

"but let Time's news
Be known when 'tis
brought forth"

Time's News

An
Aperiodic
Newsletter

Time's News No. 29

International Society for the Study of Time

March 1999

Report from the President

After the Tutzing Conference, the Society's Council met to review the proceedings and to make suggestions for the improvement of future conferences. Suggestions included circulating the program in advance, nominating chairs in advance so that the nominees can seek support from their institutions, including more books by members in the book exhibit, and promoting more participation from young scientists perhaps by substantially increasing the number of posters.

Thanks were also in order: to Martin Held for his personal investment in the excellent organization of the conference; to Jo Alyson Parker for the well done book exhibit; and to Thomas Weissert for creating the ISST web site. The site can be visited at <http://www.StudyofTime.org>. Future uses of the web site might include information about the next conference, an index of the Study of Time book series and perhaps a central library of time-related articles.

The content and circulation of forthcoming issues of *Time's News* was also considered. To lower the burden of postage we might offer our members the

option of receiving the issues in printed format or e-mail.

The council moved to appoint Olga Hasty as chair of the membership committee and suggested that the Vice President have a special charge to contact other multidisciplinary societies involved in the study of time in order to seek out common initiatives.

Claudia Clausius was asked to coordinate the efforts for determining the site of our next conference in 2001. All suggestions should be directed to her.

Finally, prospects for the development of ISST are good. Fully interdisciplinary forums like ours are rare and fulfill a profound need for those who want to be more than just a good specialist in a narrow field, in other words, for those who want to be also an "honnête homme" in the classical sense of the word. We will succeed if we are at the same time attentive to keeping pace with the development of openness in this world, where ways of dialogue and cooperation have never been so large and diverse. (RL)

The Founder's Column

After thirty-two years ISST is alive, thriving, and ready to make long-term plans. Its success was made possible through a fortuitous combination of two elements. One was the readiness of a number of fine scholars and scientists to form a group for an interdisciplinary inquiry into the nature of time. The other was the availability of the catalytic labor and personal diplomacy of a person to serve the society. But, like most other people, the catalyst has been

getting a year older every year and it is time for him to retire, step by step.

At this juncture it is appropriate to ask: where are we going?

Surveys of the unique problems and promises of ISST may be found—among other of my writings—in two papers. "Toward an Integrated Study of Time," *The Voices of Time*, 2nd ed. (1981) pp. xxv-xlix and "A Backward and a Forward Glance" in *The Study*

of *Time IX*, pp. xiii-xxii (also 1981).

Earlier (1966), at the concluding session of a conference on time at the New York Academy of Sciences, in an attempt to identify the optimum conditions for an interdisciplinary study of time, I remarked that the important element which must be sought is a freshness of vision and rebelliousness of mood.... The way to grant [the study of time] its charter resides in...supporting an intellectual climate where creativity, common to all forms of knowledge, is permitted to bring forth a synthesis by interacting through the common idea of time.

The operating principles of the Society may be found in its Constitution adopted in 1974, amended in 1979, 1983, 1989 and in 1994.

Dr. Victoria Koehler-Jones, a social psychologist and enthusiastic supporter of the Society suggested the need at this time for "strategic planning." Strategic Planning, she wrote, "often takes this form:

(1) First a vision statement or description of the ideal organization.... (2) Then an articulation of core values.... (3) Then some mission statements.... (4) Then maybe a list of long-term and short-term goals."

To involve all members of the Society in planning its future, this is a call for suggestions related to the four items listed. Please send them to the Executive Secretary, Dr. Thomas Weissert no later than April 30, 1999.

For his addresses see the Secretary's Report in this issue of *Time's News*. The replies will be collected and submitted to the Council for its consideration and action.

As you compose your recommendations, please keep in mind that although the methods of survey we employ here were developed for industrial/commercial use, we are not manufacturing and merchandising light bulbs but looking for the light. (JTF)

Message from the Executive Secretary

Greetings fellow time scholars. I'm delighted to make my first report to you in my newly elected capacity as Executive Secretary. There are several electronic news items first. As about one hundred of you already know, the society maintains an electronic LISTSERV, which is simply an email discussion and information forum that is accessible by members only, and only by members who have sent me their email address. We hope to move much of the communication within the society to this forum, and thus we request that anyone who has not done so, to please join up. Don't worry about a bunch of email cluttering up your mailbox; so far the volume has been extremely low, and content-wise it has been quite interesting. If anything, I would like to see that traffic increase with even more interdisciplinary time-related discussions appearing on the listserv. Eventually we may start sending out an electronic version of this newsletter across that medium, which might make this aperiodical become more periodical. To join the listserv, send an email request to me at:

Thomas_Weissert@Irwins.pvt.k12.pa.us
and I'll be happy to add your name and tell you how it works.

The second and even more exciting news is that the ISST now has the beginnings of a WEB PAGE. The page is in its early stages, but it's growing fast. We hope to add many features both informative to the general public and to time scholars as well, including electronic forms for requesting membership that will go directly to the chair of our membership committee, Olga Hasty. Another feature that should appeal to our members is a page of hyper-links to other time-related web sites and interdisciplinary organizations, thus making it a central station for time scholarship. To view the ISST WEB PAGE, aim your web browsers at:

<http://www.StudyofTime.org>

Don't forget to add that address to your list of favorites or bookmarks. If you have any suggestions or complaints concerning our web site, feel free to send an email message to me at the address above.

As always, one of my primary functions as executive secretary is to maintain the directory of our membership. So it is imperative that you keep me abreast of any changes in your name and postal or email addresses (over email, of course). The membership directory is available upon request in either hard copy or electronic form. For those of

you who do not or cannot use the email, I also maintain a post office box at:

Thomas Weissert
Executive Secretary, ISST
PO Box 436
Wynnewood, PA 19096 USA

As you know, and as I write elsewhere in this newsletter, the society awards the J.T. Fraser Book Prize every three years at our triennial meeting. The time has come once again to nominate books you believe deserve to be considered by our prize committee for the next prize. The book must contain new scholarship in the study of time, be written by a single author, and have been published in English during the three-year period 1997–1999. Nominations require nothing more than the book's bibliographical information sent to the chair of the prize committee, Mark Aultman.

On the Saturday morning immediately following our recent triennial meeting in Tutzing, the Council met to discuss the meeting itself and to plan for the future. One of the topics discussed was the format of papers. Following a discussion by members at the General Business Meeting in which it was mentioned that there was too little time for discussion of the papers, we considered the

possibility of several different formats for papers ranging from the presentation of short outlines followed by a long discussion session, to the reading of long papers with very little discussion time. The format desired by any speaker might be requested by her or him in advance of the next meeting. The **General Business Meeting** is, by the way, the only existing non-electronic open forum within which a significant portion of the membership can air their ideas and opinions about the society itself. As such, I strongly urge more members to attend that meeting in the future so the council may better represent the desires of the membership.

As a final note, the Council will be meeting again this fall to discuss, among other things, the theme of the next triennial meeting. We will also be gathering information on potential locations for that meeting as well. If any of you knows about a site that we might want to consider for the triennial meeting in 2001, you should convey as much information as you can about that site to the chair of the site-location committee, Claudia Clausius.

And that is all the news I have to report on this time. As always, I look forward to hearing from you on the email.

Thomas Weissert

Officers and Council Members: 1998-2001

President: Rémy Lestienne: Research Director at France's Centre National de la Recherche Scientifique. He served as the Scientific Attaché of France to Algiers and later to the United States. His publications include *Les Fils du Temps* (*The Children of Time: Causality, Entropy, Becoming*) and *Le Hasard Créateur* (*The Creative Power of Chance*).

Vice President: Jonathan D. Kramer: composer and music theorist, currently Professor of Music at Columbia University. His compositions have been played in 23 different countries. His publications include, *The Time of Music*.

Executive Secretary: Thomas Weissert: teacher of mathematics at Agnes Irwin School as well as at

Saint Joseph's University, Rosemont College and the University of Colorado. He is the author of *The Fermi-Pasta-Ulam Problem: Genesis of Simulation in Dynamics*.

Treasurer: David Burrows: Professor of Music at New York University, where he has also served as Chairman of the Department. He is the author of *Sound, Speech, and Music*.

Membership Chair: Olga Peters Hasty: Professor of Russian Language and Literature, Princeton University. She is the author of *America through Russian Eyes* and *Tsvetaeva's Orphic Journey in the Worlds of the Word*.

Council Members:

Mark Aultman: Attorney in the area of legal ethics and has published review articles on law and society, legal ethics as well as a philosophical fantasy story, "Nightfire."

Claudia Clausius: Professor of English at the University of Windsor. Her publications include books and articles on Chaplin, Pinter, Beckett, Faulkner, feminism in film and drama, and critical theory.

Sabine Gross: Assoc. Prof. of German at the University of Wisconsin in Madison. Her publications include Lese-Zeichen: Kognition, Medium und Materialität im Leseprozess.

Paul Harris: Assist. Prof. of English at Loyola Marymount University. He has published several articles on time in literature and science, including pieces on Faulkner, Calvino and Pynchon.

Marin Held: Lecturer on Economics at the Evangelische Akademie, Tutzing. He is the author and editor of several publications in economics, ecological issues, and time.

Marlene P. Soulsby: Assoc. Prof. of German and Comp. Lit. at Penn State Scranton. Her publications include articles on East-West literary relations and temporal experience in literature.

Reflections on ISST Conference X Tutzing, Germany July, 1998

ISST held its tenth conference, celebrating thirty years of its work at the Evangelische Akademie in Tutzing on Lake Starnberg, Bavaria. Here are a few appreciative comments:

Location: Even the most consummate intellectuals among us are not disembodied minds but have a physical presence as well, which is why place and location matter in setting a mood for meetings and discussions. The Evangelische Akademie on Lake Starnberg was an extremely fortunate choice for the last conference. Its beautiful, historically resonant buildings, multi-media conference room, and spacious grounds provided the perfect backdrop for the intense yet relaxed working atmosphere that prevailed for a week. Somehow, the tranquil garden and lake (which provided a pleasant view for those who decided against braving its chilly waters) seemed to ground us in between spurts of communication and intellectual interaction. The dining room deserved the awards it has garnered, the "larded bread" provided at night was the perfect accompaniment to talking and drinking, and those of us who discovered her were most pleased that the duck nesting in a large planter on the balcony did not seem to take our presence as a reason to flee her chosen place. Sabine Gross

Representation: Those who attended the conference reflected the diverse, international membership of the Society. Members attended from Africa, Asia, Australia, Europe, North America, and South America, with Europe and North America being the most heavily represented continents. Countries represented, besides the host country, Germany, included Austria, Denmark, France, Italy, the Netherlands, United Kingdom, Portugal, Russia, Sweden, Slovakia, Israel, Egypt, Japan, Taiwan, Brazil, Australia, the United States and Canada. Mark Aultman

The Book Exhibit: The Book Exhibit featured an impressive array of texts in English, French, German, Italian, Spanish and Chinese. Over the three days during which the exhibit was open, conference attendees had the chance to leaf through some seventy-five books and numerous journals and pamphlets devoted to the study of time, many of which were written by Society members. Individual tables were devoted to the volumes of *The Study of Time* series (including the recently published Volume 9), texts from the Time Ecology group of Tutzing, recent editions of *Time and Society*, books by the founder (including translations in four different languages) and the Fraser Prize finalists. Running concurrently with the Exhibit was the

Poster Session featuring posters from architecture, biology, literature, medicine and sociology. Jo Alyson Parker

The Piano Recital: A recital by the Russian pianist, Mikhail Arkadiev, was a highlight of the conference. Mr. Arkadiev, who is chair of the Piano Department of Moscow's Academy of Art, performed two works by Russian composers. A work by the contemporary Sviridov was inspired by poems of Puskin. The major work on the program was "Pictures at an Exhibition" by Modeste Moussorgsky (1839-1881). This composition, a musical representation of vivid pictorial scenes, has been a challenge to pianists for over a century and Mr. Arkadiev proved himself equal to its demands in a vivid musical performance. Particularly memorable is his powerful and sonorous rendition of the final movement, "The Great Gate at Kiev." Stuart Feder

The J.T. Fraser Prize: Over the two years prior to our 1998 meeting, a four member committee considered the merits of more than twenty books published in the three year period, 1994-96. These

books were nominated by both members and publishers as candidates for the book that most advanced the study of time during that period, published in English, and written by a single author. After carefully reading and weighing the merits of these texts according to a set of agreed-upon criteria which included elements of style, content, and form, the committee was able to narrow the selection down, first to the ten excellent titles that were displayed in the book exhibit at our meeting, and finally, to a single winning title. The Trail of Time: Time Measurement with Incense in East Asia, by Silvio S. Bedini (New York: Cambridge University Press, 1994) is an outstanding and richly illustrated work that introduces readers to the rich ancestry of time measurement in the Far East where burning incense to keep time has been a part of daily life rituals for over a thousand years. The award certificate and check were presented to the author by mail and announced at the opening of the book exhibit. Unfortunately, Dr. Bedini's illness prevented him from attending the meeting to accept his prize in person. Tom Weissert

Fraser Prize Nominations Invited

The International Society for the Study of Time invites nominations for the 2001 J.T. Fraser Prize. The Prize is awarded once every three years at the Society's conference to an outstanding time-related book or work that in the judgment of the Society's prize committee makes the best contribution to the study of time. Primary consideration will be given to works published or translated into English with copyright dates of 1998, 1999, or 2000 that are the work of single or multiple authors or creators, as contrasted with editorial compilations.

All works that come to the attention of the Committee in any way are eligible for consideration, but nominations are especially encouraged. Those wishing to nominate works for consideration by the committee should submit or encourage publishers to submit five copies of the work before December 30, 2000, to the Chair of the Prize Committee: Mark H. Aultman, 150 East Wilson Bridge Road, Suite 200, Worthington, OH 43085-2328

Time's Books

The Time's Books column has two editors:

Prof. Jo Alyson Parker
English Department
St. Joseph's University
5600 City Ave.
Philadelphia, PA 19131-1395
USA

Dr. J.T. Fraser
P.O. Box 815
Westport, CT 06681
USA

Address correspondence concerning this column to either editor. The total number of books so far reviewed in this column is 287. The opinions stated are those of the reviewers and the reviews are their intellectual properties. But, since they are copyright *Time's News*, if you wish to quote from any of the reviews or republish a review, please cite the newsletter and its date.

If you wish to write an unsolicited review—in English—of any serious time-related book, published in any language, please check with either book review editor for a preliminary approval, length and deadline. Note that we are not looking for synopses but for professional peer evaluations.

Reviewers in this issue:

Mark Aultman (MHA)
Ubiratan D'Ambrosio (UD)
Gus Koehler (GK)
Roger A. Kruger (RK)
Rémy Lestienne (RL)
Thomas Müller (TM)
Peter Øhrstrøm (PØ)

Bertman, Stephen. *Hyperculture: The Human Cost of Speed*. Westport, CT, and London: Praeger, 1998.

Impressive in its command of details and description, this book accurately describes the revolutionary social changes wrought by modern culture, and especially the instantaneous (or "synchronous") culture of electronic communication. It does so, however, in pursuit of a thesis it cannot

quite maintain. The thesis is twofold: 1) that modern culture inculcates a focus on the present (called, somewhat tiresomely, "the power of now"); and 2) that speed kills, especially the spirit.

If you can imagine Marshall McLuhan as a thoroughgoing pessimist you would get an idea of the spirit of this book, at least until the end. A new sense of time, Bertman argues, where we focus on the present at the expense of past and future, is redefining the meaning of the individual, of society, of democracy, of international relations and of the natural environment. The power of now is the "intense energy of an unconditional present," where priorities are set by our "final act of adaption to electronic speed."

Bertman is a classical scholar. This adds strength to his descriptions of ancient culture but also lends itself to classical bias: the senses, he says, respond spontaneously and rapidly, subverting reason, which is slow and deliberate. This implicit equation of reason, values, and the past or tradition runs throughout most of the book, until chapters on technology and environment force recognition of the fact that reason rises above and changes the natural environment or the past. After that comes a chapter that describes both the advantages and disadvantages of "nowism," and finally recognizes that the present, being the only framework in which we can act, is opportunity rather than enemy.

Whereas Bertman accurately describes social developments, then, his temporal analysis is defective. Tradition, the past, and existing reality are significant because that is what we know. The future is uncertain and we do not know it, but only predict it. To say we focus only on the present is meaningless: all knowledge involves knowledge of

the past, just more or less immediate and more or less extended. New technologies are extended through foresight and planning, not through a narrow focus on the present.

Bertman describes information overload and its effects on the individual, families, and other social structures, but he gives insufficient consideration to social differentiation and specialization. This tendency causes him, throughout most of the book, to conflate speed and "nowism." But society handles information growth by specializing and finding ways (markets, the Internet, libraries, mass communication generally) to make useful information available to those who might use it. That the information is available more quickly need not mean a speed-up in the pace of one's life, anymore than does the fact that I can walk to a phone and talk almost immediately to someone a thousand miles away.

Moreover, it is not just speed that causes stress -- for a commuter sitting in a traffic jam the lack of speed may be more stressful. Social/cultural evolution sets up expectations of timing, and it is the contrast between these expectations and the ability to act that creates stress. Social organizations impose their own timing, and individuals are made to conform to the extent they wish to participate (as in airline flights, for example, where the motto may be "hurry up and wait").

The final message of this book is slow down and recapture control of your life. This is a good message, but to the extent that it suggests that we can or should do so by removing ourselves from the synchronous society, that is, the society that exists now, it is an exercise in nostalgia. And nostalgia, like the past, just isn't what's happening. (MHA)

Dolnikowski, Edith Wilks. *Thomas Bradwardine: A View of Time and a Vision of Eternity in Fourteenth-Century Thought*. New York: E. J. Brill, 1995.

Edith Wilks Dolnikowski's *Thomas Bradwardine: A View of Time and a Vision of Eternity in Fourteenth-Century Thought* not only is an excellent, well written and carefully researched study of an important fourteenth century thinker, but it also provides an opportunity to reexamine one's often uncritically accepted thoughts about the

structure and meaning of time. She has provided an extensive bibliography that should prove useful to any scholar interested in classical through fourteenth century views of time. A minor quibble is inclusion in the footnotes of important excerpts in Latin without translation.

Thomas Bradwardine was one of the most influential English philosophers and theologians of the early fourteenth century. He was chancellor of St. Paul's and confessor to Edward III, and he was eventually rewarded the See of Canterbury in 1349 for his skill in handling ecclesiastical and civil responsibilities. He was highly skilled in natural philosophy, theology, and mathematics. Some historians have called him a mathematical genius and compared his works in physics to that of Galileo. Dolnikowski notes that twentieth-century studies of Bradwardine have tended to single out one of the three areas of his expertise at a time, failing to provide an integrated view of how they come together to inform his entire philosophy. Other scholars have tried to identify what he had in common with the scholarly debates of his time but without highlighting what his unique contribution was.

Dolnikowski makes a scholarly contribution toward remedying both these shortcomings. She does so by exploring how Bradwardine's conceptions of time as a philosophical, a physical, and a theological problem inform each other throughout his scholarly work. This integrated investigation helps her establish the context for a later examination of Bradwardine's assertions about time, contingency, divine foreknowledge, and predestination in *De causa Dei*. (Below I will show how Dolnikowski's approach helps to enrich our own debates about the study of time as well.)

Dolnikowski's integrated analysis throws new light on the lively fourteenth-century academic debates about God, natural law, and philosophy. For example, Dolnikowski concludes after a reevaluation of Ockham's thought that "Ockham never advocated so rigorous a skepticism that it rendered God and the natural order totally incomprehensible; he merely pointed out that the human tools of propositional logic and philosophical analysis can only partially explain how and why God exercises his absolute power as he does" (p. 219). By showing that Ockham held a more moderate position than the "Ockhamists" who followed him, Dolnikowski puts less emphasis on single defining personalities and

opens up the whole question of who influenced whom within the complex scholarly interaction of the mid-fourteenth century. For example, how did the "Ockhamists" influence Bradwardine's arguments concerning time, contingency, grace, and free will? After a critical review of various contemporary scholarly analysis of this issue, Dolnikowski suggests that "fourteenth-century thought cannot be accurately portrayed by emphasizing individual personalities, well-organized intellectual alliances, pervasive skepticism or the breakdown of thirteenth-century synthesis. Instead, the complex interaction of scholars is the most striking feature of the period" (p. 231).

Dolnikowski prepares us for our intellectual journey by reviewing and contrasting a number of earlier philosophers' concepts of time. The list stretches from Heraclitus of Ephesus, Plato, and Aristotle, through Augustine, to Boethius, Anselm, Garlandus, and Aberlard, ending in the thirteenth and fourteenth centuries with Averroes, Maimonides, Albertus, Aquinas, Grosseteste, Ockham, Scotus, Buckingham, and Holcot. For this laymen reviewer, this intellectual tour-de-force, and the integrative approach Dolnikowski takes to Bradwardine's work is most interesting for at least two if not more reasons.

Dolnikowski's review suggests that time can be thought of as lived as well as abstracted, as being both qualitative and quantitative, as even having a transcendent dimension. For example, qualitative considerations such as God's grace and redemption inform many older philosophies of time. This perspective is refreshing given our strongly ingrained, abstracted Newtonian time framework. This dominant paradigm makes it difficult to understand relationships between time, form, and their qualitative meanings (beauty and justice for example) in other than an impoverished linear, "value-free," and sequential way. For example, complexity theory provides a mathematical map of deep rules, with possible variations in timings, that govern the emergence of psychological, social, economic and other forms in a discontinuous and apparently non-linear way. (See Gus Koehler and Victoria Koehler-Jones, "The Feigenbaum Diagram: A Metapattern for the Social Construction of Time", a paper presented at the Annual Conference of the Society for the Study of Chaos Theory in Psychology and the Life Sciences, Berkeley, 1997). It seems possible, for the purpose of thought

experiments, to draw a parallel between the notion of God's eternal, infinite time (the deep mathematical map) and the particulars of human change (a point on a deterministic strange attractor). Theology investigates the relationship between the eternal and the particular in the fourteenth century; in ours it is post-modernists such as Deluze and Guattari in *A Thousand Plateaus* (Minneapolis: Univ. of Minnesota Press, 1987). We are fortunate in that Dolnikowski's analysis, in her chapter "Mathematics, Proportionality and Time", gives us an excellent map of fourteenth century scholar's discourses on these issues. We can see what form such an examination might take in our own time. As she points out, it is this interplay between the "progression of mathematics from a simple tool to a necessary language for natural philosophy and finally to a component in theological speculation . . . that must be taken into account in any investigation of Bradwardine's [studies]" (p. 82). It may be that a similar *formal* melding both in our examination our current dominant paradigm and in developing a more complete theory of time is far overdue in our era.

Today, serious discussions of time are limited to what occurs in our physical, emotional, intellectual and biological worlds. This situation was not always the case. In her discussion of Augustine's work, Dolnikowski notes: "Like all other creatures, humans live and change in time; but, because they have souls, they can transcend, in certain respects, the limitations of creation. Their souls make them more like God and make God's eternity more accessible to them. Thus humanity stands between time and eternity and the soul is the tool for measuring and interpreting time." This passage suggests that the soul has its own unique time separate from God or that of the world. If it did not, there would be no standard against which to measure or to interpret. This passage also suggests that causality is much more complex than we think. Perhaps, since it is like God's time, the time-of-the-soul that extends after death permits actions that penetrate simultaneously into multiple space-time presents, much like Abbot suggests in his discussion of the relationship between a two dimensional and three dimensional world in his book *Flatland*.

I do not wish to debate these speculations, but rather to draw attention to the way that our current scientifically based time paradigm ignores both death and the "soul-time" that may come after it.

The discoveries of science which elevated life as something unique in the world are only a few centuries old. This elevation degraded death in two ways, as J. T. Fraser suggests in *Of Time, Passion, and Knowledge* (Princeton: Princeton UP, 1975): "it was less significant than life, hence not worthy of attention; and with the demise of the [older] organic view of the world; it was also removed from the scheme of life" (198). Death remains as a problem outside of science and theories of time, coming in only as a final ending. This, despite a growing scientific literature on "near death" experiences and experiential evidence, including "death technologies", from other cultures. Perhaps other concepts of time such as synchronicity, the progression of Jung's archetypes, that of shaman, etc., are excluded for the same political reason. (See for example: Kenneth Ring, *Life at Death* [New York: Quill, 1980]; Victor Mansfield, *Synchronicity, Science, and Soul-Making* [Chicago: Open Court, 1995]; Paul Radin, *Primitive Man as Philosopher* [New York: Dover, 1927]; Ben Okri, *The Famished Road* [New York: Doubleday, 1991]; Mircea Eliade, *Shamanism* [Princeton: Bollinger Series, 1964]; and Geshe Kelsang Gyatso, *Clear Light of Bliss* [London: Wisdom, 1982].) The result from including these concepts could be a different and more complex interweaving of forms of causality (final, formal, and material as well as efficient) and a broader base for explanation. For an excellent discussion of how such an approach might improve psychological studies, resolve some general time related anomalies, and improve the range of possible and useful explanations see *Time and Psychological Explanation*, p. 232. Because the philosophical speculations of the philosophers that Dolnikowski reviews come before the completion of the scientific revolution, they provide an intellectual starting point for a reexamination of these paradigmatic limitations. (GK)

Emery, Eric. *Temps et Musique (Time and Music)*. New Edition. Lausanne: L'age d'Homme, 1998. 696 pp.

Eric Emery's book is one of the best references in the French language for scholars in philosophy, psychology, epistemology, and musicology as well as for musicians interested in the relationships

between time and music. However, the 1975 edition was long out of print. The new edition thus fills a hole that could so far only be avoided by going to one of those few public libraries that were fortunate enough to have a copy of the original book.

The book in itself is an impressive presentation of the history of the philosophical thoughts about time—from Pythagoras to Heidegger—followed by a reflection on the esthetics of music and the relation between music and time, which is inspired by texts and compositions of a few composers from Mozart to Xenakis. The first part introduces the reader to the distinction between time-as-an-idea (Plato, Descartes, Spinoza, Locke, Newton, Kant, Hegel, Schopenhauer, etc.), time-as-the-root-of-existence (Aristotle, Avicenna, Maimonides, Thomas Aquinas, Suarez, Nis, etc.) and time-as-inseparable-from-consciousness (Augustine of Hippo, Berkeley, Condillac, Bergson, etc.). Emery observes that for many modern thinkers "time-as-inseparable-from-consciousness and time-as-the-root-of-existence are backing up each other, so as to allow women and men to build a time-as-an-idea" (p. 647). He notes that Royer-Collard, Guyau, Wundt, Mach, Enriques, Janet, Minkowski, Pieron, Piaget and Fraisse are among the latter. The second part focuses particularly on the aesthetics of twentieth-century music, as viewed by contemporary composers, performing musicians, and teachers. Among many original thoughts, let me note I. Stravinsky's statement that perhaps "music is the only domain where women and men really achieve their present" (p. 572).

The general line of thought of the work is perhaps to verify whether, over all times, the idea of musical composition was driven by the successive outbreaks of new ideas about time. As the author himself concludes: "We have briefly sketched here some elements that intend to show why the musician's project, that of enduring, is to endure by becoming a being-in-the-world, and how this project is sometimes transformed to becoming a being-together-with-other-beings" (p. 627).

The new edition contains a touching new forward, where the author pays tribute to his master and inspirer Ferdinand Gonseth and reveals the pains and difficulties that accompanied the birth of the first edition (after eight years of exhaustive work), as well as the doubts he experienced before deciding to put forward this new edition, a

development in which ISST's existence may have played a modest role. (RL)

Halliwell, Jonathan J., Juan Pirez-Mercader, and Wojciech Zurek, eds. *Physical Origins of Time Asymmetry*. Cambridge, Cambridge UP, 1994.

Twenty-eight years after a celebrated symposium held at Cornell (published as *The Nature of Time*, T. Gold ed. [Ithaca, Cornell Univ. Press, 1967]), another symposium, held in Mazagon, Spain, in 1991, gathered forty-two first-rank physicists on the same question. Comparing the two books makes clear that the question has not yet been solved, but that the approach has been considerably narrowed.

Although physicists generally accept that several arrows of time should be considered, they give to two of them—the thermodynamic arrow of time and the cosmological arrow of time—a special importance. They do believe that other arrows might be relevant, such as the radiation arrow and the psychological arrow, but they tend to accept that these are subsumed under the thermodynamic arrow. Linking the latter with the cosmological arrow is not a new problem (indeed it can be traced to Eddington's pioneering insights, formulated in the 1930's), but it has gained new and unexpected twists. In P. C. W. Davies's terms, the thermodynamic arrow requires consideration of initial conditions, and cosmology is the only subject that has attempted to present a theory of initial conditions. The fundamental problem of the physics of time, therefore, is perhaps to find the reasons why the thermodynamic arrow of time may be traced back to cosmological initial conditions.

In that context, the contributions to the symposium tended to focus on two areas. First, because in the initial conditions of the universe, the leading phenomena were related to quantum gravitation, one needs a new formulation of Quantum Mechanics (Q.M.), applicable to gravitation, with which the question of the initial conditions of the universe can be approached. Second, the special needs of quantum cosmology have led to a strong resurgence of interest in quantum measurement theory. The idea here is to build a new quantum theory that would explain how, under the influence of interactions with the environment, quantum systems lose the quantum

coherence that makes them so distinct from classical systems. Thus, the incoherence of having two laws of evolution—the Schrödinger equation on the one hand and the collapse of the wave packet in the other hand—in the same theory is circumvented. Alas, most of the decoherence works (Zurek, DeWitt, Wheeler, Hartle, Halliwell) points towards an interpretation of Q.M. that will appear terribly hard to swallow for the laymen, that of the "many worlds" to which the names of Everett and Wheeler are attached. This theory argues, in short, that although we have the illusion of living in a single and well defined world, in reality there is a continuous creation of quantum mechanically superposed universes. The reason of this appeal to such an abstract interpretation of Q.M. is that, unlike the conventional (Copenhagen) interpretation, it allows one to attach to any physical system a consistent history (Griffiths, Zurek, Omnès, Wheeler, Gell-Mann, Hartle). Halliwell, however, insists that consistent history is not a sufficient condition for having decoherence; some amount of coarse graining is still necessary (p. 379).

One of the participants, Julian Barbour, conducted a very informal poll, putting the following question to the participants: "Do you believe time is a truly basic concept that must appear in the foundations of any theory in the world, or is it an effective concept that can be derived from more primitive notions in the same way that a notion of temperature can be recovered in statistical mechanics?" Unsurprisingly, there was no absolute consensus on the answer, but Fraser's followers may be interested to know that sixty per cent of the participants were more inclined to think that time would not appear at the most basic level of the theory, in accordance with some sort of hierarchical theory of time. (RL)

Handling Absence & Tardiness Effectively. Federal Judicial Center, Thurgood Marshall Federal Judiciary Building, One Columbus Circle, N.E. Washington, D.C. 20002-8003.

The Federal Judicial Center was established in 1967 as the research, education, and planning agency of the federal courts. It develops and administers education and training programs for judges, career court and defender lawyers, and, in a separate division, for non-judicial court personnel,

such as those in clerk of court offices and probation offices. This is a booklet for non-judicial management personnel on how to handle absence and tardiness by employees. At first glance it is every bit as interesting as one would expect of a federal training manual for employee absenteeism.

But why, then, does it contain as an introduction a reproduction of Pieter Brueghel's painting *The Triumph of Time*, with a quotation from J. T. Fraser in *The Voices of Time* explaining the painting's symbolism? And why, at the end, does it reproduce a chart from *The Voices of Time* showing the progress of timekeeper accuracy from 700 A.D. to twentieth century atomic clocks? Has time regulation of employees in federal offices reached a point of such precision that atomic clocks are necessary for effective monitoring? Even the Republican revolution is unlikely to have accomplished this.

The booklet contains the usual managerial goodthink expressed in the benign/helpful/lifeless bureaucratese of the established organization: for example, "A Counseling Approach to Chronic Tardiness," "The Motivation Blockages Questionnaire," "Managing Absenteeism for Greater Productivity," and "Dig Deeper to Uncover Real Reasons for Shirking." Some of the background readings are of interest. One concerns the reaction of municipal employees to replacing timecards and an electronic clock that monitors employee comings and goings with a scanner reading the palms of hands ("Palm-Reading Time Clock . . ."). Another, entitled "Time and Time Consciousness," advises managers that employees from some cultures have different attitudes toward time than clock-driven Americans. Another lists the creative excuses employees give for absenteeism. Many point out the benefits of understanding the personal problems that underlie absenteeism.

Why, though, the excerpts from *The Voices of Time*? One explanation seems obvious. Organizations with too much time and/or money on their hands can afford to ruminate, and sometimes they go to odd unexpected places. But why, in particular, Brueghel's *The Triumph of Time*? Fraser's quotation gives a hint. The central figure is Anthropomorphized Time, or Father Time, who is seen as destructive, devouring his children, and also is regarded as part of, although not identical to, a creative and sustaining force. For the manager who must discipline employees who are absent or late,

particularly those whose personal problems contribute to the problem, there is a problem in creating pain and maybe destroying the worker (the usual conceit being that the worker will be devastated by losing the job) for the presumed good of organizational productivity.

Organization is coordination and timing of different factors, among them employees. The social organization is not anthropomorphized time, but, in the communication environment of the sociotemporal, that which has subsumed levels of time viewed as lower. Brueghel's painting thus raises uncomfortable questions. It also gives comfort that the bending of constituents to the ways of the organization and, that failing, the possible destruction of constituents in the name of the organization—though perhaps ugly—is justified, or if not that, at least the way of things.

But this is only a training manual, and why should such ideas be sought or found there? This is a good sign. Maybe we need a warning label for federal agencies: thinking about time may be dangerous to your mental health. (MHA)

Hildebrandt, Gunther, Maximilian Moser, and Michael Lehofer. *Chronobiologie und Chronomedizin (Chronobiology and Chronomedicine)*. Stuttgart: Hippokrates, 1998. 141 pp.

In this text, published in a series of books named "Learning and Improving," Gunther Hildebrandt, one of the founders of German chronobiology, gives a summary of more than 45 years of research in biological rhythms and offers thereby an introduction to the topic. In order to give a comprehensive view on the temporal organization of life, the authors describe the biological basis of rhythms—oscillators—and explain endogenous rhythms in nature, animals, and man, focusing on their interdependencies. They also describe reactive periods, resulting from illness and necessary in healing.

Hildebrandt et al. show why the concept of "homeostasis" should be replaced by the idea of "homeodynamics" and how the analysis of rhythms and their dysfunctions can be used in diagnostics. Therapy should try to structure time and to resynchronize rhythms, and "chronohygiene" should be considered in daily life as a valuable prophylaxis

as well as part of a concept of an ecology of time. A special chapter deals in detail with selected measuring techniques for students' practical studies.

The whole book, summing up half a century of rhythm research, is informative and easy to read for everyone, but it thereby sometimes leaves already informed readers unsatisfied. While the authors explain all kinds of rhythmical phenomena, precise advice for diagnosis and therapy of temporal disorders is often missing, as well as the latest results of research in the molecular foundations of oscillators in the human body.

Physicians (as all authors) usually think about individuals. The authors embed the individual and his/her temporalities in geological and tidal rhythms. Talking about the increasing emancipation from natural time-scales through civilization, they ask how far humanity may ignore its natural pacemakers or oscillators. This apparently political question is answered biologically. Of course, time policy isn't the book's title.

Many of the graphics and their captions are quite poor, most of them having been taken from slides Hildebrandt used in his lectures and publications decades ago. As the book is sold at DM 68 (about \$40 US), this is a nuisance.

In conclusion, *Chronobiologie und Chronomedizin* can be recommended as an introduction to the topic, containing the results of half a century of research. The comprehensive bibliography enables the interested reader to pursue further the topic of biological rhythms.

Besides the "Learning and Improving" series, the publisher offers a "Select and Apply" series. It is to be hoped that the indispensable supplement for physicians, giving more precise diagnostic and therapeutic advice, will be published there. (TM)

Nahin, Paul J. *Time Machines: Time Travel in Physics, Metaphysics, and Science Fiction*. New York: American Institute of Physics, 1993.

Paul J. Nahin offers us extensive coverage of what has been written about travel in time. At moments witty, the author is successful in carrying the reader through literature intercalated with scientific arguments. He makes it very clear where the boundaries of science and of fiction are, and this distinction is particularly important for the reader

unfamiliar with the theme. Not to burden the reader with mathematical explanations, he leaves scientific arguments to nine technical notes that should offer no problem to someone with college calculus and physics. An exhaustive and well organized bibliography, both of literature and science, plus a helpful index, make this book an invaluable introduction to the fascinating theme of travel in time.

Nahin reveals himself from the beginning to be an experienced time traveler. He is well aware of other travelers, of the difficulties encountered by them and how they tried to circumvent them. A thorough analysis of H. G. Wells is a remarkable moment in the book. We might say it is a tribute to this major writer. Nahin claims that Wells introduced the first time machine, and he makes it clear that the writer was a very sharp social critic.

Chapter 1 sets the tone for this excellent book. Beginning with an overview of time travel—from popular conjectures about it to the scientific possibilities as evaluated in different moments of history—Nahin shows how some of the most intriguing paradoxes (for example, someone going back to kill his own great-grandfather in his childhood) have been treated in literature. The possibility of action in the past is fascinating, both because of the paradoxes and the morality involved in it. When Nahin published this book, George G. Simpson's *The Dechronization of Sam Magruder* had not yet been discovered. Otherwise Nahin would have discussed this remarkable time traveler as well. It is appropriate to recommend this small metaphoric book. It seems it did not receive much attention by those interested in the morality of time travel.

Indeed, one of the most interesting philosophical issues related to travel to the past, or equivalently a return from a trip to future, is the moral question. The knowledge available to the traveler gives him/her a strong advantage. For example, the possibility of an amelioration of a species would interfere with the course of evolution. An equally difficult moral dilemma comes from the fact the traveler would be acting like someone who plays a game with the utmost advantage of knowing the outcome.

The drive towards transcending one's own existence, which prompted searching into the past through history and probing into the future through religion, divination and science, is the main characteristic of our species. Thus, it makes sense

for humans to observe and rejoice or regret the past and guess and activate the future. From this point of view, time travel is inhuman and unfair. Two questions precede all others: can the time traveler maintain the condition of being a member of the species? Is travel in time compatible with the phenomenon life? These questions, formulated differently, permeate Chapter 2 of Nahin's book, mainly when he discusses block-Universe, one of the most, among so many, highlights of the book. Chapter 2—"On the Nature of Time, Spacetime, and the Fourth Dimension"—begins with a basic question: "What is time?." From the comments of early Christian thought through the developments of physics in the second half of the twentieth century, the author shows that current scientific knowledge does not provide the answers for this fundamental concept.

This discussion opens up the possibility of a mathematical description of what might be called the behavior of time, expressed in the title of Chapter 3: "The Arrows of Time." This is one aspect of time studies that has inspired interesting mathematical treatment. Algebraic structures have been weakened to allow for more general systems. Indeed, these generalizations make us realize that the study of time has been, in classical mechanics, a study of algebraic structures. And this is insufficient. The possibilities of understanding time in terms of Newtonian Mechanics are nil. Quantum Mechanics, however, opened up new possibilities for understanding time. Paradoxes, which are intrinsic to quantum theories, are equally so to time travel. This situation is dealt with in Chapter 4: "Time-Travel Paradoxes and (some of) Their Explanations." Nahin leads the reader to realize the paradoxes inherent in each by using a number of examples taken from literature, which are intercalated with the fundamental works of eminent physicists, among them John A. Wheeler and Richard Feynman.

The Epilogue makes explicit the tone of "no one knows" that pervades this fascinating book. A set of notes leads the reader into deeper questions. And the technical notes are an excellent example of good pedagogy. An extensive bibliography covers practically all that is available on the theme. A carefully prepared index is a good help to the reader.

Nahin writes clearly, and he is successful in bringing the reader along with him in building up arguments. His strategy is to use references to popular novels, stories and movies on science

fiction, making choices that we might call precise. He is able to organize the book in a very efficient way. The reading flows smoothly, stimulating the reader to attempt a travel in time. But, as Nahin makes clear, it is very improbable that he or she will have a machine for the travel. (UD)

Slife, Brent D. *Time and Psychological Explanation*. Albany: State University of New York Press, 1993. 343 pp.

Like an attorney setting forth to puncture as many holes as possible in the prosecution's case, a case which after its presentation seemed virtually indisputable, Brent Slife takes on the challenge of creating a "reasonable doubt" that the Newtonian concept of time provides satisfactory explanations for the phenomena that are the subject of study in the field of psychology. He does so by going in search of anomalies, findings, and explanations that are incompatible with Newtonian time in various psychological subspecialties.

This is no mean feat. As Slife feasibly contends, practitioners of "soft sciences" rarely are aware that they even have a conception of time, much less appreciate the effect their conception of time may have upon their theory and practice. This lack of awareness is quite likely due to psychology's birth during the golden age of Newtonian science in the late nineteenth century. Newton himself stated as a presupposition his theory that "Absolute, true and mathematical time, of itself, and from its nature, flows equably without relation to anything else." Although many other physical scientists since then have discussed their own particular conception of time and its significance to their discipline, such discussion infrequently has been the case in psychology. Because psychology battled for acceptance as a "science" during a period when linear time was an indispensable requirement for objectivity, within the discipline a conception of time that "from its nature flows equably" remains not only unquestioned but also virtually unnoticed.

Slife's project is also no mean feat because to challenge the Newtonian paradigm requires taking a step back, to see and write from a broader, interdisciplinary perspective. This focus, in turn, requires a publisher willing to take a risk in putting out a work that is not market-specific. Therefore,

Slife's publisher and the SUNY series edited by Michael A. Wallach of which this book is a part deserve credit as well. The result is a most important work and a must-read for all who work in the broad area of psychology.

Slife identifies five characteristics of Newtonian time—objective, linear, continuous, universal, and reductionistic—and then traces their influential presence in six sub-disciplines of psychology: developmental psychology, personality theory, psychological method, cognitive psychology, individual therapy, group therapy, and family therapy. Some of these influences are easy to trace. Developmental psychology is quite simply Newtonian time filled in with psychological phenomena: individuals develop in a linear, continuous, universal fashion that, when reduced to its individual components, can be objectively studied. Approved psychological method is quite simply the research approach that assumes linear time. Some of these influences, however, are not so obvious. Group therapy and family therapy, with their emphasis upon the present and the influence of systems rather than individuals, seem the antithesis to linear, continuous, and reductionistic approaches. Yet even here Slife finds that pervasive linear models have caused theorists and practitioners to force fresh insights into old molds.

After demonstrating the influence of the Newtonian paradigm in each field, he points out the anomalies—the rough edges where Newtonian time fails to provide adequate explanations—and he presents some of the individuals and theories that have attempted to engage these rough edges. And, although he indicates his intent is not to provide an alternative theory of time, having amassed a significant amount of material that appears not to fit into a Newtonian time frame, he reviews in the final chapter these anomalies in search of common themes, from which he proposes two different approaches to temporality: an organismic temporality and a hermeneutic temporality.

The one great irony in this project, of which Slife appears to be unaware, is that, in attributing the current influence of objective, linear time to Newton, Slife is himself following a Newtonian model: locating causality in the past, attributing the formulation of an idea to a single individual, tracing a reductionistic, continuous chain of causality from past to present, and omitting systemic and subjective influences. This paradox does not detract from

what Slife has accomplished. It only shows how difficult it is to separate oneself from this mode of thinking. (RK)

Ter Meulen, Alice G. B. *Representing Time in Natural Language*. Cambridge: MIT Press, 1997. 152 pp.

The subject of this book is the dynamic process of interpretation and preservation of temporal information in a continuously changing world. In the book Alice G. B. ter Meulen presents a systematic investigation of how we use the temporal information given in texts or discourse to reason in time about the flow of time. The notion of temporal information given in texts can be illustrated by one of the examples in the book: "Jane felt ill. She sat down, attempted to decipher the message, and looked at her watch. She sighed. It was not even noon yet" (p. 4). From this passage, the reader obtains a great deal of temporal information: for example, that the event of Jane sighing must have occurred before this information was given and that the event of Jane sighing took place after she sat down and before noon.

In chapter 1, ter Meulen introduces three modes of aspectual control in the system of dynamic interpretation: holes, filters, and plugs. Holes correspond to activities or processes—that is, descriptions of events that apply throughout their internal structure homogeneously. Filters correspond to accomplishments, which are descriptions of change that never apply to any proper part of the event they describe. Plugs are special cases of filters, which may also be called "achievements." It turns out that these three modes of aspectual control contribute significantly to the architecture of the representation of the flow of descriptive information.

Chapter 2 offers a very interesting analysis of the logical meaning of aspectual verbs. This analysis leads ter Meulen to the introduction of dynamic aspects trees (DATs) in chapter 3. DATs are directed graphs in which information about events can be represented. Let us consider one of ter Meulen's examples—that is, the relation between two brief passages:

- (1) The car hit the fence. The driver had been killed. The police arrived.

(2) The car hit the fence. The police arrived.
The driver had been killed. (pp. 44-45)

Using her graphical formalism, ter Meulen represents the information in (1) and (2) by means of two different DATs. Her analysis clearly illustrates that from (1), but not from (2), we can infer that the driver was killed before his car hit the fence and before the police arrived.

Chapter 4 contains an analysis of various kinds of states (transient states, progressive and perfect states), along with a discussion of generic information, conditionals, and temporal quantification.

Besides aspectual and descriptive information, linguistic expressions ordinarily contain perspectival information, relating the source of information to what is described. In general, a DAT constitutes a perspective on the described episode. The role of this perspectival information is discussed in chapter 5.

In chapter 6, a limited fragment of English is described. This fragment very clearly illustrates the

idea of dynamic interpretation of tense and aspect, using DATs and their so-called chronoscopes as tools for semantic representation.

Chapter 7 is an epilogue that contains some further reflections on the foundational issues of DAT representations. In this final chapter of the book ter Meulen also considers of the role of parametric types in modeling temporal reasoning.

The tools of semantic representation employed in the book are inspired by some fundamental assumptions and logical techniques developed in *Situation Semantics* by Barwise and Perry (1983). Ter Meulen presents a nice and clear formalism of terms in which it can be expressed that a situation supports (or perhaps does not support) a given (parametric or non-parametric) type.

This is a very interesting book. It should be read by anybody in linguistics, computer science, or philosophical logic who is interested in how we use the temporal information given in texts and how we can model temporal reasoning. (PØ)

The Study of Time

Cumulative Index Volumes I-IX 1927-1997

- Aaronson, B.S. "Time, time stance, and existence." I: 293
 Adam, B. "The technology-ecology connection and its conceptual representation." VIII: 207
 _____. "Chernobyl: Implicate order of socio-environmental chaos." IX: 109
 Agren, Hans. "Chinese traditional medicine." V: 211
 Akhundov, M.D. "Transformations of Kronos." VII: 73
 Albert, S. "Time, memory, and affect: Experimental studies of the subjective past." III: 269
 Alverson, H. "Cross-language universals in the experience of time: Collocational evidence in English, Mandarin, Hindi, and Sesotho." VIII: 105
 Argyros, A.J. "Interdisciplinarity and time." IX: 137.
 Ariotti, P.E. "The concept of time in western antiquity." II: 69.
 Arlow, J.A. "Time as emotion." VI 61
 Atwood, S.G. "The development of the pendulum as a device for regulating clocks before the 18th century." II: 417
 Augusto, MHO. "Time and the individual in the contemporary world: The meaning of death." VIII: 229
 Aultman, M.H. "A lawyer's perspective: Re-presenting human life to society." VIII: 199
 Balslev, A.N. "Reflections on time in Indian philosophy." V: 104
 Becker, J. "Hindu-Buddhist time in Javanese gamelan music." IV: 161
 Bedini, S.E. "Oriental concepts of the measure of time." II: 451
 Bielawski, L. "The zones of time in music and human activity." IV: 173
 Blatt, S.J. and Quinlan, D.M. "The psychological effects of rapid shifts in temporal referents." I: 506
 Block, R.A. "A contextual view of time and mind." VI: 61

- _____. "Psychological time and memory systems of the brain." VIII: 61
- Brandon, S.G.F. "The deification of time." I: 370
- Brockmeier, J. "Anthropomorphic operators of time: Chronology, activity, language, and space." VIII: 239
- Brodhead, G.L. "Metaphor and deep time in music." VII: 167
- Bronstein, H. "Time schemes, order and chaos." IX: 33
- Brumbaugh, R.S. "Metaphysical presuppositions and the study of time." III: 1
- Bunge, M. "Time asymmetry, time reversal, and irreversibility." I: 122
- Cairns-Smith, A.G. "Beginnings of organic evolution." IV: 15
- Capek, M. "The fiction of instants." I: 332
- Cassirer, E. "On the reality of becoming." I: 345
- Christensen, F. "The theory of space-like time." III: 167
- Church, M. "Fiction: The language of time—Thomas Mann and James Joyce." III: 500
- Clarke, C.J.S. "Process as a primitive physical category." VII: 53
- Clausius, C. "Waiting and deconstruction: Between order and chaos in post-modern drama." IX: 63
- Cloudsley-Thompson, J.L. "Biological clocks and their synchronizers." III: 188
- Corish, D. "Time, space, and free will: The Leibniz-Clarke correspondence." III: 634
- _____. "The beginning of the beginning in Western thought." IV: 34
- _____. "The emergence of time." V: 69
- Costa de Beauregard, O. "No paradox in the theory of time anisotropy." I: 131
- _____. "The third storm of the twentieth century: The Einstein paradox." III: 53
- Crawford, M. "Genetic disruption, temporal order, and epigenetic phenomena during early development." IX: 177.
- Dauer, D.W. "Nietzsche and the concept of time." II: 81
- Davies, P.C.W. "Space-time singularities in cosmology and black hole evaporation." III: 74.
- de Solla Price, D. "Clockwork before the clock and timekeepers before timekeeping." II: 367
- Denbigh, K.G. "In defense of *the* direction of time." I: 148
- _____. "The objectivity, or otherwise, of the present." III: 307
- _____. "Physical time and mental time." VI: 143
- Dobbs, H.A.C. "The dimensions of the sensible present." I: 274
- Dreyfus, H.L. "Human temporality." II: 150
- Efron, R. "The measurement of perceptual durations." I: 207
- Elchardus, M. "The revolutionary transition and the modern problem of process." VII: 87
- Epstein, D. "On musical continuity." IV: 180
- Finkelstein, D. "Beneath time: Explorations in quantum topology." III: 94
- Ford, G.H. "The eternal moment: D.H. Lawrence's *The Rainbow* and *Women in Love*." III: 512.
- _____. "Death, literature, and its consolations." IV: 46.
- _____. "Humanities and the experiences of time." V: 141
- Fraser, J.T. "The study of time." I: 479
- _____. "Introduction to the special session of flight dysrhythmia." I: 503
- _____. "Clockmaking—the most general trade." II: 365
- _____. "The individual and society." III: 419
- _____. "A backward and a forward glance." IV: xiii
- _____. "A report on the literature of time 1900-1980." IV: 234
- _____. "The problems of exporting Faust." V: 1
- _____. "The many dimensions of time and mind: An epistemic jigsaw puzzle game." VI: 1
- _____. "The elusiveness of the mind." VI: 305
- _____. "Change, permanence, and human values." VII: 1
- _____. "Time and the origin of life." VIII: 3
- _____. "From chaos to conflict." IX: 3
- Gibson, J.J. "Events are perceivable but time is not." II: 29
- Clark, P. "Temporal inventories and time structuring in large organizations." III: 391

- Goldman, S.L. "On the beginnings and endings of time in medieval Judaism and Islam." IV: 59
- Goody, W. "Some factors in the production of dysrhythmia and disorientation associated with rapid latitudinal transfer." I: 533
- Goodwin, B.C. "Temporal order as the origin of spatial order in embryos." I: 190
- _____. "A structuralist view of biological origins." IV: 73
- Green, H. B. "Temporal attitudes in four Negro subcultures." I: 402
- _____. "Temporal stages in the development of the self." II: 1.
- Gross, S. "Real time, life time, media time: The multiple temporality of film." VII: 133
- Guantao, J., Dainian, F., Hongye, F. and Qingfeng, L. "The evolution of Chinese science and technology," V: 170
- Guanyuan, Y. "A communication from the Chinese Academy of Social Sciences." V: xvii
- Gunneil, J. G. "History of political science and the myth of the tradition." II: 283
- Haber, F. C. "The Darwinian revolution in the concept of time." I: 383
- _____. "The cathedral clock and the cosmological clock metaphor." II: 399
- _____. "Time, technology, religion, and productivity values in early modern Europe." V: 79
- Halpern, J.M. and Christie, T.L. "Time: A tripartite sociotemporal model." VII: 187
- Hamblin, C.L. "Instants and intervals." I: 324
- Harris, P.A. "The light of time: Einstein and Faulkner." VIII: 121
- _____. "Scaling mortality to the letter: Georges Perec's stylistic mechanics of death." IX: 51
- Hasty, C.F. "Duration and rhythmic process in music." VII: 147
- Hasty, O.P. "Time and process in Marina Tsvetaeva's definition of lyric verse." VII: 189
- Heath, E. "On the normative implications of a theory of spontaneous social order." IX: 125
- Heller, M. "The origins of time." IV: 90
- Helm, B.P. "Emerson and the sacredness of becoming." VII: 263
- Huertas-Jourda, J. "Structures of the 'living present': Husserl and Proust." II: 163
- Hund, F. "Zeit als physikalischer Begriff." I: 39
- Jackson, J.A. "The processing of temporal information: Do we indeed time our minds?" VI: 43
- Johnson, C.D. "Scientific explanation and the evolution of time." V: 39
- Kalmus, H. "The measurement of biological and social changes." III: 237
- Kamefuchi, S. "A non-causal approach to physical time." II: 239
- Kastenbaum, R. "Time, death and ritual in old age." II: 20
- Knapp, R.H. "Personality and the psychology of time." I: 312
- Kramer, J.D. "Temporal linearity and nonlinearity in music." V: 126
- Landsberg, P.T. "Time in statistical physics and special relativity." I: 59
- _____. "Thermodynamics, cosmology, and the physical constants," III: 116
- Lawrence, N. "Temporal passage and spatial metaphor," II: 196
- _____. "Levels of language in discourse about time." III: 22
- _____. "My time is your time." IV: 1
- _____. "The origins of time." V: 23
- Lestienne, R. "Chance and time: From the developing to the functioning brain." VIII: 43
- _____. "Time, chaos and memory from physical object to living beings." IX: 191
- Lochhead, J. "The expressivity of tempo and timing in musical performance." VIII: 147
- Lundmark, L. "The separation of time and nature." VIII: 97
- Macar, F. "Central and peripheral mechanisms in timing." VII: 109
- Macar, F., Vidal, F., and Bonnet, M. "Attention and brain activation in the processing of brief durations." VIII: 31
- Macey, S.L. "The changing iconography of Father Time." III: 540
- _____. "The relationship between our new sense of time and our sense of an ending in tragedy." IV: 94
- _____. "Literary images of progress." V: 93
- _____. "Time and life: An evolving relationship." VIII: 87
- Matsumoto, M. "Time: Being or consciousness alone?" II: 206
- Mayr, A. "Social time in experimental music and art." VI: 217

- Mays, W. "Whitehead and the philosophy of time." I: 354
 ———. "Temporality and time in Hegel and Marx." II: 98
- McVittie, G.C. "General relativity and time in the solar system." I: 33
- Melbin, M. "City rhythms." III: 444
- Melges, F.T. "Disorders of time and the brain in severe mental illness." VI: 99
- Meredith, P. "The psychophysical structure of temporal information." I: 259
- Merleau-Ponty, J. "Ideas of beginnings and endings in cosmology." III: 333
- Michon, J.A. "Processing of temporal information and the cognitive theory of time experience." I: 242
 ———. "Time experience and memory processes." II: 302
 ———. "J.T. Fraser's 'levels of temporality' as cognitive representations." V: 51
 ———. "Timing your mind and minding your time." VI: 17
- Miller, D. "Neighbors." IX: 79
- Miyake, M. "Some perspectives on the idea of progress as a problem in the study of time: The cases in China, Japan, and Russia in comparison with modern Europe." VIII: 215
- Needham, J. "A message." V: xiii
- North, J.D. "The time coordinate in Einstein's restricted theory of relativity." I: 12
 ———. "Monasticism and the first mechanical clocks." II: 381
- Nowotny, H. "Time structuring and time measurement: On the interrelation between timekeepers and social time." II: 325
 ———. "Mind, technologies and collective time consciousness: From the future to an extended present." VI: 197
 ———. "Times of complexity." IX: 91
- Ogawa, H. "The concept of time in the Mithraic mysteries." III: 658
- Ono, K. "On the origin of indeterminacy." II: 249
 ———. "On two fundamental laws of nature and the role of time in time-space manifold." III: 143
- Osborn, L. "Against the stoics: Non-order and temporality in contemporary Christian theology." IX: 21
- Palmer, J.D. "The living clocks of marine organisms." III: 216
- Pannikar, R. "Time and sacrifice—The sacrifice of time and the ritual of modernity." III: 683
- Park, D. "The myth of the passage of time." I: 110
 ———. "Laws of physics and ideas of time." II: 249
 ———. "The past and the future." III: 351
 ———. "The beginning and end of time in physical cosmology." IV: 103
 ———. "Should physicists say that the past really happened." VI: 125
 ———. "Consciousness and the individual event in scientific theory." VIII: 77
 ———. "The fortunes and misfortunes Laplacian determinism." IX: 147
- Pasler, J. "Narrative and narrativity in music." VI: 233
- Pilarcik, M. See Soulsby, M.P.
- Pöppel, E. "Oscillations as possible basis for time perception." I: 219
- Pouthas, V., Provasi, J., and Droit, S. "Biobehavioral rhythms: Development and role in early human ontogenesis." VIII: 19
- Price, H. "Chaos theory and the difference between past and future." IX: 155
- Prior, A.N. "The notion of the present." I: 32
- Quinones, R.J. "Four phases of time and literary modernism." II: 22
- Rabin, A.I. "Future time perspective and ego strength." III: 294
- Reinberg, A. "Evaluation of circadian dyschronism during transmeridian flights." I: 523
- Renzong, Q. "Cultural and intellectual attitudes that prevented the spontaneous emergence of modern science in China." V: 181
- Richter, C.P. "Astronomical references in biological rhythms." II: 39
- Rochbrg, G. "The structure of time in music: Traditional and contemporary ramifications and consequences." II: 136
- Rowell, L. "Time in the musical consciousness of old high civilizations—east and west." III: 578
 ———. "The creation of audible time." IV: 198

- _____. "Music as process." VII: 127
- _____. "*Ma*: Time and timing in the traditional arts of Japan." VIII: 161
- Schaltenbrand, G. "Cyclic states as biological space-time fields." II: 54
- Schipper, K. and Hsiu-Huei, Wang. "Progressive and regressive time-cycles in Taoist ritual." V: 185
- Schwarze, S.C. "The branch system hypothesis: A critique" IV: 213
- Sebba, G. "Time and the modern self: Descartes, Rousseau, Becket." I: 452
- Shalom, A. "Time and mind in the constitution of the universe: A critique of the participatory anthropic principle." VI: 151
- Sherover, C.M. "Time and ethics: How is morality possible?" II: 216
- _____. "Perspectivity and the principle of continuity." IV: 136
- _____. "*Res Cogitans*: The time of mind." VI: 279
- _____. "The process of polity." VII: 243
- Sivin, N. "On the limits of empirical knowledge in the traditional Chinese sciences." V: 151
- Smith, J. Maynard. "Time in the evolutionary process." I: 207
- Soulsby, M.P. "Beginnings and endings: Hesse and Kawabata." IV: 119
- _____. "Mind and time: A comparative reading of haiku, Kafka, and LeGuin." VI: 261
- _____. "Order and disorder: Creating temporality in literary experience." VII: 205
- Spangler, M. "Time proverbs and social change in Belgrade, Yugoslavia." IV: 223
- Stevens, W.M. "Cycles of time: Calendrical and astronomical reckonings in early science." VII: 27
- Stone, R.M. "The shape of time in African music." V: 113
- Stuhr, J.J. "Pragmatism, life, and the politics of time." VIII: 267
- Taylor, J. G. "Time in particle physics." I: 53
- Thornton, R.J. "Time scales and social thought." VI: 181
- _____. "Malinowski and the birth of functionalism or Zarathustra in the London School of Economics." VIII: 251
- Toda, M. "Time and the structure of human cognition." II: 314
- _____. "The boundaries of the notion of time." III: 314
- Torgovnick, M. "Closure and the shape of fictions: the example of *Women in Love*." IV: 147
- Trommsdorff, G. and Lamm H. "An analysis of future orientation and some of its social determinants." II: 343
- Turner, F. "Poesis: Time and artistic discourse." III: 614
- _____. "Space and time in Chinese verse." V: 241
- Ungvari, T. "Time and the modern self: A change in dramatic form." I: 470
- Vinsrygg, S. "Time in archaeological thought." V: 225
- Voegelin, E. "On Hegel—a study in sorcery." I: 418
- Voisé W. "On historical time in the works of Leibniz." II: 114
- Voisé W., Zeman, J., Molchanov, J.B., and Ackchurin, I.A. "The study of time in Poland, Czechoslovakia, and the Soviet Union." III: 471
- Watanabe, M.S. "Creative time." I: 159
- _____. "Causality and time." II: 267
- Weissert, T. "Dynamics and narrative: The time-identity conjugation." IX: 163
- Werth, L. P. "Clarifying concrescence in Whitehead's process philosophy." VII: 219
- Whitrow, G. J. "Reflections on the history of the concept of time." I: 1
- _____. "Man and time: Some historical and critical reflections." VI: 295
- Yamamoto, M. "What time is not." II: 231
- Yinzhi, Z. "Mohist views of time and space." V: 206

The International Society for the Study of Time

The International Society for the Study of Time is a professional organization of scientists and humanists interested in exploring the idea and experience of time and the role time plays in the physical, organic, intellectual, and social world.

By holding meetings once every three years, the Society provides a forum for the exchange of ideas among its members. Selected papers from these meetings have been published in a reference library, consisting thus far of the eight volumes of *The Study of Time* series with over 205 articles, making for a total of 3600 printed pages.

Why should there be an interdisciplinary study of time?

Time is a fundamental feature of the physical universe. It is intimately connected with the life process. The human mind, setting our species apart from all other species, is characterized by its ability to formulate and pursue long-term plans and to meet present contingencies based on the advantages of long-term memory. The passage of time has been of concern to all great religions and philosophies, and has found an infinite variety of expressions in the arts and letters. No other single aspect of reality relates more directly to basic human needs and desires than does time.

Although time has been a staple of all human knowledge and modes of expression, no systematic attempts have been made in modern times, before the founding of the International Society for the Study of Time (ISST) in 1966, to explore the nature of time through the collective power of scientific knowledge and humanistic insight.

If there exists a unity in the studies of the nature of time, conducted through the different fields of human knowledge, it is likely to reveal itself to the open mind through the course of our work.

But even without assuming the possibility of a universal theory to time, the interdisciplinary efforts of our meetings have been found rewarding, as demonstrated by the unique stimulus that ISST conferences have provided to their participants. The recent upsurge of professional and popular works dealing with time may well be credited to the two decades of quiet pioneering work of members of ISST.

The Society was founded in 1966 by Dr. J. T. Fraser, acknowledged to be the world's leading scholar in the interdisciplinary study of time.

At the end of 1998 the Society's membership was close to 300, consisting of scholars from 33 countries around the world. The disciplines

represented by members of the Society include anthropology, astronomy, the biological sciences, economics, geology, history, law, linguistics, literature and the arts (including the history of art), mathematics, medical science, music, philosophy, physics, political science, psychology and psychiatry, religion, and sociology.

Individual members of ISST, writing in their own fields, have published scores of books relevant to the study of time, directed both to the scientist and academic, and to the inquisitive lay reader.

The Society has published 9 volumes of papers selected from its 10 conferences. Volume 10 will appear in 2000.

1969, Oberwolfach, West Germany: *The Study of Time* New York: Springer-Verlag, 1972)

1973, Lake Yamanaka, Japan: *The Study of Time II* (New York: Springer-Verlag, 1975)

1976, Alpbach, Austria: *The Study of Time III* (New York: Springer-Verlag, 1978)

1979, Alpbach, Austria: *The Study of Time IV* (New York: Springer Verlag, 1981)

1983: Castello di Gargonza, Arezzo, Italy: *Time, Science, and Society in China and the West* (The Study of Time V) Amherst, University of Massachusetts Press, 1986)

1986, Dartington Hall College, Totnes, Devon, England: *Time and Mind* (The Study of Time VI) (Madison, CT: International Universities Press, 1989)

1989, Glacier National Park, Montana, USA: *Time and Process* (The Study of Time VII) (Madison, CT: International Universities Press, 1991)

1992 Cerisy-la-salle, France: *Time and Life* (The Study of Time VIII) Madison, CT: International Universities Press, 1996)

1995 Sainte Adèle, Québec Canada: *Time, Order, and Chaos* (The Study of Time IX) Madison, CT: International Universities Press, 1996)

1998 July 5-11 Evangelische Akademie, Tutzing (Bavaria), Germany: *Time at the Millennium: Changes and Continuities*. (The Study of Time X) Westport, CT: Greenwood Publishing Group.