EDITORIAL AND INVITATION

by Roger Conant

I would like to invite readers to send in brief articles for this newsletter which describe their current work and interests. I for one have little understanding of what most of you out there really do or really are interested in. Most of you are just names on a mailing list as far as I am concerned, except for those of you who I have met at a conference or elsewhere. Don't be shy - this newsletter can be a vehicle for us to discover one another. Maybe you are doing something in your work which would be of interest to others. I certainly hope so! And if so, why not share it briefly with others in the Society? Maybe you have had a Profound Cybernetic Thought. Share it! Please don't think of this newsletter as something you read but do not contribute to. It is supposed to be an interactive vehicle for all of us, from freshmen to retirees, from cybernetic greenhorns to Cybernetic Saints. The newsletter is only valuable if folks read it, and the only way I can tell that folks read it is if folks react somehow. So far I have only enough objective evidence to prove that about 8 people read it. Where are all the rest of you?

NEW HEADER FOR THE NEWSLETTER

I'm sure you have noticed that the ASC News has a much more impressive header at the top of the page than it used to. The new version is the result of the artistic inclination and graphical skill of Klaus Krippendorff. Thanks, Klaus!

ASC CONFERENCE

This newsletter might be an appropriate place for self-organization of the ASC conference to be held next fall. If you have an idea for the conference and would like to work on it with other folks, but you don't know who might be interested in cooperating on it with you, why not send in a note which can be posted here?

Here is the first such request: Doreen Steg would like to organize a panel on "Cybernetics and Consumer Behavior" and she would like anyone interested in participation on the panel to get in contact with her.
SYSTEM DYNAMICS CONFERENCES

from Dennis Meadows

Notice of three upcoming conferences related to system dynamics has come from Dennis Meadows. The following is a very brief abstract of the information contained in his letter. For further information about the first two please write him at: Resource Policy Center, Thayer School of Engineering, Dartmouth College, Hanover, NH 03755. For information about the third write Professor Anderson at the address below.

May 25-June 4: NATO Advanced Study Institute on the application of system dynamics to analysis of resource issues. Ten leading system dynamicists and about 60 invited participants. Near Copenhagen. Conference is free, but you must pay room and board ($450) and transportation. There will be lectures on the mechanics and philosophy of system dynamics, lectures on specific applications, and small group working sessions designing and analyzing actual SD models. Write Dennis M. for details.

August 31-September 4: SD conference at Dartmouth, apparently tutorial in nature (at least in part) with a teaching staff of Eminent Systems Dynamicists, modest cost. 25 participants to be selected. Write D. M. if you are interested in receiving more information and registration forms.

October 14-17: SD conference for active practitioners of the field. Formal presentations of papers, small group discussions. Papers are now being solicited. $95 for registration, $205 for room and board for three days. Contact Prof. David Anderson, Institute for Governmental and Policy Studies (ULB 96), State University of New York at Albany, Albany, N.Y. 12222.

OTHER CONFERENCES ETC.

from Roger Conant

First International Conference and Exhibition on Applied Modelling and Simulation, Lyon, France, September 7-11, 1981. For details write to me and I will Xerox the announcement for you.

Twenty-first Century Media Inc. is planning a tour of the Far East, October 7-21, 1981, which will take in five major computer trade shows as well as other things. Write me for details. Don’t bother if you are a struggling student since the lowest cost listed is $2290.

CYBERNETIC NEWSLETTERS

by Roger Conant

This is not the only newsletter from a cybernetics group although it may be the least formal and least organized. The Cybernetics Society, London, has one called "Cybernetic Notes in Hand" which is edited by Annetta Pedretti and on which some brief comment was made in the last issue. It is off to a good start, and you can get a subscription by sending 5 pounds (U.K.) to Dr. Brian Warburton, Dept. of Pharmaceutics, School of Pharmacy, 29/39 Brunswick Square, London WC1N 1AX, England.

There is an "International Cybernetics Newsletter," a very slick and high-class publication edited by F. de P. Hanika, Austrian Society for Cybernetic Studies. This has been going for several years. Address: F. de P. Hanika, International Secretariat (OSGK), Haus Hanika, A-8524 GMS 92, Austria.

Another is the newsletter of the International Cybernetics Association, for which the address is Prof. Helmar Frank, Institute of Cybernetics, University of Paderborn, 16B Kleinenberger Weg, Paderborn, W. Germany.
ASC QUESTIONNAIRE RESULTS

by Roger Conant
from data compiled by Frank Leonard

Last summer Frank and Allessa Leonard carried out a questionnaire to discover who the ASC folks are (or were then, anyway) and here are some of the results. The base is 40 respondents.

#13 - what aspects of cybernetics are of the greatest personal and professional interest to you? (numbers given are percentages of the respondents.)

60 general systems theory
53 foundations & principles
45 management theory
43 artificial intelligence
43 methodology
38 epistemology
38 brain models
35 information theory
33 futuristics
30 communication theory
28 heuristics
10 game theory
 8 numerical control

21 other (organization theory, definitions of cybernetics, public education, integration of cybernetic concepts and applications, economics, social applications, and socio-cybernetics).

#18 - Would you be interested in having more active/interactive membership in ASC activities?

24 = 77% yes
7 = 22% no

#17 - How would you rate the following aspects of your membership in ASC? (numbers given are numbers of respondents, not percentages)

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no response:

7 new member
6 no indication

#19 - Which of the following areas of ASC activity are of particular interest to you? (percentages given)

60 epistemology
58 workshops & conferences
53 publications
35 newsletter
28 advanced applications
20 local chapters
20 speakers bureau
15 professional ethics
13 core curriculum
8 membership
5 basic sources
5 awards/fellowships

- others mentioned: cross fertilization, elementary & secondary texts, international contacts
THE PROVINCE OF CYBERNETICS

from Paul Henshaw

Larry Richards in the March 15 ASC Newsletter said: "I believe that the interests of the ASC membership are broader and more penetrating than those of other professional societies." I agree completely, and wish here to extend the thinking a bit.

The province of science, as I comprehend it, revolves around the search for truth, whereas cybernetics, as I perceive it, goes farther. Cybernetics, being concerned with communication and control in operative systems - be they organisms or machines - goes beyond the search for truth to deal with purpose and efficiency. Being concerned with goal determination and purpose, cybernetics is subjective as well as objective, and must concern itself with judgements, ethics and human values, including what is meant by quality of life as defined by human beings. Cybernetics, it seems necessary to accept, involves a dimension beyond that of pure science.

Now let me go a step farther. If plans go as expected, in the next issue of the ASC FORUM, I will have an article on ethics in science - that is, science in general as well as science as involved in cybernetics. It is a kind of manifesto patterned after the Hippocratic Oath that has served practitioners in medicine for such a very long time. It was done by a student colloquium for younger people anticipating a career in science. It seems to me appropriate that cybernetics should concern itself with this kind of matter. It is hoped that the article, if and when it appears, will merit comment and be worthy of publication in various scientific journals.

IDEAS FOR SESSIONS AT THE ASC CONFERENCE TO BE HELD IN WASHINGTON, D.C., OCTOBER 30-NOVEMBER 1 SHOULD BE SENT TO LARRY RICHARDS BY APRIL 30 (ADMIN. SCIENE DEPT., COLBY COLLEGE, WATERVILLE, ME H: 207/465-3876). TEXT FOR THE PRELIMINARY PROGRAM IS DUE MAY 25TH.

PUZZLE

by Roger Conant

In a puzzle book I have been enjoying lately I discovered what seemed to me to be an extraordinarily fine puzzle. I have a hypothesis that people with cybernetic training might succeed somewhat more often at this wonderful puzzle than others. So here it is. If you like this sort of thing try it out and send me the answer, and in the next issue of this newsletter I will publish the names of all successful respondents. It is taken from a paperback titled "Solve It" by James Fixx.

Two people were talking. One said to the other, "I have three sons whose ages I want you to ascertain from the following clues: (1) The sum of their ages is thirteen. (2) The product of their ages is the same as your age. (3) My oldest son weighs sixty-one pounds." "Stop," said the second person. "I know their ages." What are they?
I have received a request to briefly explain what N-dimensional information theory is. When Shannon (with a little help from his predecessors) invented Information Theory, he had two variables in mind: X, the message sent, and Y, the message received. Clearly for a usable communication system X and Y must be strongly related. If X and Y are completely unrelated the communication is a total flop. The most central quantity in information theory is T(X:Y), the transmission between X and Y, and it is a measure of the degree of relatedness of X and Y.

Ashby and others realized that the measure T could be generalized to N dimensions as T(X1:X2:X3:...:Xn), and there it would be a measure of the strength of relationship over the whole set of n variables, or to put it as Ashby did, of the total constraint over the set of n variables. Being an objectively measurable quantity associated with the behavior of a system of n variables, and being amenable to various mathematical operations, it is an ideal starting point for the objective measurement of the structure of systems. Indeed there is a currently small group of researchers using information theory to deduce and analyze the structure of systems this way (including Klaus Krippendorff, Gerritt Broekstra, myself, and perhaps others) with notable success. To give one simple example the information theory identity T(A:B:C:D:E)=T(A:B)+T(C:D:E)+T(AB:CD:E) corresponds with the view of a 5-variable system as composed of two subsystems in which the T(A:B) and T(C:D:E) correspond to constraints (or the strength of relationships) within the two subsystems A-B and C-D-E, and the the term T(AB:CD:E) corresponds to the relationship between the subsystems. Since these quantities can be measured, you can determine the values of the quantities to verify a hypothesis, for example, that the two subsystems are nearly unrelated (and thus the system is nearly decomposable into the two subsystems.)

There is a lot of literature on N-dimensional information theory, and this is only the tip of the iceberg.

I met John Voevodsky at the ASC meeting in San Francisco in 1980 and so was very interested to see reports of a gadget he has thought up and marketed, called the Cyberlite. It is a taillight, suitable for cars and motorcycles, which flashes at a rate dependent upon the rate at which the vehicle is decelerating. If the car or cycle is screeching to a halt the Cyberlite flashes violently, producing, from reports, an instinctive braking response in following drivers. When tested very extensively in California it produced, for the cabs so equipped, a 60 percent reduction in rear-end collisions - pretty impressive!

It is a good example of an invention which integrates principles from widely differing fields, from modern electronics to neurophysiology, to serve a practical need. Its essential principle is to provide by automatic means the information which following drivers need, under emergency conditions, and moreover in a mode which takes advantage of the known psychological and neurological properties of the recipient.

This is not an advertisement but if you are interested in technical details or ordering information you can write Voevodsky Cyberlite, Inc., 770 Welch Road, Suite 154, Palo Alto, CA 94304. Tell him ASC News sent you. The cost for the light is $125 (+3.50 s&h).
MORE ON BREMERMANN'S LIMIT

by Roger Conant

Bremermann's limit is derived from fundamental physical principles and states that matter cannot process information faster than about $10^{47}$ bits per gram per second ( $\times$ denotes exponentiation). Klaus Krippendorff has read and objected to my note entitled "How to avoid Bremermann's Limit" not because the argument in the note is wrong but rather because the title is too dramatic and, he feels, subject to misinterpretation. He feels that people are likely to say, "Oh, well, you don't have to worry about Bremermann's Limit any more, some fellow has shown that you can just avoid it!" His point is that the limit is there, cannot be beaten, and that what I really showed in the note was that by some cleverness (specifically by using Ashby's notion of selection-amplification) you can stay far below the limit so that it does not inhibit your work.

Of course I agree. In fact that is stated in the note. Perhaps a better title for the note would have been, "How to Make Selections in Such a Way that Although the Amount of Selection Seems to Require an Amount of Information Greater than That Allowed by Bremermann's Limit, You Can Do It Anyway" or some such title. I am afraid that in my zeal to select a catchy title I may have chosen one which is itself subject to misinterpretation. Sorry.

The point of the note is this: Suppose that you want to make a selection of one element out of a set of $2^{10^{100}}$ elements. This amount of selection is measured, according to the laws of information theory, by $10^{100}$ bits (possibly less with unequal probabilities, a technical diversion). There is no hope of accomplishing this feat, at the physically maximal rate of $10^{47}$ bits/gram/second, even with a galaxy-sized computer and aeons of time, if the selection is done in the ordinary way (i.e. one bit of information selects one half of the set, and to narrow the set down to just one element requires $10^{100}$ such halvings and hence $10^{100}$ bits.) But - and this is the key point - there are other ways to perform selection, and these are vastly more efficient, and by using these other methods the amount of information you have to process is far, far below the physical limit deduced by Bremermann. So, in that sense, you can avoid Bremermann's limit. It is similar to train travel - you can't get from Philadelphia to San Francisco faster than the speed of light, as we all know, but since you never even get close to the speed of light that physical limit is of no immediate concern and you "avoid" it.

To summarize: selections from arbitrarily large sets can be performed, and there is no a priori reason to believe that in making such a selection one will necessarily bump into Bremermann's Limit as a practical obstacle to success, provided the selection is done cleverly.

HELPHELPHELPHELPHELP

from Barry Clemson

I need examples of application of Stafford Beer's management cybernetics. My book, Management Cybernetics for Human Service (London, Abacus Press, due early 1982) is currently about half written and would benefit greatly from additional examples of actual application. If you can send me papers or references, I would like to use them. I would also like to hear from people who have done applications of management cybernetics.

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