M U D P I E no. 5

Museum and University Data, Program, and Information Exchange

TAXIR PROGRAM AT THE UNIVERSITY OF COLORADO

The Taximetrics Laboratory at the University of Colorado, Boulder, played host October 8, 1968 to a group of museum and university representatives sharing an interest in data storage, manipulation and retrieval. The TAXIR programs, devised by a group working with Dr. David Rogers, were demonstrated after descriptions of various aspects of the program by the staff. Although the number of specimens forming the data base was not large (about 2000 in the "curatorial" bank, used to retrieve catalogue data, and about 70 in the "morphological" bank, used for sorting, key development, and derivation of descriptions), it was clear that the programs were viable and functioning. At the present time, and with the "descriptor states" built in by Rogers' group, it is perhaps solely functional for processing data in the plant genus Manihot, but the group is confident that it can be adapted readily to both curatorial and monographic functions for other workers, and they are interested in contacts with other workers who might be in a position to take advantage of their work. A series of mimeographed statements on the program, its capacity, and so on, were given out to the participants. Copies of a few of these items are still available, and will be sent on request by Dr. David J. Rogers, Taximetrics Laboratory, University of Colorado, Boulder.--JAP.

ENNEAMETRIC SYSTEMATICS

Anthony Santiago, of the Botany Department, University of Singapore, Bukit Tamah Road, Singapore 10, has published a series of papers recently on what he calls "enneametric systematics." This approach, based on a concept of trichotomy rather than dichotomy, is organized around a three by three matrix, or a set of nine cells. Santiago makes several points in support of this thesis, including the following:

1. The human mind tends to categorize into groups of three or less any mass of objects, using relationships, real or fancied, as the basis for the classification.

2. The modern tools for sorting, such as computers, punched cards, and so on, are not limited to dichotomies, but can utilize polychotomous arrangements for classification.

3. A three-way split permits breakdown and assortment of continuous variation [clinal?] by assigning positions to the group at each extreme and the group about the mean.

4. There are many classifications and groupings that fall naturally into three by three matrices, and organizing data in this way makes it more easily grasped.

In reviewing several of his recent papers, however, one gains the impression that the universality of his concept is highly doubtful. He seems to be severely limited in his approach by his commitment to the 3 X 3 matrix. As a result, he ends up with some matrices that contain overloaded cells, and others that contain empty ones. He indicates that an empty cell represents a "not yet determined" subject or condition, but in some cases this is clearly a biological unlikelihood, and in those cases where the "not yet determined" holds throughout a row or column, the validity of the category itself is challengeable.--JAP

TIME-SHARING IN MEDICINE

COMPUTERS IN THE SERVICE OF MEDICINE--Essays on current research and applications. Edited by G. McLachlen and R. A. Shegog. Vols. I and II. Oxford Univ. Press, 1968.

Time-sharing appears only in the preface and in the predictive essays in these two volumes. Brian Flowers, writing the preface, says that "fast arithmetic was the first stage of the computer revolution; multi-access is the second." It is clear that the second revolution has not hit British hospitals, however, when one reads these essays. In every case where I could find time-sharing mentioned, it was as a future potential. Dale and Roberts (vol. 2, p. 83) are pessimistic about the use of teletypes by the nursing staff, and predict a high error level if the input must be typed by any and all users. Bennett and Holland (vol. 2, p. 127) touch very briefly on the potential storage of diagnostic information to be used for query by practicing physicians. James (vol. 2, pp. 157-167) discusses the development of multi-access systems in relation to the development of information systems, but regards it as in the future. Weir (vol. 2, 171-181) attempts to predict the next ten years in hospital computer use. He discusses a "national network of computers in medicine," (p. 178) but also (p. 179) says that "even by 1977 the establishment of a large multi-access machine working solely within a hospital in the United Kingdom is by no means certain." It would seem that time-sharing is not moving rapidly for this group of authors.--JAP

AVAILABLE PROGRAMS

9. NTERM--A numerical taxonomy program modified from the Smithsonian Institution program CLUSTR [see MUDPIE no. 2, program 8]; written in Extended BASIC for use on GE Mark-II T/S system. Performs: read-in of triangular or rectangular matrix; character standardization; computation of pair-wise estimates of similarity, with three options; and cluster analysis, using weighted pair group method with average linkage. Written by W. W. Moss. [W. W. Moss, Division of Entomology, University of California, Berkeley, California--note change of address from that given in MUDPIE 2. Tape also available from Peters, Smithsonian Institution.]

10. PUBLIC--An experimental program, written in BASIC, intended as a preliminary demonstration of the feasibility of providing direct computer access to the public in museum exhibition halls. Shows how machine could be programmed to answer standard questions and take care of non-programmed queries. Basic concept by Richard van Gelder, program written by J. A. Peters. [Peters, Smithsonian Institution.]

11. [Unnamed program]--General program for analysis of variance, one-way, fixed effects, for determining if a character varies more between populations than within a population. Dimensioned for up to eight populations with maximum of 20 individuals in each, but expandable. In FORTRAN-IV, for IBM 360/65. [Joseph Pylka, Allen Center, New Jersey Neuro-Psychiatric Institute, Box 1000, Princeton, New Jersey, 08540.]

COMPUTER SCIENCE AND ENGINEERING BOARD

"The National Academy of Sciences has announced the establishment of a Computer Science and Engineering Board, which will include academic and industrial experts in computer and information science. In making the announcement, Academy President Frederick Seitz said, 'The Board's assignment will be to assess the implications of the enormous and somewhat heterogeneous growth of information-processing technology as it affects the public and private sector of our nation." [from Science, 21 June 1968, p. 1321.]

CALL/360: BASIC

IBM has announced (Computing Report, July, 1968) a new time-sharing system, yclept "CALL/360: BASIC," which is currently available in 34 cities in the United States. The computer is an IBM 360 Model 50. The following publications and further information can be obtained from any IBM branch office:

J20-0035-1	Introduction
J20-0037-1	Terminals manual
J20-0044-1	Reference card
J20-0045-1	Library programs
J20-0043-1	Handbook

RECENT PUBLICATIONS ON MUDPIE-RELATED SUBJECTS

Abelson, P. H. Computer-Assisted Instruction. Science, 162, 1968, 855. It appears that this approach to time-sharing could provide the ultimate basis for a MUDPIE network, and we should keep a close eye on its development at the University of Illinois, particularly in the light of the hoped-for cost "per student per hour of use" of 25 cents!

Atkinson, R. C. and H. A. Wilson. Computer-Assisted Instruction. Science, 162, 1968, pp. 73-77.

Bartholomay, A. F. The Case for Mathematical Biology or the Mathematical Destiny of Biology. BioScience, 18, 1968, pp. 717-26.

Boughey, A. S., K. W. Bridges and A. G. Ikeda. An Automated Biological Identification Key. Mus. Syst. Biol., Univ. Cal., Irvine, Res. Ser. no. 2, 1968 pp. 1-36, i-xix.

Cantrell, Harry N. Computer and Console: Costs and Convenience. Science, 162, 1968, p. 620. A rebuttal to the remarks about time-sharing in the paper by M. V. Mathews. One interesting point is his analysis of use, which indicated that 10 % use of a teletype is close to optimal, because this obviates queueing of high priced personnel.

Crovello, T. J. Problems in the Use of Electronic Data Processing in Biological Collections. Taxon, 16, 1967, pp. 481-494.

CSIRO Symposium--The Collection and Processing of Field Data. Edited by E. F. Bradley and O. T. Denmead, Canberra, Australia, 1967. L.C. no.: 67-20259. The following two titles are of interest to MUDPIE addicts:

Frost, P. H. and J. P. Penny. On-Line use of Display Units with the CSIRO Control Data 3600, pp. 475-490.

Kowarik, M. Economic and Technical Aspects of Computer use in On-Line Experiments, pp. 461-468.

Davidson, R. A. and R. A. Dunn. Computer Simulation of Certain Forms of Evolutionary Change: A Preliminary Report. Taxon, 17, 1968, pp. 3-10.

Goodall, D. W. Identification by Computer. BioScience, 18, 1968, pp. 485-88.

Kemeny, J. G. and T. E. Kurtz. Dartmouth Time-Sharing. Science, 162, 1968, pp. 223-228. A summary of the early work at Dartmouth, where BASIC was developed, and the software of time-sharing developed. This is the granddaddy of all commercial operations.

Knuth, E. The Art of Computer Programming, Vol. 1, Fundamental Algorithms. Addison-Wesley, Reading, Mass., 1968, xxii + 634. ($19.50).

Mathews, M. V. Choosing a Scientific Computer for Service. Science, 161, 1968, pp. 23-27. An interesting summary of hard-to-get information, but somewhat misleading about time-shared operations. See note by H. N. Cantrell on this article.

Morse, L. E., J. H. Beaman, and S. G. Shetler. A Computer System for Editing Diagnostic Keys for Flora North America. Taxon, 17, 1968, pp. 479-483.

Moss, W. W. Some New Analytic and Graphic Approaches to Numerical Taxonomy, with an Example from the Dermanyssidae (Acari). Systematic Zoology, 16, 1967, pp. 177-207.

Moss, W. W. Experiments with Various Techniques of Numerical Taxonomy. Systematic Zoology, 17, 1968, pp. 31-47.

Orr, W. T., Ed. Conversational Computers. Wiley, New York, 1968, xiv + 236. ($8.95).

Rogers, M. H. Some Aspects of the Multiple-Access Computer System. Science Progress, Oxford, 56, 1968, pp. 389-97. "Some of the inherent difficulties in the use of time-sharing systems are outlined and a simplified account is given of address calculation in a time-sharing system." (Author's abstract).

Squires, D. F. Collections and the Computer. BioScience, 18, 1968, pp. 973-74. A major break-through, for Squires not only recognizes the existence of time-share in the museum-computer relationship, but also is impressed by its significance.

Williams, W. T. The Computer and the Tropical Rain Forest. Australian Nat. Hist., 16 (3), 1968, pp. 92-96.

Smithsonian Institution
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