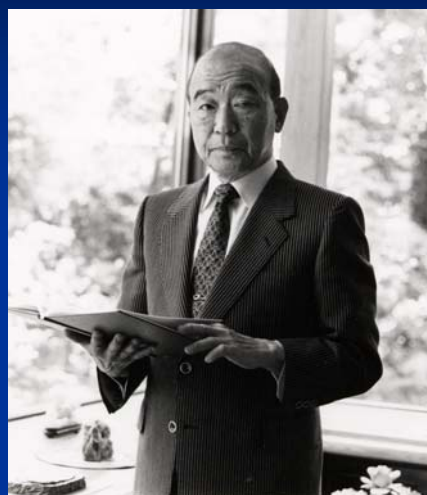


Memorial Session for Chikio Hayashi



IFCS-2004, Chicago, U.S.A.

Organizer

Noboru Ohsumi

The Institute of Statistical Mathematics

Memories of Chikio Hayashi and His Great Achievement

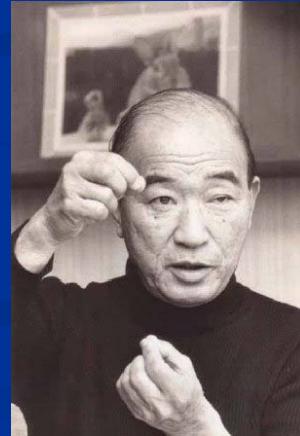
Memorial Session for Chikio Hayashi
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Noboru Ohsumi

The Institute of Statistical Mathematics

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- On August 6th, 2002, the most tragic event was happened.
- In the early morning that day, Professor Chikio Hayashi passed away in a hospital in Tokyo.
- He was 84 years old.



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- Chikio Hayashi was the pioneer and founder of *data science*, and
- a unique and exceptional leader and mentor in the area of *statistics* in Japan.
- He often mentioned his determination to “*die with his boots on,*” remaining active on duty throughout his lifetime.
- In fact, up to one month prior to his hospitalization, he had been actively engaged in various activities.

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Nearly two years have passed since that day,.....



His tomb (2002); with his handwriting “Kue-Issho”
(eternally sleeping and final resting, as the words of “Zen”)

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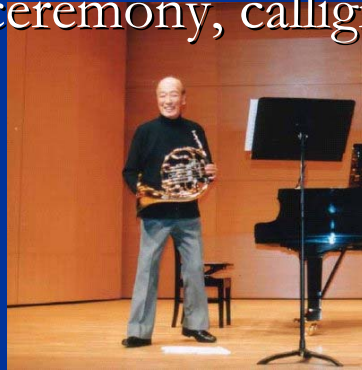
- Hayashi covered a vast range of research subjects in his professional field.
- he was also a versatile and many-talented person with interests extending to a great many areas.
- My knowledge of him must be no more than a tiny fraction of his life.
- Some of the things I knew about him are included in a tribute for mourning I wrote in Issue 24 of IFCS-newsletter (December, 2002) :

Professor Chikio Hayashi and Multidimensional Data Analysis
— “Quantification Methods and Data Analysis, from
Classification to Data Science” —

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“Being both a good warrior and a good scholar” as a saying in Japan

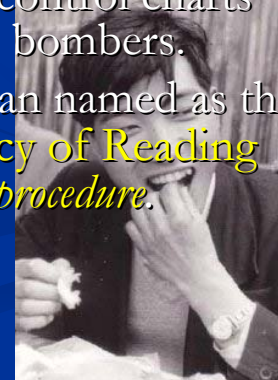
- Hayashi, in fact, was a scholar athlete of varied attainments.
- He loved many kinds of sports and is a man with extensive knowledge of art such as music playing, the tea ceremony, calligraphy, and so



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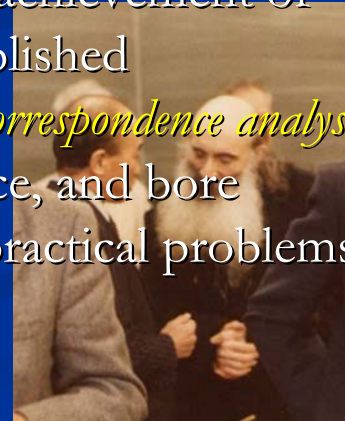
First statistical survey research in Japan

- Hayashi was born in 1918 in Tokyo.
- After graduated from the university he joined the military force, and after that, he shifted the ISM established 1944.
- There are many episodes and successful achievements. I have introduced some of them in my paper.
 - Devised a unique way of using a sort of “control charts” to predict air-raids on Tokyo by the US B29 bombers.
 - Conducted the first attitude survey in Japan named as the “Survey Concerning the Japanese Literacy of Reading and Writing” based on *statistical sampling procedure*.



Principle of quantification theory,

- As we know very well, Hayashi is widely known as the person who advanced the *quantification methods*.
- The speakers of today's session will mention this fact in their respective topics.
- Acclaimed as a particularly notable achievement of Hayashi is the fact that he had established *quantification method Type III* before *correspondence analysis* was conceived by Benzécri of France, and bore remarkable fruits by applying it to practical problems.



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Academic contributions

- His research activities were not limited to the areas of *quantification methods* and *sampling surveys*.
- At present, Murakami and Sugiyama are engaged in a project to publish a *collection of his writings*. When completed, this collection would likely be comprised of over 10 volumes when completed.
- Separately from this project, I am organizing a plan to make a database of all available information regarding Hayashi,
 - Including *his treatises, causeries, critical essays, comments, newspaper articles, and interviews*.
 - While it depends on how you count, we now have *more than 1,800 entries* including co-authored documents.
 - To cover Hayashi's all achievements throughout his life as a researcher in *the field of statistics*, on for nearly 55 years.
 - Upon completion, the database will be distributed on CD-ROM as an archive to libraries.

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Some of the major keywords in his research achievements

- Conception of *the principles of quantification theory and the methods*
- Research and development of *the quantification methods: Types I through VI*, and activities for their diffusion
- Establishment of practical methodologies for *the sampling survey method in survey researches* including social survey and opinion survey.
- Study of the *Japanese National Character*
- *Cultural Link Analysis (CLA)* for International Comparative Survey Research, in extended application of the above study.
- Studies of *statistical research methods for investigating wildlife*, which include:
 - Originally devising statistical estimation method for animal population
 - Attitude surveys on symbiosis of humans, nature and wildlife

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Behaviormetrics, EDA, and data science

- He integrated these studies into a concept that extends *Behaviormetrics* and *EDA* (Exploratory Data Analysis in his own way), and
- deployed it as *Data Science (Deta no Kagaku* in Japanese).



His handwriting "Data Science"

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Concept of data science

- In Hayashi's idea, *Data Science* is not merely claiming some theories but is *a science* that:
 - Enables us to understand or clarify phenomena *through data* that are gathered *by careful design of experiments*,
 - *Classification* is just the fundamental operation that should precede in all sorts of thinking, and
 - Executing and conducting carefully *data analysis, classification, statistics*, and other relevant methods.
- the basis of data science is an extremely straightforward concept.
- His idea is always philosophical and charismatic.

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- This idea, unfortunately, was still incomplete, and much to our sorrow Hayashi had to depart on the course of integrating it.
- For your reference, I would like to introduce some documents that were written in English on the idea:
 - Hayashi C. (2002), Questionnaire Construction, Data Collection and Data Analysis: An Approach by the Idea of Data Science. in *Measurement and Multivariate Analysis*, Nishisato, S. and others (eds.), Springer-Verlag Tokyo, 13-24.
 - Hayashi C. (1997), Chikio Hayashi and Data Science -What is data science? -, *Student*, Vol.2, No.1, 44-51.
 - Hayashi, C., Suzuki, T. and Sasaki, M. (1992), *Data Analysis for Comparative Social Research: International Perspectives*, North-Holland Tokyo.
- Details of the research exchanges and a brief history of data science in Japan
 - Ohsumi, N. (2000), From Data Analysis to Data Science, in *Data Analysis, Classification, and Related Methods*, H.A.L. Kiers, J.-P., Rasson, P.J.F. Groenen and M. Schader (eds.), 329-334, Springer-Verlag Heidelberg.
 - Ohsumi, N. (1997), From Data Analysis to Data Science - An Overview and Future Prospects: the Research Interchange in Data Analysis between Japan and France -, SFC-97: The Meeting of the 20th Anniversary of Société Francophone de Classification, September 17 - 19, 1997, Université Lumière Lyon 2, Lyon, France.

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International contribution

- In the area of international conferences, Hayashi made substantial contribution in implementing a variety of international conferences.
- For example, he assumed the role of the President or an Organizing and Program Committee member in the following meetings:
 - *International Statistical Institute, the 46th ISI Session, Tokyo (1987)*
 - *The XIIth International Biometric Conference, Tokyo (1984)*
- There are many others in which he played an indispensable role such as:
 - *Japanese-French Scientific Seminar(1987, 1992) ,*
 - *The World Association for Public Opinion Research (WAPOR),*
 - *International Symposium on Data Analysis and Informatics (1979, 1983, 1985),*
 - *International Conference on Social Science Methodology, etc.*

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Contribution to classification studies

- For International Federation of Classification Societies (IFCS)
 - He took a role of *President of IFCS-96* held in Kobe (Japan),
 - *IFCS President* between 1998 and 2000, and
 - helped establish the *Travel Awards Program* (TAP),
 - It will be very pleasant news for us if that IFCS will be able to decide at this meeting to name this program as the “Hayashi Award.”
- In Japan, he was involved in the foundation of *Japanese Classification Society* (JCS), and
- several times served as President.
- For more information regarding this, refer to the aforementioned tribute text in IFCS-newsletter (issue 24).

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About his awards

- Professor Hayashi's great achievements over a period of many years were recognized when he was awarded the *Purple Ribbon Medal in 1981*, followed by the Order of the Sacred Treasure, *Gold and Silver Star in 1989*.
- Following his death, he was posthumously conferred with "*Shou-shi-i*" in Japan's official court rank.

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Session speakers and titles

- *Validation Technique in Correspondence Analysis*
Ludovic Lebart
Director of Research
Centre National de la Recherche Scientifique, and
École Nationale Supérieure des Télécommunications, France
- *Classification in the Life Span of Chikio Hayashi*
Hans-Hermann Bock
Professor
Applied Statistics at the Institute for Statistics
Technical University of Aachen, Germany
- *Chikio Hayashi and Data Science in Japan*
Baba Yasumasa
Professor
Department of Statistical Methodology
The Institute of Statistical Mathematics, Japan

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- The professor was 84 years old when he passed away. It was too soon and we still need his wisdom. I pray for the professor's happiness in the next world.

May his soul rest in peace.

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This completes and
thank you for your kind attention for my
talk.

- I would like to make this talk an introductory address, and
- I would like to continue and offer three talks of this memorial session to mourning of Professor Chikio Hayashi.

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