

Light Treatment and Biological Rhythms

Bulletin of the Society for Light Treatment and Biological Rhythms



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ANNUAL MEETING PLANS AND PRE-REGISTRATION

A brochure, registration materials and abstract submission form for the SLTBR Annual Meeting, set for 30 April - 1 May 1992 were mailed to all members in January.

The meeting, to be held at Lister Hill Auditorium on the campus of the National Institutes of Health in Bethesda, MD, will feature oral scientific presentations and poster sessions on recent research in chronobiologic sleep and mood disorders as well as a tutorial entitled *Light Therapy and Circadian Rhythms Circa 1992* conducted by a group of experts in the field, with opportunity for clinicians to pose questions and discuss practical diagnostic and treatment strategies. Application has been made for Category 1 CME certification for these educational segments of the meeting. An open forum on Friday afternoon, 1 May, will focus on diagnostic criteria for DSM-IV, light apparatus manufacturing standards and FDA regulations. Corporate exhibits will again be an integral part of the meeting. Our meeting banquet will be held on Thursday evening at Bish Thompson's, a Bethesda seafood restaurant.

SLTBR members active in research are invited to participate in the meeting presentations. Please complete the abstract submission form and return it to the SLTBR office before 6 March. Please note the expanded requirements for abstract format and include appropriate and complete information in the abstract body. Meeting registration must accompany your abstract submission. The Program Committee will review abstracts and respond with session assignments about 1 April.

We hope that you will invite your non-member colleagues to attend the meeting. Additional registration forms can be obtained from the SLTBR executive office by calling 503-694-2404. Non-member registration fee includes dues for the 1992 membership year. For 1991 members who have not yet renewed their membership, a renewal category is

included on the registration form. The separate menu selection card should be completed and returned by registrants who have reserved banquet seating.

The Bethesda Ramada has made available a block of discounted rooms for SLTBR meeting participants. Please make your reservations directly with the hotel (301-654-1000). The special room rate of U.S. \$79/single or double will be available for reservations made before 14 April 1992. The hotel has offered to extend the special rate

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Light Treatment and Biological Rhythms

Bulletin of the Society for Light Treatment and Biological Rhythms



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Anna Wirz-Justice, Ph.D.

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Alfred J. Lewy, M.D., Ph.D.

Norman E. Rosenthal, M.D.

Michael Terman, Ph.D.

Unsolicited manuscripts, letters to the editor, and Bulletin Board announcements should be submitted to Dr. Anna Wirz-Justice, Editor, Psychiatric University Clinic, Wilhelm-Klein-Strasse 27, CH-4025 Basel, Switzerland. Please submit one double-spaced hard copy and a diskette file (Macintosh: Ms-Word, MacWrite; IBM: WordPerfect as Textfile); BITNET: WIRZ@URZ.UNIBAS.CH. Manuscripts and diskettes will not be returned. We reserve the right to edit and condense letters to the editor.

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beyond the meeting dates for those who plan to spend additional time in the Washington D.C. area. Be sure to indicate that you are a meeting registrant when you make your reservations.

Meeting packets with travel instructions and other information will be mailed to registrants after the 10 April general registration deadline.

SLTBR BOARD URGES RESPONSIBLE ADVERTISING, LIGHT APPARATUS DEVELOPMENT

It has come to our notice that advertising claims of some light fixture manufacturers have exceeded the available clinical evidence. This has led to an FDA initiative challenging certain manufacturer claims, and requiring registration of the apparatus in question.

While light therapy has been usefully and widely used for the treatment of winter depression in seasonal affective

disorder (SAD), we are aware that much work is required to delineate the appropriate configurations of adequate diagnosis and treatment. Light treatment remains an active area of research for SAD and many newer applications such as subsyndromal SAD, shift work, jet lag and sleep phase adjustment.

Responsible advertising and initiatives to provide safe, convenient and effective devices are encouraged. However, some light apparatus manufacturers routinely recommend light treatment parameters for SAD based on preliminary data. They have also suggested treatment parameters for other conditions, despite the paucity of research data for these applications. Furthermore, it appears that the advertising of some companies imputes specific research studies and investigators in subtle endorsement of indirectly related, or even unrelated apparatus. Documentation of the efficacy of generically different classes of device needs to include convincing placebo controls. The testing of new light fixtures involves issues of safety, clinical self-management and the appropriate clinical trials. The role of light apparatus manufacturers in developing more exacting fixtures is an important one but requires close collaboration with researchers.

Although we appreciate the role of regulatory agencies, excessive regulation would unfairly limit the potential application of light. The Board of Directors of SLTBR considers the Society to be responsible for keeping a balance among these issues. Commercial interests must be combined with serious statements of efficacy, and we urge both members of the SLTBR and all manufacturers of light treatment apparatus to join a formal discussion on standards at the annual meeting in Washington.

Charmane Eastman, Ph.D.

Alfred Lewy, M.D., Ph.D.

Norman Rosenthal, M.D.

Michael Terman, Ph.D.

Anna Wirz-Justice, Ph.D.

NOTES FROM THE EDITOR

The innovative role a botanist has played in the development of our field is probably not widely known by many younger researchers and psychiatrists. Yet it is important to recognize the origin of concepts we use in hypothesizing about seasonal mechanisms in humans and their response to light. For this reason, we are grateful

that M.K. Chandrashekar has written an appreciation of Erwin Bünning's contributions to chronobiology for *LTBR*.

Dr. Chandrashekar, himself a pupil of Bünning, exemplifies the role a biologist can play in transmitting concepts from basic animal research to the human application. He has studied circadian and seasonal rhythms in bats and birds, and the spectral, timing and intensity requirements of light for phase shifting. Since rhythm research is indeed sparse in India, it is a major achievement that he has now set up a temporal isolation facility for the study of light in humans. The first publications indicate that this research is well under way (see references below).

Chandrashekar is also the first recipient of "ASCHOFF'S RULE(r)", a mysterious award of no known precedent, no commercial value, little aesthetic appeal, but mightily symbolic. It is a somewhat battered 25 cm-long (of course) ruler, extricated from Aschoff's wastepaper basket in Andechs, and bearing signs of wear and tear in the decades of drawing those famous linear correlations (by hand, *nota bene*). The prize, conceived with considerable lightness of being, should remind all of us to pursue our scientific work according to Aschoff's spirit. Aschoff has not only opened up one of the most fascinating fields in biology but also has taught us to ask and answer questions bridging many biological disciplines and methods. This spirit is responsible for the ongoing communication between chronobiologists working with several different species on many different levels of biology, ranging from molecular approaches in unicellular organisms to the investigation of psychiatric phenomena in humans. This interdisciplinary exchange is unique among the natural sciences today.

Dr. Till Roenneberg's rules of succession are that ASCHOFF'S RULE(r) be passed on each year by the winner to a chronobiologist who may not be working 1) in the same country nor 2) with the same organism. A unique and honorable award indeed!

A.W.-J.

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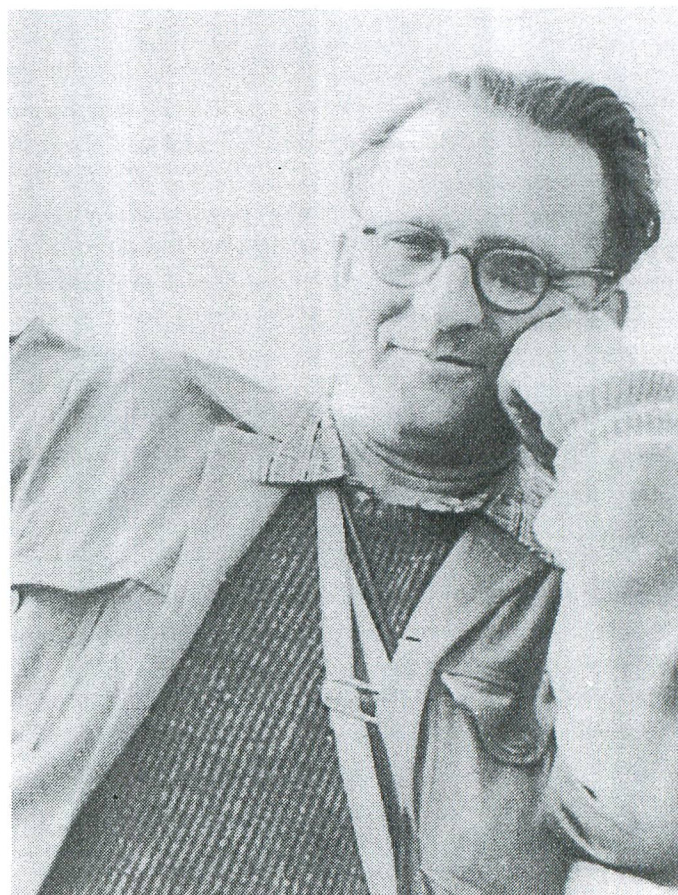


Photo courtesy of Ilse Franklin-Bünning, Basel.

ERWIN BÜNNING (1906 - 1990)

Contributions to biology and chronobiology

Colin S. Pittendrigh drew pointed attention in most of his landmark papers of the late 1950s and early 1960s, to what he himself gave the name of the Bünning hypothesis. He also recognized that Bünning's idea was wholly new (Pittendrigh, 1960). Bünning (1936) clearly postulated that circadian rhythms acted much as yardsticks in measuring day length and, therefore, the seasons of the year. The paper became a citation classic of *Current Contents* in 1982, having been cited in over 135 publications since 1961 and, further, turned out to be the most cited paper ever published in the journal *Berichte der Deutschen Botanischen Gesellschaft*. Bünning, in what was really a very original hypothesis, implicated circadian rhythms in the time measurement in photoperiodism. By means of the diurnal oscillations (the physiological clock) the cell is brought alternately into two period parts with properties differing both quantitatively and qualitatively. Each of these parts lasts approximately eleven to thirteen hours. The basic importance of this oscillation lay in the fact that

the cell is thus brought to certain extreme physiological states. Various physiological functions are possible only when these extremes are reached. One of these extreme states is characterized by a high synthetic capacity and the other by a high catabolic capacity. Bünning also very lucidly explained that photoperiodic regulation of a biological process is linked with time measurement. Organisms have an inherited time scale at their disposal. Day after day, throughout the year, they compare the scale with the actual length of day or night. As soon as day or night exceed this inherited scale, a physiological response ensues. This is what we call a photoperiodic reaction, and the inherited time scale is known as the critical day length.

There was some controversy for a while over whether photoperiodic time measurement is made by the principle of an hourglass or by a process of oscillation. The hourglass model gradually found less and less support since the inherited time scale of the critical day length ticking off time was found to be practically independent of temperature with Q_{10} values in the range of 0.9 to 1.1.

It is now not only safe but gracious to speak of Bünning's pioneering role in having made chronobiology a frontier area in biological sciences. But Bünning's contributions on biological rhythms, strangely enough, did not find much resonance, even in his native Germany. He complained, "... I was rather disappointed to find many people calling this field an accumulation of mysticisms, metaphysics and experimental errors." Among the best Ph.D. theses written under Bünning's research supervision in the 1950s was that of Walter Könitz. Könitz demonstrated that in the short day plant *Chenopodium amaranticolor*, far red light, if offered during the main photophase, inhibited flower induction and that this inhibition can be reversed by red light. In the scotophase it is just the opposite: red light inhibits flower induction and far red light reverses the inhibition. Könitz and Bünning concluded that phytochrome pigment is involved. In its active form phytochrome (PFR) promotes flower induction during the photophilic endogenous half-cycle and the same phytochrome inhibits flower induction during the scotophilic half-cycle. These important findings were questioned as soon as they were published and even established scientists described them as "fairy tales instead of solid science." Fortunately, however, Bünning lived to see all his research find scientific and universal acceptance. Bünning was a Fellow of the Academies of Göttingen, Berlin, Heidelberg and Leopoldina in Halle. The Universities of Glasgow, Freiburg, Erlangen and Göttingen conferred on him doctorates *honoris causa*. Bünning formally retired from service in 1971 and was Emeritus

Professor in Tübingen until his death on 4 October 1990.

Maroli K. Chandrashekar, Ph.D., D.Sc., Dept. of Animal Behavior and Physiology, School of Biological Sciences, Madurai Kamaraj University, Madurai, India 625021. Tel (91) 452-85216; fax (91) 452-85205.

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DSM-IV

In the November 1991 issue of *LTBR*, several options for the revised criteria for Seasonal Pattern were presented. We would like to emphasize that the *DSM-IV Options Book: Work in Progress* (September 1991) presents options. If any individual, or the SLTBR as a group, wants to argue for or against one or more of these options with supporting data, please write me a well documented letter on why and what you desire. This input will go to the DSM-IV Mood Disorders Work Group, which will give such contributions serious consideration in its decision-making process. **We need your written input by 20 April 1992.** The background/ basis for the options will be published in the *DSM-IV Source Book*, scheduled for publication in December of 1992.

DSM-IV wants SLTBR input. Please write, documenting your position with data. The key issue is, if the criteria are too loose, everyone is seasonal and gets light; if they are too tight, then no one gets it. One option — to leave the formal criteria unchanged but to use the text to indicate that some patients may be diagnosed with less than 3 episodes and a wider window (60-90 days) — may be a useful compromise.

A. John Rush, M.D., Mental Health Clinical Research Center, University of Texas, Southwestern Medical Center, 5323 Harry Hines Blvd., Dallas, Texas 75235-9070. Tel 214-688-8768; fax 214-688-6788.

ICD-10

Dr. Norman Sartorius, of the World Health Organization in Geneva, recently asked the ICD-10 Working Group to suggest further categories of mental disorders for the

ICD-10 Research Diagnostic Criteria (RDC). Based on discussions in *LTBR* re criteria for DSM-IV [(1989) 2(1): 2-3; (1990) 2(3):5-6] the SLTBR Consensus Statement [LTBR (1991) 3: 45-50] and the recent information from the DSM-IV Options Book [LTBR (1991) 4: 2-3], together with data from long-term studies on diagnostic and catamnestic issues that are being completed in Basel, we recommended Option #2 for the ICD-10 Research Diagnostic Criteria.

Volker Dittmann, M.D. Member of the ICD-10 Work Group, Psychiatric University Clinic, Wilhelm-Klein Strasse 27, CH-4025 Basel, Switzerland. Tel (41) 61-325-5213; fax (41) 61-325-5258.

ARTICLE REVIEW

A SENSE FOR TIME

Review of The brain and interval timing in psychological and photoperiodic time measurement by Joe Herbert. In Advances in Pineal Research 5, J. Arendt and P. Pévet eds. (1991) John Libbey & Co. Ltd., London, pp. 1-9.

If our sense of timing is lost, then so are we. The society and the environment in which we live are both ordered along a strict temporal basis to which we have to be matched and which we must understand if we are to interact, compete and succeed. Synchrony is not the sole preserve of the artist — efficient and effective timing is a biological and social necessity. However, recognition of this primary role of timing has not yielded a flood of revelations as to the mechanisms of time-keeping. Perhaps because of its all pervasive nature, the generality of a sense of time is overlooked, and its study has been impaired by a tendency to pigeon-hole timing into specific and isolated contexts, despite the fact that time itself is a continuum across such scales. Of these, the circadian context has probably had the greatest general impact, but timing on either side of the circadian scale is investigated by people using contrasting techniques and philosophies who talk neither to each other nor to much of the broader biological world. Cozy clubs do not work, either in society or in science, and so it is exciting to see a recent article by Joe Herbert which aims to construct bridges across the different contexts of timing by exposing their parallel properties and, in so doing, lays a general foundation for the wider understanding of the broader principles of biological timing.

Herbert's thesis is drawn from parallels between the cognitive sense of time which enables us and other species to estimate the passage of external time over the order of minutes, and seasonal time in which the organism exhibits sensitivity to events along a scale several orders of magnitude higher. Unfertile ground you may think, but not so. The subject in both cases is confronted by two problems: how to recognize sequences (a qualitative sense of synchronization) and how to define a single interval and compare it to other intervals of different or equal proportion (a quantitative sense of relative spacing). Both processes are essential for adaptive organization of internal events as well as for understanding action and causation in the external world. The higher cognitive function of humans is based not solely upon our capacity for acquiring, handling and cross-referencing greater volumes of sensory information. The key to understanding the world (i.e., causation) lies in assembling such information into an extensive and sophisticated temporal sequence. Learning and memory require a sense of time just as much as interacting metabolic and endocrine processes.

Herbert points out a major problem for biological timers. Unlike other sensations, time has no intrinsic property to which the nervous system is sensitive. The nervous system must therefore operate upon derived measures of time. These may be internal representations of external events, such as the nocturnal secretion of the pineal hormone melatonin which starts and stops in response to dusk and dawn. Alternatively, they may be internal constructs such as the animal's perception of the course of an interval, as revealed by increased operant responding at a certain time following presentation of a tone. Where the true distinction between externally driven and internally conceived processes lies is, of course, less clear cut. In particular, there must be some metabolic representation of the perceived interval which can be initiated and allowed to run in response to the operant cue — it is simply the case that the measurement of melatonin is technically and conceptually easier. Having achieved an internal representation of time, the organism then faces the question of what it means — in effect, is this longer or shorter than anticipated and so what action should ensue? This is where Herbert's thesis is on strongest ground, drawing elegantly upon work in cognitive and seasonal timing to provide formal models which incorporate essentially equivalent components. Current time, held in working memory, is compared to a reference memory. Action is then taken dependent upon the comparator and the reference may or may not be amended for future use. Immediately, the concepts from biology and psychology

are brought together and effective experimental verifications and comparisons can be made.

In presenting this model, Herbert succeeds in providing the ground work for an exploration of biological time. Whether or not the parallels hold up under closed scrutiny is irrelevant — the test is the important product of this exercise. Several points of the model are unsatisfactory and require further development. For example, the internal cognitive construct of time has to be provided by a pacemaker. But if we allow ourselves the luxury of a hypothetical pacemaker, we have immediately avoided the question of how the organism defines time. Perhaps some clue is provided by the scalar properties of time perception, directly following Weber's Law in which the accuracy in defining the interval is a constant proportion of the magnitude of the interval. In other sensory systems, this property is related to the successive recruitment of units of progressively higher threshold, separated by progressively wider intervals. A similar relationship governs the ratio of force and accuracy in motor control. The scalar property of time may therefore provide a message about the structure of sub-units used to construct perceived intervals, which may allow for the removal of the pacemaker from the model. A second point raised by Herbert is the aspect of learning time, suggesting that, in the absence of direct "chrono-receptors", time perception is intrinsically more difficult than other types of perception for the organism to achieve. This is not necessarily the case. All sensory mechanisms operate over a scale set by experience. The brain is not born with an internal set of standards for light, sound or touch. Any parent will tell you instinctively that the infant should be bombarded with ordered experience if it is to grow up making sense of the world. The secret of the success of the developing mind is its ability to exploit early experience and establish templates against which future sensory events can be experienced. Time perception relies upon a similar, imposed template from the external world. We can therefore expand Herbert's thesis even further and emphasize the importance of a sense of time, not because it is different, but because it is the same as other sensations — a true sixth sense.

The article, then, can be recommended to a wide audience, both for its specific subject and its wider message. If the model is to be expanded, it is necessary that it be applied to a variety of contexts. Biology, after all, is the science of comparison — none of us will benefit from a prolonged stay in a cozy pigeon hole. There is one final point to all of this. How long do you think it took you to read this

article, and when you check it against the clock, were you accurate in your assessment?

Mick Hastings, Ph.D. Department of Anatomy, University of Cambridge, Downing Street, Cambridge CB2 3DY, United Kingdom. Fax (44) 223-333-786; EMail MH105@PHOENIX.CAMBRIDGE.AC.UK.

NEUROBIOLOGY OF CIRCADIAN AND SEASONAL RHYTHMS: ANIMAL AND CLINICAL STUDIES

Highlights of the Philippe Laudat Conference, November 1991, Strasbourg/Bischenberg, France

This was a most excellent and interesting conference, exceptionally well organized and extraordinarily well-fed and watered (but, of course, this was France). A very substantial amount of time was devoted, rightly, to the structure and function of the suprachiasmatic nucleus with many leaders in this field worldwide in attendance.

S. Daan gave an objective and lucid overview of the evidence for one or more oscillators within the circadian rhythm generating system, and concluded that many observations, for example, internal desynchronization, splitting of rhythms, fractional desynchronization and differential re-entrainment are all compatible with a single oscillator. Nevertheless, some phenomena such as residual rhythms following SCN lesion (e.g., visual sensitivity and anticipatory feeding activity) all made a case for a second oscillator. Daan concluded his provocative presentation by suggesting that perhaps the left and right SCN are the evening (e) and morning (m) oscillators respectively.

The structure, inputs and outputs of the SCN were very comprehensively covered by R. Moore, A. Watts and, in a fascinating talk, by D.F. Swaab. Professor Swaab gave a most enlightening presentation on the human suprachiasmatic nucleus and its relationship with development, sexual behavior (e.g., homosexuality), aging and dementia. The many neurotransmitters and neuromediators within the SCN, both aminergic and peptidergic, were covered by H.E. Albers, M.A. Gillette, W. Rostene and R.M. Buijs. The mapping of SCN connections is evidently of primordial importance to an eventual full understanding of its function. We were

particularly interested to learn that SCN lesion does not affect the episodic ultradian LH secretion (Watts).

Entrainment, both photic and non-photoc was covered at a variety of levels. Of major interest was the talk by B. Rusak on the regulation of gene expression in the SCN by specifically timed light. However, it was clear from this talk that changes in gene expression are probably not essential for non-photoc phase-shifting. For example, while light does induce immediate early genes in the SCN, dark pulses, which can induce large phase advances in the daytime, did not induce immunoreactive C-fos. Likewise, triazolam, a phase-shifting drug, did not affect C-fos, and melatonin whose phase advancing affects in rats are maximal at CT-10 and 11 only induced C-fos at CT22. J.H. Meijer covered the broad field of photic entrainment and P. Zee described the fascinating observation that grafting SCN from young animals to old animals restored the lost ability (during aging) of triazolam to induce activity phase shifts. M. Gillette described a series of in vitro electrophysiological experiments on isolated SCN, looking at various phase-shifting agents such as 5HT and melatonin. These in vitro phase-shifts were circadian time dependent, this dependency being different for different phase-shifting agents.

E. Gwinner and P. Pévet considered circannual functions. Gwinner's work with birds has shown little effect of SCN-lesion on circannual rhythms. Pévet's talk concerned pineal influence on seasonal and circadian rhythms. He described the entrainment of circadian rest-activity cycles in a paradigm using programmed 6-hour melatonin infusions. The bulk of his talk concerned pineal influence on seasonal and circadian rhythms. The neuroendocrine implications of SCN activity were considered by A. Assenmacher. A.A. Borbély has expanded and tested his two-process model for sleep regulation. The model fits a variety of real data to a very large extent. J.L. Valatx considered the possible role of prolactin in the circadian organization of sleep but the data are as yet somewhat unconvincing.

S.M. Reppert and M. Mirmiran considered, respectively, the development of rhythmicity and circadian rhythms in aging. The developmental story is well known but remains of exceptional elegance: the demonstration of maternal fetal communication in the setting of fetal circadian rhythms. While melatonin is clearly able to communicate phase to the fetus, whether it actually does so as an endogenous compound remains to be shown unequivocally. With respect to aging, of course, there is substantial

clinical interest in the possibility of reinforcing the circadian system in old-age, given that degenerative processes lead to less robust rhythmicity. Continuing in the direction of the clinic, T. Akerstedt gave a troubling talk on the problems of shift work and jet lag associated clearly, in most cases, with circadian disruption. We were amazed to learn that on at least one occasion the entire crew of a long haul jet have been found to be asleep simultaneously and that overnight train drivers may have persistent sleep episodes throughout their night shift. This presentation highlighted the importance to health, industrial productivity and the economy of therapeutic approaches designed to alleviate rhythm disturbance. H.J. Haug then considered from the psychiatrist's viewpoint the diurnal and seasonal variations in affective disorder and A. Wirz-Justice presented an objective review of the present hypotheses underlying light therapy for winter depression. Wirz-Justice's own research approach is to consolidate much of the early and, in some cases, controversial observations on the timing of light therapy and the relation of light therapy to melatonin secretion as well as to include metabolic measures. J. Arendt described experiments in the use of melatonin and bright light to help adaptation to forced phase-shift both in jet lag situations, night shift work, and in the blind, and mentioned briefly the use of melatonin in delayed sleep phase insomnia. The meeting was concluded by B. Claustrat who described similar studies using melatonin as a phase-shifting agent. Of particular interest in his talk was the development of a transdermal patch to administer slow release melatonin and the induction of phase-shifts according to a PRC by slowly infused single pulses of melatonin. Phase-shifts comparable to those obtained by oral administration were described, but plasma levels remained close to physiological concentrations.

The organizers of this meeting, P. Pévet, R.M. Buijs, M. Jouvet, J.L. Valatx and A. Wirz-Justice, together with the sponsors INSERM, are to be congratulated on a really outstanding meeting. A summary will be published in the annual review of the 1991 Philippe Laudat Conferences and may be obtained in spring 1992 from *INSERM, 101 rue de Tolbiac, F-75654, Paris Cedex 13, France.*

Josephine Arendt, Ph.D., Department of Clinical Biochemistry, University of Surrey, Guildford, Surrey, GU2 5XH, United Kingdom. Tel (44) 483-571281; fax (44) 483-576978.

LIGHT THERAPY RESEARCH IN AUSTRIA

This report gives a short chronological review of Austrian research activities concerning the therapeutic use of bright light in psychiatric patients, as far as it has been possible for us to get information from research groups working in this field.

In our country, light therapy was first applied in depressed patients by the research group of Dr. Margot Dietzel at the Psychiatric University Clinic in Vienna in the early 1980's. Like other scientists in this field, Dietzel focused initially on the role of melatonin as a possible key to understanding the underlying biological mechanisms of the effectiveness of light therapy. She showed (Dietzel et al., 1986a) that the seasonal variation in the melatonin rhythm differs in depressed patients and healthy controls. She further discussed (Dietzel, 1987) in non-seasonal depressives a "hyper-melatonin-syndrome" in summer and a "low-melatonin-syndrome" in winter.

An interesting and important practical aspect of the research of the Viennese group and, since 1988, of the light therapy research group directed by Dr. Josef Schwitzer and myself at the Department of Psychiatry of the Innsbruck University Clinics, was the effort to open up new possible uses for light therapy in psychiatric patients. I would like to summarize these studies in more detail.

Dietzel postulated that light therapy's efficacy is mainly due to its nootropic properties (Dietzel et al., 1989a). Thus states of reduced vigilance, such as withdrawal syndromes, confusion in the aged, demented patients or delirious conditions, could be possible further indications for treatment with light. A pilot study in ten arteriosclerotically demented patients indicated that light therapy could improve their disturbed sleep-wake cycles, confused states during the night, and sometimes also mood (Dietzel et al., 1989a).

Then, in a single blind study, Dietzel tried to treat patients in acute alcohol withdrawal with light therapy (Dietzel et al., 1989b). The preliminary results were quite interesting insofar as vigilance, concentration and memory improved significantly, whereas vegetative symptoms did not. In this trial, light therapy was given for 7 hours daily (6-8 am and 5-10 pm) for a week. Nevertheless, the author

suggested that a larger and drug-free patient sample would be necessary to draw relevant conclusions.

In our clinic, we have used light therapy not only in SAD, but also in a large number of hospitalized major depressive patients. We studied light as an adjuvant treatment in therapy-resistant major depression (Schwitzer et al., 1990b). Fifteen patients with major depression and considered resistant to drug treatment were given light in addition to antidepressant drug treatment using clomipramine/maprotiline or dibenzepine/amitriptyline. After the application of light all patients showed marked improvement in several psychological rating scales. Further analysis revealed that this improvement was highly significant in the group receiving clomipramine/maprotiline during light therapy, but only marginally significant in the group receiving dibenzepine/amitriptyline. There was no difference between patients with unipolar or bipolar depression with regard to their response to light therapy.

Another interesting observation we made (Schwitzer et al., 1990a) was that two patients suffering from major mood disorders with hypersomnia and hyperphagia in a non-seasonal course "switched" into mania in the course of light therapy. Both patients had previously shown a unipolar course of the illness.

We also tried to apply light therapy for non-seasonal affective disorders with hypersomnia (Neudorfer et al., 1989) and could demonstrate a relevant improvement of depression after 14 days light therapy. This was significant in the group of patients with the "atypical" symptoms of hypersomnia and hyperphagia, but only marginal in the group of "classical" major depressive disorder patients.

In the field of electrophysiology, a polysomnographic evaluation in non-seasonal depressed patients by Dietzel et al. (1986b) is notable. They demonstrated that sleep after a single day of light treatment (6-9 am and 5-9 pm) showed a tendency to shortened sleep onset, decreased numbers of awakenings, and increased REM-latency. The average REM period length was significantly attenuated by light.

Finally, our group has also investigated the electrophysiological effects of light on non-seasonal depressives and controls (Neudorfer et al., 1991). After 7 days light treatment (4 hours/day) a significant increase of absolute Alpha-2 and Beta power occipital-parietal was

found in the healthy control group. In the depressive group, no significant change of absolute spectral power density could be observed in any frequency band.

Christian Neudorfer, M.D., Psychiatric University Clinic, Anichstrasse 35, A-6020 Innsbruck, Austria. Tel (43) 512-504-3621; fax (43) 512-504-3628.

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BOOK REVIEW

Biological Rhythms: Implications for the Worker

US Congress, Office of Technology Assessment (OTA-BA-463), Washington, D.C.: US Government Printing Office, September 1991, 250 pp.

This book (and series) is intended as an overview of an area of knowledge, but with a very pronounced emphasis

on practical implications and applications. Thus it is not a scientifically oriented text. It is, in fact, a text on the problems of shift work (irregular work hours), their causation and their elimination. The concept of biological rhythms is addressed mainly as the central mechanism behind shift work problems.

The first major chapter concerns circadian rhythms — their general properties, their generation, their response to the environment, their implications for health and performance, and ways of manipulation. This is a nice introductory review. Light, incidentally, gets two pages and is recognized as the major circadian synchronizer. It is also stated that neither melatonin nor benzodiazepines, diet or activity have been conclusively proven to modify circadian rhythms.

The next chapter introduces the applied aspects and discusses the forces behind the use of shift work as well as its prevalence in the population and occupation. While useful, much of the information concerns conditions specific to the US.

The chapter on "Biological rhythms and work schedules" is the central chapter of the book. It starts with a statement of methodology in which the difficulties of physiological field studies are recognized and that, consequently, few such studies exist, particularly in the US. Questionnaire studies, on the other hand, are found to be very common. One aspect lacking emphasis here is the confounding effects of selection into and out of shift work, which have been recognized as the major problem in shift work epidemiological research.

Further on in this chapter, the major problems of shift work are listed, i.e., sleep disturbances, gastrointestinal problems, cardiovascular disease, performance, safety, etc. Obviously, the effects on the latter two are the main reasons for writing the present book, but the conclusion is, quite correctly, that we have precious little data to rely on, even if much circumstantial evidence is there. Consequently, research in these areas is highly encouraged. Lack of research is also found with regard to possible interventions to improve the shift workers' situation. Thus, it is concluded that we know too little about the effects of the speed of shift rotation, the direction of shift rotation, the duration of shifts, the effects of light, the effects of medication, the importance of monitoring devices, employee education, physical fitness programs, etc. What I find missing here is a stronger emphasis on the lack of experimentation and on the lack of

studies on interactions between shift work and environmental factors.

The subsequent chapter deals with legal and regulatory issues. This is, no doubt, quite a useful summary of an area that most researchers know too little about. It is, however, restricted to US conditions. In order to facilitate understanding and add "local color", the book also includes a series of case studies of nuclear power plant personnel, nurses, resident physicians and military personnel. This makes for a better understanding of the problem.

The book ends with appendices on international regulation and federal research activities — surprisingly interesting and useful collations.

The summary (first chapter) does what it is supposed to do. The second and more important part, however, is the suggestions on policy issues and options for congressional action. Major decisions may be taken on these recommendations. First, it is concluded that shift work research has received very limited support in the US. This is no doubt correct and the difference compared with Europe is remarkable. Then three major areas for congressional action are suggested. The first is federal research funding. Here, the options given to Congress, aside from no action, are 1) the creation of a federal interagency task force to guide research efforts, 2) the creation of a national commission to provide guidelines for research priorities, 3) the direction of the Bureau of Labor Statistics to collect data on work schedules on a regular basis, and 4) an increase of research funds in the shift work area. The second area of options is improvement of federal mechanisms for collection of work safety statistics.

The third area is congressional measures to protect the well-being of shift workers in terms of education, issuing of standards, review of regulations and increased surveillance of existing standards. The European reader should be advised that in the European community there have been, and still are in existence, various commissions to promote research activities in the shift work area. The legal/regulatory aspects are being addressed in the European community as well. There is also a scientific society for shift work research, presently a part of the International Commission of Occupational Health.

On the whole, this is an interesting and unusual type of book. It is not a front-line publication on the latest scientific developments. Instead, its primary use is as an overview for decision makers. One clearly sees the political intentions behind the book, but its impact remains to be determined. The book may also serve as a handbook for the chronobiologist who wants to get into shift work research as well as for the shift work researcher who wants an overview of and an introduction to legal and regulatory aspects of shift work. It is, of course, also of interest to any researcher who wants an easy way into the shift work research area. I doubt, however, that it would interest those whose concerns are restricted to light or chronobiology per se, or to their clinical applications.

Torbjörn G. Akerstedt, Ph.D., IMP & Karolinska Institute, Box 60205, 104 01 Stockholm, Sweden. Tel (46) 8-340560; fax (46) 8-344341.

(Note: Orders for this publication should reference GPO stock number 052-003-01254-5 and be sent to the US. Government Printing Office, Washington, DC 20402-9325 accompanied by payment of U.S. \$11.00.)

BULLETIN BOARD

WELCOME TO NEW MEMBERS

The Board of Directors welcomes the following new members who have joined SLTBR since publication of the last issue of *LTBR*.

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The eighteen-paper volume presents a range of research ranging from fundamental and historical presentations, to comparisons of a variety of glare metric approaches developed in Europe, the United States and the United Kingdom. Factors such as age, specific environments and light sources (e.g., interior versus street lighting), and optometric considerations, as well as established and emerging techniques for measuring discomfort and disability glare, are covered. Contributed papers and their references are printed in full and include tables, charts, drawings and mathematical formulae. The 218 pp. volume is soft-bound.

The **Glare Proceedings** may be ordered from the *Lighting Research Institute*, 345 East 47th Street, New York, NY 10017, accompanied by a check or money order for \$75 US, payable to LRI. If you need an order form, write to the Institute or contact: tel 212-705-7511; fax 212-705-7641.

European Neuroscience Programme
1992 Autumn School on "TIME AND THE BRAIN"
San Feliu de Guixols, Costa Brava, Spain
19-26 September 1992

European applications are invited for participation at this ENP Autumn School on "Time and the Brain", organised by Dr. Joe Herbert (Cambridge, UK) and Professor F. Seitelberger (Vienna, Austria). Forty-four places are available for scientists under the age of 35 who already have some experience in the field.

SLTBR ABSTRACTS CORRECTION

The authors of *Seasonal affective disorder: A controlled study of phototherapy* [Demjen et al., (1991) SLTBR Abstracts 3: 5] report that a post-presentation review of research methodology revealed discrepancies due to wavelength filtering which also significantly reduced the actual light intensity received. Because of this flaw in methodology, the authors request that those who attended the presentation, and others who have reviewed the abstract, disregard its contents. The authors are currently working to improve the methodology involved in this research and apologize for any misinformation that has been provided. For further information, please contact *Chris P. Gorman, M.D., F.R.C.P.(C), Affective Disorders Clinic, Foothills Hospital, 1403 29th Street N.W., Calgary, Alberta, Canada T2N 2T9. Tel 403-270-8222.*

RESEARCH COMPENDIUM ON GLARE

The Lighting Research Institute, an organization closely associated with the Illuminating Engineering Society of North America, announces the publication of technical papers presented exclusively for the 1st International Symposium on Glare which was held in Orlando, FL in October 1991. Organized by Dr. Werner Adrian, an optometrist and member of the LRI Research Advisory Committee, the meeting brought together for the first time an international panel including lighting engineers, transportation research specialists, optical scientists and optometrists to compare, both historically and procedurally, different glare rating systems, expand on the concept of visual comfort probability, and outline specific technical recommendations for the accurate prediction of discomfort glare for both interior and exterior systems, thereby prioritizing research needs and directions.

The School will introduce students to a cross-disciplinary approach which mirrors the diverse yet complementary ways that time measurement has been studied. The fact that time is, itself, a subject of debate will be considered. The various ways that animals need to use time in a biological context will be discussed. The sense of time as a cognitive process will be debated - particularly the brain's ability to estimate durations, and to determine sequences of events, and discriminate past, present and future. The relationship between biological, philosophical and psychological concepts of time will be considered. Speakers are: J. Arendt (Guildford, UK), J. Aschoff (Freiburg, Germany), R.A. Block (Bozeman, Montana US), J. Campbell (Oxford, UK), S. Daan (Groningen, The Netherlands), S. Folkard (Sheffield, UK), M. Hastings (Cambridge, UK), J. Herbert (Cambridge, UK), H. Illnerova (Prague, Czechoslovakia), G. Lincoln (Edinburgh, UK), F. Macar (Marseille, France), B. Malpaux (Mouzilly, France), J. Meijer (Leiden, The

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Further information and application forms can be obtained from *Miss Chantal Durant, ENP Administrative Secretary, European Science Foundation, 1 quai Lezay-Marnésia, F-67080 Strasbourg Cedex, France.*

SIGH-SAD NOTES

Editorial revisions of the SIGH-SAD and SIGH-SAD-SR instruments are being prepared for completion this spring. Any suggestions should be submitted in writing, before 15 March 1992, to: *Dr. Janet Williams, Biometrics Department, Box 74, NYS Psychiatric Institute, 722 West 168th Street, New York, NY 10032; fax 212-960-5525.*

An important note on the proper scoring of SIGH-SAD-SR item 48 (severity of symptoms of somatic anxiety): Scale values of 0-3 should be converted to 1-4, respectively, in order to achieve parity with the corresponding Hamilton Depression Scale and SIGH-SAD interview items. In the

next edition, the stem question will be rephrased ("Check off all of the following physical symptoms **that have bothered you** in the past week: . . ."), and the scale values adjusted. In the meantime, if you are photocopying the instrument (latest version dated October 1991), you may wish to correct the scoring key in the right-hand column:

$$(48/ \underline{\quad} 4 \underline{x})$$

(add 1↑)

aaaggggh . . . !

ENDNOTE: BLOOMINGDALE'S CHIC

"Chicly Suffering From SAD? (Seasonal Affective Disorder). There's a new name for your fashionable despair, the blahs brought on by the darkest days of January, when even a dinner party with Truman Capote, Kiki de Montparnasse and Bébé Berard couldn't cheer you. It's SAD. So christened (it's quite true) by the AMA. Our advice? Wallow in it, pet, with a roaring fire, a bit of brandy and one of our handmade, old-fashioned jigsaw puzzles from the Tate Gallery, just arrived from London (where they know about dark days) in *Past and Present*. On 5." — Advertisement in the *New York Times*, 12 January 1992, Section 1, p. 5.