Mathematical Biology Newsletter

Society for Mathematical Biology Volume 9, Number 3 September, 1996

Dear SMB Members,

Many of us have just returned from the recent SMB Annual meeting with AIBS, the American Institute of Biological Sciences (Aug 4-8, 1996, Seattle, WA, at the University of Washington campus). A short report on this meeting appears in this issue of the newsletter. Many SMB concerns, including the rising cost of institutional subscriptions to our Society-owned journal, the Bulletin of Mathematical Biology, and the attrition of library subscriptions were discussed at our business meeting. Some of these subjects are detailed in the following pages.

I would like to draw your attention to a new initiative, the **Akira Okubo memorial fund** which has been set up to honor the memory of this distinguished scientist and role-model. Contributions to this fund (administered jointly by SMB and JAMB) are being accepted now, and will be dedicated to initiatives in honor of Okubo. (See details on p 11).

This issue features an article about the history of the Society for Mathematical Biology, written by one of our long-standing members, Michael Conrad. We are still interested in further reminiscences, contributions, and articles on this, and any subject of interest to our members. We also urge readers to send their correspondence, or submit short articles for this publication. Submissions should be forwarded by email to keshet@math.ubc.ca

Sincerely yours,
Leah Edelstein-Keshet
President, SMB

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Deadline for submissions: Dec 1, 1996
Dissemination date: Jan 1, 1996

WATCH FOR MEMBERSHIP RENEWAL INVOICE FROM ELSEVIER COMING SOON TO A MAILBOX NEAR YOU !

- - - - - Keep your membership to SMB current - - - - -

Society for Mathematical Biology

A Report on the **Annual Meeting of The Society for Mathematical Biology**, Aug 4-8, 1996 Seattle, WA
Modified from an article by James Watmough, UBC

The Society of Mathematical Biology held its Annual Meeting, August 4-8, at the University of Washington campus in Seattle. Although overcast on Sunday, the weather became clearer as the meeting progressed, leaving us with images of a beautiful campus and Mount Ranier towering in the distance. (Almost as spectacular as British Columbia's coast!)

The meeting was held in conjunction with the 47th Annual Meeting of the American Institute of Biological Sciences. In keeping with the meeting's theme of the ``temperate rainforest", the opening plenary AIBS session on Sunday night warned us of the dangers of forest preservation without careful management, and stressed the importance of maintaining species diversity in the environment.

The talks and posters at this year's SMB meeting covered a wide spectrum of topics and a wide range of scales in both theoretical and experimental biology. We learned of swarming and schooling behaviour from bacteria (Jim Shapiro) to fish, (Julia Parrish) and, on a still larger scale, of the invasions by species with both fast and slow dispersers (Mark Lewis).

Attendance far exceeded the modest expectations of the organizers. Thus, Monday morning found us packed like sardines for the opening session on pattern formation and developmental biology. Talks by the "Oxford contingent" (P. Dale, N. Monk, J Cook, et al), and by a UBC-associated crowd (L. Harrison, D. Holloway, M. Lyons) were punctuated by a new look at fur coloration patterns by M. Reimers. The session was introduced and chaired by Sharon Lubkin. The afternoon session on neurophysiology and physiological modelling stressed nonlinear dynamics of neural firing patterns, and was chaired by R. Miura.

Enthusiasm for the annual meetings is strong, and the number of submitted papers was large enough to warrant parallel sessions on Tuesday. S. Gueron's Ecology session focused on foraging, and featured a talk by T. Lauck on the foraging by fishermen (for fish) as well as a description of fish foraging (for smaller fish) by J. Parrish. A parallel session on networks in genetic and metabolic systems featured talks by M. Savageau, J. Mittenthal, R. Redfield, and others, and was chaired by Denis Thieffry.

Competition for a common resource (or niche) was an inadvertent theme on Tuesday afternoon, as participants struggled with a group of anonymous para-psychologists for the same lecture space. (Close to fisticuffs, we eventually found a new niche to inhabit in the same building). Our cancer session, chaired by JC Panetta, was smooth sailing after this initial excitement. The second ecology session, dedicated to the late Akira Okubo, began with a fine tribute, by the organiser, D. Grunbaum, to the research of this warm and gentle scientist. Other participants, including Fred Adler and Peter Kareiva, added their thoughts and contributions.

The poster session on Tuesday evening was shorter than anticipated. (At 9:00 pm the "HUB" turns into a pumpkin, and we were all evicted by UW personnel). However, the turnout was good, and the mixture of socializing, snacking, science, and society work seemed successful. The topics of the posters covered a range from purely experimental to purely theoretical. However, even the short poster session did

- - - - - - - **continued on page 11** - - - - - - - -

Participants at the Neurophysiology Session of the recent SMB meeting in Seattle gather for a group photograph.

A Report about the Bulletin of Mathematical Biology

------ SMB Needs Your Help ! ----------

As a member of the Society for Mathematical Biology, you are entitled to a complimentary subscription to the Bulletin of Mathematical Biology. Many of you have a collection of back issues on your office shelves, and thus rarely have the need to drop by your library to find a BMB article or check the contents of the latest issue. You may have even considered the idea of donating your personal copy to a local library or department shelf. If so: resist this temptation !

Few of our members realize that library and institutional subscriptions play a vital role in promoting the health of our society. Many members are surprised to learn that the individual membership fee of $50 contributes a mere $15 to the society itself. And although $35 of your membership fee goes to Elsevier towards the subscription fee, this sum barely covers the true cost of printing, handling, and mailing an issue. Indeed, the financial stability of SMB depends directly and exclusively on the institutional subscribers to the Bulletin. In contrast to individual subscribers, each institutional subscription to the Bulletin of Mathematical biology (charged by our publisher, Elsevier, at $700 per year thus far, with an upcoming increase of 5%) contributes over $100, in royalties to SMB.

As you know, libraries face ever-tightening budgets, and respond by cutting journal subscriptions. Attrition is now a serious concern to the publisher and to SMB. Our ability to support yearly meetings, plan future initiatives, and contribute to the health of the mathematical biology community depends on our ability to persuade librarians that BMB is an important research tool that should be kept current. It is in the interest of SMB to assure a broad dissemination of our journal, and to keep institutional prices reasonable. (To offset attrition, Elsevier has asked for a 10% institutional subscription increase. We have reached a compromise of 5% for 1997 after intense negotiation.) Only by stemming the loss of library subscriptions will we be able to argue effectively against future institutional price increases, as well as ensuring the income and support of our society's vital activities.

The following list contains the names of a few of the recent library cancellations of the BMB subscription. We call on members at these institutions to voice their support of the Bulletin of Mathematical Biology, and to help reinstate the local subscriptions.

Library and Institutional Cancellations:

Connecticut University, Storrs, CT
New York State University Science Library, Binghamton, NY
Alabama Univ.(Lister Hill, Health Sciences), Birmingham, AL
Donner Library, Lawrence Berkeley Laboratory, CA
New York University Medical Center,NY
Jackson State College, MS
University of Texas Moody Medical Library, Galveston, TX
IBM Thomas J Watson Res Ctr, Yorktown Heights, NY
Johns Hopkins University (Welch Med Library), Baltimore, MD
University of Florida Libraries, Gainesville, FL
University of Wyoming Library
MIT, Electronics Res Lab, Cambridge, MA
Colorado State University, Fort Collins, CO
Montreal Universite, Quebec, Canada
Valparaiso Catolica Univ, Chile
Univ Louise Pasteur, Strasbourg, France
Wako University, Tokyo, Japan
UNAM Inst invest. mathematicas, Mexico
Tokyo University (Fac of Engr), Tokyo, Japan
Kyoto University
Singapore National University

Members at all institutions can help as follows:
(1) Check that your library maintains a current subscription.
(2) Tell your librarian about your interest in this journal. Though you may own a personal subscription, the ability to access back issues, to keep the journal available to students, colleagues, and the research community should be stressed.
(3) Include citations of BMB references in research articles you write. These citations add to the journals "impact factor" - a numerical descriptor that libraries consider in assessing the importance of each journal.
(4) If you teach Mathematical Biology at your university, include homework assignments that require the students to look up recent BMB articles in the library. Their request and usage of the journal will reinforce the importance of maintaining a library subscription.
(5) Avoid donating or loaning your personal copy, especially to an institution.

POSITION IN MATHEMATICAL BIOLOGY
Mathematics Department, University of British Columbia

The Mathematics Department is seeking an outstanding candidate in Mathematical Biology for a tenure track Assistant Professorship to begin 1 July 1997. Applicants should have a proven research record of high quality and have demonstrated interest and ability in teaching. Preference will be given to candidates who have one or more years of postdoctoral experience. This position is subject to final budgetary approval. Appointment may be considered at a higher rank for a member of the designated equity group with exceptional qualifications. A joint appointment with one of the Life Sciences, if appropriate, is a possibility. The salary will be commensurate with experience and research record. Applicants should send a C.V. including list of publications, statement of research and teaching interests and arrange for three letters of recommendation to be sent directly to:

Professor U. Haussmann, Head, Department of Mathematics, University of British Columbia, #121 - 1984 Mathematics Road, Vancouver, B.C. Canada V6T 1Z2.
Applications must be received before November 1, 1996
UBC welcomes all qualified applicants, especially women, aboriginal people, visible minorities, and persons with disabilities.
Individuals not in Mathematical Biology should not apply.

Feature Article:

Mathematical Biology in Japan

and the Japanese Association for Mathematical Biology.

Contributed by: Yoh Iwasa, secretary general of JAMB
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The Japanese Association for Mathematical Biology (JAMB) was established in 1988, and, as of spring, 1996, includes over 200 members. The two major activities of JAMB are publishing the JAMB Newsletter (three to four issues per year), and holding a "Symposium on Mathematical Topics in Biology" every autumn.

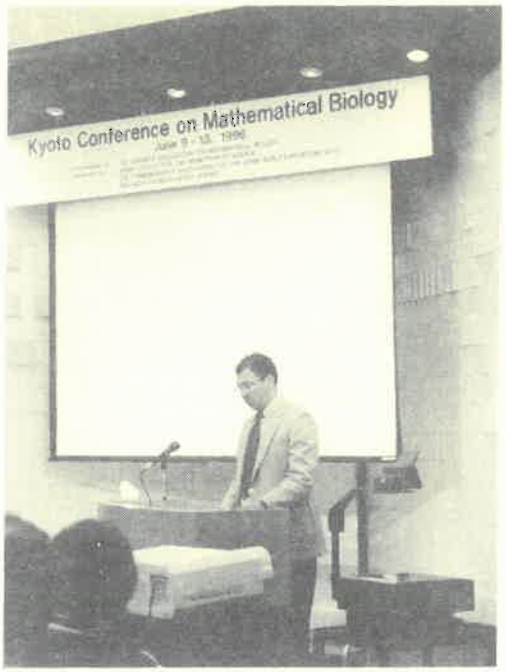
The first symposium was held in the Research Institute of Mathematical Sciences, Kyoto University, in October, 1990. The latest one was the Sixth JAMB symposium at the Graduate School of Mathematical Sciences, University of Tokyo (Komaba), in November of 1995. It lasted three days. In addition to the two organized sessions, and a special lecture, over 30 oral papers were presented.

Examples of lecture topics were: evolution (gene-culture coevolution, brood parasitism and host defense, evolution of genomic imprinting), population dynamics (matrix model for plants, SIR epidemics, population fluctuation and delayed regulation, experimental pre-predator system, advantage of delayed reproduction, epidemic spread on 2D lattice, spatial spread of organism), pattern formation (homologues recombination, spiral form of sea shells, reaction-diffusion stripes on coral fish, plant architecture, formation of network of blood vessels), self-organizing criticality in neural networks (ant-lion, edge of chaos in sensory receptor, owl's auditory system)

In addition, there were two organized sessions: "Constructive approaches to life" and "Pattern formation in the visual cortex"; each included several papers and was organized by a guest organizer. There was also a Special Lecture "Prey-predator PDE system with cross-diffusion". A book for abstracts of the JAMB symposium constitutes an issue of the JAMB Newsletter. In addition, we often publish a proceeding volume for papers presented in the symposium. For the Sixth JAMB Symposium, mentioned above, about 10 selected articles from the oral presentations were invited to contribute to a special issue of Forma, an international journal of pattern formation.

Every year, we publish three to four issues of the JAMB Newsletter. The contents include reviews of a subfield of mathematical biology, lists of books, and basic literature for workers new to a particular subject (e.g. quantitative genetics, gene-culture coevolution, dynamic optimization models in evolutionary ecology, GA, A-Life, developmental pattern formation, global changes). We have also printed the titles of seminar series in mathematical biology in various institutes, the research activities of members, introductions of various laboratories by JAMB members, articles on related meetings both overseas and domestic, explanation of the activities of related scientific organizations (both foreign and domestic), such as SMB, and various announcements, such as address changes, job advertisements etc.

In 1990, Japan acted as the host of the Fifth International Ecology Congress, Yokohama, and as a satellite meeting, the Fukuoka Symposium on Theoretical Ecology (org. Hirotsugu Matsuda) was held in Fukuoka, where many of JAMB members were involved. - - - **Contd on page 11** - -



Lee Segel leads toast at farewell party; Simon Levin lectures at Kyoto '96. photos courtesy N. Shigesada

A Report on the
Kyoto Conference on Mathematical Biology June 9-13,'96
by Chris Cosner, University of Miami, Coral Gables, Florida
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The Kyoto Conference on Mathematical Biology '96 was held at Doshisha University in Kyoto, Japan, June 9-13, 1996. There were approximately 150 participants from around the world. The conference was originally intended to celebrate the seventieth birthdays of Ei Teramoto and Akira Okubo. Sadly, both of them passed away earlier this year, so the conference was dedicated to their memory. Since their contributions to mathematical biology were largely in the areas of population dynamics and ecology, it was appropriate that the main focus of the conference was on those topics. Nanako Shigesada gave a memorial speech for Ei Teramoto, Simon Levin reviewed work inspired by Akira Okubo, and there was a memorial evening featuring videotapes of the two scientists and personal reminiscences by their colleagues. (Reviews of the scientific careers and contributions of Teramoto and Okubo appeared in an earlier issue of the Mathematical Biology Newsletter.)

The Kyoto Conference brought together a diverse group of mathematicians and scientists. There is a large and active mathematical biology community in Japan, but there has been less communication and collaboration than there should be between Japanese scientists and their American and European counterparts. The conference provided an excellent opportunity for increased interaction. The Kyoto Conference also encouraged interactions between mathematical biologists and theoretical ecologists. The speakers included frequent participants in mathematical biology meetings such as S. Levin, O. Diekmann, L.Segel, V.Capasso, and others, but there were also people like D. DeAngelis, J. Cohen, T. Powell, and H.C.J. Godfray who are usually more closely associated with ecology than mathematical biology per se.

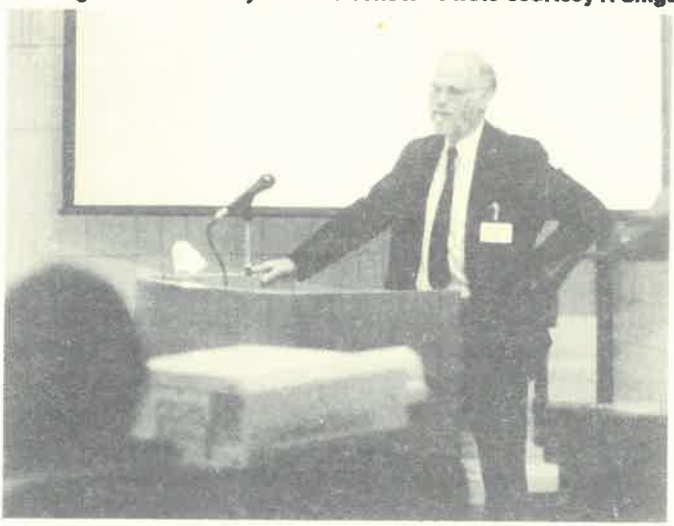
The talks were organized into sessions on ecosystem processes, population dynamics, lattice models in population dynamics, pattern formation, and evolutionary ecology. There was also a poster session with a similar focus on ecology and population dynamics. There were many interesting talks and posters, and deciding what is most interesting is highly subjective, but there were a few themes or ideas that were discussed that I think are worth mentioning because of their novelty. J. Cohen compared the spectral properties of real time series data on populations with the output of simple chaotic models and suggested that there were systematic differences between the spectra of the models and the data. A. Hastings pointed out that the transient dynamics of spatial population models may last so long that they are more relevant for applied purposes than the asymptotic dynamics. These observations illustrated the limitations for some applied purposes of analyses such as determining whether or not a given model has a strange attractor.

M. Lewis talked about models for biological invasions based on stochastic dispersal mechanisms which cannot be described in terms of traveling waves generated reaction-diffusion equations. K. Kawasaki discussed related issues in the context of cellular automata models. There were a number of other talks by Japanese scientists about lattice models for spatial dispersal, including a review of the area by H. Matsuda. There is evidently a strong interest in lattice models among Japanese scientists. M. Mimura discussed some reaction-diffusion models for the patterns of spatial growth of bacterial colonies. D. DeAngelis talked about simulation models for the spatial dynamics of freshwater mussels. These talks, taken together, served as a reminder that many biological phenomena are sufficiently complicated that no single modeling approach is adequate. There were a number of talks by biologists about factors affecting the structure of food chains and communities. The speakers on this topic included J. Grover, M. Higashi, and H. Matsuda.

The problem of understanding the structure of biological communities has received a lot of attention in the ecological literature but somewhat less from the viewpoint of mathematical biology. Mathematical treatments tend to focus on the dynamics of two or perhaps three interacting species. It was interesting to hear discussions of how larger communities are assembled, and the talks suggested that there is much work to be done on the mathematical analysis of multi-species models. There were many other excellent talks on a variety of topics. An underlying theme that was woven through the fabric of the conference was diversity: the diversity of nationalities and scientific disciplines among the participants, the diversity of approaches to the formulation and analysis of the models, and the diversity of the systems and situations being modeled.

The organizing committee, chaired by Nanako Shigesada, did an outstanding job. The facilities were good, the presentations ran smoothly, and there were a number of social events including an excursion to historical sites around Kyoto. The organizers made sure that even those of us with no knowledge whatsoever of the Japanese language were comfortable and able to enjoy ourselves. Overall, the conference was very successful in bringing together researchers from many different places and disciplines. Hopefully the interactions initiated at the meeting will continue and grow in the future.

Lee Segel lectures at Kyoto conference. Photo courtesy N Shigesada.



A report on the **Gordon Conference in Theoretical and Mathematical Biology**, Tilton, NH, June 9-13, 1996
by G. Bard Ermentrout

The 1996 Gordon Conference in Theoretical Biology occurred this June in Tilton, New Hampshire. The organizers were Bard Ermentrout of the University of Pittsburgh and Lisa Fauci of Tulane University. The conference began on Sunday with a series of three talks in ecology. The first two speakers, Jim Cushing from Arizona State and Peter White from Utah State spoke about mathematical model of beetles. The third speaker, Ignacio Barradas from the Center for Mathematical Investigation in Mexico, spoke about competition and coexistence. The session was chaired by Shay Gueron. Afterwards, we retired to the bar and the ping pong room.

Monday began with the usual photo session and then the morning session on calcium and synaptic transmission. Experimental results were presented by Elis Stanley from the NIH , Sobhana Sivaramakrishnan from the Mayo Medical Center, and Ruth Heidelberger from Goettingen. Richard Bertram from the NIH presented a theory on the work of Stanley. Arthur Sherman of the NIH chaired the session. The afternoon was free, as is the usual case in Gordon Conferences. The first poster session began on Monday as well; over 60 posters were presented this year.

After the evening meal, we had the evening session chaired by John Miller from Berkeley. The session topic was the analysis of information encoding. Bruno Olshausen from MIT and Tim Gawne (NIMH) presented.

The Tuesday morning session on Molecular Motors was chaired by George Oster (UC Berkeley). Experimentalist Steve Block (Princeton) described methods for measuring very small forces in biological molecules. Theoreticians Alex Mogilner (UC Davis) and Tim Elston (Los Alamos) presented recent results on the mechanisms responsible for the generation of these small forces.

Bob Dillon (Tulane) chaired the Tuesday Evening session on Microbial Motility. Roseanne Ford (U. Virginia) spoke about some of her recent results on chemotaxis and bacterial motility while John Kessler (Arizona) spoke about experimental observations on the velocity and locomotion of swimming algae.

On Wednesday morning, we returned to the theme of Neuroscience. John Rinzel (NIH) chaired the session which featured talks by experimentalist Yang Dan (Rockefeller) on coding of scenes in the lateral geniculate, theoretician Emilio Salinas (Brandeis) on sensori-motor transformations, and Emery Brown (Mass. Gen. Hospital) on statistical techniques for the analysis of neural data.

Sharon Lubkin (U. Washington) and new baby chaired the evening session. Denise Kirschner (Texas A&M) spoke about a model for AIDS and Micah Dembo (Boston Univ.) described a model for the control of cell division and the mechanical forces that underlie it.

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Traditional lobster dinner and limerick competition at recent Gordon conference. Composite photo showing Bard Ermentrout (reading limerick), and Lisa Fauci (standing, 3rd from right), this year's GRC co-chairs.

A Report on the **Summer School on Nonlinear Dynamics in Biology and Medicine**, McGill University Montreal, Quebec, May 20 - June 7, 1996
by Jennifer Enns-Ruttan, UBC, Vancouver, BC

A three week summer school (May 20 - June 7, 1996) was taught by the faculty of the Centre for Nonlinear Dynamics in Physiology and Medicine. Upon arriving, I was surprised at the diversity of the participants. As one of the few native Canadians, I felt outnumbered by the people from other countries. Besides the expected Americans, there were people from Germany, England, Belgium, France, Italy, Norway, Denmark, the Netherlands and some more exotic countries like Korea, Russia, Lithuania, and Israel. Of the roughly 60 participants, there were about 35 grad students, 10 faculty, and the rest were postdocs. Of these, about 25 would classify themselves as biologists and 35 as mathematicians. Of course, given the interdisciplinary nature of the summer school and the participants' research interests, the distinction is a little grey.

In the first week, Leon Glass, Michael Guevara, and Jacques Belair gave an insightful introduction to nonlinear dynamics. They discussed the dynamics of finite-difference equations and ordinary differential equations with an emphasis on equilibrium points, limit cycles, and various types of bifurcations, including routes to chaos. Their use of applications from biology, particularly from cardiac electrophysiology, at once motivated and illustrated the theoretical concepts they were trying to teach. Afternoon computer labs complimented the morning lectures and gave participants a chance to work with a partner and gain a better understanding of the material.

In contrast to the rather relaxed pace of the first week, the second week, with its distinct morning and afternoon streams of lectures and associated labs or demos, was a little hectic. In the mornings, Jacques Belair, Marc Courtemanche, Michael Mackey, and Andre Longtin discussed more aspects of nonlinear dynamics, including spatially distributed systems, numerical solutions, waves in reaction-diffusion systems, excitable media, differential delay equations with applications in cell replication and control, and noisy dynamics. In the afternoons, Danny Kaplan kept us entertained with a crash course in linear and nonlinear time series analysis.

The pace slowed down again in the final week as we returned to the morning lecture and afternoon computer lab routine. Andre Longtin, Anne Beuter, Rod Edwards, Michael Guevara, Danny Kaplan, Alain Vinet, Marc Courtemanche, and John Milton led us through some detailed studies of biological applications involving some of the techniques learned in the preceding two weeks.

In case you were starting to think that the summer school was all work and no play, let me assure you that 60 young scientists cannot converge on a "party town" like Montreal and not have at least the occasional good time. In fact many of us enjoyed what one of the participants termed "a gruelling social pace". The organizers of the summer school planned several official social events including a couple of backyard dinner parties Chez Mackey and Chez Glass, a hike, canoe trip, concert, casino night, and Montreal Expos baseball game. In addition, we took advantage of free entrance to a number of museums and art galleries on Montreal Museums Day. Evenings typically consisted of a large group of people meeting at The Rock between the dorms and then wandering

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Participants at the McGill Summer School pose on campus and off. Photos courtesy J. Enns-Ruttan.

SMB - CHILDHOOD, BOYHOOD, YOUTH

by Michael Conrad
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At the meeting of the Society for Mathematical Biology, held in Mexico in 1995, Leah Edelstein-Keshet, suggested that I prepare a history of the Society for the *Newsletter* . It is natural, since the Society comes of age this year, its first post-charter meeting having been held in Bowling Green in 1975.

Leo Tolstoy, at some point in his life, seems also to have been impelled to rummage about in his memories. The title of the resulting trilogy, *Childhood, Boyhood, Youth*, aptly captures the main stages of social development of the SMB.

Actually the Society was born somewhat earlier than the meeting in Bowling Green, having been founded shortly before by a triumvirate consisting of George Karreman (first president), Herbert Landahl (second president), and Anthony Bartholomay. The founding was connected to the management of the *Bulletin of Mathematical Biology*. The journal, originally called the *Bulletin of Mathematical Biophysics*, had been initiated much earlier by Nicholas Rashevsky. When Rashevsky died, Mrs. Rashevsky transferred ownership to Landahl. A group of charter members were brought together by the founding triumvirate, and as soon as a charter was established Landahl transferred the *Bulletin* to the Society.

I think it fair to say that the childhood stage, the period of somewhat wide-eyed exploration, was consummated under Karreman and Landahl. John Stephenson and John Jacquez, the next two Presidents, brought the Society into its boyhood period, though perhaps it would be more acceptable and even more descriptive to use the term adolescence. Tolstoy described how, somewhere between this period of boyhood and youth, the protagonist daydreamed that for some reason everyone in society had a great respect and love for him. This was indeed the adolescence of the SMB. Obtaining professional respect for mathematical biology was the order of the day.

There are some reasons for this, which are important for understanding the dynamics of our field during this period, but which are still, well, shall we say, enveloped in a penumbra of delicacy. The main fact is that mathematical biology was not in good repute, and theoretical biology was in the doghouse as well. Of course, one can look back and say that Danielli had founded the Journal of Theoretical Biology prior to this period, and that Waddington's Towards a Theoretical Biology meetings were having effect. The success of these enterprises, I believe, was not just due to their high quality, but as well to the existence of a lacuna concomitant to the doghouse atmosphere.

This atmosphere was the natural aftermath of the truly great advances in molecular biology initiated in the fifties by the discovery of the significance of DNA. Though the argument might be made, retrospectively, that this discovery was infused with theoretical analysis and synthesis, the inexorable spin at the time was simple: a generation of theoretical "speculation" was being sent to the graveyard in body bags.

How does this tangle with the history of the SMB? At the outset I have to say that I never met Rashevsky. But it is clear that he was the name most closely identified with mathematical biology, because of the quantity of work, because of the school and journal he had founded, and because of definitive achievements. The latter included the first mathematical study of neural nets, early mathematical models of pattern formation, and mathematical analyses of cell fission that were rapidly absorbed by the U.S. military nuclear program. Overarching this was a spirit of relationalism that was highly disconnected from molecules and from the material substratum of life generally, despite the then claim of the *Bulletin* to be a venue for papers on the physico-mathematical foundations of biology. It was an approach that abstracted the "sociological" aspects of biological organization at a time when the molecular-material aspects had come to the fore. Suffice it to say that Rashevsky had become the Trotsky of mathematical biology. Landahl's wish for the Society to eventually encompass all mathematical and theoretical biologists could not come to fruition given the resulting polarization in the mathematical / theoretical biology community. The reins of leadership would have to move to the outside if this were to be preserved as a goal, and they did; but with the almost foreseeable consequence that other alienations inimical to the goal would ensue. (Unfortunately I don't see how any useful history of the Society can be written without acknowledging this point.)

Actually, the efforts to attain professional status began during the Karreman presidency, when Stephenson succeeded in placing the annual meeting in the framework of FASEB (Federation of American Societies of Experimental Biology), under the auspices of the American Physiological Society. Several subsequent meetings were held in this context, and later under auspices of the American Institute of Biological Sciences and the Society for Industrial and Applied Mathematics. By the time Stephenson had completed his presidency, the Society had accumulated quite a nest egg. This allowed for a curious annual meeting experiment in 1986, effectively during the presidency of John Jacquez. The meeting that year was held in conjunction with a Symposium on Pattern Recognition in Natural and Artificial Systems, hosted by the Center for Adaptive Systems at Boston University. It was just at the moment when neural networks were emerging from a long dormancy. The SMB contribution was highly appropriate, given the seminal work in the field that appeared in the Bulletin (in particular the work of McCulloch and Pitts in 1943).

Simon Levin's presidency (circa 1988) was a takeoff period, in terms of infrastructure development and growth in

membership, including new members from the ecological and applied mathematics communities. The attempt to transcend the physiological identification that had developed was a somewhat deliberate sentiment at the time. My analogies are getting rough around the edges, but let us call this the late boyhood period. (Some might call infrastructure an early middle age sort of thing, but it is critical in the early life of a society.)

At about this time it was becoming clear that the Society had achieved its goal of professional recognition and had made some progress in building up sources of funding for work in mathematical biology. Of course, this was not entirely a matter of the efforts of the Society. Many of the problems coming to the fore in biology were calling for mathematical and computational methods: complex ecological systems, neural models, the new developments in gene sequencing, and so forth. But the Society was there and had been working like a mole on the milieu, which was now far different than it had been a decade earlier.

This success had its antithesis, though. The joint meetings that had contributed so much to forging links with the broader biological community had subjected the Society to centrifugal forces that were inimical to its own identity and to the type of community interchange which is so crucial to the advance of a science. Even at the Boston meeting, which was more limited in scope, the activities of the Society were rather a sideshow.

The sense took hold that it was time to move back to a stand alone meeting format, like that of Bowling Green. Stuart Kauffman, who took over the presidential reins in 1989, recognized this need and accordingly moved to organize the 1991 annual meeting in Santa Fe. It had positive effect, and led to the policy of holding stand alone meetings at least once in every two years. I like to think of this as marking the inception of the youth stage of the Society, taken in the sense of its being a stage of greater self-confidence.

The presidencies of Alan Perelson and John Tyson are too contemporary to be included in a history. But I think it is noteworthy that the recent stand alone meeting in Mexico, initiated and organized during Perelson's and Tyson's terms, and hosted by Francisco Lara Ochoa, was the best attended meeting held by the Society, and the most international.

This international theme has a long history in the Society, running back to Landahl's term. It is important to make a few comments on this, since it dovetails with the development of the Society and remains a pertinent issue. Landahl asked the present chronicler to chair an ad hoc committee for international cooperation. We made a worldwide survey, in the 1981-82 period, to assess interest in either international expansion or affiliation with other societies. The response from groups in over twenty countries was strikingly enthusiastic. The main difficulty was that the SMB was and is by itself international in its membership; some mechanism was required to cooperate with existing groups in other countries while at the same time maintaining our own international profile. The Board passed a resolution authorizing the President to negotiate agreements with existing international groups and also to develop a chapter structure. But when the interests of the Society turned inward, to obtaining professional recognition from the established U.S. institutions, the desire to use this authorization disappeared. Levin and Kauffman, during their presidencies, made an attempt to revive the international agenda relative to Europe, but the receptivity had changed, probably in part because of the then emerging sense of European unity but possibly also because of the inward focus of the SMB during the previous period. New groups and new fora are now proliferating, reflecting new ideas and methodologies, and new regional networks. The relations between SMB and this world community-indeed the place of SMB in this larger community-is an issue that is bound to come up again and again.

No history of the SMB can be complete without noting the long term service of its Treasurer, Torcom Chorbajian. I, and undoubtedly all other past or present activists, can testify to the fact that Torcom has been the constant presence that has held the Society together day to day from its inception.

What about the future? Well, this I am afraid is a brief and of necessity selective social history, not a futurology. Undoubtedly there are many new young scientific personalities out there who would take exception to my belief that the Society is in its youth; they may think it is well into its middle age or even aged. I hope that they think this, for if so they are in the right frame of mind to keep the Society young.

Further articles about the history of SMB:

Our photo collection of past presidents and SMB officers is growing, but still incomplete. We hope to publish a complete set in an upcoming issue. Missing are some of our earliest presidents, including Landahl, Karreman, Bartholomay, Stephenson, (and Kauffman). If you own a good, well-focused B&W or color photo of these individuals, or of other events of historical interest, please lend them to us ! They will be treated with care and returned.
Please contact keshet@math.ubc.ca for mailing instructions.

Society Mail Bag

The newsletter will feature a new column with your input ! Letters to the editor, (100-200 words), short articles (1-2 columns), conference announcements, and other matters of interest to our readers are being solicited. Your name could appear here ! Write to us with your views or opinions, or suggestions about future articles that you'd like to see in the pages of this newsletter.
Send your articles, letters or suggestions by email to:
keshet@math.ubc.ca
Accompanying photographs are particularly desirable, and will be returned if so requested. Send full name and address.

Space, Devastation, and Ecology at Mt St. Helen's :
A Report on the SMB field trip lead by Bill Fagan (UW)

by Ray Mejia (NIH) and Danny Grunbaum (U. Utah)

On Thursday, August 8 a group of ecologists, botanists, mathematical biologists, and other hardy scientists attending the joint SMB-AIBS meeting was led by Bill Fagan on an SMB-sponsored field trip to Mount St. Helens.

A first impression upon entering the area of the Mountain, approximately 3 hours by bus south of Seattle, is of the devastation. Trees lie like match sticks on the ground in the monument portion of the area that has been preserved for scientific investigation, while the area that has been logged and replanted flourishes with young pines (approximately 1500 feet of the north face of the Mountain blew out on the major eruption of May 18, 1980).

Evident, also, are the patches of growth that had a head start due to protection from the blast by snow and ridge lines. The most recent prevailing winds are marked by the location of floating logs on Spirit Lake, as is the high-water mark on the surrounding hills that was created by the molten rock dumped by the explosion. Meta Lake is especially remarkable: a swarm of tadpoles are visible near shore - evidence to the scarcity of predators. A hike to within a couple of miles of the northeast face of the mountain provided evidence of the renewal of both flora and small critters, while a herd of elk was visible grazing on a nearby valley just off the monument grounds. Interestingly, the first animals to recolonize the inhospitable zone immediately under the ruptured crater were predacious insects and spiders, which fed on dead and dying insects blown in by the wind.

Recolonization by plants was led by lupines, which (by fixing nitrogen) paved the way for a succession of other plants and their herbivores. Hiking on pumice is not unlike walking on moderately soft sand. There was no lava flow associated with the most recent eruptions; however, molten glacier and dirt caused mudflows to fill river valleys through which rivers are once again cutting a path.

The trip itself was terrific -- we all enjoyed it very much, and it is pretty mind-boggling to see the carnage in person and imagine what it was like in 1980. Our thanks to Bill Fagan, who put a lot of effort into organizing this trip, a mere 2 days after a gruelling PhD thesis defense in the Zoology Department of the University of Washington. Thanks to him, it was a most instructive and stimulating experience.

ELECTRONIC COMMUNICATIONS:

Have you seen our SMB home page ?

The address for the SMB home page is
http://www.iam.ubc.ca/spider/spiros/smb/index.html

Congratulations to Nancy Kopell

SMB sends warm congratulations to our SMB member, Nancy Kopell, for her recent election to the National Academy of Sciences on April 30, 1996 of this year, and to the American Academy of Arts and Sciences two weeks earlier. Nancy Kopell got her A.B. from Cornell, and Ph.D from Berkeley in 1967. She was a CLE Moore Instructor from at MIT 1967-79, then at Northeastern University. She has been a full professor at Boston University since 1986.

Her previous honors include, Sloan, Guggenheim and MacArthur Foundation Felowships. Nancy currently holds a University Research Initiative Award from AFOSR to create an interdisciplinary center studying problems concerning networks of neurons with rhythmic behavior.

She has chaired the Advisory Panel to NSF's Division of Mathematical Sciences and the Board of Governors of the IMA. She has also served on the Board of Trustees of MSRI and on NSF's advisory committee to the Mathematical and Physical Sciences Directorate. Congratulations, Nancy !

Nancy Kopell photo by Georgia Litwack

FURTHER ELECTRONIC COMMUNICATIONS

More about the **Bulletin of Mathematical Biology**: You can find out more about our BMB publisher, Elsevier, by accessing the home page
http://www.elsevier.nl/locate/bulmathbio

The BMB homepage includes information to authors, ordering information for institutions etc.

The Table of Contents of recent BMB issues may be read at http://www.elsevier.nl/cas/estoc/contents/SAB/00928240.html.

A Report on the **OKUBO MEMORIAL FUND**
by : LEK

In the June 1, 1996 issue of this newsletter, we announced the preliminary steps in setting up a new fund, dedicated to the memory of Akira Okubo, who passed away in 1996. A great scientist, mentor, teacher, and colleague, Okubo is remembered by many for his warmth and humility.

Since the initial announcement, through the help of Profs Simon Levin and Robert Miura, SMB has been in contact with the Japanese Association for Mathematical Biology, (see article about JAMB, this newsletter). An agreement has been reached to make this a joint effort.

The funds collected will be dedicated to honoring Okubo. The details of the Okubo prize will be announced once the contributions have been collected. Depending on the amount raised, the fund may support a periodic prize for outstanding scientific contributions, travel support to SMB and JAMB conferences, or other events sponsored by our societies.

Keep the memory of this great scientist alive !
We urge you to forward your contribution soon, to:

Leah Edelstein-Keshet
Department of Mathematics,
University of British Columbia,
Vancouver, BC, V6T 1Z2
Canada

A receipt will be mailed to you.

OBITUARY

Philip R. Wohl 1944-1996
Communicated by: John Adam, Old Dominion

Dr. Philip R. Wohl, an associate professor in Mathematics at Old Dominion University, and member of SMB, died after a long illness on January 8, 1996. He had been in the department since 1974. Dr. Wohl received his PhD in Applied Mathematics from Cornell in 1971. He taught a variety of mathematics courses at Old Dominion, including a graduate/senior course in Mathematical Biology.

He was active in the university's senate, grievance committee, and graduate studies committee. He was a favorite among students and in 1981, organized the university student chapter of the Society for Industrial and Applied Mathematics. He served as faculty advisor to the chapter from 1981-1986.

Dr. Wohl gave valued and distinguished service to Old Dominion, the College of Sciences, and the Dept of Mathematics and Statistics for twenty-five years. His dedication and strong will to serve will long be remembered by his students and colleagues.

SMB Annual meeting : Continued from page 2

generate a lot of discussion. We gathered together for a brief SMB member's business meeting in the same room, and shared some matters of interest and concern. The issue of next year's meeting (in Raleigh, NC), library subscriptions to BMB (see page 3) and the new Okubo fund (see article on column 1 of this page) were among these.

Wednesday was the last day of lectures, and was devoted to a session on movement and motility organized and chaired by T. Daniel in a set of talks that showcased the **B** in SMB. In a spectacular sequence, starting at the molecular level (myosin, motors, and mechanics) and ending at the organismic level (aerial acrobatics, appendages, and arms), we explored the essence of biological movements. One of the most impressive experimental feats of the meeting was a roller-coaster ride, through a three dimensional reconstruction of the chromatin-cytoskeleton association of a cell from confocal microscopy data (Garry Odell).

A small subset of the SMB participants stayed on to participate in a tour, on Thursday, of the ravaged landscape and interesting ecology of Mt. St. Helen's, led by W. Fagan. (See report, page 10 of this newsletter).

In a short report of this nature it is impossible to do full justice to the variety of fascinating and diverse presentations. For more details of the program and the abstracts, the reader is encouraged to view the SMB home-page (see p10).

The SMB meeting this year benefitted directly from the terrific local talent and expertise, as many chairs and speaker from UW and the Pacific Northwest threw their efforts into ensuring a successful and stimulating conference. It also gained in excitement, diversity and breadth from numerous long-distance participants, including international members from Italy, France, Belgium, India, and Japan. All participants and organisers are to be thanked for their part in making this a memorable meeting. Charlie Smith and the NCSU folks begin preparations for the next annual meeting to be held in Raleigh, North Carolina and we hope to see you all there.

The Japanese Mathematical Biology, cont'd from p 4

In May of 1996, the Kyoto Conference on Mathematical Biology (KCMB96) was organized by some of the core members of JAMB (org. Nanako Shigesada). Many members of JAMB attended and presented work at KCMB96. (See a report on the conference on page 5.)

For the first few years, the office of the JAMB was located in Department of Biophysics, Kyoto University. JAMB Members in Kyoto University and Ryukoku University, and other institutes near Kyoto, ran the office and set up the foundations of JAMB. Then the JAMB office moved to Department of Mathematics, Hiroshima University, and then

to Department of Biology, Kyushu University. It became customary for the JAMB office to move every two years. From the autumn of 1996, Professor Toshiyuki Namba (tnamba@center.osaka-wu.ac.jp), Osaka Women's University, will be the Secretary General of JAMB, and members in and near Osaka city will help him as council members .

Recently we started distributing an E-mail version of the JAMB Newsletter, which should allow more efficient and faster communication. So far, we have kept JAMB a relatively small and informal organization, useful for communication among people interested in any field of mathematical biology. At this moment, we do not publish an international scientific journal, nor did we attempt to make JAMB a more formal "Society". The situation, however, may change in the near future as more new members join the association.

Yoh Iwasa
Secretary General of JAMB, until the Summer of 1996

MEMORABLE QUOTATIONS:

" *I have had a change of life.. When I was a mathematical biologist, I had great confidence about understanding the exact behaviour of a mathematical model, but felt grave doubts about its relevance to the biology. Now that I do experiments, I have no doubt about the biological relevance of my research, but little confidence that I understand anything that I am seeing.*"

- Garrett M. Odell, SMB annual meeting, '96

GRC - continued from p 6

The theme for Thursday was Biofluidynamics. The morning session, chaired by Aaron Fogelson (Utah) was mainly concerned with the numerical computations involved in modeling fluid flow in biological systems. Charlie Peskin (Courant) presented a new method for analyzing the interactions of objects immersed in a fluid. Nick Hill (Leeds) showed us how to solve convection problems on a sphere and Moury Gharib (Cal Tech) described a new universal time scale in vortical flow based on some experimental and theoretical results. Thursday's dinner was the usual lobster fest as well as the biannual limerick contest. After a large meal, we all listened to Steve Vogel (Duke) introduce the evening speaker, Mimi Koehl (Berkeley) by way of a videotape of her as a young postdoc on the PBS program NOVA. Mimi spoke in an animated fashion of her work on animals with bristled appendages.

The conference ended with the election of the new chairs, Mark Lewis from Utah and John Milton from Chicago.

Historical Remarks on the GRC

" I think it should begin with the Gordon Conference *putsch*. This may have been during my first summer as a theoretical biologist, in 1969. At that time the GRC in theoretical and mathematical biology met yearly, but the biology wasn't taken very seriously. Some people felt that mathematical biology should be much more tightly tied to experiment. To do this, David Block of Cornell was put up as President. A beloved and respected person, he was not blessed with strong administrative abilities. Thus a young Cornell colleague, Simon Levin, was nominated as co-chairman. Walter Freeman was Vice Chair. The understanding was that Simon would do all the work. .... This strategy succeeded, and in my opinion the GRC never looked back. "

-Lee A. Segel

McGill Summer school, cont'd from p 7

the streets of Montreal in search of cheap restaurants. Depending on the energy level of the group, we went out to various bars and nightclubs afterwards, since (from this author's biased point of view), no trip to Montreal is complete without sampling as many night clubs as possible.

I give this summer school Siskel and Ebert's* two thumbs up. If you're sorry you missed it this year, don't worry. It sounds like they are going to try to run it again next year. For more detailed information on the summer school or the Centre for Nonlinear Dynamics in Physiology and Medicine, check out the home page (http://www.cnd.mcgill.ca/Montreal96).

(* *Ed note:* S & E are cinema critics on American Public TV)

UPCOMING CONFERENCES:

International Conference on Parallel Problem Solving from Nature (PPSN IV), Berlin, Germany, Sept 22 - 26, 1996.
http://ftp-bionik.fb10.tu-berlin.de/ppsniv.html

3rd European Conference on Mathematics Applied to Biology and Medicine, Heidelberg, Germany, October 6.-10. 1996
E-mail: ecmbm96@iwr.uni-heidelberg.de
http://www.iwr.uni-heidelberg.de/ECMBM96/

Bio-Informatics and Pulse-Propagating Networks, Berlin, Germany, November 14.-15. 1996
http://www.gfai.fta-berlin.de/

International Conference on Computational Molecular Biology
Jan 20-22, 1997, Eldorado Hotel, Santa Fe, New Mexico
http://www.cs.sandia.gov/recomb97

DON'T FORGET TO RENEW SMB MEMBERSHIP
ELSEVIER'S INVOICE IS COMING SOON !
