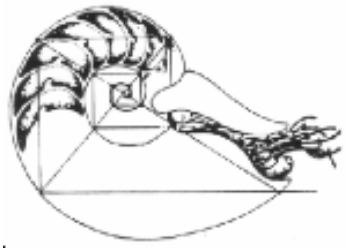

Mathematical Biology Newsletter

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The Society for Mathematical Biology

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Edited by: Holly Gaff

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Some comments on education from the SMB President

Lou Gross
Departments of Ecology and Evolutionary Biology and Mathematics
University of Tennessee - Knoxville

Over the past several months I have become more and more convinced of the need for our Society to provide input, as individuals as well as a Society, for many issues of great concern worldwide. Our research efforts have direct impact into issues as varied as public health, education activities at all levels, economic development, and research that is at the frontier in this "Century of Biology". Those in attendance at the Dundee Conference had the opportunity to learn about the great diversity of activities of our members in research, but relatively little about our educational efforts.

The vast majority of Society members are involved in formal educational activities as faculty members, mentors to colleagues, and graduate students involved in assisting instruction. In addition, many of us are involved in informal educational activities, as parents, speakers to community groups and "distributed mentors" to those across the planet with web access who need to have some question answered. I hope that many members, as I do, respond to questions from students and others out there on the web who ask questions (sometimes naive) about their work. I intend to work on ways for our Society to foster methods to enhance public understanding of the relationship between mathematics and biology, just as we have so effectively (in no small part due to the efforts of Gerda de Vries) developed methods to assist in mentoring younger researchers in our field.

This is therefore a call to members to volunteer to lead, under the auspices of the Education Committee, ways to improve the public understanding of quantitative biology. There is an expanding literature on research in learning that can benefit all of us involved in education. A brief summary of the approaches, including examples from across math and science, is in Charlene D'Avanzo's article "Research on learning: potential for improving college ecology teaching" published in the journal Frontiers in Ecology and the Environment 1:533-540 (http://www.frontiersinecology.org). Numerous reports are available on-line that can help members improve their ability to connect their research and educational activities. One is a report of a Workshop I chaired at the US National Academy of Sciences - Integrating Research and Education: Biocomplexity Investigators Explore the Possibilities, available through http://www.nap.edu.

I regularly tell my graduate students that research efforts are not "science" until they are published in the open literature, making them accessible to be critiqued, modified and expanded. In the same way, our research efforts should not be considered complete until we have adequately translated them into a form that is accessible to the general public. Certainly this is difficult, and I'm sure many of you tire of trying to come up with ways to explain what mathematical biology is all about when you tell folks what you do at parties. Yet, this is essential, and I hope that the efforts of the Society in this regard (which are just getting underway, in that we wish to produce a simple take-away document that might be used to explain mathematical biology to public officials) will grow.

Please contact me if you have additional ideas about how our Society can expand its educational activities and broaden public understanding of mathematical biology.

2004 Annual Meeting of The Society of Mathematical Biology

Remember to mark your calendars for July 25-28, 2004, at the University of Michigan, USA. Download Flyer and Advertise for the Annual Meeting from: http://www.smb.org/SMB-2004final.pdf. Proposals for minisymposia topics are currently being accepted. Deadline for minsymposium submission is February 10, 2004. Contributed session and posters will be accepted starting January 15, 2004. Registration is now available. We will have information available in January for student and post-doc travel support. For more information on all of these topics please go to: http://www.math.lsa.umich.edu/~pwn/SMBindex.html.

Turning a Random Walk into a Focussed Mission

Kirstie Urquhart
European Editor, Science's Next Wave

The presentations are all very well, but as Magnus Knecht, a PhD student from the Swedish University of Agricultural Sciences, points out, what conferences are very much about is "making contact and interacting with people who have similar interests." The problem, he highlights, is that "as an inexperienced PhD student you don't know that many scientists, and which are in your area of interest. At best you start a random walk, and with some luck you get into some interesting conversations. But it is quite unlikely that you'll find the person that would provide the best possible exchange." What's more, "even if you know which people you'd like to speak to, it is not that easy to step up to that person and start a conversation."

It's a dilemma that many young scientists will recognise. Your boss has agreed that you should attend THE international conference in your field, and you want to make the most of it. But walking into a crowded reception and striking up casual conversation with the leaders in your research area can seem like mission impossible.

Fortunately for Knecht, he's a mathematical biologist. Earlier this year he attended the annual meeting of the Society for Mathematical Biology (SMB) held in Dundee, UK. Now in the final year of his PhD, "I've been to at least half a dozen conferences," he explains, "however … the SMB03 has given me more than all the previous conferences put together." This is partly, he admits, because he has grown in confidence and experience. But the conference's success for him was mainly, he says, thanks to the SMB's conference mentoring programme.

Gerda de Vries, an associate professor at the University of Alberta, runs the programme. Anyone attending the conference can apply to take part, as either mentor or mentee. In fact this year, she says, "one of the mentees, a young faculty member whom I matched with a senior faculty member, also acted as a mentor for a beginning graduate student." It's entirely up to mentor/mentee pairs how they want to use their time at the conference together, she points out, but there are a number of suggestions on the society's mentoring Web page which she set up when the scheme was started 4 years ago.

"Although I typically talk with each mentee in some detail about the scientific work they are pursuing," explains Lou Gross, professor of ecology and evolutionary biology and mathematics at the University of Tennessee, he sees the mentors' role as ensuring "that the younger set gain

benefit from our experiences, not just with regard to details of the science presented at these meetings, but with all the other aspects of being successful in the 'world of science.' "Therefore, with each of the five mentees he has met at SMB meetings during the mentoring programme's lifetime, he has spent quite a bit of time discussing "where they want to be 5 years from now and how they might spend their effort in getting there." This in turn allows him "to introduce them to people attending--or give them contacts if the person is not attending--who might be helpful to them in reaching their goal."

Paul Anderson, a PhD student at Imperial College London, was Gross's mentee at the Dundee meeting. "This was my first conference and I was the only person from my section attending," says Anderson, but Gross "made me feel at home immediately." Daniel Dvorkin, who was mentored by Leah Keshet of the University of British Columbia, echoes Anderson's sentiments: "It was largely thanks to her efforts that I was able to jump into the activities of the conference immediately instead of taking more time to get my bearings."

In fact, thinks Dvorkin, a second-year graduate student at the University of Colorado, Denver, also attending his first conference, "considering [Keshet's] importance in the field, I was probably a bit tongue-tied [at first]. It can really be very intimidating … to meet someone whose name you've been seeing in the literature for years!" But then a major purpose and benefit of the programme is that it helps "to break through the intimidation barrier," he points out.

"Having such a well connected mentor helped put my work into perspective with the rest of the research community," says Anderson, who took the opportunity to pick his mentor's brains about a possible future career move into the field of bioinformatics. "I much appreciated Lou's take on what is hot and what is not," he explains, particularly "as he is not involved in the field directly so can take a different perspective to someone whose work has been solely in bioinformatics." In fact, such interactions work both ways. The opportunity "to get a different perspective on what the really 'hot' and important topics are," because "it is simply impossible to keep up with the breadth of mathematical biology today," is one of the advantages that Gross sees, as a mentor.

"I now regard Dr Keshet, and the other people at the conference I met through her, as valuable professional contacts," says Dvorkin. "Overall, I think I got much more value out of the conference because of the mentoring programme than I would have without it." A ringing endorsement, which might encourage other learned societies to set up similar schemes. But with academics so busy these days, just what does it involve?

Having once done the background work to put the programme in place, the answer is "not a lot of time," according to de Vries, who estimates that in total she spends "perhaps one day a year" on it. Of course SMB is relatively small, with somewhere between 200 and 250 people attending the Dundee meeting, and just 28 mentees and 16 mentors taking part in the mentoring programme this year (mentors can have two, but no more than two, mentees). Needless to say, more mentees tend to put themselves forward than mentors, "so I usually end up contacting senior scientists attending the meeting asking them whether they are interested in being a mentor," de Vries says, and gratifyingly, "most are."

However, although she herself matched mentors and mentees this year, "in previous years, I've had my graduate students go over the letters of interest and make the matches. My students loved doing it, because it gave them some insight into research areas outside of their immediate interest, and it gave them an opportunity to learn more about what senior scientists are doing," she explains.

All in all, then, this programme's value seems to easily outweigh the onerousness of its administration. In fact, its model could probably be adopted far more widely, and even implemented by the younger members of a society themselves.

Meanwhile, says Dvorkin, "I would encourage all students attending future SMB meetings to sign up for the programme as mentees, and all senior researchers to sign up as mentors--a role I look forward to filling at some point in the future."

Alcalá 2nd International Conference on Mathematical Ecology

Andrew M. Edwards
Dalhousie University, Nova Scotia, Canada

From 5th-9th September, participants convened for the Alcalá 2nd International Conference on Mathematical Ecology, held at the University of Alcalá. The venue was the University's historic Colegio Mayor de San Ildefonso, in the heart of the town of Alcalá de Henares, a UNESCO World Heritage Site just outside of Madrid. Such a fine location provided an intellectually stimulating setting for the conference, which was attended by over 200 participants. The conference's title truly deserved the moniker “international” - I attended talks by speakers from five continents.

Lev Ginzburg gave the opening lecture, using the orbits of planets as an analogy for the growth of populations. Ten further plenary lectures were given throughout the conference, discussing organisms that spanned the size spectrum from viruses to fish to black bears to oak trees. A vivid account of how modelling can influence public policy was given by Mark Woolhouse. He described his group's work on modelling the 2001 epidemic of foot-and-mouth disease in the UK. This work included both real-time modelling during the evolution of the epidemic, and later investigations of how future epidemics can be limited in scope by the use of effective control measures.

Twenty-four special sessions took place, with five sessions held concurrently. Session topics included individual-based spatial simulations, management of renewable resources, matrix models, molecular ecology, pattern formation, and stochastic versus deterministic modelling. Some work focused on modelling a particular ecosystem, while other work was concerned with developing the mathematical tools needed to confront complex ecological problems.

For two days the talks ran from before 9am to after 8pm, with a poster session breaking up the afternoon (though some participants hoped a siesta would be scheduled!). Such a timetable allotted a generous 25 minutes for each talk. This and the specialised nature of the audience allowed speakers to give both ecological background and extensive mathematical details of their work. This was eminently preferable to the often-rushed 10 minute overviews that can be common at large conferences. The posters were prominently exhibited around the outside of the courtyard for the duration of the conference, providing ample viewing opportunity.

The Spanish hospitality was immediately evident, with the first day including both a lunchtime reception and an evening welcoming party. Unfortunately, some participants missed most of the party, as they were busy checking their email and did not realise that they had become locked in

the building that housed the computers. Despite having instant access to computer users around the world, it took them a few hours to attain their short walk to freedom. (For the record, even though I was the last person to leave the building before it was locked, I still maintain that this incident had nothing to do with me -- although we can now guess what that Spanish cleaning lady had been trying to tell us just before I left).

For the final evening we were treated to a full banquet, with tapas and sangria upon arrival, followed by several excellent courses focussing on local specialties, and concluding with a toast to the organisers. The conversation flowed as freely as the wine, and, as on several nights, continued into the night over a glass of brandy.

There were several trips organised for the free day, mid-way through the conference. Some participants went for a hike followed by a visit to San Lorenzo El Escorial, a palace/monastery/mausoleum built in the 16th century. After a few hours of wandering through the huge square complex, with the coach-departure time drawing near, we had no idea as to how near we were to the exit. We felt trapped in a fractal maze -- maybe those 16th century architects were mathematically ahead of their time.

Just a few weeks after returning home, participants received an email bearing the sad news that Ovide Arino had passed away. He had helped organise many previous conferences and workshop, and was on the organising committee for the Alcalá conference. Several of his former students were at the meeting, as was one of his sons. A full obituary can be found on the conference website http://euromedbiomath.aicme.free.fr/.

The size of the meeting and the many organised social events created a congenial atmosphere. This gave ample opportunity to catch up with former supervisors and colleagues, and to make many new contacts. I finally came face-to-face with several people who I already “knew” through email exchanges, and future trips and projects have been planned as a direct result of the conference. Though one such collaborator may be in no mood for travelling any time soon, as his luggage remains lost somewhere between Madrid and Calcutta.

Organisation of the meeting was excellent, from the website that provided up-to-date information to the unique design of the conference poster. The poster incorporated pictures of Alcalá's own ecological success story - the white stork, which increased from 11 to 90 breeding pairs due to local conservation efforts. The work of the organisers continues - papers based on presentations are to appear in refereed special issues of five journals, and the pre-screening of submissions is already underway.

In the closing remarks, the organisers were thanked for their hard work, and the desire to hold a 3rd Alcalá Conference was enthusiastically received by participants. The 1st meeting was held five years ago, but we might have to wait only four years for the next one.

¡Espero sinceramente poder levantar una copa en Alcalá en 2007!

New Directions in Interdisciplinary Research

Marcus Tindall

The role of mathematical modelling in assisting researchers in the life sciences is of vital importance for biomedical and biological research in the 21st century. Aware of this growing importance, Oxford University has recently appointed Dr. Marcus Tindall as a Research Facilitator for interdisciplinary research between life scientists, the biotechnology industry and applied mathematicians. The grant, awarded to Prof. Jon Chapman and Dr. Chris Breward of the Oxford Centre for Industrial Applied Mathematics (OCIAM) and Prof. Philip Maini of the Centre for Mathematical Biology (CMB), all members of the Mathematical Institute, is for an initial period of two years.

Dr. Tindall's role involves facilitating contact with experimental biologists and biomedical researchers and discussing their areas of research interest. Problems where it is felt mathematical modelling could make a positive contribution are then presented at regular weekly workshops attended by members of OCIAM and the CMB. Such workshops are used to not only inform mathematicians of important biological problems, but also provide impetus for future interdisciplinary research through research projects and studentships. Biotech companies also feature within this remit and links are currently under development with both large and small companies in the biotech industry, where the objectives of the position and the importance of mathematical modelling have been warmly received. The remaining fifty percent of Dr. Tindall's time is spent working on specific modelling problems identified through collaborative contacts.

Contact with possible collaborators is generally initiated by way of an introductory e-mail although other methods include attending seminars in life science departments as well as meetings and conferences in fields, that it is felt, mathematical modelling could provide assistance. In respect of commercial collaborations contact with biotech network groups have been found to be more fruitful than simply 'cold-calling' on companies. This reduces both time and the likelihood of unrewarded effort and in many cases people running the networks will be better placed to contact the right companies. Attendance at network meetings not only allows contact with people working in the industry biotech, but also an opportunity to present and speak about the application of mathematics to problems in medicine and biology, thus educating the audience, many of whom are unaware of the benefits mathematical modelling can bring, as to the wide applicability and usefulness of mathematical modelling.
Dr. Tindall's post also comes at a time when there is increasing awareness of the role the mathematical and physical sciences have to play in life science research. Funding initiatives such as the Life Sciences programme run by the Biological and Physical Science Research Councils in the UK as well as recent meetings at the Newton Institute in Cambridge are but a few examples. Other related programmes include the Mathematics in Medicine Study groups held at the University of Nottingham for which further funding is currently being sought.

All those involved in the project are aware that it provides an exciting opportunity to facilitate research between mathematicians and life scientists, to work on problems at the forefront of biological and biomedical research and also importantly, to educate those in the life sciences of the importance of mathematical modelling in providing new ways of understanding their problems. Dr. Tindall would be happy to discuss further details of the post and any problem areas on which people are currently working. He can be contacted by e-mail at tindallm@maths.ox.ac.uk.

Ramit Mehr selected to this year's class of The International Women's Forum (IWF) Leadership Foundation Fellows

Excerpts from an IWF press release

WASHINGTON, DC, September 12, 2003 - - The IWF Leadership Foundation Fellows Program gives up-and-coming women leaders the tools to break through barriers in their professional lives with unique and customized professional training. This year is the 10th Anniversary of the Fellows Program and includes a diverse group of 14 professional women selected to be a part of this historic year. Over the past decade, the Leadership Foundation has given over 125 women the tools of empowerment to succeed in today's most demanding jobs.

"Women have always been leaders. They haven't always been paid for their leadership or recognized for that leadership. The Fellows Program, created by the recognized women leaders of the IWF, is contributing to building a world where women leaders are schooled, skilled, paid and recognized for their contributions," said Karyl Innis, CEO of The Innis Company and President of The Leadership Foundation of the IWF.

The 14 women selected to participate in this prestigious yearlong Fellowship program were selected from a diverse pool of candidates that reflect the face of today's female professional leaders. The 2003-04 Fellows are top corporate executives in the telecommunications and pharmaceutical industries, CEOs, law firm partners, and leading academics in universities. This year's corporations sponsoring Fellows are Bell Canada, Cinergy Corporation, General Dynamics Armament, Pfizer, Shell, Schering-Plough, Southern Company and Texas Instruments. The Fellows Program is committed to work for the benefit of women worldwide and this year's class comes from Canada, Israel, Singapore, Uganda and from across the US.

Ramit Mehr, Ph.D. was selected to this year's class of Fellows. She is a Senior Lecturer in Theoretical Immunology within the Faculty of Life Sciences at Bar-Ilan University, Israel. Ramit serves on the SMB board of directors and has chaired the SMB publications committee since 1997. Ramit is the first Israeli in the IWF fellows program.

Our Mathematical Biology colleagues in Japan announce some changes

The Japanese Association for Mathematical Biology (JAMB) has been transformed into a new organization, the Japanese Society for Mathematical Biology (JSMB) as of September 20, 2003. The JAMB was originally established in 1989 and has since been playing an active role in promoting mathematical biology in Japan. Its membership has grown to over 300. As the first president, Hirotsugu Matsuda, Emeritus Professor of Kyushu University was selected for a transition period of September 20, 2003 through December 31, 2004. Apart from administrative changes, the JSMB wholly inherits the resources and activities from the JAMB.

SMB has a reciprocal arrangement with JSMB regarding reduced membership dues, and both Societies share the responsibility to administer the Okubo Prize.

New Journal - Theoretical Biology and Medical Modelling (TBMM) from Elsevier, London

TBMM mission statement: We shall publish papers on aspects of theoretical biology or medical modeling that have been judged acceptable by peer review. Papers need not be explicitly mathematical, but preference will be given to work that aims to explain rather than simply to describe experimental or observational data. TBMM will be published exclusively online.

Some Upcoming Meetings of Interest

Please check http://www.smb.org/meetings for a complete list

First SFBT (Société Française de Biologie Théorique) International Conference is co-organized by the International Centre "Dynamical Systems" (CISD, Marrakech, Morocco), and will be held in Marrakech, Morocco, from May 21 to May 25, 2004. Website: http://euromedbiomath.sfbt.free.fr .

IEEE Computational Systems Bioinformatics Conference will be held in Stanford, California, USA, August 16-19, 2004. The conference's goal is to facilitate collaboration between computer scientists and biologists by presenting cutting edge computational biology research findings. Website: http://csbl.bmb.uga.edu/conference/CSB2004/webconf/ .

A Research Workshop of the Israel Science Foundation focused on models and methods for analysis of lymphocyte and pathogen repertoire generation, development, selection and evolution will be held at the Princess Hotel in Eilat, Israel, February 29th - March 4th, 2004. Website: http://repertoire.ls.biu.ac.il/workshop.htm .

The International Symposium on Dynamical Systems Theory and Its Applications to Biology and Environmental Sciences will be held March 14-17, 2004 in Hamamatsu city campus of Shizuoka. Website: http://yoake.sys.eng.shizuoka.ac.jp/~symposium/ .

The Thirteenth Annual Computational Neuroscience Meeting CNS*2004 will be held July 18 - July 20, 2004 with additional workshops: July 21-22, 2004, in Baltimore, Maryland, USA. Website: http://www.neuroinf.org/CNS.shtml .

Gordon Research Conference on Theoretical Biology & Biomathematics, June 6-11, 2004, Tilton, NH, USA, http://www.grc.uri.edu/programs/2004/theobio.htm

SIAM Conference on the Life Sciences, July 11-14, 2004 Portland, Oregon, USA, http://www.siam.org/meetings/ls04/

SMB Annual Meeting, July 25-28, 2004, University of Michigan, USA, http://www.math.lsa.umich.edu/~pwn/SMBindex.html

Postdoctoral Researcher Position: Infectious Disease Modeling

The Department of Epidemiology and Preventive Medicine at the University of Maryland, Baltimore, seeks applicants for a postdoctoral scientist position to conduct research on mathematical modeling of infectious diseases. Interested candidates should submit a letter of application, CV and three letters of recommendation to: Dr. David M. Hartley, c/o Diane Lindt, Business Services Specialist, 660 W. Redwood St., HH 109, Baltimore, MD 21201 or email at: dlindt@epi.umaryland.edu

Postdoctoral Position: Multiscale Biological Modelling

We seek Postdoctoral Fellow to participate in an NSF funded collaborative project between research groups at University of Notre Dame, Indiana University, Bloomington, the University of Missouri, New York Medical College and Emory University on developing a multiscale understanding of complex organ formation, focusing on avian limb development as a model for general organogenesis. All applicants should send a statement of qualifications, curriculum vitae, and three letters of reference to Professor Mark Alber: malber@nd.edu

Postdoctoral Position: Stochastic Kinetic Pathway Modeling

The Theoretical Neurobiology group at the University of Antwerp (Belgium) has a postdoc position funded by the Human Frontier Science program to study the effect of concentration gradients on signaling pathways responsible for the induction of synaptic plasticity. Applications with CV and publications in pdf format attached and also names and address info of 2-3 references should be e-mailed Prof. E. De Schutter (erik@bbf.uia.ac.be). More info on the Theoretical Neurobiology group is available at http://www.bbf.uia.ac.be.

Postdoctoral Positions: Quantitative Ecology

The Program for Interdisciplinary Mathematics, Ecology, and Statistics (PRIMES) at Colorado State University is seeking to hire two postdocs to begin in the 2004 academic year. Post-Doctoral position in population/quantitative genetics: This position will be associated with the Department of Mathematics and the United States Department of Agriculture ARS National Center for Genetic Resources Preservation on a project to develop optimization algorithms for use in maintaining plant genetic diversity. Post-Doctoral position in the Department of Statistics: This position will be associated with the Department of Statistics. Research interest in spatial statistics, Bayesian statistics, time series, or sampling is preferred. Applications and guidelines may be obtained at: www.primes.colostate.edu/post-doc_info. For full consideration, applications should be received no later than January 12, 2004.

Opportunities in Math Biology, University of Utah

We also have several open postdoctoral positions. We require at least one postdoctoral fellow to work with Aaron Fogelson and Jim Keener in our NSF-FRG grant on the dynamics of growing biogels. The successful applicant will have skills in numerical computation of partial differential equations coupled with modeling of solid/continuum dynamics. We also have an opening for an IGERT postdoctoral fellow. Finally, we anticipate that there may be up to two additional postdoctoral positions for individuals with a strong background in Applied Mathematics who wish to direct their research efforts toward Mathematical Biology. Finally, we hope to admit several beginning graduate students into our NSF-IGERT Interdisciplinary Mathematical Biology Graduate Program. More information about the program and application procedures can be found at our website http://www.math.utah.edu/igert.

UCSF Postdoctoral/Graduate Fellowships in Theoretical Neurobiology

The Sloan-Swartz Center for Theoretical Neurobiology at UCSF solicits applications for pre- and post-doctoral fellowships, with the goal of bringing theoretical approaches to bear on neuroscience. The application deadline is January 30, 2004.
http://www.sloan.ucsf.edu/sloan/sloan-info.html

Post Doctoral Positions in Mathematics and Biology

Institute for Theoretical and Mathematical Ecology, the University of Miami, Coral Gables, FL, USA. Contact Dr. Stephen Cantrell
http://www.math.miami.edu/~rsc/ITME_Post_Doctoral_Positions.html

Postdoctoral Positions – HIV modeling

Postdoctoral positions are available immediately to study molecular mechanisms of HIV disease pathogenesis with a particular emphasis on HIV immune evasion. This position also has the opportunity to work closely with a mathematician to perform cutting edge research in HIV modeling. A strong background in molecular and cellular biology is desired. Please contact Patrick Nelson: (734) 763-3408 for more information or send or FAX curriculum vitae and three references to: Kathleen Collins, M.D., Ph.D., 4301 MSRB III, box 0638, 1150 West Medical Center Drive, Ann Arbor, MI 48109, FAX: 734-763-7672.

Pictures from Alcalá Meeting

Attendees of the Alcalá Meeting 2003

An international conversation - Andrew Edwards (an Englishman living in Canada) talks plankton modelling with Khalid Boushaba (a Moroccan living in the United States).