

THE TIDE-WAVE MODEL

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Is change something that just **"happens"** or can we produce it? Should we concern ourselves with the **"great trends"** or the **"small steps"**? Does this perhaps depend on whether we are pursuing a change **within a system** or a change **of a system**? **Why must we so often move "three steps forward, then two (or even more) backward?"** Is it because we are promoting **"the right change at the wrong moment"**? And what can we achieve anyway if we are **"just a small part of a complex system that is to be changed"**? The tide-wave model might help us find answers to these intriguing questions.

THE MODEL

When we go to the beach we see the waves repeatedly trying to sweep up over the sand. Each is succeeded by the next one, which may advance further landwards if high tide is approaching. On the contrary the waves tend to get weaker during the advent of low tide and the area of dry sand increases.

For our present purposes, we will call the combination of tide and waves, i.e. the factors affecting the advancing or receding of the sea over the coast, the Tide-Wave System. Now, this is a very peculiar system. You would think, by looking at the waves and the tide, that the waves are the **parts** and the tide is the **whole**. But this is not so, for one important reason: **the waves are not cumulative!** In other words: the aggregate of waves does not cause the tide; the tide is not the sum (or the sum plus x) of the waves.

On the contrary: each wave, once it has reached its maximum height and exhausted its force, recedes back into the sea. In fact, this backward flow is the main obstacle the **next** wave must overcome in order to reach its own summit. We will call this backward flow the "Counter Wave".

The strength of this counter wave is a function of three factors:

1) the configuration of the coast, i.e. how steep the beach is at the edge of the sea; 2) the force and direction of the tide, i.e. whether it is growing or diminishing; and 3) the strength of the wave that originated it.

On the other hand, even if the tide and the waves are not linked in the manner of a whole and its parts, they are nevertheless closely interrelated. First of all, the waves are the **manifestation** of the tide; and secondly the waves **help**

the tide advance.

With the first statement, we mean that we don't "see" the tide: **the only movement we perceive is that of the waves**. When the tide is advancing our perception of it is derived from the waves, which are of different strengths. When the tide is receding the only thing we observe is that the waves are becoming weaker, but just watching one wave or another, we may wrongly believe a forward movement is still taking place, when in reality the net change is in the other direction.

The second aspect may or may not correspond to actual fact in the realm of physics or hydraulics, but for the sake of our argument we will assume that it does. When the tide is growing, we contend that **its advance is being enhanced by the waves**: in still waters, i.e. without waves, the high tide would take longer to reach its top level. During the recession of the tide, however, we will assume that this factor is no longer relevant; as the waves get weaker, the low tide will arrive irrespective of whether there are waves or not.

THE APPLICATION OF THE MODEL

Now we can apply this model to our inquiry about change. We propose, that the process of change in complex societies - such as the process of development in a developing country (2) - is very similar to a "Tide-Wave System".

1 - The **great trends** are the "tides". Their origins often elude our power of observation, the contributing factors are beyond our individual influence.

2 - We do not "see" the trends, we can only reach some conclusions about them "ex post facto". What we do see are the "waves": the specific actions, intents, movements, by which the great trends **materialize**.

3 - Those actions, the "waves", are **within our reach**: We can "produce" them, or fail to do so.

4 - If they are intended to cause changes "within" a system, such actions may achieve their purpose by themselves. If their intent is a change "of" the system, the purpose will **not be achieved** by one single wave, and not even by a set of waves: only a "tide" will accomplish this.

5 - In other words, the **type of change** we are speaking about (3) is a "tide", and not just a succession of "waves", valuable as these may be.

6 - **Our actions** - the "waves" - are not useless, however: they significantly enhance the "tide". Without them, the great trend might still come about, but possibly later, with more sorrow or cost, or perhaps it would materialize after it was already too late.

7 - In other words, when the trend comes (the "high tide"), our actions should coincide with it, lest it pass by without being perceived, i.e. without materializing, and the **opportunity** is lost. Let us refer to Shakespeare's Julius Caesar: "There is a tide in the affairs of men, which, taken at the flood, leads on to fortune; omitted, all the voyage of their lives is bound in shallows and in miseries."

8 - **Against** the trend (the "low tide") our actions will have little effect, except (and this may be important) that the "waves" **keep the movement up**. But the objective will not be achieved until "the tide changes". This is the typical "intent of change in the wrong moment".

9 - Unless our actions are trivial, they will cause a **reaction**, a "counterwave", that will negatively affect not only the "wave" that provoked it, but also the subsequent "waves", especially the next one.

10 - The stronger our **action** (the "wave") the stronger the reaction (the "counterwave"). Moreover, two other factors will influence the force of this "counterwave" and finally determine whether it will cancel out the "wave" or just make the action more difficult: the strength of the **context** or situation to be changed (the "configuration of the coast"), and the general **trend** (the "tide").

CONCLUSIONS

The "Tide-Wave Model" has helped us to understand the nature of change in complex societies. Particularly, it has shown that concrete actions (the only "visible" events in the process) are important in that, even if they do not "form" the trends, they do enhance them, give them momentum, open the way for their materialization. Above all, we hope the model will help us to avoid infantilism - thinking that we can change everything by ourselves - as much as fatalism - thinking that nothing we can do will really influence change.

REFERENCES

- 1) Herrscher, E.G. et al: Strategies for Change in Developing Countries - to be presented at the 1989 ISSS Meeting in Edinburgh
- 2) Herrscher, E.G.: Cause - effects loops as explanation of underdevelopment, Human Systems Management (1988), and: Mutual Causality in Developing Countries, Systems Practice, Vol. 1 Nr. 3 (1988)
- 3) Strategic Change in R. Ackoff's terms, Change 2 as per Systems Design per J.P. van Gigch.

Let's play that Evolution Game

Recreating natural selection with graphic computer simulation

Stephen Sokoloff

Natural evolution is a two-step process. First mutant forms of an organism occur randomly, then those best adapted to the given environmental conditions are selected for - they show an enhanced probability of survival and reproduction. As to which selection criteria were involved in the evolution of a given organism or group of organisms we can only make assumptions; by simulation with desktop computers we can, however, test the validity of these hypotheses.

We begin the simulation with a drawing of a plant or animal, and the computer is programmed to randomly introduce minor alterations. Then selection criteria are provided; the computer eradicates the least well-adapted "mutants", and the survivors undergo further rounds of mutation and selection. If the patterns of change conform to those observed in the fossil record, our hypothesis as to the nature of the selection criteria can be regarded as plausible; a strict proof cannot be obtained with this method, however.

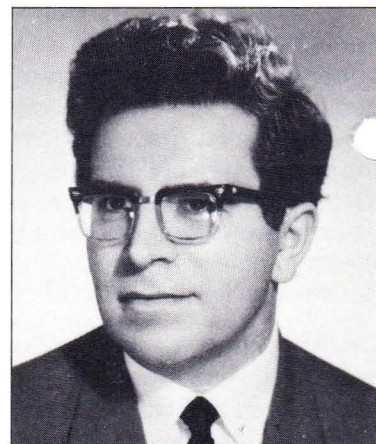
Of course the computer is only capable of dealing with the evolution of relatively simple systems. For this reason, primitive leafless land plants were chosen for study. These were the first species which had water-transporting vessels.

The following assumptions were made: 1) More branch-endings enable a wider dissemination of spores and therefore a larger number of offspring. 2) More sunlight results in better growth, and therefore an improved chance of surviving. The amount of sunlight received is directly proportional to the exposed area, since the photosynthetic structures are spread over the entire surface of the plant. Shading either by parts of the same plant or by other reduces the photosynthetic activity.

The simulated plants "evolved" from low-growing, infrequently branched types to forms with vertical axes and many flattened lateral branches. The same pattern of changes can be found in the fossils of the primitive land plants which existed between 410 and 350 million years ago.

Computers thus enable us to simulate and roughly visualize natural evolution; they help us determine its driving forces.

Literature: Niklas, Karl J., Computer-Simulated Plant Evolution, Scientific American, March 1986.



Jan M. SZYMAŃSKI

The Logic of Social Dynamic Systems

An Analytic View

Jan Maria Szymanski

Systems Engineering Center, Polish Cybernetical Society, Warsaw, Poland

It is generally agreed that we have arrived at a turning point in the history of civilization. The era in which weapons were used to maintain class structure and dictatorial powers is

coming to a close. An age of **intercultural partnership and global policy** is now dawning. It would, however, be wishful thinking to believe that the world will change suddenly in a miraculous way. Before the necessary alterations can occur we will have to discard some of our **cultural baggage**, for example the glorification of killing enemies and the **tribal** principle of social integration. The outdated world-view upon which these modes of thinking are based should, in the age of computers and atomic energy, be replaced by a universal social integration. How will we, however, be able to achieve the necessary reforms without destroying our sense of **cultural and national identity**? A reliable formula has yet to be found.

An appropriately structured society is a precondition for the existence of civilization. Some provision must be made to allow for the dissipation of human energy. This dispersion occurs when we act in solidarity with our "natives" and oppose our "enemies". Present-day science has proven that the scheme "native-strangers", or "homeland- enemy", or more generally "good-evil", is an intrinsic feature of our genetic makeup. Since human beings are, however, capable of abstract thinking, the enemy does not necessarily have to be a group of people. A **symbolic adversary** would serve the same purpose. **"My homeland" could, for example, be identified with "civilization" and "my foe" with "barbarity"**.

Such a formula would be acceptable to both Christians and Marxists. In fact, it could serve as a test of the profundity of their convictions. It may, however, turn out to be inconvenient because it would mean that the "enemy" we are striving to eradicate is often to be found within our very selves. Instead of fighting others we would have to often compel ourselves to refrain from using naive or hypocritical slogans or from indulging in destructive heroics.

Nobody can foretell whether the above view will gain a greater degree of acceptance. My own experience leads me to doubt the ability of mankind to arrive at a general consensus, to think independently and predict accurately. It was Norbert Wiener who said that the future would not be a paradise full of slave robots but a hard fight against the limitations of our minds.

The theoretical foundation

I arrived at the above conclusions by application of my theory, which is based on the reduction of multivariety to a certain subset of states. The bounding factor can be called a structure, and the subset of states determined by it the set of states admissible for that structure. The relation between these two elements has been called a **transformation system**. It cannot be denied that Piaget and other structuralists had a profound influence on the development of this theory. Treating an ordered pair of transformation systems as the set of arguments and values of a control function, we can define a **control system**. Then, relating the concept of the control system to the universe of information, we arrive at the concept of the information control system, i.e. the **decision making system**. Relating it to the universe of matter and energy, we arrive at the concept of the **dynamic system**, a category which is shared by machines and biological organisms. The type which is relevant for human populations is the **social dynamic sys-**

tem. All of these notions taken together constitute the base upon which a broader conceptual system has been developed.

The formal structure of the theory

In spite of all the well-known logical consequences of Goedel's theorem, I decided that there is no necessity for the introduction of an advanced formalization of concepts, especially of those whose generality renders measurements difficult and results dubious. Consequently I have limited myself to the following:

1) Taking into consideration the revolution in the methodology of sciences that occurred in the first half of the 20th century, I have accepted the appropriate intellectual commitments.

2) By using simple set-theoretical notions and the "white box method", it was possible to define the transformation system. Having introduced a possibility set (an idealization of the unlimited multivariety) and a bounding operator (the structure) which is defined on this possibility set, and transforming it into its subset (the set of admissible states), I have defined the transformation systems as a pair of the structure and the set of admissible states. Similarly, the concept of the control system has been defined with set-theoretical notation.

3) The formal description of the decision-making system does not, in fact, go far beyond the commonly known results. Difficulties connected with the modelling of social systems have been avoided by the introduction of two complementary models: the horizontal one, which expresses the static properties of the system, and the vertical one, which expresses its dynamics.

The empirical falsification of the theory

Ideas disagreeing with generally accepted conclusions of the behavioral sciences were not employed in the construction of the theory. The concept of the structure adopted here conforms closely to the vision of nature derived from Einstein's theory and the second law of thermodynamics. Actual decision processes in the world of human beings and animals as described by experimental psychology and ethology confirm the validity of the decision making system model. The results of mechanics and biology do not contradict the concept of the dynamic system. In the same way a falsification of the concept of the social dynamic system has been avoided.

A more thorough treatment of the above theory can be found in my book "Reformulated Cybernetics", published in Polish by Ossolineum, Wroclaw, 1988.

Editor's note: *The theory that aggressivity is part of our genetic makeup is still subject to considerable controversy, and by no means generally accepted.*



JAN WOLEŃSKI

INTERNATIONAL CONFERENCE ON PRAXIOLOGY AND THE PHI- LOSOPHY OF ECONOMICS

Jan Woleński

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The conference, which was held in Warsaw from 2-5 September 1988, was devoted to general themes connected with praxiology and economics: their histories, philosophies and methods, the conceptual foundations of Austrian and Polish traditions in praxiology, the logic of action, and finally systems approaches to economics. The more than thirty papers delivered during the conference covered a very wide variety of topics.

Many speakers and participants in discussions focussed on fundamental problems of economics and praxiology. It was generally agreed that basic studies are of primary importance for the further development of those fields. However there was dissention in regard to more specialized matters. K. Boulding, H. Simon and G. Klir stressed the importance of highly sophisticated and formalized models, whereas D. McCloskey and R.N. Langlois pointed out various limitations of professional economics and proposed a more "anthropological" approach to economic theory. This controversy also has to do with the role of values, especially moral ones, in economics and praxiology. Boulding, Simon and Klir maintain that these fields of study can and should be rectified (freed) of axiological content (content having to do with moral values). Contrarily, McCloskey and Langlois seem to admit axiological commitments of theoretical systems in the social sciences. However, the former party does agree that there is an indirect connection between economics and praxiology on the one hand and axiology on the other one.

Another heated debate involved various interpretations of the history of Austrian economics and its relation to Austrian philosophy. B. Smith expressed the opinion that K. Menger's approach was methodologically parallel to the Brentanian one in philosophy; therefore he asserted, that Austrian economics and Austrian philosophy were concretisations of the same intellectual paradigm. An opposite view was presented by K. Milford, who argued that Menger should instead be regarded as a proponent of classical economics. Similar questions were dealt with by O. Lange, who discussed the relationships between marxism and liberalism.

In the above report I limited myself to problems which are important from my professional (i.e. philosophical) point of view. However, I hope that this account reflects the general intellectual climate of the conference. The exchange of ideas which took place was highly stimulating indeed.

The conference was organized and sponsored by the Austrian Institute of Warsaw and the SABRE Foundation (New York) together with the Institute of Philosophy and Sociology of the Polish Academy of Sciences (PAS) and the Polish Philosophical Society. The Organizing Committee consisted of Prof. Klemens Szaniawski (the president of the Polish Philosophical Society), Dr. Georg Jankovic (the head of the Austrian Institute), Prof. Wojciech Gasparski (the head of the Department of Praxiology of the PAS) and Dr. Josiah L. Auspitz (the secretary of the SABRE Foundation); Mr. Burton Grey, the president of the SABRE Foundation, was also present at the conference.

The proceedings of the conference will be published in "Praxiology", a journal edited by the Polish Academy of Sciences.

AMERICAN SOCIETY FOR CYBERNETICS

Current Officers

Larry Richards	President
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Elin Smith	Secretary
Fred Steier	Treasurer
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Michael Ben-Eli	Ombudsperson

Activities

Co-sponsor of "Support, Society and Culture": mutual uses of Cybernetics and Science, to take place in Amsterdam, The Netherlands, March 27 - April 1, 1989 (see Meetings List).

Annual Meeting: October 25-29, Virginia Beach, VA, USA.
Further information: Fred Steier, Tel. (804) 683-4938.

Both the editorial and production processes for the journal **Cybernetic** are currently under review.

THE POLISH CYBERNETICAL SOCIETY

Current Officers

1. Prof. Piotr Sienkiewicz	President
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Activities

In **basic research** we are involved in the following areas: methodological foundations of cybernetics and systems theory; methodology of systems research and design methodology; theoretical aspects of artificial intelligence;

modelling of socio-economic systems; decision theory; theory of systems reliability; foundations of systems diagnostics; biocybernetics; theory of systems effectiveness; research on the mutual relationship between cybernetics, praxiology and general systems theory.

In **applied research** we are concentrating on applications of the methods and models of cybernetics and systems research to fields such as: nautical economics; robotics and computer aided manufacturing in the machine industry; computer diagnostic systems in medicine; expert systems for computer-aided diagnosis and decision making; cybernetic systems in the social sciences.

Some of our **achievements**: development of systems methodology (Section of Methodology and Theory of Systems), development of the cybernetics of economy including continuation of the research of Oskar Lange; application of decision theory to incomplete information and fuzzy circumstances; development of multicriterial optimization methods; progress in the fields of expert systems and computer-aided decision making; development of the theory of autonomous systems by Marian Mazur and application of that theory to the medical sciences; development of optimization methods in systems engineering and analysis and estimation of their efficiency; development of design methodology.

Publications: Original papers are published in the quarterly "Postepy Cybernetyki" (Progress in Cybernetics). Books are published by the Polish Academy Publishing House "Ossolineum" in a special series called "The Cybernetics".

Workshop and conference plans: 6th International Symposium on System-Modelling-Control, Zakopane 1990; 2nd Conference "Cybernetics 89", Warsaw 1989; 3rd Workshop on Artificial Intelligence and Developing Systems, Warsaw 1988; 1st Conference on Artificial Intelligence, Warsaw 1989; National Conference on Machines and Technical Equipment Exploitation, Warsaw 1989; 4th Workshop on Pedagogical Cybernetics, Warsaw 1990; 4th Workshop on Systems Engineering 1991; Workshop on Design Methodology 1989; Conference on the Medical Computer Sciences 1988; Conference on Cybernetics, Systems Research and Computer Science 1992 (30th year of the Polish Cybernetical Society).

THE UNITED KINGDOM SYSTEMS SOCIETY

CURRENT OFFICERS

Chairman: Lynda Davies,

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R.G. Saunders,	F. Stowell,
R. Stewart,	R. Flood,
E. Maguire-Vynalek,	M. Jackson,
P. Ledington,	D. West,
C. Atkinson,	M. Cobb

KEY ANNUAL ACTIVITIES AND PROJECTS

We had our first conference on the occasion of our tenth anniversary in July, 1988. This was attended by over two hundred and fifty delegates from the U.K. and abroad and was declared a huge success by the attendees. The proceedings are to be published by "Plenum" in 1989 under the title of "Systems Prospects". We have co-sponsored many conferences with other societies and in July 1989 hosted and organised the annual one of the International Society for General Systems Research, which was held at Edinburgh. We plan to make conferences a more regular annual event; the 1990 one will probably be hosted by City University in London and the 1991 one by Lancaster University. In 1987 we ran a workshop which was very popular and we foresee the likelihood of putting on a similar event at a later date. Also, we annually run a stream at the Operational Research Society's annual conference and we are co-sponsoring a special conference with this organization at Queen's College, Cambridge in April 1989 entitled "Operational Research and the Social Sciences".

We have just started developing Special Interest Groups with the first of these concentrating on Project Management and led by Bob Saunders. This is in collaboration with the Association of Project Managers. Other groups are planned in areas such as Risk Management and Information Systems. We are also aiming to start local area interest groups throughout the U.K. and possibly amongst our overseas membership.

A mainstream activity of the Society is the running of our quarterly newsletter "The Systemist" which is now edited by Paul Ledington. This provides a forum where all members may contribute to discussions, announce interest in contacts and submit development ideas, papers and other items of general interest. We also publicize conferences and other activities from fellow systems societies and books which are either produced by the systems community or are of interest to our readers. The philosophy of the Society is one of integration and the encouragement of shared development in systems thinking which is carried out by both practitioners and academics. This newsletter is the main arena where such a philosophy can be realised on a regular basis; our other activities provide a wider spectrum of opportunities.

We have no BITNET number.

NEW BOOKS AND PUBLICATIONS

ORSA Journal on Computing

Dr. Harvey J. Greenberg, Editor

Mathematics Department, Campus Box 170
University of Colorado at Denver
1100 Fourteenth Street
Denver, CO 80202 USA
phone: 303-556-8464
BITNET: HGREENBE@CUDENVER

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This journal seeks to publish quality research results in the interfaces between operations research and computer science. Our guiding principle is that the contribution must satisfy at least one of the following:

- Operations research is applied to a computer science problem (e.g., queuing theory for operating system design).
- Computer science is applied to an operations research problem (e.g., advanced data structures to improve an optimization algorithm).
- Results draw from both operations research and computer science (e.g., an expert system for building simulation models).
- Results enter uncharted areas that have the potential of advancing operations research and/or computer science and are in their interface.

Please send (4) copies of your paper to the Editor.

A new book about multidimensional psychiatry:

Plädoyer für eine mehrdimensionale Psychiatrie (in German)

Prim. Dr. Gerhard Bengesser and Stephen Sokoloff Enke-Verlag, Stuttgart, ca. 150 pp. Price: ca. 48 DM (24 US\$).

The uses of psychopharmica and various psychotherapeutic and social psychiatric techniques are compared. Possibilities for a preventive psychotherapy are considered. This medical book is written so as to be comprehensible to anyone with a college-level education. Please order advanced copies from the editor of this Newsletter (Dr. Stephen Sokoloff, Breitwiesergutstraße 40/7, A-4020 Linz, Austria).

PROJECT: A FESTSCHRIFT IN HONOR OF C.W. CHURCHMAN

Dr. Ulrich and I have embarked on a project to celebrate Dr. West C. Churchman's contributions to the systems movement. To this effect we have prepared a proposal for a book in his honor. So far, we have obtained a list of contributors and contents. We have a tentative publisher who has indicated that he would be interested in the project if he could be assured a minimum sale of 600 copies (Initial printing: 800-1000).

We are publishing this open letter in order to galvanize support for our project. It is our hope, that the Int. Federation and/or some of its affiliated sister societies will come forward with a plan to guarantee the purchase of the minimum 600 copies. We visualize that the society/societies would commit themselves to buy a certain number of volumes for their members.

Our aim is to mobilize the goodwill of all the members of the system community to ensure the realization of our project. We would appreciate hearing from anyone who has worthwhile suggestions in this regard.

Dr. Werner Ulrich, Sichelweg 41, CH-3011 Schliern/Köniz, Switzerland, and Dr. John P. van Gigch, School of Bus. Admin., California State Univ. Sacramento, 95819-2694, USA.

MEETINGS - DETAILED INFORMATION

FUSCHL CONVERSATIONS

5th "CORE" CONVERSATION: FUSCHL LAKE, AUSTRIA

April 23 - 27 1990

TO: MEMBERS OF THE "CORE" CONVERSATION GROUP

FROM: BELA H. BANATHY, 6/6/89

SUBJECT: INVITATION TO THE 90 CONVERSATION

Since the 1988 "Core" Conversation, we had a Regional Conversation in Spain last Fall, and we are now preparing for the "Pacific Rim" Regional Conversation at the Asilomar Conference Grounds in California, this coming Fall. The next "Core" Conversation is scheduled at the Fuschl Lake, April 23 - 27, 1990.

Possible topics we nominated for the 90 Conversation at last year's meeting included the following:

- A. Global Societal Learning (our original theme)
- B. Societal Evolution and Integrated Development (continuing)
- C. Designs for Systems Learning (continuing) and
- D. Systems for Design Learning (new topic)

I recommend that we establish four research teams, with six to seven members each, with a maximum number of 28 participants. Accordingly, I request that you let me know AS SOON AS POSSIBLE BUT NOT LATER THAN THE END OF SEPTEMBER:

- * Your choice of research team, (first and second choice)
- * Your interest in offering your services as the organizer or a member of the organizing group of your selected research team

In addition to your response to the two items above, I invite your ideas and recommendations for the general organization and conduct of the Conversation. We can anticipate the support of IFSR, IISA, ISSS, and possibly others.

We scheduled a planning session for the 90 Conversation during the 89 ISSS Annual Meeting at Edinburgh. Please plan on joining us.

Note my change of address. I am now "semi-retired" and we moved to the Monterey Peninsula. My new address is: 25781 Morse Drive, Carmel, CA. 93923 - Tel: (408) 625-3178 FAX: (415) 565-3012

MEETINGS and COURSES

Title	Date	Place	Deadlines	Further Information
Beijing International Conference on System Simulation and Scientific Computing	15. - 18. August 1989	Beijing (Peking) People's Republic of China	Abstract or Paper 15 March 1988	Chinese System Simulation Council Beijing Institute of Aeronautics and Astronautics Beijing, China
First international conference on computers for handicapped persons	21. - 23. August 1989	Vienna Austria	25. Feb. 1989	Prof. Roland Wagner Johannes Kepler University Institute for Computer Science A-4040 Linz, Austria
12th International Congress on Cybernetics	21. - 26. August 1989	Namur, Belgium	—	Association Internationale de Cybernetique Secrétariat Palais des Expositions Place André Rijckmans B-5000 Namur, Belgium Tel: 081 / 735209
14. Symposium on Operations Research	6. - 8. September 1989	Ulm W. Germany	Abstracts 15. June 1989	Prof. Dr. U. Rieder Abt. Mathematik VII, Univ. Ulm D-7900 Ulm, W. Germany, Tel. 07 31 / 176 - 3273
CI-International '89 Third International Conference on Human-Computer Interaction	18. - 22. September 1989	Boston Mass. USA		Dr. Gavriel Salvendy HCI International '89 263 Grissom Hall Purdue University West Lafayette, In 47907, USA Tel. (317) - 494 - 5426
I. International Congress on Systems for Development	19. - 22. September 1989	Murcia Spain	Final Papers 28. February 1989	5. International Congress SESGE Escuela Universitaria de Informatica Universidad de Murcia San Cristo 1 E-3001 Murcia Spain Tel. (968) 833190 or 833908 Ext. 190 or 204
4. International Conference Fault-tolerant Computing Systems	20. - 22. September 1989	Baden-Baden Germany	Papers 31. Jan. 1989	VDI/VDE GMA H. Wiefels P.O. Box 1139 D-4000 Düsseldorf 1 FRG
Congrès Européen de Systémique	3. - 6. October 1989	Lausanne Switzerland	Full papers 15. January 1989	AFCET CES 1 156, boulevard Péreire F-75017 Paris, France
6th World Congress on Medical Informatics	16. - 20. October 1989	Beijing (Peking) People's Republic of China	Final papers (Camera ready) 10. January 1989	Ms. Shan Huiquin Medinfo 89 - Secretariat 29 Xueyuan Nanlu Haidian District Beijing, China Tel. 892565, 898516 Cable: 2400
Beijing International Conference on System Simulation and Scientific Computing (BICSC)	23. - 26. October 1989	Beijing (Peking) China	Abstract or complete draft (two copies) 15. Sept. 1988	Secretariat 1989 BICSC POX. 301 Beijing Institute of Aeronautics and Astronautics (BIAA) Beijing, 10083 China Tel. 2017251-609 Telex: 22036 BIAAT CN
Unternehmensstrategien im sozioökonomischen Wandel	3. - 4. November 1989	Trier F. R. Germany	Short version 30. April 1989	Prof. Hans Czan Universität Trier Wirtschaftsinformatik Postfach 2835 D-5500 Trier, F.R. Germany
Third Conference on Quality of Life and Marketing	8. - 10. November 1989	Blacksburg Virginia USA (Virginia Tech)	Papers 30. May 1989	M. Joseph Sirgy Department of Marketing Virginia Tech Blacksburg VA 24061 Tel. (703) 961-5110

Title	Date	Place	Deadlines	Further Information
INTERNATIONAL CONGRESS ON SYSTEMS AND COMMUNICATIONS MEDIA FOR DEVELOPMENT	20. - 24. November 1989	Madrid Spain	Abstracts 15. September 1989	Fundación Germán Sánchez Ruipérez C / Don Ramón de la Cruz, 67 28001 Madrid, Spain Tel. 401 1200
IFAC/IFIP SAFETY OF CONTROL COMPUTER SYSTEMS	5. - 7. December 1989	Vienna Austria	Full paper 30. June 1989	Austrian Center for Productivity and Efficiency (OEPWZ) Dkfm. Mag. W. Stejskal Rockhgasse 6 A-1010 Vienna Austria Tel. 0222/638636/25
EMCSR 1990 10th European Meeting on Cybernetics and Systems Research	Date 1990 17. - 20. April 1990	Vienna Austria		Prof. Robert Trappl Department of Med. Cybernetics University of Vienna Freyung 6/2 A-1010 Vienna, Austria Tel. +43-222-535328 10 Fax: +43-222-630652
5th „CORE“ CONVERSATION Fuschl Lake Austria	23. - 27. April 1990	Fuschl Lake Austria		Prof. Bela H. Banathy 25781 Morse Drive Carmel, CA. 93923 USA Tel. (408) 625-3178
IFIP TC-11 Sixth International Conference and Exhibition on Information Security	23. - 25. May 1990	ESPOO (Helsinki) Finland	two copies of paper 31. March 1989	IFIP/SEC '90/CONGREX (Finland) Linnankatu 3 SF-00160 Helsinki, Finland Tel. +358-0-175355
CECOIA II 2e Conférence Internationale sur l'Economie et l'Intelligence Artificielle	2. - 6. June 1989	Paris France		Prof. Robert Vallée 156, bld. Péreire F-75017 Paris France
8th International Congress of Cybernetics	11. - 15. June 1989	New York City, USA	Abridged Paper Nov. 89	Prof. Constantin V. Negoita Congress Chairman Department of Computer Science Hunter College, City University of New York 695 Park Ave New York, NY. 10021, USA
DIAC 90 Directions and Implications of Advanced Computing	28. July 1990	Boston Mass. USA	Papers (4 Copies) 1. March 1990	Douglas Schuler Boeing Computer Services MS 7L-64, P.O. 24346 Seattle, WA 98124-0346, USA Tel. (206) 865-3226
Operations Research 1990	28. - 31. August 1990	Vienna Austria	Abstracts 15. April 1990	Prof. G. Feichtinger Institut für Ökonometrie Technische Universität Wien Argentinierstraße 8 A-1040 Wien, Austria
International Conference on Signal Processing '90	22. - 26. October 1990	Beijing (Peking) China	Abstracts 20. November 1989	Professor Yuan Baozong Research Institute of Information Science Northern Jiaotong University Beijing 100044, China
MIE-European Federation for Medical Informatics Medical informatics 10th International Congress	Date 1991 19.- 22. August 1991	Vienna Austria		MIE 91 Interconvention A-1450 Vienna, Austria Tel. (43) (222) 23 69 26 41

Offenlegung: Der „IFSR Newsletter“ erscheint vierteljährlich in englischer Sprache unter der Redaktion von Dr. Stephen Sokoloff. Die Zeitschrift dient der Information über die Aktivitäten der IFSR. Sie wird kostenlos an Mitglieder ihrer insgesamt 17 Mitgliederorganisationen in 14 Ländern versandt. Die Kosten werden von der IFSR aus den Beiträgen der derzeit 17 Mitgliederorganisationen getragen.
Präsident der IFSR ist für 1988/90 Prof. Gerrit Broekstra (Niederlande). Vize-Präsident Prof. Dr. Franz Pichler (Österreich). Sekretär-Schatzmeister Dr. Bela Banathy (U.S.A.). Alle Funktionen werden ehrenamtlich ausgeübt.
Druck: Druckerei Bad Leonfelden, 4190 Bad Leonfelden
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