

〒107 東京都港区赤坂二丁目三〇番  
五ノ六三二一(代) 電話  
ラック赤坂ビル

医学博士 大島 正光

財団法人 医療情報システム開発センター

S. Su.

26th  
12 30  
secretary

**TAKAO OHKUBO, M. D.**

Professor on work physiology Ergonomics,  
Dept. of Industrial Eng. and Management,  
College of Industrial Technology, Nihon University  
1-2-1, Izumi, Narashino, Chiba (〒275) office (0474) 73-1211 (ext. 365)  
home 4-13-9, Sera, Setagaya, TOKYO (03) 709-0875

**KIYOJI ASAI PH. D.**

PROFESSOR OF INDUSTRIAL ENGINEERING  
UNIVERSITY OF OSAKA PREFECTURE

MOZU, UMEMACHI  
SAKAI, OSAKA 591  
JAPAN

TEL. 0722-52-1161

**TOSHIHIRO TSUMURA**

DOCTOR OF ENGINEERING,  
PROFESSOR OF AERONAUTICAL ENGINEERING  
COLLEGE OF ENGINEERING  
UNIVERSITY OF OSAKA PREFECTURE.  
MOZU, SAKAI, OSAKA, 591 JAPAN  
TEL (0722) 52-1161

ERGONOMICS AND SAFETY IN THE GENERATION,  
DISTRIBUTION, AND USE OF ELECTRICAL POWER

RICHARD G. PEARSON, PH.D.  
NORTH CAROLINA STATE UNIVERSITY  
RALEIGH, NORTH CAROLINA, U.S.A.

The era of microelectronics, information technology, and telecommunications is bringing vast changes to industrial and business operations as well as to our private lives. Within industrialized countries we are seeing the advent of computer aided manufacturing, automatic process control, and robots; within the office we see increasingly sophisticated machinery -- VDT's, small business computers, and copying machines. And, in the United States, we are witnessing a rapid explosion within the home of personal computers and video games based upon micro-processor technology.

These rapid developments pose problems for the field service engineer and maintenance personnel who must deal with new designs, installations, and modes of operation. As Meister (1982) has observed, in the next two decades the increasing sophistication of computer systems and artificial intelligence will lead to even more complex human-machine systems that will be increasingly more difficult to maintain.

This paper will discuss some of the emerging evidence relative to the electrical hazards and safety problems associated with these technologies, with emphasis on maintenance practice and maintainability design.

The safe generation of power is, of course, a concern to all of us. With regard to the operation of nuclear power plants, for example, industry is at that point where it is changing from a traditional process control approach

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toward one which involves newer computer-based display and control technology. Currently, industry thru research and development is focusing its efforts on the area of control room operations involving such topics as panel backfits (thru paint, label, and tape), CRT displays of safety parameters for transient detection, diagnostic decision aids, reactor operator selection and training, emergency operating procedures, human reliability, and simulator development. Of special interest is the active development of what has generically been termed a Safety Parameter Display System, or SPDS for short. Basically, the SPDS is a computer-driven CRT graphic display of a minimum set of critical, safety-related nuclear plant parameters that would aid the reactor operator in identifying abnormal operating conditions. While the objective of reducing the large amount of display data which an operator might otherwise have to monitor in the case of an abnormal transient is clearly a worthy one, the introduction of the SPDS does pose some concern from an ergonomics viewpoint. Currently, a large variety of SPDS designs from different manufacturers are under research and development. Training centers associated with the steam generator vendors and utilities have or will have different training programs, simulators, and SPDS prototypes. In short, there is no single design--no "agreed-upon," standardized approach in terms of the parameters displayed, the display format, the use of color-coding, etc. What problems can we anticipate, in terms of habit interference, when the reactor operator receives training on one SPDS design, begins his job using a second design, then moves to a different utility where a third design is in use?

Apart from nuclear plant operations as such, the area of maintainability has been relatively neglected so far in terms of priority, but attention is shifting. In the next few years, hopefully, maintainability will receive greater attention. The reliability of alarms and annunciators must be ensured thru better maintainability design, system redundancy, and the use of state-of-

the-art sensors. The maintenance of hardware and software involved in the computerized operator procedures now under development will be critical to effective plant operations. New job performance aids will need to be developed for maintenance tasks. Ultimately we shall see computer-based aids for diagnostic decision-making by maintenance personnel, such as involved in symptom analysis.

From nuclear power generation we now turn to the power delivery area involving high voltages--a challenging topic for the ergonomist concerned with the safety of field installation and maintenance personnel. As one example, there is the problem involving contact with high voltage cables by trenching and tunneling equipment, cranes, and lifts. Proximity sensors are a recent adjunct to traditional safety devices used in such tasks, but a problem occurs with the failure of associated visual and auditory warning devices to attract the attention of the worker. At the industrial plant the non-uniform physical configurations involved in electrical power source cabinets and enclosures among different models of the same equipment often leads to maintenance errors, accidents and injuries, and equipment damage and loss. In one accident case reviewed by this speaker there was a change of circuit breaker location in a new model enclosure (as compared to older models); the line and bus terminal sides were reversed, leading to a service engineer's error and serious electrical shock. The safety concerns of service departments are, it appears, not commonly heeded by the original-equipment designers. A dialogue needs to exist between these two groups so that greater emphasis is given to maintainability design involving ergonomic concepts in order to reduce human error potential.

At the user-operator-consumer level the task of the service engineer is changing. One may recall earlier days of mechanical typewriters and adding machines. Today we have more electronics at the office and industrial workplace,

with their associated voltage hazards. In short, there is a convergence between the two types of service, electrical and mechanical, that we once encountered. The power delivery specialist must, on occasion, deal with relatively small, "low voltage" power sources, and so must the office equipment repairman. Typically the training of these personnel, and their job performance aids, are lacking with regard to these new tasks. Such shortcomings were documented in an interview survey of 100 service engineers directed by the author.

The survey indicated a concern on the part of these personnel about being hurt or killed at tasks where their training and safety manual guidance (which emphasized power delivery and high voltage) were irrelevant. Overall they felt the corporate safety program was not designed for them. They noted that smaller, less expensive components changed in their design more frequently, yet in their job they might not encounter a particular model only once every one or two years. In working with CRT's high voltages can be encountered, yet many of these engineers felt they lacked the proper training and equipment to work safely. Often the job was complicated by the fact that information concerning CRT high voltage supplied by the vendor at the time of delivery was later lost by the customer.

As ergonomists we are concerned not only with the safety of maintenance personnel, but also with the contribution of reliable maintenance to plant productivity. As Rigby (1967) has shown, maintenance errors constitute a substantial portion of the total human errors which contribute to system failure during its life cycle. While computer and microprocessor-based maintenance aids, such as automatic test equipment, are worthy adjuncts to the maintenance task, they change the skill requirements of the technician, i.e. more skill in electronics is now needed, as Christensen and Howard (1980) have observed. Beyond this concern



For our lab : 3/4 of the program on this subject

- automatization in food industry
- in railways
- computerization in journals
- news agencies
- oil refineries
- national census registration system
- insurance companies
- robotization in car industry

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BACKGROUND OF THE SYMPOSIUM

- Is there not an oversat of computers and robots inside the general research for productivity? which is fundamental to increase resources for the enhancement of human life

- Universal technology (p. 3) "... created the cultures unique to each race. Recently, however, the trend has been for the cultural traits of one race to be immediately incorporated into the cultural sphere of another. Therefore, it can be said that the future effect of micro-electronic technology depends upon how each race incorporates it into its own society.

- Repetition of old story of industrial revolutions.

- steam 1st industrial revolution
- mechanics 2nd industrial revolution
- electricity night shift
- oil
- nuclear energy → automation same story

evolution except race

- Anthropotechnology : incorporation - rejection of technology in an existing and long lasting cultural and social structure related to geography, history, economics ... that is not racial

- Now, biology is much more important for changes in civilization than microelectronics : vaccinations, antibiotics, anti parasitosis, contraceptive pills, production of food.

- Anthropotechnology : incorporation - rejection of technology in an existing <sup>cultural and social</sup> structure - that is not racial, it is <sup>change in</sup> a historical evolution of <sup>structure</sup>

- Now biology much more important for civilization than microelectronics : vaccinations, antibiotics, antiparasitosis, female pill, production of food.

one should not overlook the contribution which ergonomics can make to the design of maintenance manuals, handbooks, tools, and training devices. As an example, Christensen and Howard cite the development of "controlled English" involved in an International Language for Service and Maintenance. The objective here is a limited set of words, less than 800, which can aid the "promotion of understanding across national language barriers."

There is much more we, as ergonomists, can do to eliminate human-engineering deficiencies in equipment design and to reduce human-initiated failures. One should not forget the systems approach which embraces not only the design of original equipment, but also design for effective installation, inspection, maintenance, and operation. The scope of this presentation precludes elaboration here, but I would refer you to some useful design checklists, found in the paper by Christensen and Howard.

With increased automation and microtechnology there have been efforts to involve the worker in equipment maintenance. While positive benefits may be realized by this approach to job enlargement and to reducing production-line boredom, the safety consequences can be of concern unless effective maintenance training and safety training are involved. A recent news release by the International Labour Organization observes that Japan has taken the lead here in arranging for equipment suppliers to provide training to their industrial workers so as to deal with the problem of adapting its workforce to the microelectronics era.

The introduction of robots in manufacturing and in nuclear plants represents a new form of hazard, especially to the operator trainee and the maintenance technician. While fatalities are rare, a survey by Sugimoto (1977) revealed that 8 percent of a sample of workers had experienced robot-related injuries and another 28 percent had experienced "near accidents." The majority of these cases were associated with teaching trainees, testing, and maintenance. The author cites

several problems in design from one robot to another, involving such ergonomic considerations as coding of symbols and controls, operating practices, and panel layout. His paper emphasizes the need for the establishment of standardized robot designs and includes a draft of proposed safety standards.

The early approaches to dealing with hazards associated with robots remind one of the machine-guarding approaches used with mechanical power presses, e.g. fences, interlocks, photocell detectors, and the like. As we know, such devices are not totally fail-safe. Accidents still occur. As some in the audience may be aware, a fatal accident occurred here in Japan when a worker climbed a guard fence, thereby bypassing an electrical interlock, in order to repair a robot. With the machine on manual control, the worker accidentally bumped the "on" switch, and the claw of the robot pinned him against the machine tooling device, crushing him to death.

In another case, this one in the United States, a robot's automatic control system apparently failed causing the arm to be driven with such force against its support that it was broken off at the shoulder. Fortunately, no personnel were close to this accident to have been injured. Still, the damage to the robot itself and the economic loss should not escape our attention.

Both of these cases emphasize the need for the application of better approaches to robotics safety since protection must be provided for personnel who necessarily must be within the area of the robot when it is operational, that is, during maintenance and during the teach mode. The importance of both maintenance training and safety have been emphasized in papers by Trouteaud (1979), von Muldau (1978), and Woern (1980).

In the United States the National Bureau of Standards of the U.S. Department of Commerce is developing an Automated Manufacturing Research Facility



where robotics safety will be one focus of attention. In a recent paper, Kilmer (1982) discusses their approach which emphasizes the use of safety sensor systems at "three levels based on the region of coverage and the associated safety strategy:

- Level I - perimeter penetration detection around the workstation,
- Level II - intruder detection within the workstation,
- Level III - intruder detection very near the robot..."

Pressure sensitive floor mats positioned around the robot are used in the Level I system. At the second level ultrasonic echo-ranging sensors are employed to detect intruders within some predetermined minimum safety distance.

Beyond these approaches Park (1978) has emphasized the importance of redundancy in both individual components of robots and safety systems. He notes that a "...safety system might have multiple sensors to detect a given hazard condition, so that it could continue to operate even if one or more sensors failed. Park also recognizes the need to protect against robot-related software failures, and points out that a "...doubly-redundant system can shut itself down when its two components disagree, and a triply-redundant system can use majority logic to override one failed component and continue operation."

Now, for a few moments, let us turn to the office and home environments. As computers become smaller and more portable we face the desire of many users to install and service their own components. The same is true for home "personal" computers and their video-game counterparts. Already there is evidence of traumatic injury to individuals involving this new form of consumer product. The U.S. Consumer Product Safety Commission has begun to accumulate statistics, the principal hazards to date being (a) fires involving the television

display set and (b) electrical shock. Both hazards appear to involve either improper mating of components or faulty cabling and connectors. Clearly ergonomists should be consulted here by manufacturers for their knowledge of coding and one-way, error-free installation practice. Finally, we must deal with the user who insists on installing and servicing his own computer. Facing such a demand, and the hazards associated with it on the part of the buyer, one computer manufacturer in the United States is now conducting research on software packages that would guide the buyer in safe installation and self-maintenance of his or her purchase.

Finally, and apart from the maintainability design considerations noted above, the ergonomics approach needs to consider the risk-taking "personality" of the service engineer. The survey mentioned above which I conducted noted several examples: working on "hot" equipment by defeating interlocks and not de-energizing; taking shortcuts, skipping procedures, substituting and improvising tools and test equipment; inadequate job coordination with others; sloppy work practices. The reasons for such practices are clear: the service engineer is under pressure to get the job done quickly, either from customer pressure or from self-imposed pressure, i.e. to get "home" at a reasonable hour. Under such conditions the individual may fail to recognize that he or she is an unsafe component of the system, whether from pressure or overwork. There is growing evidence of a risk-taking personality -- a correlation between accident potential and such dimensions as impulsivity, neuroticism, and sensation-seeking. Interacting with the hazards associated with risk taking is another hazard that is correlated with job experience. After several years in the same job many field engineers begin to experience their tasks as routine to the point of being less attentive to hazards and more prone to distraction. Ultimately we shall also have to address these factors--risk taking and task routine--for the safety of those who maintain our human-machine systems.

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30, 1980, Dearborn, MI.

外国人参加者 (Foreign Participants)

G #  
 US #4  
 in +  
 B #

I #  
 F #  
 SW #  
 Can #  
 Col +

Klaus J. Zink	Universitat Kaiserslautern (Germany)
Buitrago Alfred	Instituto Seguros Sociales (Colombia)
H. McIraine Parsons	HumRRO (U. S. A.)
Rabindra Nath Sen	Calcutta University (India)
P. Godts	O. L. V. Middelaes Hospital (Belgium)
Micheli Sergio	Nuova Italsidar S. P. A. (Italy)
A. Wisner	Conservatoire National Des Arts Et Metiers (France)
Richard G. Pearson	North Carolina State Univ. (U. S. A.)
David A. Thompson	Stanford University (U. S. A.)
Kjell Groth	Swedish Embassy (Sweden)
Goran Olsson	University of Lulea (Sweden)
Ian Noy	HFAC Transport Canada (Canada)
John O'Hare	US Navy (U. S. A.)
Edouard Richard	Universite Jean Moulin (France)
Volker Graefe	HSBW Munich (Germany)
John L. Burch	Ergosyst Associates, Inc. (U. S. A.)
Helmut Peters	University of Wuppertal (Germany)
B. Muller	University of Wuppertal (Germany)
R. Dewitte	O. L. V. Middelaes Hospital (Belgium)

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 27 étrangers  
 8  
 77  
 2 P V D I

Alphonse Chapanis

The Johns Hopkins Univ.  
(U. S. A.)

R. Hirsch

IBM (U. S. A.)



T. IKEDA.	OSAKA GAS CO., LTD.
T. IWASA	— OSAKA INDUSTRIAL UNIV.
H. ODA	KINTETSU RAILWAY CO.
I. OSAWA	? DAIFUKU KIKO
M. ARAI	— UNIVERSITY OF OSAKA PREF.
Y. UTSUI	— UNIVERSITY OF OSAKA PREF.
K. ISHIDA	TEIJIN CO.
T. INARI	MITSUBISHI ELECTRIC CO.
K. AWA	— KWANSEI UNIVERSITY
M. OZAWA	OSAKA GAS CO.
K. ASAKAWA	FUJITSU LTD.
T. UCHIYAMA	FUJITSU LTD.
Y. IKEDA	MATSUSHITA ELECTRIC INDUSTRIAL CO.
Y. OHMORI	KINKI ELECTRIC WORKS CO.
K. INOUE	— RITSUMEIKAN UNIV.
N. UEHARA	SUMIKIN KOZAI CO.
H. UNZAKI	— KYOTO UNIV.
Y. ARAI	
K. ASAI	— UNIVERSITY OF OSAKA PREF.
K. OYASU	TATEISHI ELECTRONICS CO.
K. UEMURA	MITSUBISHI ELECTRIC CO.
Y. IKEDA	— AICHI INDUSTRIAL UNIV.
H. AOYAGI	TAKENAKA CONSTRUCTION CO.
A. OHOKA	SUMITOMO ELECTRIC CO.
K. AOKI	? NIPPON DENSO
A. OGAWA	HITACHI SHIPBUILDING CO.
T. UMESAO	— NATIONAL MUSEUM OF ETHNOLOGY
K. ANDO	FUJITSU LTD.
K. ATSUMI	— UNIVERSITY OF TOKYO
H. INADA	— OSAKA UNIVERSITY
Y. UMETANI	— TOKYO INSTITUTE OF TECHNOLOGY
M. IHARA	— SHIZUOKA UNIVERSITY
H. ODANI	MATSUSHITA SEIKO CO.
S. AOYAMA	— TOYOHASHI UNIVERSITY OF TECHNOLOGY
T. OKU	DAIHATSU MOTOR CO.
Y. OKADA	DAIHATSU DIESEL CO.
T. INOUE	SHINKO ELECTRIC CO.
J. OGAWA	KOBE STEEL CO.

JAPANESE PARTICIPANTS

1 Miles  
- Wm

M. AKI		SANYO ELECTRIC CO.
T. OSAKADA		TOYO KOGYO LTD.
H. AIKAWA		MITSUI TOATSU CHEMICAL CO.
K. OKAMOTO		MURATA KIKAI CO.
H. OHHORI		MATSUSHITA ELECTRIC INDUSTRIAL CO.
T. AIUCHI		IBM JAPAN
T. OZAWA		SWEDEN EMBASSY
H. INOUE		MATSUSHITA ELECTRIC CO.
N. AOKI		KANSAI ELECTRIC POWER INC.
Y. OKUDA		
H. OKAMURA		KYOTO SCIENCE CO.
M. SYODA	-	OSAKA UNIVERSITY
R. IWASA		GK INDUSTRIAL DESIGN CO.
Y. KUBOTA		KAWASAKI HEAVY INDUSTRIAL CO.
N. KOMATSU	-	UNIVERSITY OF OSAKA PREF.
T. KURATA	-	KANSAI UNIVERSITY
K. GOTO		KOMATSU LTD.
Y. KAWAKAMI		YANMAR DIESEL LTD.
S. KAMIUCHI		KAMIUCHI ELECTRIC CO.
T. KIRENGAWA		
O. KAJI	?	DAIKIN KOGYO.
H. GENCHI		TOSHIBA CORPORATION
M. KENMOCHI	?	YANAGISAWA SEISAKUSHO
T. KONISHI		TOYO KIKAI LTD.
S. ASAI		HITACHI SHIPBUILDING CO.
O. KITAMURA	-	KYUSHU INSTITUTE OF TECHNOLOGY
I. KURODA	o	AEROMEDICAL LABORATORY, JASDF
M. KOYAMA		ALL NIPPON AIRWAYS
S. KITAMURA	-	KOBE UNIVERSITY
I. KATO	-	WASEDA UNIVERSITY
S. KOMATSU	?	AUTHOR
Y. KURIOKA	-	MITI, INSTITUTE OF TECHNOLOGY
H. KAMITA	-	OSAKA INSTITUTE OF TECHNOLOGY
K. GOTO		FUJITSU LTD.
I. KAMO		NIPPON ELECTRIC CORP.
M. KAWABATA		SAKAI CITY
Y. KAWAMURA	-	OSAKA UNIVERSITY
S. KAMIZUKI	-	KOBE INSTITUTE OF TECHNOLOGY
H. KIRITA	?	
I. KUROSE	-	NAGOYA UNIVERSITY OF TECHNOLOGY

K. TAKAHASHI		SENYO KIKO LTD.
S. TSUJI	—	OSAKA UNIVERSITY
I. TSUTSUMI	—	KANSAI UNIVERSITY
H. TERADA	—	OSAKA UNIVERSITY
M. TASHIRO	?	INTER
S. TANAKA	—	DESIGN DYNAMICS RESEARCH INSTITUTE
E. TANAKA	—	EHIME UNIVERSITY
K. TAMAI	o	DAIHATSU KOGYO.
H. TSUBONO	?	KUBOTA LTD.
A. TERAOKA	+	OSAKA INSTITUTE OF TECHNOLOGY
S. TERADA	—	OSAKA INSTITUTE OF TECHNOLOGY
S. TOMITA	+	GAS BOILER SALES LTD.
H. TAKENAKA		IBM JAPAN LTD.
S. TANAKA	—	UNIVERSITY OF OSAKA PREF.
K. TANAKA		KUBOTA LTD.
M. TAKEBAYASHI	o	MITI
Y. NAITO		
R. NOMURA	?	TAITO KOGYO
S. NAKAYAMA	—	MEIJO UNIVERSITY
H. NAGANO		JAPAN AIR LINES
K. NORO	—	UNIVERSITY OF OCCUPATIONAL AND ENVIRONMENTAL HEALTH
M. NAGAFUNE		TATSUMI ELECTRONICS INDUSTRY
A. NEMOTO		IBM JAPAN LTD.
H. NINOMIYA		SHIKOKU ELECTRIC POWER INDUSTRY
T. NAGAI		MITSUBISHI ELECTRIC CO.
K. NUSHIDA	—	OSAKA INSTITUTE OF TECHNOLOGY
A. NAKAMURA		MATSUSHITA ELECTRIC INDUSTRIAL CO.
K. NIWATA	—	UNIVERSITY OF OSAKA PREFECTURE
H. NAKAYASU	—	KANAZAWA INSTITUTE OF TECHNOLOGY
Y. NISHIMURA		ALL NIPPON AIRWAYS
N. NAGATA		MATSUSHITA ELECTRIC INDUSTRIAL CO.
K. HATTORI		OSAKA GAS CO.
Y. FUKUMORI		OSAKA GAS CO.
M. HASHIMOTO	—	UNIVERSITY OF OSAKA PREFECTURE
R. HOSOI		IBM JAPAN LTD.
S. HANDA	—	CDI (COMMUNICATION DESIGN INSTITUTE)
M. HIKITA	—	CDI
R. HONTANI		KANSAI ELECTRICAL INSTRUMENT CO.

K. KUMAGAI		KANSAI ELECTRIC POWER INDUSTRY INC.
A. KUGO		KANSAI ELECTRIC POWER INDUSTRY INC.
M. KATO		IZUMI DENKI CORPORATION.
T. KUNO		TOYODA RESEARCH AND DEVELOPMENT INC.
K. KITO		TOYODA RESEARCH AND DEVELOPMENT INC.
T. KOYAMA	o	TEITO RAPID TRANSMIT AUTHORITY
K. KURODA	—	GK INDUSTRIAL DESIGN INSTITUTE
S. SUGIYAMA	—	KWANSEI GAKUIN UNIVERSITY
S. SUGITA	—	NATIONAL MUSEUM OF ETHNOLOGY
T. SAWADA	—	UNIVERSITY OF OSAKA PREF.
M. SAKAI	?	INTER
O. SUENAGA	—	SHIZUOKA UNIVERSITY
Y. SAITO	?	MATSUSHITA DENKO.
S. SHINZAWA		SONY CORP.
M. SHIMIZU		
M. SHINMURA		SANYO ELECTRIC CORP.
O. SATO		FUJITSU LTD.
T. SUZUKI	—	KYOTO KOYO SCHOOL
Y. SANO		IZUMI DENKI TOYAMA WORKS
Y. SUGE	—	GK INDUSTRIAL DESIGN INSTITUTE
S. SASAHARA	—	UNIVERSITY OF OSAKA PREF.
K. DOI		YOSHIKAWA CORP.
T. TO	—	UNIVERSITY OF OSAKA PREF.
Y. TSUBOI		mitsubishi ELECTRIC CORP
J. TAMATE		SUMITOMO TRADING CO.
E. TSUDA		mitsubishi ELECTRIC CORP.
A. TAKAHASHI	o	JAPAN MANAGEMENT ASSOCIATION
T. TAKEDA		KOMATSU SEISAKUSHO LTD.
S. TORIZAKI		KOMATSU SEISAKUSHO LTD.
Y. TAMORI		YANMAR DIESEL
Y. TANAKA		JAPAN COMPUTER SCIENCE CO.
Y. TSUCHIYA		KUBOTA IRON WORKS LTD.
H. CHO		TOYO KIKAI CO.
T. TATEISHI		TATEISHI ELECTRONICS CORPORATION
T. TSUMURA	—	UNIVERSITY OF OSAKA PREF.
Y. TANAKA		SUMITOMO KINZOKU (IRON WORKS) CO.
S. TAKASHIMA	o	ASSOCIATION OF MACHINERY PROMOTION
H. TAKEDA	—	OSAKA ELECTRIC COMMUNICATIONS UNIV.

K. FUKUI	FUKUI SEISAKUSHO CO.
J. BABA	MITSUBISHI ELECTRIC INDUSTRIAL CO.
S. HAYASHI	— OSAKA ELECTRICAL COMMUNICATION UNIVERSITY
G. HYODO	TATSUMURA TEXTILE CO.
R. HOSOI	TOHO ENGINEERING
N. HIRAO	— UNIVERSITY OF OCCUPATIONAL AND ENVIRONMENTAL HEALTH
H. HIROSUE	— AWAJI PRIMARY SCHOOL
T. HASEGAWA	HASEGAWA DENKI CO.
N. FUJIWARA	— UNIVERSITY OF OSAKA PREFECTURE
K. BABA	IZUMI DENKI CORP.
T. FUJIMORI	SONY CORPORATION
H. MIKI	KAWASAKI HEAVY INDUSTRY CO.
M. MIYAMURA	SHIN-MEIWA INDUSTRY CO.
M. MIYUKI	SHARP CORPORATION
T. MIZUTANI	OSAKA GAS CO.
H. NAGASAWA	JAPAN UNITED STATES CO.(JASCO)
H. MIYAKE	MATSUSHITA SEIKO CO.
H. MINAMI	TAIYO KOGYO CO.
T. MURAKAMI	KOMATSU LTD.
T. MATSUSHITA	— UNIVERSITY OF TOKYO
T. MUROGA	SUMITOMO METAL CO.
T. MURAYAMA	HITACHI SHIPBUILDING CORP.
R. MORI	— TSUKUBA UNIV.
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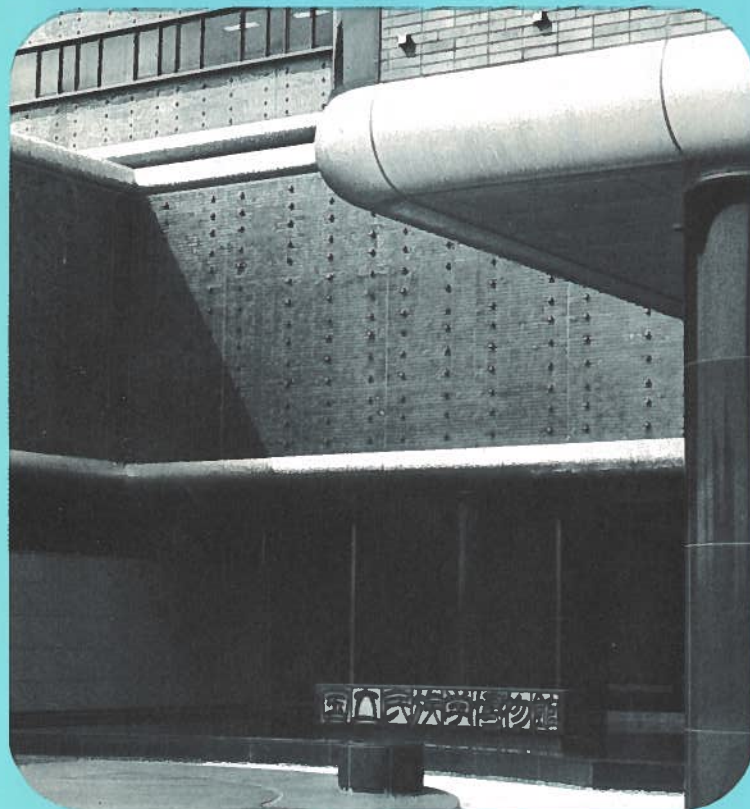


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# National Museum of Ethnology

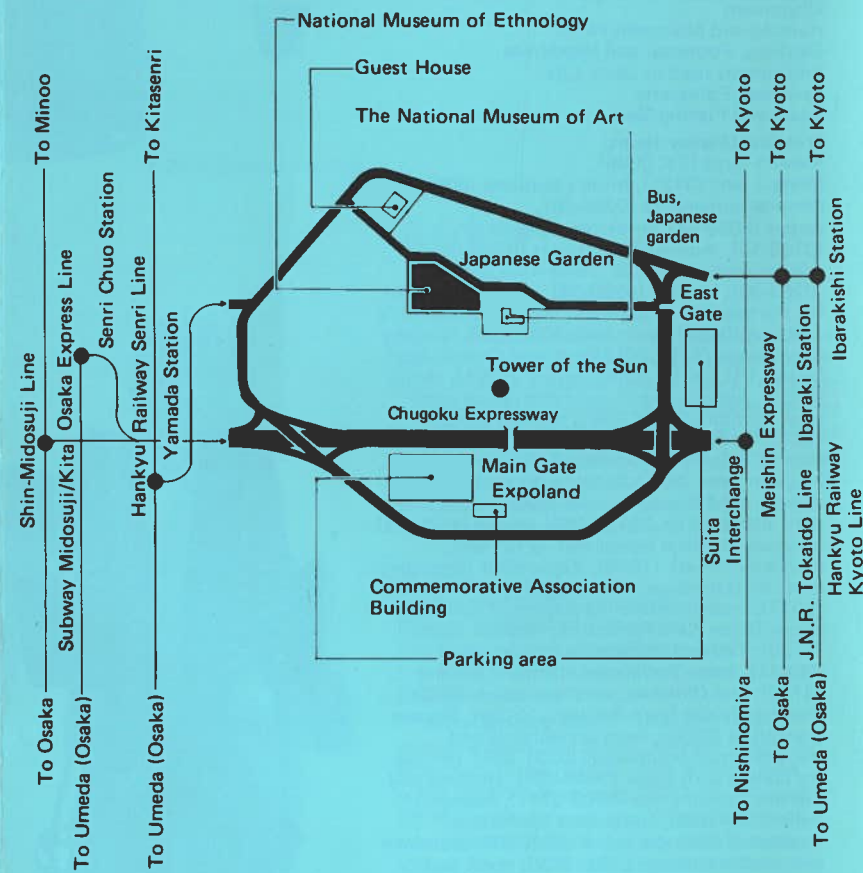


## General Museum Information

**Hours:** 10:00-17:00 (Entry permitted up to 16:30)  
**Closing Days:** The regular closing day is Wednesday. When Wednesday falls on a national holiday, the museum will be closed instead on the following day. The museum will be closed from December 28 until January 4 for the year-end and New Year period. In addition, the museum may be temporarily closed when necessary.

Admission Charges:	Individual	Group
Adults	¥250	¥200
Students (Senior High School and College)	¥150	¥120
Children (Elementary and Junior High School)	¥100	¥80

**Location:** Senri Expo Park, Suita, Osaka 565, Japan  
**Telephone:** 06-876-2151  
**Transportation:** Buses run to Expoland or Nihon Teien Mae (Japanese Garden) from the National Railways Ibaraki Station, Hankyu Ibarakishi Station, Hankyu Yamada Station, and Senri Chuo Station on Kita Osaka Express (Midosuji Subway Line).



National Museum of Ethnology

Senri Expo Park, Suita, Osaka, Japan  
 Phone 06-876-2151

## Museum

The National Museum of Ethnology was established in 1974 to provide the public with up-to-date information, based on the results of ethnological field research, on the world's cultures and societies. It is hoped thereby to contribute to a deeper knowledge and understanding of mankind.

This is a "research museum", which combines the operations of research, collection of materials, and public exhibition and education. Its activities aim to reach every part of the globe and to investigate all peoples. The museum's collection comprises not only such articles of daily life as clothing and utensils, but rather all kinds of relevant materials including written documents, photographs, films, records and tapes. In short, the museum is striving to assemble and make available a comprehensive collection of ethnological materials, dealing with all areas.

The exhibits are broadly classified as either regional or cross-cultural. The regional exhibits are divided into several large area sections; Oceania, the Americas, Europe, Africa, West Asia, Southeast Asia, Central Asia, North Asia and East Asia. The cross-cultural exhibits, which, by definition, are not limited to the cultures of specific areas, deal, *inter alia*, with such fields as music and linguistics. The regional exhibits begin with Oceania and move eastward round the globe, ending with East Asia, which includes Japan. In this way, Japanese culture can be viewed in the light of its relationships to, and contrasts with, other cultures.

A special feature of the museum's exhibit area is the Videothèque. Here, cultural and social characteristics of various peoples are illustrated and explained by means of video cassette tapes. The audio-visual equipment of the Videothèque is furnished with a device that automatically selects, presents and returns videotapes in response to the viewer's request as the appropriate buttons are pushed in the viewing booth.





## Ethnology

Ethnology (Cultural Anthropology) is the comparative study of the societies and cultures of the world's peoples. In Japan this type of research was being carried out prior to the Second World War, but it has become especially popular in the post-war period. The term "Ethnology" is used mainly in Europe, whereas in North America the term "Cultural Anthropology" is more common. In Japan, too, "Cultural Anthropology (*Bunka Jinruigaku*)" has recently come to be widely employed.

Because Ethnology is a science which carries out objective investigations of ethnic groups in their milieu, the results of field research in all parts of the world constitute a fundamental source of materials. In other words, a special characteristic of ethnology is that it differs strikingly from disciplines which depend mainly on the academic study of written documents or other secondary sources. The scope of investigation covers all aspects of life, such as dwellings, clothing, food procurement and nutrition, history, world view, family and social structures, language, religion, psychology, arts and crafts, and technology.

To achieve mutual interchange among the peoples of the world, it is necessary that they become aware of each other's customs and ways of thinking. Only then can true international understanding begin to emerge. This type of education, too, is one of Ethnology's principal objectives.



## Site and Building












Because the National Museum of Ethnology is located in the Expo Memorial Park, the height of construction has been limited to harmonize with the overall architectural plan of the park. The building has some distinctive features of traditional Japanese architecture, such as an emphasis on the horizontal lines of the eaves. The ground plan consists of a central block and five display blocks. Rather than allowing light to enter from the outer wall of each block, light enters through patios which have been built inside the exhibit areas. These patios are utilized for outdoor exhibits. Storage, exhibition and research facilities are distributed on four levels, conveniently connected by elevators and staircases, but the independent functions of each individual area are consolidated on one level. The exhibits are arranged in the form of a circular tour, making it possible for a visitor either to see everything systematically, or to enjoy an abbreviated tour of each regional display.

The main facilities on the first floor are the Main Hall, restaurant, and storage area. The second floor contains the exhibit areas, seminar rooms, language laboratory, and offices. The Information and Documentation Center is located on the third floor, and the fourth floor houses the offices of the research staff. The Main Hall, restaurant, and exhibit areas are open to the general public.

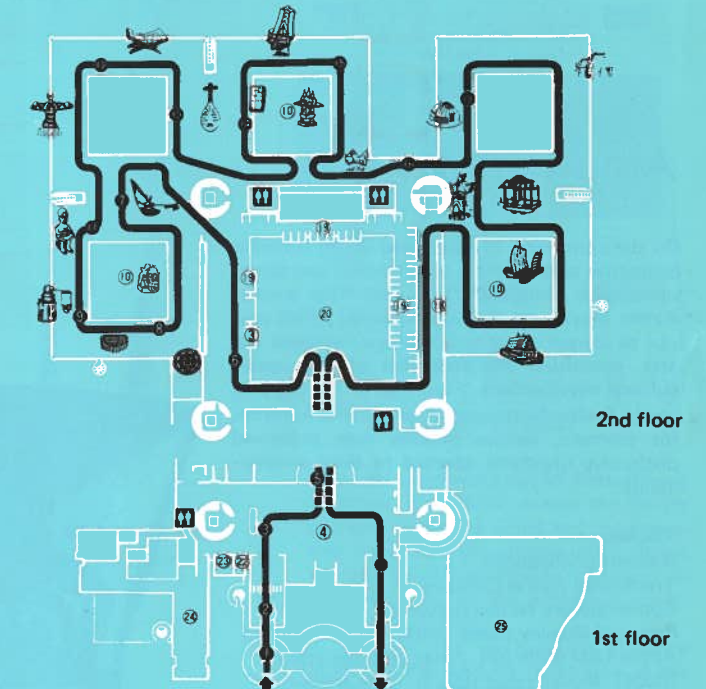
Area of Museum Site: 40,821 square meters  
 Construction Material and Scale: steel-frame, ferro-concrete, four-storey building, with an area of 11,407 square meters, and a total floor area of 33,754 square meters.



## Explanation of Symbols

- |   |   |   |   |
|---|---|---|---|
|  | Information Counter (first and second floors)   |  | First Aid (in case of sudden illness or accident, please inquire at Information Counter.) |
|  | Coin Lockers (next to Main Hall)  |  | Rest Rooms (all floors)   |
|  | No Smoking (please limit smoking to lounge area.)   |  | Public Telephones (first floor)   |
|  | Use of tripod or photographic lighting is not permitted. Please inquire at Information Counter concerning commercial photography. |  | Restaurant (south side of Main Hall)  |
|  | Animals and dangerous objects may not be brought into the museum.   |  | Museum Shop (north side of Main Hall)   |
|  | Umbrellas may not be brought into the museum. Please leave them in the umbrella stand.  |   |   |

## Facilities and Visitors' Route



- |                        |                          |                                       |
|------------------------|--------------------------|---------------------------------------|
| ① Ticket Office        | ⑪ Africa Exhibit         | ⑲ Videothèque                         |
| ② Vestibule            | ⑫ West Asia Exhibit      | ⑳ Central patio (Futuristic Monument) |
| ③ Information Counter  | ⑬ Music Exhibit          | ㉑ Museum Shop                         |
| ④ Main Hall            | ⑭ Linguistic Exhibit     | ㉒ Public Telephones                   |
| ⑤ Front Stairway       | ⑮ Southeast Asia Exhibit | ㉓ Coin Lockers                        |
| ⑥ Introduction (Lobby) | ⑯ Rest Area              | ㉔ Restaurant                          |
| ⑦ Oceania Exhibit      | ⑰ Central Asia           | ㉕ Auditorium                          |
| ⑧ Americas Exhibit     | ⑱ North Asia             |                                       |
| ⑨ Europe Exhibit       | ⑳ East Asia Exhibit      |                                       |
| ⑩ Exhibit Patio        | ㉑ Hall for New Exhibits  |                                       |



## Oceania

Oceania is the world of the Ocean. Since the Stone Age, the islands of the Pacific have, through the use of canoes and long-range navigation, come to share a common culture, dispersed over a large area. The material culture of these island environments reflects a limited resource endowment. Nevertheless it is rich. The masks and sacred images tell the story of the traditional spiritual life of the peoples.

### Themes:

Oceanian Peoples

Life-style

World of Rituals

**Principal Display Items:** stick charts (OS 0022-28), decorations from canoe prow (0038-40), paddles (0041-68), fishing canoes (0071-73), fish traps (0076-82), scoop nets (0087-92), fish hooks (0103-32), digging sticks (0136-38), vessels for food storage (0147-252), tapa [bark cloth] (0259-62), stone axes and adzes (0396-416), musical instruments (0492-514), weapons (0525-702), Samoan house (0703), Maori storehouse (0704), gable from Palauan men's house (0725-30), sacred images (0731-94), masks (0753-857)



• Mask [New Guinea]



• Still [Central France]

## Americas

On the continents of North and South America distinctive cultures have been formed and developed over thousands of years. The ancient Aztec, Maya, and Inca civilizations, which gave rise to unique social organizations, religions and arts, constitute the pinnacles of this native cultural development. Even now in the extreme north, Pacific Northwest Coast and the Amazon, for example, various peoples have preserved distinctive life-styles adapted to their environments.

### Themes:

Ancient Civilizations

Traditional Native Cultures

Contemporary Native Cultures

**Principal Display Items:** pottery of the ancient Andes (AM 0005-24), Aztec calendar stone (0026), Mayan relief (0027), Chilkat blanket (0124), Eskimo cold weather dress (0160-61), totem poles (0172-74), carved wooden bowls (0181-84), decorated copper plates (0195-97), rug (0207), slings for stone throwing (0212-13), ceremonial staff (0214), decorated ceremonial housefront (0230), backstrap looms (0233-34), jars (0254-56), bows and arrows (0276-94), spears (0300-01), manioc presses (0305-08), shrunken head (0331), stamping tubes [musical instrument] (0334-37), bull-roarers (0345-46), dancing masks (0357-60)



• Decorated copper plate [British Columbia]



• Maternity figure nursing a child [Ghana]

## Europe

In Europe, many different peoples have developed various cultures since ancient times. Mixed farming, represented by dairy and wheat production, has formed the basis of European modes of life, with the addition of specialized activities such as wine-growing, in certain areas. The traditional cultures of the various ethnic groups are reflected in their wood and stone dwellings, articles of daily life, and clothes.

### Themes:

Mixed Farming and Food Processing

Daily Life

Gypsies

**Principal Display Items:** wheat scales (YO 0005), butter tub (0026), butter churn (0027), still (0125), table and chairs (0127-30), cradle (0146), couch (0141), the process of making wooden shoes by hand (0132-34), iron bed warmer (0148), carpet (0149), water tank for hand washing (0156), birch-bark products (0160-61), Gypsy handicrafts (0173-81), Gypsy wagon (0192), Chairs and stools (0202-9)

## Africa

Several distinct cultures have been fostered in the world of black Africa, which extends southward from the Sahara Desert. Set in savannah or jungle, the various peoples have, in the past, formed several kingdoms, and developed cultures based on mixed grain farming and pastoralism. From sculptures and masks to articles of daily life, these people have produced distinctive forms of plastic arts.

### Themes:

History of African Civilization

African Peoples and Life-styles

The World of Ritual and Plastic Arts

Life Style and Culture of the Coastal Swahili

Ethiopian Culture

**Principal Display Items:** maternity figure nursing a child (AH 0003), earthen images for magical purposes (0006), pipe (0008), gold weights (0015), necklaces (0021-26), ritual skirt (0035), calabash products (0186-244), hand hoes (0246-58), picture cloth (0326), screen (0514), beds (0515-16), chairs (0518-19), musical instruments (0520-38), sculptures (0544-613), masks (0618-712), *injela* table (0739)

## West Asia

West Asia, a dry region which fostered the oldest known civilizations, has been the scene of interchange among many different peoples. Cities came into being in this area from very early times, and traditional modes of city life have endured to this day. Several of the world's great religions arose here, and at present Islam is the basic foundation for the spiritual life of the West Asian peoples.

### Themes:

Agricultural and Pastoral Life

City Life

The Islamic World

**Principal Display Items:** ox cart (NI 0004), plows (0006-09), threshing equipment (0012-13), scythes (0039-41), wooden finger covers for wheat harvesting (0042-46), saddles (0079-80), sheep bells (0086-100), spindles (0106-10), felt mantle (0115), musical instruments (0117-25), guns (0127-32), ceiling painting (0134), clothing (0169-95), caps (0200-18), marionettes (0246-94), lamps (0298-300), water jugs (0317-22), samovar (0337-45), blocks for printing cotton (0346-50), tiles (0351-54), pen holders (0356-59), Qur'an (Koran) stand (0362), priest's alms bowls (0368-71)



• Qur'an and Qur'an stand [Afghanistan]



• Rubab [Afghanistan]

## Music

Sound is closely related to civilization. Throughout the life and activities of the various peoples, sound becomes music. In the cultures of Asia and Africa, there are many types of music based on systems which differ from that of European music. Here, several types of instrumental ensembles from Asia, such as the Indonesian *Gamelan* and the Japanese *Gagaku*, are introduced.

### Themes:

Musical Instruments of Various Peoples

Japanese Musical Instruments

**Principal Display Items:** Biwa [Japanese lute] (ON 0001), instruments of Iran (0003-05), instruments of Afghanistan (0007-12), instruments of India (0014-16), instruments of the Korean Peninsula (0018-29), instruments of the Gamelan [Indonesia] (0064-117), instruments of Gagaku [Japanese court music] (0122-38), instruments used in Kabuki accompaniment (0155-82), Japanese drums (0183-91), instruments of Sankyoku [Japanese musical trio] (0192-95)

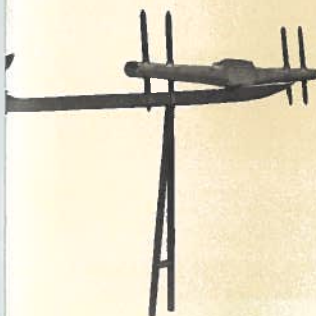






● Chū-yung-kuan inscription [China]

ghanistan]



## Linguistics

Language is the key to culture. It has been mankind's most valuable tool in developing social life, widening the scope of communication, and in accumulating the products of the intelligence.

### Themes:

Various Writing Systems  
Thinking about the Japanese Language  
Articulatory Analysis of Vocal Sounds  
Types of Word Order

**Principal Display Items:** Inca knotted cord (GE 0002), Hyakuman-to Dharani [oldest printed letters in the world] (0004), hieroglyphic (0006), Rosetta Stone (0071), linguistic map (0075).

**Electronic Display Equipment:** A voice recorder demonstrates dialectal patterns from various regions of Japan; a computerized machine displays the articulations for pronouncing vowels and consonants; and another computerized machine contrasts and compares word order patterns for thirty-two languages.

## Southeast Asia

Life in Southeast Asia is mainly supported by rice cultivation. From ancient times various techniques for cultivating rice have been developed, and the peoples dependent on this staple enjoy a colorful and abundant way of life. In addition, historical festivals and performing arts continue to be practiced in all parts of Southeast Asia. In these colorful forms can be seen the mixture of traditional and imported cultures.

### Themes:

Culture of Rice Cultivation  
Life-style of Mountain Dwellers  
Realm of Faith  
Festivals and Performing Arts  
The Influence of Southeast Asian Culture on Japan (map)

**Principal Display Items:** plows (TO 0003-08), irrigation waterwheels (0025-26), granary (0033), sickles (0035-45), shoulder baskets (0125-48), ox cart (0190), fishing gears (0224-69), clothing (0280-83, 0311-14, 0813-18), bronze drums (0636-37), carved pillar (0638), guardian spirit shrine (0647), lacquered case for manuscripts (0682), puppets (0690), *barong* dance costumes (0701-03), dancing bamboo horses (0705-08), kites (0710)

## Central Asia North Asia East Asia

East of a line connecting the Ural Mountains with the Caspian Sea live pastoralists, together with agriculturalists who dwell in oases. Further north, inhabiting severely cold regions, are people who use advanced techniques for fishing, hunting and gathering. Lying off the east coast of the Asian mainland, the Japanese archipelago extends roughly from north to south, and includes various natural settings that range from deep snow areas to the semi-tropical zone. Nurtured in these environments and influenced by neighboring societies, various regional cultures have developed throughout Japan.

### Themes:

Pastoral and Farming peoples of Central Asia  
Pastoralism among the Mongols  
Hunting and Fishing Peoples of North Asia  
Shamanism in North Asia  
Fishing, Hunting and Farming among the Ainu;  
Traditional Ainu Sacrificial Ceremony  
Festivals and Performing Arts in Japan  
Japanese house, Farming and Transportation Equipment  
Hunting and Mountain Work  
Clothing, Footwear and Headdress  
Implements used in Daily Life  
Everyday Folkcrafts  
Boats and Fishing Gear

### Principal Display Items:

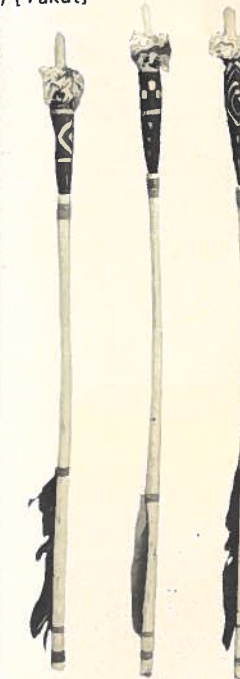
Kazakh tents (TK 0095), Mongol tent (0121), bride's costume (0051-52), personal ornaments (0055-88), carpet (0090-94), smoking implements (0108-14), musical instruments (0115-19), still for making *kumiss* [horse-milk alcohol] (0203-06), harness (0260-64), implements used for the practice of lamaism (0239-52), shaman's costume (0455), spirit idols (0431-54), hunting implements (5181-96) (*North and Central Asia*); houses (HI 5001), leather armor (5291), canoe (5237), *pasuy* [a small symbolic device used when drinking] (5369-98), *nusasan* [altar] (5345) (*Ainu traditional culture*); *Neputa* [float from Aomori Prefecture] (2030), magical ropes (2297-2339), *mikoshi* [portable shrine] (2402), *ema* [votive tablets] (0929-78), dolls (0998-1019, 2911-3156), masks (1002-73), *hanayasa* [festival headdress] (2721-99), *hikiyama* [float] (1076), *Yagorodon* [legendary giant on festival-car from Kagoshima Prefecture] (1077), models of four main types of traditional house [from Nara Prefecture, western Japan (0228); Toyama Prefecture, central Japan (05631); Iwate Prefecture, northern Japan (0749); and Okinawa, southern Japan (0003)], thatched house from Akiyama Village, Nagano Prefecture (0393), farm implements and transportation equipment (0231-391), devices for coping with snow (0448-501), clothing and utensils for daily use (0603-0717), *kokeshi* dolls (0754-893), equipment for making traditional Japanese paper (3842-61), tableware and food containers (3401-822), boats and fishing gear (0041-227, 4001-71), artifacts from Okinawa (0014-43) (*Japanese culture*).

## Hall for New Exhibits

Since it is NME policy not to change the exhibits periodically, new exhibits are displayed in this Hall for about six months.



● Unty or torbasy (boots) [Yakut]



● Arrow used in the bear-sacrifice ceremony [Hokkaido, Japan]



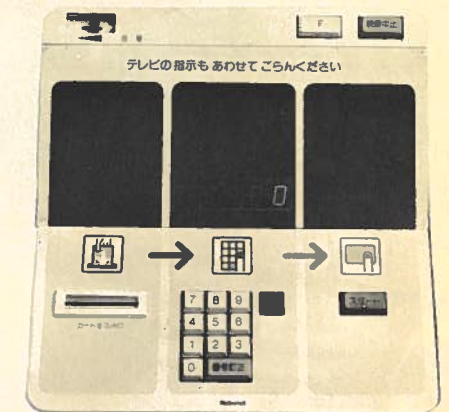
● Back carrier [Yamagata, Japan]

## Videotheque

The Videotheque (automatic audio-visual transmission device), which employs a system developed by this museum, provides visual displays giving an actual view of the life-styles of the world's many peoples, as well as audio presentations introducing various types of music and languages. For the visual display, some 600 videotape cassettes running up to fifteen minutes each have been prepared, and the audio presentation consists of approximately 180 kinds of music and language cassette tapes of about three minutes each. Booths are provided where visitors may freely select the tape of their choice from a program book, and operate the device themselves.

### Principal Content Items:

**Visual:** livelihood, food, clothing and housing; festivals, entertainment  
**Audio:** folk songs, narrative arts, theater and dance music, languages of the world



● Operation panel

### Requests concerning use of Videotheque

1. When the visitor enters the booth and sits down, the lights and the operation panel turn on automatically. Please operate the Videotheque according to the directions on the television screen or operation panel.
2. Do not tear or fold the entrance ticket, as the card for utilization of the Videotheque is printed on the back of it. Groups must obtain Videotheque cards from the person in charge of the Videotheque.
3. One Videotheque card may be used for one program. Visitors wishing to play more than one program may request additional cards from the person in charge. The request may be refused at crowded times.
4. When leaving the booth, please be sure to remove the Videotheque card from the slot.



**MAN-COMPUTER  
INTERACTION:  
HUMAN FACTORS  
ASPECTS OF  
COMPUTERS AND  
PEOPLE**

**Brian Shackel, editor**

*the long-awaited and  
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of the NATO Advanced Study Institute  
on Man-Computer Interaction (MCI)  
Mati, Greece  
September 5-18, 1976*

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# MAN-COMPUTER INTERACTION: HUMAN FACTORS ASPECTS OF COMPUTERS AND PEOPLE

Brian Shackel, editor

A milestone in the study of human-computer interaction over the past decade, this historic, two-week long conference served to define many of the central issues for the then still emerging field and to identify critical research needs. The invited participants included leading scientists from Europe and North America (15 countries) -- all eminent in their fields -- whose pioneering work was stimulating the recognition and understanding of user needs.

The present book, edited by the Institute's chairman, Prof. Brian Shackel, Director of the Human Sciences and Advanced Technology (HUSAT) Research Group at Loughborough University of Technology (England), contains revised versions of selected presentations given at the Institute and at last brings together in a single volume numerous papers that, as separate unpublished reports, have been widely acclaimed for their exemplary or seminal character. Selected presentations range from accounts of basic empirical research (Chapanis) and empirical surveys (Damodaran, Eason) through reports on investigations of particular problems which yielded suggestive generalizable results (Fitter, Baker, Spence, Bernotat) to a theoretical construct for man-machine problem-solving (Sackman). The focus throughout, as Shackel notes in the Introduction where he establishes an elegant framework for studying human interaction with computers, was on human issues rather than computer issues, so that, while the papers represent a variety of disciplines and emphases, all share a common interest in an integrated approach to total system performance.

Specific subjects addressed in the 21 papers collected here include: an overview of problems and realities of MCI (Shackel); the design of the workplace (Östberg); paradigms for user modeling, training, and support (Baker, Annett, Damodaran); methodologies for understanding and affecting the impact of computer use on organizations (De Brabander et al., Bair) and on groups within organizations (Eason, Margolies); identification of user needs, both specialized (Stewart, Spence, Ivergård) and general (Palme, T.H. Martin); human-to-human communication (Nickerson, Chapanis) and man-machine communication (Evans, Sime); task differentiation and control (Fitter, Bernotat); and man-machine problem solving (Sackman). A number of the papers touch, as well, upon the larger social, psychological, and political implications of the man-computer relationship.

In all, this volume at once demonstrates the multidisciplinary nature of the human-computer interaction field and shows the need for close collaboration among its many constituent specialties; in aid of the latter, addresses are included for all participants, in the hope that readers of the Proceedings will continue the interactive communication begun at the Institute. A copy of the complete Institute program is also included.

MAN-COMPUTER INTERACTION: HUMAN FACTORS ASPECTS OF COMPUTERS AND PEOPLE is available for immediate shipment. Just fill out this form and send it with a check for \$63.00 (US) to THE REPORT STORE, P.O. Box 3708, Lawrence, Kansas 66044, U.S.A. Price includes shipping and handling.

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OSAKA

Le Pen

OSAKA 19.8.82 - 11 h.15 - 12 h.35

'80' 27' pour chacun

Programme: HOW HAS SOCIETY RECEIVED ROBOTS ?

Case 1 : in EUROPE.

Téleg. SOCIETY'S ACCEPTANCE OF ROBOTS IN FRANCE

Réponse - ROBOTS IN EUROPE.

JAPAN

REG. SER

*Industry*  
*Quality Circle*  
GOLDBOX  
*grand m*  
FLOWERS and TEA  
*wife*  
Robots  
*moving*

INTRODUCTION

- English
- Difficulty to prepare a text in a very short time (5 days before I <sup>left</sup> France).

- Reluctance toward the notion ~~the~~ of acceptance. I am not a psychosociologist but
  - an ergonomist and cognitive psychologist
  - an anthropologist
  - a part-time specialist of SCIENCE, TECHNOLOGY and SOCIETY

- Difficulty to speak about the subject too vague (what parts of the Society?) and too limited (France) I will speak merely about production part of the society and I will speak of Europe.
- Difficulty to accept <sup>some aspects</sup> the background of the Symposium *introduction paper*.

OUR BACKGROUND

- Big program of french government on "new technologies"
- Big program of E.E.C. (Economic European Community) on "new technologies" with cooperative research.
  - New technologies and worker stress
  - Robots and night shift in automobile industry
  - New types of telecommunications.

10'

Small panorama of Europe

- Great inequalities between countries : in fundamental research, technology research and development. Different expressions: military, and space technology, nuclear energy, oil research, computers and microelectronics production, manufacturing <sup>use</sup> technology (automatised chemistry, transfer machines) medical technology - Story of gas ducts : what is american <sup>is</sup> not electronics but turbines
- great differences in economy and finance politics : dependance to USA or not - USSR and East Germany.

- great differences <sup>ences</sup> in social politics :
  - country closed to migration : Sweden like Japan <sup>has a</sup> strong robotization
  - country open to migration : France, Germany, G.B. doubled foreign workers in 10 years (France 2 → 4 millions) slow robotization. Recent change.

*difficult social problems (not slaves!!) But good for international relations*

15'

Problems in robotization and computerization

- Computers, freedom, citizen right, system of power
- Computers, knowledge, control of the keys, Disparition of easy access <sup>to sources</sup> : <sup>your</sup> journals, books, loose of mental techniques: computation, <sup>long term</sup> ~~easy~~ term memory.
- Computers and organization. Reinforcement of old social structures "Computers says ..." *to justify old thinkings.*
- Computers and limits of mathematical modeling *of human behaviour*
- Computers and telemasurement : decision on the uncertain - *Symbols*
- Computers and health : very small effects - High costs.
- Computers and employment : is it a technological crisis or a crisis of distribution of areas of production and by the way a political crisis.
- crisis of social progress : too quick. People think that everything is socially possible.

20'

A special look on shopfloor and office

- modelisation of human movement : painting
- mental overload in plants and offices *+++ IFRA Books*
- robots and robotized systems : frequency of stops

checking

- coordination between computers, mechanics and hydraulics: it works on planes why not in factories? *lot* of reasons.
- difficulties of checking and maintenance
- so low working time in nuclear <sup>re</sup> treatment factories  
10 % France, 15 % Japan.

25'

Difficulties par general population

- a special problem : the coded language. *Future of psycholinguistics*

OSAKA 19.8.82 - 11 h.15 - 12 h.35

80' 27' pour chacun

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#### Background of the symposium

- big program of french go~~v~~vernment
- Oversale of computers and robots
- Universal technology (p. 3) ".... created the cultures unique to each race. Recently, however, the trend has been for the cultural traits of one race to be immediately incorporated into the cultural sphere of another. Therefore, it can be said that the future effect of micro-électronic technology depends upon how each race incorporates it into its own society.
- Repetition of old story of industriel revolutions.
  - steam
  - mechanics
  - electricity
  - oil
  - nuclear/energy



- Anthropotechnology : incorporation - rejection of technology in an existing structure - that is not racial
- Now biology much more important for civilization than microelectronics : vaccinations, antibiotics, antiparasitosis, female pill, production of food.

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- Great inequalities between countries : in fundamental research, technology research and development. Different expressions: military, and space technology, nuclear energy, oil research, computers and microelectronics production, manufacturing <sup>and</sup> technology (automatised chemistry, transfer machines) medical technology - Story of gas ducts : what is american not electronics but turbines
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- Computers, freedom, citizen right, system of power
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- <sup>journal</sup> ~~books~~, books, loose of mental technique : computation, <sup>long term</sup> ~~easy~~ memory.
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### A special look on shopfloor

- modelisation of human movement : painting
- mental overload in plants and offices
- robots and robotized systems : frequency of stops



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- automatization in food industry  
in railways
- computerization in journals  
news agencies  
oil refineries  
national census registration system  
insurance companies
- robotization in car industry

### BACKGROUND OF THE SYMPOSIUM

- Is there not an oversaturation of computers and robots inside the general research for productivity?

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- Repetition of old story of industrial revolutions.

- steam
- mechanics
- electricity
- oil
- nuclear energy

- Anthropotechnology : incorporation - rejection of technology in an existing and long lasting cultural and social structure related to geography, history, economics ... that is not racial

- Now, biology is much more important for changes in civilization than microelectronics : vaccinations, antibiotics, anti parasitosis, contraceptive pills, production of food.

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3

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- great differ<sup>ences</sup> in social politics :
  - country closed to migration : Sweden like Japan <sup>has a</sup> strong robotization
  - country open to migration : France, Germany, G.B. doubled foreign wokers in 10 years (France 2 -> 4 millions) <sup>slow</sup> robotization. Recent change.

## Problems in robotization and computerization

- Computers, freedom, citizen right, system of power
- Computers, knowledge, control of the keys, Disparition of easy access <sup>to sources:</sup> <sup>long term</sup> journals, books, Loose of mental techniques: computation, <sup>early</sup> tem memory.
- Computers and organization. Reinforcement of old social structures "Computers says ..." <sup>to justify old thinkings.</sup>
- Computers and limits of mathematical modeling
- Computers and telemasurement : decision on the uncertain -
- Computers and health : very small effects - High costs.
- Computers and employment : is it a technological crisis or a crisis of distribution of areas of production and by the way a political crisis.
- crisis of social progress : too quick. People think that everything is socially possible.

## A special look on shopfloor

- modelisation of human movement : painting
- mental overload in plants and offices
- robots and robotized systems : frequency of stops
- coordination between computers, mechanics and hydraulics: it woks on planes why not in factories? <sup>lot</sup> of reasons.
- difficulties of check<sup>ing</sup> and maintenance
- so low working time in nuclear re<sup>me</sup>nt factories  
10 % France, 15 % Japan.

checking

## Difficulties par general population

- a special problem : the coded language. <sup>Future of psycholinguistics</sup>



Arupat SOYO 3,800 ¥  
SOYO - SEMRI 2,500 ¥

Osaka Symposium on the Contribution of Microelectronics  
to the Enhancement of Human Life

National Museum of Ethnology

August 19th and 20th, 1982

Robots, automated machinery, and data processors (including household electric apparatus, vending machines, and robots for medical treatment, aviation and industrial use) are the products of advanced microelectronics; their present influence upon human life is enormous. How can we best utilize these microelectronic machines in serving human beings and their societies? We would like to seek out new possibilities.

Host

Japan Society of Human-Robotics

President: Kiyoji Asai  
(Professor, University of Osaka Prefecture)

Osaka Symposium-Steering Committee

Chairman : Toshihiro Tsumura  
(Professor, University of Osaka Prefecture)

Advisory Board

Tadao Umesao (Director, National Museum of Ethnology)  
Sakyo Komatsu (Author)  
Hidetoshi Kato (Professor, Gakushuin University)  
Sadao Sugiyama (Professor, Kwansei Gakuin University)  
Kaoru Ando (Advisor, Fujitsu, Ltd.)  
Ichiro Kato (Professor, Waseda University)  
Saburo Tsuji (Professor, Osaka University)

(No special order is observed.)

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(Includes those still under negotiation.)

Ministry of International Trade  
and Industry

The Science Council of Japan

National Museum of Ethnology

Osaka Prefecture

Osaka City

Osaka Chamber of Commerce and Industry

The Ethnology Foundation of Japan,  
Senri Office

The Yomiuri Shimibun, Osaka Head Office  
Yomiuri Telecasting Corporation

(No special order is observed.)



With the Cooperation of:

The Foundation of Osaka Science  
and Technology Center

Kansai Institute of Information  
Systems

Kansai Productivity Center

The Japan Ergonomics Research Society  
Society of Instrument and Control  
Engineers

Japan Association of Automatic Control  
Engineers

Information Processing Society of  
Japan

Society of Bio-mechanism

Japan Industrial Robot Association

(No special order is observed.)



## Osaka Symposium on the Contribution of Microelectronics to the Enhancement of Human Life

With the recent radical development and widespread use of micro-electronic parts, computers have become increasingly more compact, while increasing in capacity. This has also permitted systems of all types to be computerized and automated; as a result, we are now in the age of microelectronics.

Such technical advances greatly effect our society; their impact cannot be ignored. Ever since the latter half of the 1970's the advantages and disadvantages of microelectronics have been argued heatedly. On one hand, it is seen as a revolutionary new technology which will free the human race from the drudgeries of everyday life and bring new and increased prosperity, while on the other hand, such advances are seen as the cause of unemployment and low morale, therefore representing a step back in social progress. There is no consensus on these views at present.

Since the beginning of history, there has always been a reluctance to accept new technologies in their developmental stage, since they involve myriad unforeseeable problems. We can therefore perhaps view these arguments against microelectronics as a continuation of such tendencies. In Japan, computers have infiltrated our lifestyles to an astonishing degree, and are being put to a wide range of uses. The degree to which industrial robots and automated equipment have been developed and introduced make the Japanese manufacturing sector one of the most advanced in the world. The achievements of microelectronics are thus finding increased acceptance in Japanese society. Good examples of this can be seen in the automation of office procedures, communications networks, aircraft and other transportation systems, as well as in the systemization of data in medical engineering.

Since the beginning of history, man has made tools, developed machines, refined his living environment and [created the cultures unique to each race. Recently, however, the trend has been for the cultural traits of one race to be immediately incorporated into the cultural sphere of another. Therefore, it can be said that the future effect of micro-electronic technology depends upon how each race incorporates it into its own society.] It also follows that one of the most vital challenges facing man today is to know himself and the true state of the new technologies of today, in order to determine what they mean to him.

This Symposium is planned for around August 1982, when ergonomists from all over the world will be present to attend the 8th Congress of the International Ergonomics Association (IEA '82) to actively exchange views on microelectronic developments and their implications for mankind so as to determine our choices for the future.



## General Information

1. Time : August 19th (Thursday) and 20th (Friday), 1982 (2 days)
2. Place : National Museum of Ethnology  
10-1, Expo Grounds, Senri, Suita City, Osaka 565, Japan
3. Fee : US\$100  
(On-site registrants are requested to pay US\$100 in Japanese Yen.)

### 4. Application

Please fill out the enclosed application and send it to the Office of Osaka Symposium.

Also, please pay the above-stated fee to one of the following accounts:

<Dealing banks>

- Sales Department, Head Office of the Sumitomo Bank, Ltd.  
Account Number: 101-430827
- Osaka Branch, the Bank of Tokyo, Ltd.  
Account Number: 060-385832

<Account name> ... ordinary deposit

"Osaka Symposium of Human-Robotics  
The Ethnological Foundation of Japan, Senri Office"

- (Notes)
1. As payer on the money order, please fill in the name of person who will actually attend the Symposium, insofar as possible. When the fee is paid under the name of the organization (company, university, etc.), please fill in the name of the attender as well.
  2. Payer is responsible for fee payment handling charges.
  3. When your payment is made near the date of the Symposium, please take a copy of your payment receipt with you for confirmation when registering.

### 5. Registration Card/Receipt

Upon receiving your application and fee payment, the Office will send you a registration card/receipt. Please take the registration card with you, for easy registration on the day of the Symposium.

### 6. Cancellation

When you wish cancel after having paid your fee, please inform the Office in written form.

The conditions for refunding are as follows:

Cancellation before August 1st:  
Half of the fee will be repaid.  
(However, we will send you the text.)

Cancellation after August 1st:  
No repayment  
(However, we will send you the text.)



7. Addressee/Inquiry

Office of Osaka Symposium  
The Ethnological Foundation of Japan, Senri Office  
1-1, Expo Grounds, Senri, Suita City, Osaka 565, Japan  
TEL: 06-877-8893 (Rep. No.)



Hotel Accommodations

The Organizing Committee has appointed the Japan Travel Bureau, Inc. (JTB) as the official travel agent for the symposium. Those who wish to apply hotel accommodation are requested to complete the enclosed form and send it to JTB directly. A special discounted room rates will be available at Senri Hankyu Hotel and Toyo Hotel which are close to symposium hall as follows:

Hotel	Single/bath	Twin/bath
Senri Hankyu Hotel	¥13,000	¥12,000
Toyo Hotel	¥13,000	¥12,000

\* The above rates will include breakfast, tax and service charge and also transportation service between symposium hall and hotel on August 19 and 20.

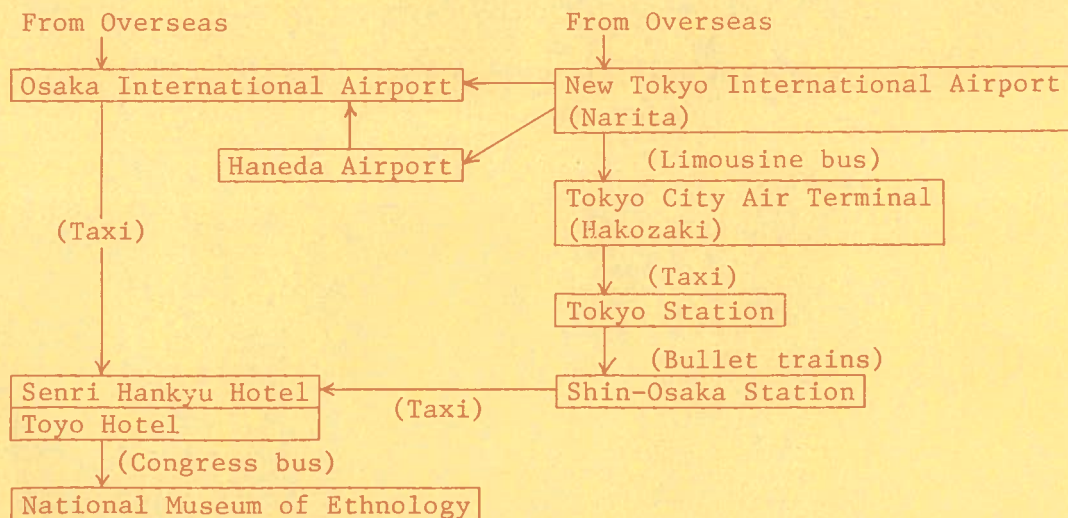
Reservation for hotel accommodation will be confirmed directly by JTB on receipt of Form B accompanied by a deposit of ¥10,000 per person. The confirmation will include information about the rooms reserved for participants.

How to Get to Osaka City

Persons arriving at Tokyo International Airport can reach Osaka by one of the following means:

By air : Regular local flights operated frequently from Tokyo (Haneda airport) to Osaka (50 minutes).

By rail: Japanese National Railways (JNR) super express trains, or "Bullet trains" leave Tokyo Central Station every 15 minutes for Shin-Osaka Station. The journey takes about 3 hrs and 30 minutes.





### Passports, Visas and Vaccinations

Every foreign visitor entering Japan must be in possession of a valid passport. Delegates from countries requiring visas should apply to the Japanese Consular Officers or diplomatic missions in their countries prior to their departure. Visas are valid for two months for tourists, and 15 days for persons "in transit". A visa is not necessary for citizens of the following countries.

Argentina	Austria	Bangladesh
Belgium	Canada	Chile
Colombia	Costa Rica	Cyprus
Denmark	Dominican Republic	Finland
France	Germany (Fed. Republic)	Greece
Guatemala	Honduras	Iceland
Iran	Ireland	Israel
Italy	Liechtenstein	Luxembourg
Malta	Mexico	Netherlands
New Zealand	Norway	Pakistan
Peru	Portugal	El Salvador
San Marino	Singapore	Spain
Surinam	Sweden	Switzerland
Tunisia	Turkey	United Kingdom
Uruguay	Yugoslavia	

No special vaccinations are necessary unless a visitor is entering Japan within 14 days of being in a smallpox infected area, in which case he must possess a valid international certificate of vaccination against smallpox. A cholera certificate will also be necessary if coming from an infected area. For details, participants are advised to contact their local travel agents or carriers.

### Foreign Currency Exchange

It is highly recommended that the participants bring a minimum of ¥5,000 in cash from the airport. (Foreign currency can be converted into Japanese yen at the bank of the airport.)

There are several bank offices within walking distance of the Senri Hankyu Hotel and Toyo Hotel, but no offices near the symposium hall. Open hour of the city bank offices is from 9:00 a.m. to 3:00 p.m. on weekdays and from 9:00 a.m. to noon on Saturdays. They are closed on Sundays and National holidays. Exchange is also available at the cashier of the hotel (24 hours open.)

### Weather and Climate

The average temperature and humidity of August in Osaka are 27°C and 70%, respectively. The symposium hall and hotels are of course air-conditioned.



### Social Events

For all the participants and their family members of the symposium, the following social events are planned by the Organizing Committee. Those who wish to attend the following excursion are requested to complete the application form (Form B) and send it to the JTB Kyoto Office.

- 1) Excursion No. 1                      on August 21, Saturday  
Fee: ¥10,000/person

Full-day excursion to Kyoto city which is the first permanent capital of Japan. This course will include Nishijin Textile Center, Nijo Castle, Heian Shrine and Shoren-in Temple (Green tea and "Koto" music will be available inside of the garden.) Lunch will be served at beautiful Japanese Restaurant.

(This excursion is the same as described in IEA '82 Final Announcement.)

- 2) Excursion No. 2                      on August 21, Saturday  
Fee: ¥9,500/person

Full-day excursion to Nara city which is an ancient capital of old Japan. This course will include Deer Park, Todaiji Temple (biggest Buddha Image), Kasuga Shrine and Kofukuji Temple. Lunch will be served at Nara Hotel.

### Official Agents for IEA'82 and Osaka Symposium

- (1) Carrier: The Organizing Committee has appointed Japan Air Lines (JAL) as the official carrier for IEA '82 and Osaka Symposium.

(2) Travel Agent

Domestic: Japan Travel Bureau, Inc. (JTB)

Tokyo: 13-1, Nihonbashi 1-chome, Chuo-ku, Tokyo 103  
Tel: 03-271-2346

Kyoto: Higashi Shiokoji-cho, Shimogyo-ku, Kyoto 600  
Tel: 075-361-7241

Overseas: (From Europe) MEON TRAVEL AGENCY, 32, High Street,  
Petersfield, Hampshire, England  
Tel: 0730-4011

(From U.S.A.) GARBER TRAVEL, 1406 Beacon Street,  
Brookline, Mass. 02146, U.S.A.  
Tel: (617) 734-2100

- ◎ The carrier and the travel agents specified above are willing to provide you with information on group flight, etc. for IEA '82 (Aug. 23 ~ 27, Tokyo) and this Symposium.



Program (1)

August 19th (Thursday)

Registration (9:00 ~ 10:00 in front of the Lecture Hall; please take your registration card with you)

Opening Ceremony (10:00 ~ 10:20)

- Opening address:
- Kiyoji Asai  
(President, Japan Society of Human-Robotics)
  - Tadao Umesao  
(Director, National Museum of Ethnology)

Keynote Speech I (10:20 ~ 11:10)

"Robot Anthropology: Machinery as Partner"

by Sakyo Komatsu (Author)

When we review human history in terms of the relationship between tool/machine and human being, we notice that machinery has always been a capable assistant of human beings and has thus contributed to the realization of human dreams, though sometimes bringing hardship to their human "parents"; various current problems concerning robots will be reviewed, with the above fact in mind. Robots are in a way the children of human beings. They may sometimes be too strong to be controlled by their "parents". However, what do we hope our "children" to be, as "parents"?

Reports (11:15 ~ 12:35)

"How Has Society Received Robots?"

- Case 1: In Europe  
by R. G. Sell (Official of British Labour Ministry)
- Case 2: In the U.S.A.  
by D. Thompson (Professor of Stanford University)
- Case 3: In Japan  
by Yukio Hasegawa (Professor, Waseda University)

Break (12:35 ~ 14:15)



Workshops (Introductory addresses: 14:20~15:20, Panel Discussion:  
15:40~16:40)

◎ Workshop A "Robots and Human Beings"

— The Future of Automated Machinery —

- Chaired by : Ichiro Kato  
(Professor, Waseda University)
- Introductory address A<sub>1</sub> : Saburo Tsuji  
(Professor, Osaka University)
- Introductory address A<sub>2</sub> : Hiroyuki Yoshikawa  
(Professor, the University of Tokyo)
- Introductory address A<sub>3</sub> : D. Thompson  
(Professor, Stanford University)

- [
- Optimal System and Adaptive System
  - FMS (Flexible Manufacturing System) and Metabolic System
  - From Coexistence and Collaboration to Life Together
- ]

◎ Workshop B "The Computer and Daily Life"

- Chaired by : Kaoru Ando  
(Advisor, Fujitsu, Ltd.)
- Introductory address B<sub>1</sub> : Hiroaki Terada  
(Professor, Osaka University)
- Introductory address B<sub>2</sub> : Ryoichi Mori  
(Professor, Tsukuba University)
- Introductory address B<sub>3</sub> : R. Hirsch (IBM)

[Computers are currently being developed to be more compact and more decentralized in function. They are incorporated into personal data processors, automated machinery and household electric appliances and have come to be very common in our daily life. Under such circumstances, we would like to review the roles of computers and human beings, and examine the future role of computer.]

◎ Workshop C "Technology and Art"

- Chaired by : Hidetoshi Kato  
(Professor, Gakushuin University)
- Introductory address C<sub>1</sub> : Takeshi Moriya  
(Associate Professor, National Museum of Ethnology)
- Introductory address C<sub>2</sub> : Shigeharu Sugita  
(Associate Professor, National Museum of Ethnology)
- Introductory address C<sub>3</sub> : Otoichi Kitamura  
(Professor, Kyushu Institute of Design)



As the relationship develops between machines and human beings, not only technology but also artistic considerations have come to be required in the design of machinery. It means that from now on, the preference will be for machinery which harmonizes with human feelings. The physical capabilities of robots and computers, although machines, have begun to approach those of human beings. On the other hand, how artistic can technology become?

Reception (17:00 ~ 19:00 at Reception Hall)

All participants will be invited.



Program (2)

August 20th (Friday)

Keynote Speech II (10:00 - 10:50)

"Microelectronics and the Challenge to Human Beings"

by A. Chapanis (Former President of IEA and Professor of  
Johns Hopkins University)

Note) IEA: International Ergonomics Association

As the microelectronic technology progresses, fields of application have also been widening, to include every aspect of human life. Many disputes as to the influence of robots on human society are heard, both optimistic and pessimistic. But, why do human beings confront the future of science and technology so enthusiastically?

Workshops (Introductory addresses: 11:10 ~ 12:10, Panel discussion:  
12:15 ~ 13:10)

◎ Workshop D "Human Beings and Aviation/Space Technology"

- Chaired by : Hidemaro Nagano  
(Advisor, Japan Air Lines Co., Ltd.)
- Introductory address D<sub>1</sub> : Isao Kuroda  
(Commander of Aeromedical Laboratory,  
J.A.S.D.F.)
- Introductory address D<sub>2</sub> : Hiroyuki Matsumiya  
(National Space Development Agency)
- Introductory address D<sub>3</sub> : Teruo Sawada  
(Professor, University of Osaka Prefecture)
- Introductory address D<sub>4</sub> : J. Lauber (NASA)

The advance in microelectronics is inseparable from that in aerospace technology. Microelectronics has accelerated space development and made flying safer. What should be the path followed by aerospace technology, if we are to create harmony among human beings and their surroundings.

◎ Workshop E "Medical Treatment and Technology"

- Chaired by : Masamitsu Oshima  
(Chairman of Directors, the Medical Information System Development Center)
- Introductory address E<sub>1</sub> : Hiroshi Inada  
(Assistant Professor, Osaka University)
- Introductory address E<sub>2</sub> : Kageyu Noro  
(Professor, University of Occupational and Environmental Health)



Introductory address E<sub>3</sub> : Yasuhisa Sakurai  
(Professor, Tokyo Women's Medical College)

Introductory address E<sub>4</sub> : Kazuhiko Atsumi  
(Professor, University of Tokyo)

The technological aspect of medical treatment has been progressing dramatically with the introduction of computers and robots, the systematization of data in medical engineering, and the utilization of artificial organs and limbs. To permit more advanced diagnosis, treatment, prevention and more satisfactory nursing and rehabilitation, while not neglecting the humanitarian aspect, we would like to discuss the possibility of further technological contributions to medical treatment.

◎ Workshop F "The Energy Industry and Safety"

Chaired by : Sakyo Komatsu (Author)

Introductory address F<sub>1</sub> : Yoji Umetani  
(Professor, Tokyo Institute of Technology)

Introductory address F<sub>2</sub> : R. Pearson  
(Professor, North Carolina State University)

Introductory address F<sub>3</sub> : (to be announced)

In developing the energy industry and solving future energy problems, robots shall be applied more actively in work at sites dangerous to human beings, including nuclear power reactors, coal mines, underground, seabed, and outer space. We would like to discuss the safety problems in energy development and the introduction of robots.

Break (13:10 ~ 14:35)

Reports from Workshops (14:40 ~ 16:15)

Each workshop (A, B and C on the first day, and D, E, and F on the second day) will report on its meetings.

Conclusive Address (16:15 ~ 16:45)

by Sadao Sugiyama (Professor, Kwansai Gakuin University)

Closing Ceremony (16:45 ~ 17:00)

Closing address: Kiyoji Asai  
(President, Japan Society of Human-Robotics)



## Agenda of Symposium

### August 19th (Thursday)

9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	7:00			
Registration	Opening Ceremony (Lecture Hall)	Keynote speech I (Lecture Hall)	Responses to robot intro- duction (Lecture Hall)	Orientation about lunch break and place for workshop	Lunch break	Workshops			Movement	Welcome Reception (Reception Hall)		
			Case 1: In Europe			Case 2: In the U.S.A.	Case 3: In Japan	Introductory address			(Coffee break)	Panel discussion
			A 1.2.3 (Lecture Hall)			B 1.2.3 (Meeting Room No.4)	C 1.2.3 (Meeting Room No.5)	Same as left				Same as left

### August 20th (Friday)

9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00				
Registration	Keynote speech II (Lecture Hall)	(Coffee break)	Workshops		Lunch break	Workshop Report				Closing Ceremony (Lecture Hall)		
			Introductory address	Panel discussion		Workshop A	Workshop B	Workshop C	Workshop D		Workshop E	Workshop F
			D 1.2.3.4 (Lecture Hall)									

English ↔ Japanese simultaneous interpretation will be performed at each meeting place.



FORM  
A

Osaka Symposium—Application

I apply for the participation in the Symposium.

Name: \_\_\_\_\_

Name of organization belonging to: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ (Extension) \_\_\_\_\_

◦ Fee  US\$100

◦ Payment

When I pay the fee through bank, I will use  the name of attendant/  
 the name of organization belonging to, as the name of payer.  
(Please check either blank.)

◦ Selection of workshops

August 19th  A  B  C  
August 20th  D  E  F

◦ Welcome reception (All Symposium attendants will be invited. However,  
please check for our information.)

Attend  Not attend

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Please send this form to the below.

Office of Osaka Symposium  
The Ethnological Foundation of Japan, Senri Office  
1-1, Expo Grounds, Senri, Suita City, Osaka 565







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500 TOKKO, NARITA-SHI, CHIBA-KEN JAPAN, 286-01 TEL: (0478)32-0032  
CABLE: HTLNIKKONRT TELEX: 3782165 JHSNRT J

Dr. Wisner:

Welcome to Osaka. I, Akiko Fukushima, will serve as the simultaneous interpreter for Osaka Symposium on the contribution of Microelectronics to the Enhancement of Human Life. I would like to know how you will present the papers. If you have prepared full spoken text, I would like to have it in advance. If not, I would like to know the outline and technical terms in advance. I am sorry to take your time, but please take contact with me to the following number.

17th ---- 03-675-0066

18th ---- 06-832-0313

I am looking forward to meeting you at Senri.

Sincerely yours,

Akiko Fukushima

Inter Group.

P.S. Please do not hesitate to call me up late at night.

We never forget how important you are.



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