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International Society for the Study of Time

Aperiodic Newsletter

December 15, 1980

No. 6

FROM THE EDITOR

If institutions can be said to reflect the light of their members, then the International Society for the Study of Time must surely be approaching its full moon phase. The lengthy column in the following pages detailing the time-related publications and activities of the membership attests to the membership's accomplishments. One can only be impressed by the wide range of expertise indicated by the topics about which we have written, talked and lectured - a range as wide as the geographical distribution of the membership. (See Sam Macey's report on membership below.) A hearty thank you and congratulations to all those who shared their accomplishments with us, thereby providing us with an extensive bibliography.

If ISST might be permitted to bask still further, I would like to report that President George Ford was recently elected a Fellow of the American Academy of Arts and Sciences. To those of you who know George and are familiar with the work of this contemporary Renaissance man this recent honor comes as no surprise. With such bright suns, the full moon of ISST must surely be on the ascendancy.

A MESSAGE FROM THE PRESIDENT

In Rochester, New York, there is a long established organization called The Pundits which has held meetings, over a span of 130 years, in order to read and discuss papers on a wide variety of topics. The variety is a reflection of the diverse interests of a membership made up of doctors, lawyers, academics (scientists and humanists), and business leaders (such as the presidents of Kodak and Xerox). The Pundits is thus, like our Time Society, an interdisciplinary organization, although the mixture it represents is obviously different from ours. A few months ago, perhaps because of such resemblances, I was asked by several Pundit members to offer a paper to them explaining the aims of our Time Society, and, in particular, to report on what had gone on at Alpbach in the summer of 1979.

This assignment led me to some reflections about past events and future developments, reflections illustrating Dickens' ever-useful opener: "It was the best of times, it was the worst of times." Generally speaking, the first half of Dickens' statement seems to me applicable to what was achieved at Alpbach that summer. Looking back on it, I have a strong sense of satisfaction that our Society is working well, on the whole, and that it is doing some remarkable things in bringing together members of different disciplines, who

learn from each other. On a much less significant level, there was also a sense of satisfaction deriving from the place itself, a sense of how the Tyrolian setting seemed to enhance our enterprise with Time. (Let me hasten to add that this encomium should not be misconstrued as a recommendation that our next meeting should be once again held at Alpbach). But I do look back with pleasure to that mountain scenery which established a kind of memory-bank from which all of us, I suspect, continue to draw. One Pundit asked me why a mountain village suited thoughts about time, and I pointed out the kind of constant geology lesson we took in every time we looked out of the windows of the conference hall, and, on a different time-scale, there was the special sound effects of bells. First, there was the big church bell, booming for early morning Mass, which woke us up every morning with reminders of mortality. Second, there were the cowbells that could often be heard all night from our balconies. As Arthur Koestler's novel about Alpbach (called The Call Girls) reminds us, each of those nightly cowbells seems to be tinkling what he calls a "monologue all for itself, to which no one listens. Exactly like having a symposium!" Please note that this was said by Koestler and not by me!

Aside from the bells outside our conference chambers, we had, of course, abundant reminders of time's role in the assorted papers on Beginnings and Endings to which we listened with assorted degrees of attention. Our treatments of time in these papers displayed an extraordinary range, beginning with the individual self and moving out through the collective selves of the social sciences and beyond these to worlds outside our globe. The effect, that is, was a kind of pulsating movement from self to universe and back again, a movement taking in a striking array of disciplines.

Ideally the effect of this operation was to be a bridging one, although let us honestly admit that sometimes not much bridging was effected. In my own case, for example, to listen to a paper on some problem of advanced physics was sometimes like my experiences in Poland struggling with a restaurant menu without a word of the language. Nevertheless, in our multiple constituency there is the contrary thrust featured in Robert Frost's poem, Mending Wall: "Something there is that doesn't love a wall." Overall, for me -- and I suspect for some others as well -- has been a sense of wonder. The highpoints of our conference gave me a sense of being a participant in a wondrously inter-related enterprise, in which the individual self became engaged in seeking connections with a vast entity, one of mind-boggling dimensions, the universe.

But to end on such a lyrical and congratulatory note would be misleading. What of "the worst of times"? My reflections in this case derive not from Alpbach but from recently encountering a book published in New York thirty years ago, called The Metaphysical Society, by Alan Brown. This book records the history of another interdisciplinary society which was founded in England over a hundred years ago and which has several points in common with our Time Society today. The Metaphysical Society was a remarkable organization; for a while it performed wonders, but then, after ten years, it folded its doors and was dissolved by the mutual consent of all of its members. Unlike the Rochester Pundits it failed to survive into our century.

The Metaphysical Society was not an international body but, rather, an interdisciplinary body. It was founded by an architect, James Knowles, and a poet, Alfred Tennyson, in 1869, with the object of bringing together thinkers of different religious persuasions, and anti-religious persuasions, who would read papers and engage in civilized discussions of contrary points of view. It was an extraordinarily brilliant group, including the Prime Minister William Ewart Gladstone; the scientist Thomas Henry Huxley (Darwin's bulldog as he was called); John Ruskin, the art critic; John Tyndall, the geologist; William Thomson who was Archbishop of York. Twenty-one of the members were categorized as "theists" of sorts, and twenty-one other members were "rationalists" of sorts.

For ten years this galaxy of brilliant men met to discuss big issues, and there is no doubt that they probably did good work in leading to increased tolerance towards the position of opponents. On the other hand, and what is scary from our point of view, is that the whole enterprise collapsed, as I said, after ten years. What went wrong? Brown's book shows that the members gradually came to realize that no one was really having any effect on anyone else -- that the Roman Catholic bishops were simply repeating the same line they had taken when the society began, and the scientists were doing likewise. No one, that is, was listening. Each speaker was repeating his solo; no choral music was forthcoming. And so the Metaphysical Society was dissolved.

I do not think our Time Society is in comparable danger, for I see few signs of our not listening to each other. Nevertheless, there may still be something here for us to ponder, so that we do not neglect the need for self-criticism. Alpbach was, generally, very good. But can we do better? And, if so, how? By re-emphasizing our international components, for example? Or by getting more from our younger members? Or women members? Or from changing our conference machinery? Or from redefining our aims?

In sum: these are not the worst of times, surely, for our Time Society. But perhaps there are ways of making them better times.

George H. Ford
(Rochester, New York)

Aperiodic Newsletter
Cabrini College
Radnor, PA 19087

Editor: Sharon Schwarze
Department of Philosophy

Published aperiodically, of course, under the auspices of the International Society for the Study of Time.

THE FOUNDER'S COLUMN

There is a continuous flow of letters to our post office box. They come from around the world from people in all walks of life, belonging to different cultures and subcultures and, if such a concept is permissible, to sub-subcultures. Most of these letters are answered in some form or other. About one-half of the mail asks about time and this Society. The other half offers proposed understandings, invitations to join a cause or -- and these are the most moving ones -- simple insights into the loneliness of man.

There are quite a number of them which come without the sender's name or address, as if the writer were afraid of receiving a brush-off. Many have drawings that suggest either drug use or unbearable anxiety. One letter, a number of years ago, reached me through J. B. Priestly, addressed to the Institute for Time and ends with, "May time be with you." A number contain technical suggestions for time machines. There are some from a psychic correspondence school that promises to teach time, atomic bombs, politics and insulin shock. Some letters are in the hand of frightened old men, some in the hand of tense, young women. Relativity Theory seems to be a favorite subject of many people lost in the moral relativism of our epoch. Some letters come from blind people reaching out for understanding and company.

These strange fragments demonstrate the power of the idea and experience of time in the condition of being human. And they increase the difficulty of giving a simple answer as to what is that which we study when we study time.

J. T. Fraser

REPORT FROM THE SECRETARY

Following the directives of the Council of the Society, formulated at its meeting on 6 April, 1980, the goal of our fifth conference will be to introduce coherence into our discussions, while maintaining the multidisciplinary character of our work. A suitable vehicle is to articulate the concrete, cultural implications of distinct conceptions of time in our epoch. Keeping with the spirit of the directive, the theme of the fifth conference will be Science, Time and Society in China and the West. We will attempt to hold this conference in cooperation with colleagues from the People's Republic of China.

According to preliminary plans, the conference will be comprised of three sets of papers. The first will focus on the conceptions of time that can be abstracted from the study of social and political institutions of the West. The second set will focus on the social and political strains that are manifest in countries which attempted to superpose, uncritically, Judeo-Christian concepts of time on different traditions. The third set of papers will focus entirely on Chinese conceptions of time.

In the most general terms we intend to ask, and hope to give partial answers to, the following questions:

The Metaphysical Society was not an international body but, rather, an interdisciplinary body. It was founded by an architect, James Knowles, and a poet, Alfred Tennyson, in 1869, with the object of bringing together thinkers of different religious persuasions, and anti-religious persuasions, who would read papers and engage in civilized discussions of contrary points of view. It was an extraordinarily brilliant group, including the Prime Minister William Ewart Gladstone; the scientist Thomas Henry Huxley (Darwin's bulldog as he was called); John Ruskin, the art critic; John Tyndall, the geologist; William Thomson who was Archbishop of York. Twenty-one of the members were categorized as "theists" of sorts, and twenty-one other members were "rationalists" of sorts.

For ten years this galaxy of brilliant men met to discuss big issues, and there is no doubt that they probably did good work in leading to increased tolerance towards the position of opponents. On the other hand, and what is scary from our point of view, is that the whole enterprise collapsed, as I said, after ten years. What went wrong? Brown's book shows that the members gradually came to realize that no one was really having any effect on anyone else -- that the Roman Catholic bishops were simply repeating the same line they had taken when the society began, and the scientists were doing likewise. No one, that is, was listening. Each speaker was repeating his solo; no choral music was forthcoming. And so the Metaphysical Society was dissolved.

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-- What kind of attitudes toward time and history and what kind of collective consciousness of time seem to have assisted the readiness of the West for adopting the scientific way of thought as the most appropriate way of dealing with the problems of man and society?

-- What collective attitudes toward time and history, and what kind of consciousness of time might be useful for China in finding its own path to science and technology?

The Secretary was instructed to prepare a proposal and to identify Chinese and non-Chinese scientists and scholars whose opinions and assistance will be solicited.

All opinions, suggestions and possible leads from the membership will be greatly appreciated.

The date of the conference is set for the summer of 1983. Decision as to the place of the conference will have to await an evaluation of the response to the proposal.

The refereed and edited manuscript of Time IV was submitted to Springer Verlag in June, 1980. A second-level review process, initiated by the publisher, resulted in requests for further revisions, some of them extensive. The unavoidable delay in publication reflects the difficulties in trying to maintain overall excellence in a multidisciplinary work.

The Secretary has been seeking a distributor through whom members of the Society could purchase time-related books at a discount. All leads to such a distributor will be appreciated.

John Michon suggested the inclusion in the Aperiodic Newsletter of very brief professional communications. The practicality of such a new column will be explored.

FROM THE MEMBERSHIP CHAIRMAN

I am pleased to report that as of October 14, 1980, I have on record 89 Members and 23 Corresponding Members, or a total of 112 people. The Membership includes at least one person from each of the following twenty-one countries: Argentina, Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Greece, Israel, Italy, Japan, The Netherlands, Poland, Sweden, Switzerland, the United Kingdom, the United States of America, the USSR, and the Republic of Zaire.

Sam Macey,
Associate Dean of Graduate
Studies,
University of Victoria.

BOOKS, ARTICLES, LECTURES, SYMPOSIA

A REPORT ON MEMBERS' AND CORRESPONDING MEMBERS' ACTIVITIES

The purpose of this column, as announced in Aperiodic Newsletter No. 5 is to inform our membership about the time-related activities of other Members and Corresponding Members. By the deadline for this issue, the following material was received. Deadline for the next issue is March 15, 1981. Please send all material to J. T. Fraser, P.O. Box 815, Westport, Ct. 06880, USA.

Jacob A. Arlow

"The Structure of the Deja Vu Experience," Journal of the American Psychoanalytic Association, Vol. 7, 1959, pp. 611-631.

"Depersonalization and Derealization," Psychoanalysis -- A General Psychology: Essays in Honor of Heinz Hartmann, ed. by R. Loewenstein, et al. New York: International Universities Press, 1966, pp. 456-478.

"A Contribution to the Psychology of Time Sense" (presented to the New York Psychoanalytic Society on December 17, 1957).

"Disturbances of the Sense of Time" (Freud Anniversary Lecture, 1974) Summary in Psychoanalytic Quarterly, Vol. 45, 1976, pp. 181-182.

"Experience of Time - A Clinical View" (Panel discussion), 1972 Abstract in: Journal of the American Psychoanalytic Association, Vol. 20, 1972, pp. 651-654.

Mark H. Aultman

"A Case of Deja Vu," National Law Journal, Vol. 2, No. 50, (New York, August 25, 1980).

Nightfire, (Paulist Press, New York, 1976).

Judith Becker

"Time and Tune in Java," The Imagination of Reality: Essays in Southeast Asian Coherence Systems, eds. A. L. Becker and A. Yengoyan, Ablex Publishing Corp.: Norwood, New Jersey, 1979.

Robert S. Brumbaugh

"Applied Metaphysics: Truth and Passing Time," Review of Metaphysics, 1966, 647-666.

"From Time to Time," Yale Reports, 1970, #571.

"Changes of Value Order and Choices in Time," ed. John W. Davis, Value and Valuation (Knoxville, 1972), 49-63.

"Systems, Tenses, and Choices," Midwestern Journal of Philosophy, Spring, 1975, 9-14.

"Metaphysical Presuppositions and the Study of Time," The Study of Time, III, 1-21.

"Time Passes: Platonic Variations," Review of Metaphysics, 1980, 711-726.

Charles F. Ehret

"The Molecular Basis for Circadian and Mitotic Rhythms in Eukaryotes," 9th International Conference, Society for Biological Rhythms, Wiesbaden, Germany, 7 April 1967.

"The Circadian Oscillation: An Integral and Undissociable Property of Eukaryotic Gene-Action Systems," 5th Meeting of the Federation of European Biochemical Societies, Prague, Czechoslovakia, 18 July 1968.

"The Sence of Time: Evidence for its Molecular Basis in the Eukaryotic Gene-Action System," Symposium on the Physics and Biology of Time, Berkeley, CA, 3 February 1969.

- "Testing the Chronon Theory of Circadian Timekeeping," Symposium on Biochronomstry, Friday Harbor, WA, 6 September 1969.
- "Circadian Parameters of the Infradian Growth Mode in Continuous Cultures: Nucleic Acid Syntheses and Oxygen Induction of the Ultradian Mode," 10th Conference, International Society for Chronobiology, Little Rock, AR, 9 November 1971.
- "Circadian Cybernetics: General Principles, and Properties of Eukaryotic Regulation During the Infradian Mode of Growth," American Institute of Biological Sciences Symposium on Protistan Circadian Rhythms, Amherst, MA, 21 June 1973.
- "The Infradian Eukaryotic Cell: A Circadian Energy-Reserve Escape-ment," 11th Conference, International Society for Chronobiology, Washington, DC, 12 August 1975.
- "Circadian Cybernetics: An integrating Discipline in the Biology of Higher Organisms," International Congress on Rhythmic Functions in Biological Systems, Vienna, Austria, 8 September 1975.
- "The Eukaryotic Cell Cycle: One Clock for Infradian and Ultradian Growth," University of California at San Diego Conference on Circadian Rhythms, LaJolla, CA, 23 January 1976.
- "Circadian Regulation" Growth Kinetics of the Infradian Cell," 29th Symposium on Fundamental Cancer Research, University of Texas M. D. Anderson Hospital, Houston, TX, 10 March 1976.
- "The Oncogenic Implications of Chronobiotics in the Synchronization of Circadian Rhythms: Barbiturates and Methylated Xanthines," 3rd International Symposium on the Detection and Prevention of Cancer, New York, NY, 29 April 1976.
- "Clocks at the Base of Life: Jet-Lag and Feeling Good" Sigma Xi Lecture, Northeastern Illinois University, 13 October 1976.
- "The Circadian Biological Clock: Chronotypes and Zeitgebers at Cellular and Organismic Levels," Department of Physiology and Biophysics Seminar, University of Illinois, Urbana, 12 November 1976.
- "Circadian Clocks at the Base of Life," Biology Seminar, Indiana University, Indianapolis, IN, 29 March 1977.
- "The Circadian Biological Clock: Its Role in the Fast Living and Slow Aging," Life Sciences Seminar, Public Lecture Series, University of Wisconsin, Kenosha, WI, 28 April 1977.
- "Circadian Dyschronism and Chronotypic Ecophilia as Factors in Aging and Longevity," Bay Pines and Eckerd College Conference on Biological Rhythms and Aging, St. Petersburg, FL, 13 April 1977.
- "The Clockwatcher's and World Traveler's Diet," Interview with Scott Simon on National Public Radio, Chicago, IL, 15 October 1977.
- "The Chronopharmacology of L-DOPA: Implications for Orthochronal Therapy in the Prevention of Circadian Dyschronism," International Symposium on Clinical Chronopharmacology, Chronotherapeutics, and Chronopharmacy, University of Florida, Tallahassee, FL, 10 February 1978.
- "Circadian Regulation: Basic Mechanisms, and the Role of Nutritional Factors and of Drugs as Environmental Zeitgebers," Department of Biological Sciences Seminar, DePaul University, Chicago, IL, 24 February 1978.
- "The Circadian Connection to Regulatory Physiology and to Orthochronal Medicine," Department of Zoology and Physiology Seminar, Louisiana State University, Baton Rouge, LA, 2 March 1978.
- "The Influence of Nutrition and Drugs on Circadian Regulation in Mammals: Implications for the Control of Jet Lag in Transmeridianal Travel," Seminar, Walter Reed Army Institute of Research, Walter Reed Army Medical Center, 20 June 1978.
- "Molecular Mechanisms in Circadian Regulation," Principal speaker, First Gordon Research Conference in Chronobiology, Plymouth, NH, 3-7 July 1978.
- "Circadian Rhythm Research on the Effects of ELF Electric Fields on Small Rodents," Seminar on the occasion of visit to DOE HQ of Soviet Scientists, USA-USSR International Effort, DOE, Washington, DC, 14 July 1978.

- "The Importance of Fundamental Research in Chronobiology to Human Health," National Conference on Health Research Principles, National Institutes of Health, Bethesda, MD, 3-4 October 1978.
- "Exposure and Data Collection Facilities for Circadian Studies of Electric Field Effects upon Behavior, Thermoregulation and Metabolism in Small Rodents," 18th Annual Hanford Life Sciences Symposium, Richland, WA, 16-18 October 1978.
- "The Role of Diet in Phase Shifting of Circadian Rhythms During Jet Travel--Studies with Experimental Animals and with Humans," Seminar Food Sciences and Nutrition, University of Minnesota, St. Paul, MN, 23 October 1978.
- "Elements of Circadian Regulation," Department of Botany, Seminar, University of Minnesota, St. Paul, MN, 24 October 1978.
- "Circadian Clocks--How They Relate to Health and Mental Health," Didactic Group Dialogue, Forest Hospital Foundation, DesPlaines, IL, 14 February 1979.
- "The Importance of Circadian Factors in Nutrition and General Medicine," The Preventive Care Conference, Hinsdale Hospital, Hinsdale, IL, 23 March 1979.
- "The Role of Circadian Cybernetics in Human Bioengineering and Behavior Modifications," Illinois Institute of Technology, Chicago, IL 27 March 1979.
- "The Circadian Connection to Orthochronal Medicine," Banquet Address, Symposium on Depression, Academy of Orthomolecular Psychiatry, Chicago, IL, 12 May 1979.
- "Induction of Circadian Dysynchronism and of Phase-Angle Differences by Dietary Phenobarbital During Light-Dark Entrainment in the Rat," XIV International Conference of the International Society for Chronobiology, Hannover, West Germany, 8-21 July 1979.
- "The Innate and Genetic Basis of Circadian Rhythms," NATO Advanced Study Institute, Hannover, West Germany, 13 July 1979.
- "The Chronon Theory of Circadian Rhythm Control," NATO Advanced Study Institute, Hannover, West Germany, 17 July 1979.
- "Consideration of Diet in Alleviating Jet Lag," NATO Advanced Study Institute, Hannover, West Germany, 21 July 1979.
- "Circadian Cybernetics," Physically Handicapped in Science Project, Center for Educational Affairs, Argonne National Laboratory, Argonne, IL, 14 August 1979.
- "The Role of Circadian Rhythms in Health," Physicians Radio, 23 August 1979.
- "The Circadian Connection to Problems from Jet Lag to Biomass Production," International Paper Company Corporate Research Center, Tuxedo Park, NY, 5 September 1979.
- "Neurochemistry and the Circadian Chronotype," Anatomy Department, University of Nebraska Medical Center, Omaha, NB, 28 November 1979.
- "The Circadian Connection to Orthochronal Medicine," 6th Annual University of Nebraska Medical Center Student Research Forum, Keynote speaker, Omaha, NB, 30 November 1979.
- "The Circadian Connection to Problems with Jet-Lag and Shift-Work," and "Circadian Cybernetics: the Fourth Integrating Discipline", George C. Wheeler Distinguished Lectureship Series, Department of Biology, University of North Dakota, Grand Forks, 15-16 April 1980.
- "New Approaches to Chronohygiene for the Shift-Worker in the Nuclear Power Industry," 5th International Symposium on Night- and Shift-Work, Rouen, France, 15 May 1980.
- "Circadian Connections to Health Problems Associated with Jet Lag and Shift Work," The Preventive Care Conference, Hinsdale Sanitarium and Hospital, Hinsdale, IL, 18 July 1980.
- "Health Problems and Environmental Impacts Arising from Shift Work: A Mandate for Circadian Chronohygiene in the Nuclear Power Industry," Meeting on the Man-Machine Interface, Idaho National Engineering Laboratory, Idaho Falls, 24 July 1980.
- "Circadian Chronohygiene for the Shift-Worker in the Nuclear Power Industry," Seminar on Effects of Working Hours on Shift Work Personnel, Westinghouse-Hanford Company, Hanford, Washington, 8 August 1980.

David Epstein

Seminar on the structure of musical time, both western and non-western, MIT, 1978-80.

Seminar on The Biological Bases of Aesthetics, with Ernst Pöppel and Fred Turner, conducted in Germany, to be continued at the Max Planck Institute, Sewiessen, Germany, 1980-81.

George Ford

"Time in Literature." Our texts included Shakespeare's sonnets, plays by Harold Pinter, novels by Sterne, Fielding, Conrad, Woolf, Huxley, and Malcolm Lowry, Undergraduate seminar at University of Rochester 1969.

Guest lecture on Time and novels for Lewis Beck's seminar on the Philosophy of Time, 1975.

"Problems of Space and Time in English novels from Sterne to Joyce," Graduate seminar, University of Rochester, 1976.

"Dickens and Time," Lecture presented at University of Edinburgh (1967) and, in various forms, at several North American universities including Toronto, Rice, Manitoba, Vermont, and Michigan.

"D. H. Lawrence and Time," Lecture presented at Frei Universität (Berlin) in 1971, and, in various forms, at American universities: Texas (conference), Southern Illinois, Ohio Wesleyan, Russell Sage College, Cincinnati (Taft Lecture), Vermont, Edinburgh, SUNY (Albany), Brown (conference). In 1976 it was revised for ISST conference and presented at Alpbach.

"Felicitous Space: Past and Future Values in Victorian Housing," Presented as a paper at a conference on Victorian issues at the University of Victoria in British Columbia, in 1973.

"Tennyson and the Victorian Sense of Time Past," Presented as the Wilson Day Lecture at the University of Rochester in 1976, and, in 1979, at the University of California at Riverside.

"Death and Literature," Presented at ISST conference at Alpbach on Beginnings and Endings, in 1979.

"Dickens and the Voices of Time," Dickens Centennial Essays ed. Ada Nisbet and Blake Nevius (University of California Press, Berkeley, 1971), pp. 46-66.

"Felicitous Space: The Cottage Controversy," Nature and the Victorian Imagination ed. U.C. Knoepfelmacher and G. B. Tennyson (University of California Press, Berkeley, 1977), pp. 29-48.

"The Eternal Moment: D. H. Lawrence's The Rainbow and Women in Love," The Study of Time III, ed. by J. T. Fraser, N. Lawrence, and D. Park (Springer-Verlag, New York, 1978), pp. 512-39.

"Death and Literature and Consolations," The Study of Time IV.

J. T. Fraser

Of Time, Passion, and Knowledge - Reflections on the Strategy of Existence, New York: Braziller, 1975.

Time as Conflict, a Scientific and Humanistic Study, Basel and Boston: Birkhauser, 1978.

Books (edited):

The Voices of Time: a Cooperative Survey of Man's Views of Time as Expressed by the Sciences and the Humanities, New York: Braziller, 1966.

The Voices of Time, London: Allen Lane the Penguin Press, 1968.

The Study of Time I, New York and Heidelberg, Springer Verlag, 1972 (with F. C. Haber and G. H. Muller).

The Study of Time II, New York and Heidelberg, Springer Verlag, 1975 (with N. Lawrence).

The Study of Time III, New York and Heidelberg, Springer Verlag, 1978 (with N. Lawrence and D. Park).

Introductory, connecting and concluding material in The Voices of Time, J. T. Fraser, ed. New York: Braziller, 1966.

"The Interdisciplinary Study of Time," Annals N.Y. Acad. Sci. v. 138, Art. 2. pp. 822-47. Reprinted in Arch. Int. d'Histoire des Sciences (Paris) and Studium Generale (Heidelberg). 1966.

"Time and the Paradox of Unexpected Truths" XIV. Int. Kongress f. Philosophie, Akten, v.4., pp. 395-402, 1968.

"Time as a Hierarchy of Creative Conflicts," Studium Generale (Heidelberg) v.23, pp. 597-689, 1970.

"Reflections on Time, Science and Man," Britannica Yearbook of Science and the Future, Chicago: The Encyclopaedia Britannica, 1970, pp. 94-105.

"The Study of Time: in The Study of Time I, New York and Heidelberg: Springer Verlag, J. T. Fraser, F. C. Haber and G. H. Muller, eds. 1972. pp. 479-502.

"Flight Dysrhythmia," Ibid, pp. 503-5.

"Time in Western Philosophy, Natural Science and History," Main Currents in Modern Thought, v.28, 1972, pp. 115-130.

"Clockmaking: The Most General Trade," in The Study of Time II, New York and Heidelberg, Springer Verlag, 1975, pp. 365-366.

"Temporal Levels: Sociobiological Aspects of a Fundamental Synthesis" J. Social Biol. Struct. 1, 1978, pp. 339-355.

"Out of Plato's Cave: the Natural History of Time," The Kenyon Review, NS 2, Winter, 1980, pp. 143-162.

"Temporal Levels and Reality Testing," Int'l J. Psycho-Analysis (London) 62, 1981, Part 1.

"The Study of Time," Lecture, University of South Florida, Department of History, May 31, 1971 Seminar on "Time and Modern Consciousness."

"The Hierarchical Structure of Time and its Implications for Physics," Lecture, Williams College, Physics Department, April 23, 1975.

"Time and the Freedom of Beautiful in Art," Lecture, The Metropolitan Museum of Art, October 18, 1975.

"Science, Truth, and Personality," Lecture, University of Kentucky, Department of Sociology, February 10, 1976.

"Time, Mind, and the Self," Lecture, Kenyon College, Integrated Program in Humane Studies, February 12, 1976.

"Comments on an Evolutionary Epistemology," Lecture, University of Pennsylvania, Society for the Comparative Study of Civilizations, April 2, 1976.

"The Individual and Society," Lecture, International Society for the Study of Time, Third Conference, July 4, 1976.

"Time and the Origins of Life," Lecture, Williams College, Philosophy Department, October 29, 1976.

"The Roots of Time in the Physical World," Lecture, Michigan State University, Physics Department, February 24, 1977.

"Time and the Brain-Mind Problem," Lecture, Michigan State University, Psychology Department, February 25, 1977.

"Time and the Ecstasy of the Dance," Yale University, Medical School and School of Music, Joint Seminar on Rhythm, May 4, 1977.

"Aspects of Time, Infinity, and the World in Enlightenment Thought," Lecture, University of Victoria, Meeting of the American Society for Eighteenth Century Studies, May 6, 1977.

"Time's Rite of Passage: from Individual to Society," Lecture, Syracuse University, Maxwell Policy Center on Aging, Conference on the Uses of Time in Social Scientific Research and Theory, November 11, 1977.

"Two Arrows for the Price of One: a Critique of the Thermodynamic Arrow of Time, Lecture, Williams College, Physics Department, December 2, 1977. Lecture and seminar.

- "Time and the Dream" Discussions of a paper, Meeting of the American Psychoanalytic Association, New York, December 14, 1978.
- "The Paradigmatic Levels of Time in Music," M.I.T. Seminar on the Structure of Musical Time, April 5, 1979.
- "Out of Plato's Cave: the Natural History of Time," University of Connecticut, lecture and seminar in the "Perspectives on the Nature of Time" series. September 12, 1979.
- "The Measurement of Time: Modes of Hypothesis Testing," Lecture Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, England, July 24, 1980.
- "Towards an Integrated Understanding of Time," Meeting on "Time, Quality of Life and Social Development" October, 1980, in San Carlos de Bariloche, Argentina.
- Senior Seminar on Time, course, Massachusetts Institute of Technology, Fall, 1966-1967.
- Introduction to the Study of Time, course, Mount Holyoke College, fall and spring semesters, 1967-68 and 1968-69.
- Time in the Intellectual History of Europe, course, University of Maryland, History Department Spring, 1969-1970.
- The Study of Time, Course, Fordham University, the Liberal Arts College, "Scholars Program", Fall, 1973-1974.

Francis C. Haber

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