Company, 81
- Hirao, Hachisaburo, 14
 - founding of Konan Boys' High School, 14
- Hitachi, Ltd., 51, 73-74, 81-83, 85
 - business ties to HORIBA, Ltd., 82-83, 86
 - advantage of relationship with, 86
 - affiliation with, 86-87
 - use of the double brand name HITACHI-HORIBA, 84-86
- Honeywell Inc., 81
- HORIBA Instruments Incorporated, 110, 129
 - name change from Olson-HORIBA Inc., 110
 - work with the EPA, 110
- Horiba Radio Laboratory, 40, 44
 - effect of Korean War on, 53-54
 - rising material and construction costs, 53-54
 - establishment of, 37, 40, 60
 - opinions on, 59-60
 - reason for, 38-42, 61
 - incorporation to HORIBA, Ltd., 57, 59, 64
 - products
 - capacitors, 48-51
 - decision to establish a mass production plant, 52, 54
 - debt, 54-55
 - investors, 52-54, 61-62
 - lack of funding, 54
 - decision to mass produce, 51
 - problems with
 - certification requirements, 51
 - production cost, 51
 - high-speed counter, 44-45
 - problems with capacitor, 46-48
 - medical electronic products, 45
 - electric-pulse oscillator, 45-46
 - problems with capacitor, 46-48
 - Model H, pH meter, 57
 - comparison to Beckman pH meter, 56
 - decision to develop, 55, 57
 - investors, 57
 - power outage emergency lamp, 42-44
 - use of GS Battery products, 43-44
 - Horiba System, the, 32-33
 - Horiba, Atsushi, 127, 130
 - involvement with HORIBA, Ltd., 128-129

- as president, 129
- Horiba, Haruko, 1, 7
- Horiba, Hiroko, 1-2
 - opinion on establishment of Horiba Radio Laboratory, 60
- HORIBA, Ltd., 1, 96, 105, 116
 - as the national standard gas generator, 112-113
 - board of directors, 67-68, 119, 127
 - opinion on corporate motto, 117, 119
 - business ties to Hitachi, Ltd., 82-84, 86
 - advantage of relationship with, 86
 - affiliation with, 86-87
 - use of the double brand name HITACHI-HORIBA, 84-86
 - corporate motto, 117-120
 - board of directors' opinion on, 117, 119
 - contest among employees, 118
 - importance of, 116-118
 - dividend management, 134-135
 - employees, 88
 - corporate motto contest, 118
 - education program, 89
 - establishment of, 57, 59, 64
 - capital, 64
 - early days of, 68
 - employee size, 64
 - facility size, 64
 - motivation for, 63-65
 - initial public offering [IPO], 67-68, 105, 116, 118, 134-135
 - opinion of investors, 65-67
 - Osaka Stock Exchange listing, 104-105, 118, 135
 - effects of, 105
 - Tokyo Stock Exchange listing, 115-116, 118, 135
 - instrumentation industry growth, 77
 - compared to other companies, 77
 - products
 - infrared gas analyzer, 77-78, 80
 - application of, 87
 - investigation of U.S. opinion on, 78-79
 - visit to Applied Physics Corporation, 79
 - inorganic single crystal window, 70, 73, 78
 - assistance from Kyoto Imperial University, 71
 - Hitachi, Ltd.'s use of, 73
 - problems with, 70-71
 - MEXA analyzer, 105, 108
 - as the world standard, 108
 - concerns about, 95

- development of the MEXA-1, 95-96
- effect on quality control, 102
- emission regulations
 - in Europe, 107
 - in Japan, 99, 105-107
 - in the U.S., 107-108
- lesson learned from, 97-98
- market for, 99-100
 - U.S. manufacturers, 100
- mass production of, 99-106
- MITI's interest in, 93-94
- partnership with Olson Laboratories Inc., 101
- relationship with automobile industry, 98-100
- Model H pH meter, 70
 - advantage over Beckman pH meter, 58, 62-63
 - application in blood research, 92
 - competition with Beckman Instruments, 57-58
 - effect of Korean War on, 59
 - marketing and distribution by Kitahama Works Company, Ltd., 68-69
- quality control, 101, 103-104
 - effect of the automobile industry on, 102-104, 106-107
 - three-zero-three-zero campaign, 103
 - zero-defect initiative, 101-104
- strategic planning, 127
- ultimate goal [joy and fun], the, 122-123
- Horiba, Masao
 - birth of, 1
 - childhood of, 6
 - interest in electronics, 7-8
 - interest in music, 7
 - interest in science, 9-10
 - juvenile rheumatoid arthritis, 7, 12, 14
 - lessons learned from his father, 9
 - doctorate degree
 - blood analysis research, 89-90, 93
 - motivation to earn, 87-90
 - thesis on blood serum, 90-92
 - relation to father's work, 92
 - effect of Korean War on personal finances, 58
 - effect of World War II on, 21-22
 - on daily life, 22
 - on education, 22
 - elementary school experience, 10
 - academic achievements, 11-12
 - effect of juvenile rheumatoid arthritis on, 12

- interest in natural science, 11
- family history of, 2-3, 5
- father [Shinkichi Horiba], 1-3, 9, 21, 37, 40, 69, 92
 - Cultural Merit Award, 92
 - effect of World War II on, 36
 - interest in chemistry, 2-4
 - as a professor, 9
 - interest in music, 5-6
 - investment in HORIBA, Ltd., 57
 - opinion on the establishment of Horiba Radio Laboratory, 59
 - work at Doshisha University, 37
 - work at Kyoto City University of Arts, 37
 - work at Kyoto Music College, 37
 - work at Osaka Prefecture University, 37
- grandmother, 2
- high school experience at Konan Boys' High School, 12-14, 20
 - academic achievements, 20
 - athletics, 14
 - interest in rugby, 15, 17
 - career aspirations, 20
 - nuclear physics, 20
 - effect of juvenile rheumatoid arthritis on, 12, 14
 - cure for, 14
 - effect of World War II on, 17
 - early graduation, 23
 - extracurricular activities, 15-16
 - ham radio club, 15-16
 - effect of World War II on, 17, 21
- interest in digital computing and circuit design, 34-35
- Japanese military experience, 29-33
 - decision to join, 29-30
 - work at the army research center, 30-33
 - radar system for the Shusui aircraft [the Horiba System], 32-33
- Kyoto Consortium of Schools, 28
 - establishment of, 28
 - need for, 28
- Kyoto Imperial University, 22-23
 - academic studies at, 23-24, 26-27
 - effect of World War II on, 24, 29
 - opinion of Hideki Yukawa, 26
 - work with Bunsaku Arakatsu, 24-25
 - opinion of, 25
 - establishment of, 27
 - father's opinion on attending, 21
 - interest in attending, 20-21

- thesis work on the digital counter circuit, 33-35
- mother [Hiroko Horiba], 1-2
 - opinion on establishment of Horiba Radio Laboratory, 60
- opinion on Japanese society and the need for change, 124-125
- personal philosophy, 65
- professional life
 - as an innovator of corporate management, 133-135
 - as president of Standard Technology Company Ltd., 113
 - encouragement of venture capitalism, 135-138
 - Horiba Radio Laboratory
 - reason for establishment, 38-42
 - HORIBA, Ltd.
 - as chairman of, 119, 126-127
 - as president of, 119, 126
 - decision to retire, 123-125
 - comparison to passing a rugby ball, 125
 - first visit to the United States, 78
 - investigation of infrared gas analyzers, 78-79
 - visit to Applied Physics Corporation, 79
 - purpose of visit, 81
 - idea for corporate motto, 118-120
 - importance of national standards, 112
 - “Let the nail stand out,” 120-122
 - ultimate goal [joy and fun], the, 122-123
- rugby, 17-18, 125
 - life lessons learned while playing, 17-18, 125
- sister [Haruko Horiba], 1, 7
- son [Atsushi Horiba], 127, 130
 - involvement with HORIBA, Ltd., 128-129
 - as president of HORIBA, Ltd., 129
- wife [Mikiko Horiba], 28
 - decision to marry, 30
 - meeting of, 28-30
 - Japanese military experience
 - work at the army research center, 30
 - opinion on the establishment of Horiba Radio Laboratory, 60
- Horiba, Mikiko, 28
 - decision to marry Masao Horiba, 30
 - meeting of Masao Horiba, 28-30
 - Japanese military experience
 - work at the army research center, 30
 - opinion on the establishment of Horiba Radio Laboratory, 60
- Horiba, Shinkichi, 1-3, 9, 21, 37, 40, 69, 92
 - Cultural Merit Award, 92
 - effect of World War II on, 36

- interest in chemistry, 2-4
 - as a professor, 9
- interest in music, 5-6
- investment in HORIBA, Ltd., 57
- opinion on the establishment of Horiba Radio Laboratory, 59
- work at Doshisha University, 37
- work at Kyoto City University of Arts, 37
- work at Kyoto Music College, 37
- work at Osaka Prefecture University, 37
- Hughes Aircraft Company, 81
- Hyogo Prefectural School of Medicine, 90

I

- IBM Corporation, 54
- Instrumentation industry
 - in 1950s Japan, 74
 - evolution over fifty years, 74-76
 - importance of national and foreign market, 76
 - in the chemical industry, 75
 - in the medical industry, 76
 - in the metals industry, 75
 - in the petrochemical industry, 75

J

- Japan Battery. *See* Genzo Shimadzu Battery, Inc. [GS Battery]
- Japan Productivity Center for Socio-Economic Development, 81
- Japanese Ministry of Education, 11, 132
- Japanese Ministry of Finance, 135
- Japanese Science and Technology Agency, 132
- Joy and Fun*, 120

K

- Kansai, Japan, 14, 69, 116
- Kitahama Works Company, Ltd., 68-69, 116
 - interest in HORIBA, Ltd., 69
- Kobe, Japan, 13
- Konan Boys' High School, 12-14, 20
 - environment, 19
 - academics, 19
 - athletics, 14-15
 - dress and manner codes, 14
 - extracurricular activities, 15
 - founder of [Hachisaburo Hirao], 14
- Konan Junior High School, 13
- Korean War, 53-54

effect on Japanese rice production, 58-59
Kyoto City University of Arts, 37
Kyoto Consortium of Schools, 27-28
Kyoto Imperial University, 5, 9, 20, 22, 27, 37-38, 69-71
 chemistry department of, 1, 3
 educational excellence, 27
 effect of World War II on, 23-24, 33, 38
 American occupation, 35, 38
 General Douglas MacArthur's order to stop research, 35
 war effort, 30
 Kyoto School of Philosophy, 27
 nuclear physics department, 20-21
Kyoto Municipal Symphony Orchestra, 6
Kyoto Music College, 36-37
Kyoto Normal School, 11
Kyoto Prefectural University of Medicine, 90
Kyoto University of Music, 6
Kyoto, Japan, 1, 3, 6, 12, 37-38, 40, 42, 57, 67, 74, 116, 135

M

MacArthur, General Douglas, 35
 order to stop research in Japan, 35
Matsushita Electric Works, Ltd., 51
MEXT. *See* Ministry of Education, Culture, Sports, Science and Technology
Ministry of Education, Culture, Sports, Science and Technology [MEXT], 132
Ministry of International Trade and Industry [MITI], 82, 93, 110, 132
 interest in HORIBA, Ltd., 93-94
MITI. *See* Ministry of International Trade and Industry
Mitsubishi Electric Corporation, 51

N

National Bureau of Standards [NBS], 81, 112
NBS. *See* National Bureau of Standards
Nippon Denchi Co., Ltd. *See* Genzo Shimadzu Battery, Inc. [GS Battery]

O

Olson Laboratories Inc., 100-101
 partnership with HORIBA, Ltd., 101
Olson, Donel R., 101
Olson-HORIBA Inc., 101
 change to HORIBA Instruments Incorporated, 110
Osaka Prefecture University, 37
Osaka Stock Exchange, 104-105, 118, 135
Osaka, Japan, 13, 37, 52, 61, 69, 74, 116
Oura, Masahiro, 89, 96, 130

- development of the MEXA-1 analyzer, 95-96
- role at HORIBA, Ltd., 95-96
 - as president of, 123, 127
 - choosing a successor, 130
 - retirement, 130
- start at HORIBA, Ltd., 71-72

P

Perkin-Elmer Corporation, 81

R

Rugby, 17-18, 125

S

Shimadzu Corporation, 74

Standard Technology Company Ltd., 113

- formation of, 110

- name change to STEC Inc., 113

STEC Inc., 113

- flow ratio mixture method, 114

- mass flow controller, 113-114

- importance to semiconductor industry, 114-115

- name change from Standard Technology Company Ltd., 113

Suez Canal, 2

T

Tokyo Stock Exchange, 115-116, 118, 135

Tokyo, Japan, 14, 74, 116

Toshiba Corporation, 51

W

World War I, 3

World War II, 17, 21-24, 33, 38

- American occupation of Japan, 35, 38

- General Douglas MacArthur's order to stop research in Japan, 35

- atomic bomb, 29-31

- B-29 bombers, 32

- Shusui aircraft, 32

Y

Yanagimoto Manufacturing Company, Ltd., 74

Yukawa, Hideki, 21, 26