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Symposium on Computers & Chinese Input/Output Systems Held Here

The First International Symposium on Computers and Chinese Input/Output Systems was held in Taipei under the auspices of Academia Sinica. More than 130 Chinese and foreign specialists attended the meeting.

Held against the backdrop of increasingly wide use of computers in Taiwan, the symposium focussed on new designs for I/O systems, and on the use of computers, especially minicomputers, for various problems in computer graphics, picture processing, pattern recognition and data communication.

Eleven sessions were held to discuss related topics including Chinese information processing systems, pat-

tern recognition, picture processing, Chinese input methods, new designs of computer systems, data communication systems, Chinese output methods and implementation, computer systems modeling and evaluation, computer applications, and algorithms and optimization methods.

A large number of papers on relevant topics were presented during each of the discussion sessions. A five-day excursion tour was arranged for foreign authors of the papers.

Held at the same time at Academia Sinica was an exhibition of Chinese input/output systems developed by Chinese engineers and scientists as well as foreign manufacturers,

including the locally developed mechanical keyboards.

The holding of the symposium was deemed timely as the Republic of China is eager to popularize the application of computers in coordination with her accelerated economic development. The trouble lies in the fact that the source data provided by the local business community are all in Chinese, so the results obtained through computer handling have to be expressed in Chinese. Therefore, development of a Chinese input/output system has become the main objective of joint research efforts by a number of government agencies and academic bodies. The National Science Council has given its full support to the research program.

(Abstracts of two of the papers presented at the symposium appear on Pages 2 & 4).

Two Short-term Visitors Expected

Two American scientists will come to Taipei next month for a brief stay under the ROC-US Cooperative Science Program.

The visitors are Dr. Shi Tsan Wu, professor of engineering of the School of Science and Engineering, the University of Alabama in Huntsville, and Dr. G. E. Thomas, associate professor of astro-geophysics of the same university.

They will be in Taipei in late September after attending the Second General Scientific Assembly of the International Association of Geomagnetism and Geophysics at Kyoto, Japan on September 9-21. They take the trip with a view to discussing with Chinese scientists over possibility of cooperation to make geomagnetic variations measurements coordinating with other worldwide stations.



Dr. Ta-you Wu, chairman of the Committee for Science Development, National Security Council, addresses the opening session of the First International Symposium on Computers and Chinese Input-Output Systems. The three-day symposium was held at Academia Sinica in the suburbs of Taipei August 14-16 with some 160 computer scientists and specialists attending.

The Feasibility of Using Chinese Phonetic Symbols in the Computer Input/Output System

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The overriding problem of computer input/output systems in the Chinese language seems to be the overwhelming number of the characters involved. The problem of character recognition and character production by computer is also a complicated process which goes beyond the limits of analysis by strokes. Besides, it involves the general configuration of the character, a task which is extremely difficult to accomplish with the use of a conventional keyboard operated device; the amount of coding and decoding required in translating characters to language codes, and vice versa also imposes a complex hardware demand. Indeed, few experts would even agree on the fundamental question as to whether the individual character must be the basic unit of entry and retrieval.

The use of a simplified I/O system based on the Mandarin Phonetic Symbols as proposed by this paper, is not only feasible but also practical. For it has the following advantages:

1. The system of Mandarin Phonetic Symbols was invented by the Chinese themselves some fifty-five years ago. Unlike existing romanization and latinization systems which at best can only approximate Chinese pronunciation, this set of symbols is derived directly from Chinese sounds; thus it offers the distinct advantage of reproducing Mandarin speech perfectly. The fact that by using this system the Republic of China on Taiwan has been able to achieve miraculous results of teaching millions of students, whatever their original dialects, to speak flawless Mandarin in the shortest time possible, further attests to the feasibility of adopting this system.
2. The use of Mandarin Phonetic Symbols in place of actual characters should drastically reduce

the number of keyboard entries down to a manageable level (about forty signals, or characters), a reduction which will allow the conversion to be executed by a conventional keyboard device. Each Mandarin Phonetic Symbol will be represented by a unique key symbol and a machine code, and each character will then be represented by a combination of two or three Phonetic symbols. Formation of character combinations and indication of tonal marks will be governed by the existing rules of general usage.

3. The one-to-one conversion via a conventional keyboard device makes the task both economical and relatively simple. Given a set of coding structures, a non-linguist could be taught a coding scheme in a short time.
4. With the adoption of Chinese language in computer I/O systems, the training of computer

specialists in Taiwan will no longer be as lengthy as it is today. Consequently, computer application will become more accessible to the users.

There are, naturally, certain intrinsic disadvantages in the application of the system of Mandarin Phonetic Symbols. First of all, it does not produce character output. Secondly, where homophone occurs, ambiguity follows. However, this phenomenon is not restricted to a phonetic system, and since Chinese characters usually have more than one meaning and the different meanings of a given character can be differentiated by their environments, the extent of ambiguity can therefore be reduced to a minimum.

While this approach is not intended to be the ultimate solution to the problem of Chinese character I/O system, it should nevertheless prove to be a highly practical interim step toward a more perfect system.

Foreign Physicians Complete Acupuncture Course in Taipei

Twelve physicians and paramedical professionals from the United States, Canada and Australia have completed a four-week course in Taipei called "Basis of Acupuncture."

Sponsored by the Chinese Acupuncture Science Research Foundation, the course was designed to promote cultural exchange and enhance the science of acupuncture internationally, said S. S. Liu, board chairman of the Foundation.

Dr. Julia J. Tsuei, course coordinator, said the teaching faculty was composed of 19 Western trained physicians and ten traditional acupuncturists with ten or more years of clinical experience. Most of the physicians are faculty members of medical schools in the Republic of China who have practiced acupuncture in recent years.

During the first week, the basic concepts of acupuncture were introduced together with moxibustion. The compatibility of Western and Chinese traditional medicine was explained in terms of etiology, terminology and

physiology as well as diagnosis and treatment.

In the second week the mechanism and function of pain relief together with anesthesia and analgesia were presented. This was topographically organized for the presentations in relation to the specific body areas, for example head and neck, major joints and extremities and trunk. Acupuncture and meridians were introduced and defined at this stage.

Lectures during the last two weeks focused on disease specific entities which have been found to respond to acupuncture treatment in clinical documentation. Organized according to Western medical approach, they included the digestive system, the reproductive system, allergic and infectious diseases, ear, nose, throat and the respiratory system.

All participants left the country with favorable comments on the course they had attended. Some said what they learned here would benefit them in their practice.

Preliminary Results in Cryogenic Preservation of Grey Mullet (*Mugil cephalus*) Sperm*

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The promise owing to the development of techniques for the preservation of life and of genetic properties by subfreezing temperatures have been experimentally extended to some fish spermatozoa (Table 1). Many remarkable advantages of such application to the cattle breeding industry have long been demonstrated. However, biological response to the freezing process of each individual type of sperm varies widely. The variables between the subjected cells and the processing must be considered and concomitantly experimentally controlled in order to obtain predictable results.

The purpose of this preliminary attempt is to study the response of the grey mullet (*Mugil cephalus*) sperm to the freezing process. Results obtained offered encouragement that

long-term preservation of mullet sperm will be practical; however, it is too soon to define many of the variables involved. Nevertheless, experience gained will benefit others and avoid unnecessary duplication of effort in future studies.

Materials and Methods

The mullet that provided sperms or eggs for the experimental use were those captured during the spawning migratory season, from December to February in 1971/1972 along the western coast of Taiwan. This coincided with the regular of the grey mullet artificial propagation project in the Tungkang Marine Laboratory. Thus the supply of mature mullet was facilitated.

A. Sample preparations and freezing

The milt was delivered into a dry clean beaker. About 0.2 or 0.3 ml of the fresh milt was transferred into a small glass freezing vial (20×55 mm o.d.) with a pipette. An equal

amount of double-strength protectant was added. After gentle agitation, the final concentration of the selected cryo-protectant was reached. Usually within half an hour, all samples belonging to one series of experiments were distributed to the respective temperatures.

With laboratory incubators and freezers a series of temperature gradations was established as follows: room temperature (about 24°C), 14°C, 7—5°C, —10°C, and —20°C. For the ultra-low temperature, —196°C, liquid nitrogen was the cryogen. Samples frozen at this temperature and those subjected to other temperatures were directly subjected to the said condition. The samples prepared were quickly inserted into the designed temperature box. In the case of —196°C, the vial containing a mixture of sperm and the protectant was quickly plunged into the liquid nitrogen cryogen. Vigorous boiling appearance was instantly seen.

(To be continued)

Table 1. Some papers of the low-temperature preservation of fish sperm

Kind(s) of fish	Cryo-protectant	Lowest temp. attained (°C)	Duration	Result	Reporter(s)	Year
1. Herring (<i>Clupea harengus</i>)	Glycerin 12.5%	—79	6 mon.	F (85%)	*Blaxter ⁽¹⁾	1953
2. Carp (<i>Cyprinus carpio</i>)	Glycerin 6~12%	—79	60 hr	M (20%)	Sneed & Clemens ⁽²⁾	1956
3. Bighead carp (<i>Aristichthys nobilis</i>)	—	+8.5 —7.0	31 hr	M (+) "death"	*侯 ⁽³⁾	1963
4. Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	DMSO + citratedextrose	—196	7 days	M (+)	Hodgins & Ridgway ⁽⁴⁾	1964
5. Gold fish	—	—73	24 hr	M (—)	Fribourgh ⁽⁵⁾	1966
6. Black sea-bream (<i>Mylio macrocephalus</i>)	—	+5	90 hr	F (+)	平野 ⁽⁶⁾	1967
7. Cod (<i>Gadus morhua</i>)	Glycerin 23.8%	—196	30 hr	F (89%) (C: 96%)	*Mounib, Ilwang & Idler ⁽⁷⁾	1968
8. Mackerel	Egg-yolk buffer	Frozen	—	M (+)	Inouye ⁽⁸⁾	1968
9. Atlantic salmon (<i>Salmo salar</i>)	Ethylene glycol 5%	—25	30 min	F (12%)	*Hoyle & Idler ⁽⁹⁾	1968
10. Atlantic salmon (<i>S. salar</i>)	DMSO 5% DMSO 5% Ethylene glycol 5%	—4.5 —4.5 —3.0	11 days 28 days 38 days	F (96%) F (81%) F (37%)	*Truscott, Idler, Hoyle & Freeman ⁽¹⁰⁾	1968
11. Steelhead trout (<i>S. gairdneri</i>)	DMSO 5%	—196	14 days	F (18%) (C: 87.2~99.3%)	*Graybill & Horton ⁽¹¹⁾	1969
12. Goby (<i>Glossogobius giuris</i>)	Glycerin 10%	Frozen	4 mon.	M (+)	申・平野・江草 ⁽¹²⁾	1970
13. Oriental weatherfish (<i>Misgurnus anguillicaudatus</i>)	Glycerin	Frozen	Long-term	F (76%) (C: 92%)	申・平野・江草 ⁽¹³⁾	1970
14. Chinook (<i>O. tshawytscha</i>) Coho salmon (<i>O. kisutch</i>)	DMSO 8%	—196	7 days	F (38%) F (79%)	*Ott & Horton ⁽¹⁴⁾	1971

F: Fertility; M: Motility; C: Control; +: Positive result; —: Negative result; *: From original report.

* Contribution A No. 17 from the Tungkang Marine Laboratory

** The American Type Culture Collection

*** Tungkang Marine Laboratory, Taiwan Fisheries Research Institute

The Creation of a Set of Alphabets for Written Chinese Language

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One of the most difficult aspects of the written Chinese language is the fact that the positioning of the constituent components of a character is very irregular. Instead of having the constituent components appearing in a serial fashion as in an alphabetical language, they are generally arranged in a pyramid fashion until a rectangle is filled in a most balanced and pleasing manner. Although this feature of the language is responsible for many unique literary forms, it also leads to many difficulties when we try to systematize or mechanically process the written language. The problem of indexing in lexicography has always been troublesome. Typesetting or typewriting have always been extremely cumbersome. Telegraphy and computer inputting and outputting require an intermediate set of codes. And above all, the language is very difficult to learn.

We have shown that, for many purposes, the pyramid-like arrangement does not prevent us from handling the Chinese written language as if it were an alphabetized language without our ever altering the language itself and without resorting to codes totally unrelated to the language and thereby enjoying all the advantages enjoyed by alphabetical languages.

Based on this observation, we took a test of frequently-used characters, 4600 in number, and broke them into smaller components. The components of each character are then strung out serially, in the same order as they are usually written. In doing so we try to avoid the two extremes:

- (a) To divide the characters into components so small that it approaches individual strokes. The characters disassembled this way will not be easily readable.
- (b) To divide the characters into components so large that the number of basic components necessary are so numerous that no advantage will be gained.

The result of this analysis is a set of 210 alphabets for the Chinese written language. This number can be further reduced if desired. At this time, it is believed that this number

is a good compromise between recognizability and engineering economy. A larger set of characters, 15,000 in number, is then checked against this set of alphabets. Only about a dozen ancient characters out of this larger set are not conveniently representable by this set of alphabets.

Except for the pronunciation, this set of symbols offers all the advantages of the alphabets of a language. The average length of spelling is approximately 4.5 alphabets per character. Almost without any training, a person who knows Chinese can read a document expressed in these alphabets with no guesswork or ambiguity, and without any referential or mechanical aid. For many purposes, it is sufficient to leave a Chinese text in this spelled-out unassembled form, resulting in a great deal of saving in equipment and personnel training.

The following are a few possible applications of this set of alphabets:

- (1) This set of alphabets can be used to transmit telecommunication messages in Chinese using existing

8-bit channels. Terminal equipment will be very inexpensive. Some prototype equipment is now being constructed.

- (2) Computer I/O involving Chinese can be accomplished by using this set of alphabets. Not only does this reduce greatly the cost of peripheral equipment, but also almost completely eliminates the need of special operator training.
- (3) Computer equipment construction and software development will be greatly simplified if this set of alphabets is used.
- (4) Further research is now in progress in the typewriting and type setting of Chinese based on the use of these alphabets.
- (5) This set of alphabets can be a great pedagogical aid for learning to read Chinese.
- (6) Once the use of these alphabets is accepted, the alphabetical indexing of lists, such as dictionaries, will be possible.
- (7) These alphabets are equally useful to Japanese and Korean.

Neurology Seminar to Be Held Here in Early September

A Seminar on Neurology will be held in Taipei September 4-6 under the sponsorship of the National Science Council, and the U.S. National Science Foundation.

Thirteen participants are coming from the United States. Five of them will arrive with the support of Asia Foundation under its Technical Cooperation Program with NSC.

The seminar is jointly organized by Dr. E. Leong Way, professor and chairman of the Department of Pharmacology, University of California, and Dr. C. Y. Lee, dean of the NTU Medical School.

There will be three discussion sessions over wide-ranging topics. The overseas participants will also visit the NTU Medical School and the National Defense Medical Center in Taipei.

Other participants are Dr. Doris H. Clouet, assistant chief of New York State Narcotics Addiction Control Commission Research Laboratories; Dr. Francis O. Schmitt, chairman of MIT's Neuroscience Research

Program; Dr. Donald Catlin, assistant professor of pharmacology, University of California School of Medicine; Dr. Ing Wang Ho, adjunct assistant professor of pharmacology, of the same school; Dr. Horace H. Loh, associate professor in residence, of California School of Medicine; Dr. E. W. Maynert, professor of pharmacology, University of Illinois College of Medicine; Dr. Eugene Roberts, director of the Division of Neuroscience, City of Hope Medical Center; Dr. Dixon Woodbury, professor and chairman, Department of Pharmacology, University of Utah College of Medicine; Dr. James Myerhoff, Department of Microwave Research Division of Neuropsychiatry; Dr. Jang-yen Wu, associate scientist, Division of Neurosciences, City of Hope Medical Center; Dr. Alan A. Boulton, director of psychiatric Research University Hospital; and Dr. H. H. Wang, associate professor, Department of Pharmacology, College of Physicians and Surgeons, Columbia University.

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