



# SIL news

Volume 63 - December 2013

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**1 APRIL 2014**

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## Budapest and beyond by Yves Prairie

**(Editor's note: this article by our new SIL President Dr. Yves Prairie can be considered also as his Introduction to our newsletter63. See also the Editor's Foreword on next page)**

The 32<sup>nd</sup> SIL congress held in Budapest this past August was all around a very successful meeting. Truly outstanding plenaries, excellent talks and posters reporting on recent advances from all over the world, social activities and a beautiful city to discover. These are the traditions of SIL meetings and like all great traditions, they have to be preserved and nurtured. Somewhat ironically, maintaining traditions also requires that we must keep up with the times! A little behind the scenes, several significant changes occurred in Budapest in the ways the Society will operate over the coming years and my objective, in this first missive as President, is to explain what some of these changes are and the purpose behind them.

### Inland Waters, a first ISI impact factor and moving towards Open Access

SIL's new journal *Inland Waters* started publishing only a little over 2 years ago and is already proving to be a viable and noteworthy publishing outlet. It started modestly by publishing less than 200 pages in its first year (2011). As this newsletter goes to press, the last issue of this year's volume has just been completed with a volume total of nearly 500 pages in 2013. Earlier this summer, *Inland Waters* also received a very respectable first "impact factor" ranking from ISI (1.533) and this puts it in the middle of the 20 journals of the limnology category, all of which have a much longer publishing history. These are rather good starts. In keeping with SIL tradition, *Inland Waters* is a journal committed to publishing limnological science from every corner of the world and making it easily



accessible and affordable. But the publishing world is changing at an incredible pace and *Inland Waters* must embrace this evolution. To this end, we have now put the structures in place to facilitate a smooth transition between a subscription-based society journal towards a fully Open Access model, all the while keeping it affordable for authors from every country to publish in it. In doing so, *Inland Waters* is poised to become perhaps the first fully Open Access limnological journal. I can only encourage all of you to partake in these exciting times and send your latest manuscript to your journal, *Inland Waters*.

### SIL congresses: more often, more diverse and more collaborative

SIL congresses occupy a very particular niche amongst the plethora of scientific meetings of interest to limnologists. For example, I think of it as the conference *par excellence* to hear about new regional or international research initiatives and it is certainly the natural home to report and discuss how global problems manifest themselves differently in various regions of the planet. It is also one of the rare conferences where cutting-edge science is confronted with very down-to-earth problems, i.e. where the applied and fundamental sides of limnology

truly feed one another. While such specific attributes are part of what keeps us returning to SIL congresses, it is important to realize that no single meeting can fulfill all of our conference “needs”. For this reason, it is increasingly important to join forces, rather than compete, with other compatible societies and collaborate with them so as to offer conference participants with the best possible experience. Former SIL president Brian Moss already promoted this view and the new SIL board will continue to actively pursue such collaborations in the future. In concrete terms, this will take the form of an increased presence of SIL in co-promoting, co-sponsoring, co-organizing smaller regional or thematic meetings. In addition to these new meetings under banner of SIL, we also voted in Budapest to increase the frequency of our traditional “world congresses” to every second year, starting with the meetings in Italy in 2016 and in China in 2018.

### New SIL initiatives, let's think big


All scientific societies struggle to maintain and build their membership base and SIL is certainly no different. Our recent decision to hold more frequent and diversified SIL meetings is part of a larger strategy to promote our discipline and our Society in every corner of the world. Similarly, the desire to build *Inland Waters* into a premier and innovative limnological journal follows the same logic. But the issue of maintaining the quality of our waters is so fundamental to human life that it remains somewhat baffling to me that the only international limnological society does not count at least 5 or even 10 thousand members. Since the congress in Budapest, we have already been hard at work developing a package of new SIL initiatives with the aim of unfolding them within the coming year. These include a complete revamping of our website, the development of international SIL-certified courses (both field and massively open online courses), new scholarship and sponsorship

programs for students and scientists, social media, making the entire *Verhandlungen* collection readily available and many others. These are only the beginnings and we welcome any suggestions you might have to improve our services to the members.

SIL must also think outside of its traditional boundaries. There are simply no other limnological societies with the history or the international scope of SIL. To be “übernational”, to use the words of Thienemann during the society’s founding meeting in 1922, certainly confers SIL with an enviable status but it also imposes some responsibilities. Of course, our first responsibility is to our members, by offering a broader suite of services. But beyond membership services, the unique position of SIL on the world stage of “freshwater” societies gives it a particularly strong legitimacy, devoid from nationalistic biases, to express science-based opinions to international bodies concerned with the preservation and management of freshwaters, including UNESCO, UNEP, the IPCC, the WWF and many others. We are committed to making SIL a significant and respected voice in such organizations.

In conclusion, what I have outlined above provides you with a general sense of the direction SIL will take over the next few years. However, none of this would be possible without the leadership of the previous SIL board and I would like to close by sincerely thanking Brian Moss and the other board members for carefully preparing the grounds for us.

Sincerely,



## Editor's Foreword

The SIL newsletter 63 is special in that it reports mainly on the 32<sup>nd</sup> triennial SIL Congress held from 4 to 9 August, 2013, in Budapest, Hungary. The main news to report is the change of the SIL Secretariat, except for the editors of *Inland Waters* and *SILnewsletter*. The Minutes of Meetings of the Executive Committee, National Representatives, and General Assembly held on 4 August are reported here for especially those who did not or could not attend the meeting at Budapest. Dr. Brian Moss, the SIL President during the previous six years stepped down along with the former secretary and former vice presidents. I also congratulate Dr. Jack Jones, Editor of *Inland Waters* and his editorial colleagues because the the SIL journal is picking up very well thanks to the Impact Factor it achieved in June 2013. This also augurs well for Journal's future.

As *SILnewsletter* editor I thank especially Dr. Brian Moss for the demanding nature of his SIL work and for his task as acting SIL secretary in place of Dr. Morten Sondergaard for a major part of his six-year term as SIL President. Dr. Sondergaard had been long ill. I also take the opportunity to welcome our new President Dr. Yves Prairie, General Secretary-Treasurer, Tamar Zohary, and the three vice-presidents: Vera Huszar, Sally McIntyre, and David Livingstone. For details, the reader should read the Minutes of the Executive Committee Meeting in this newsletter and elsewhere. Dr. Yves Prairie, the new SIL President, in his maiden write-up for the newsletter (see the article by him on front-page of this newsletter) pleads for more frequent SIL congresses, i.e. Congress should be held biennially rather than triennially as now, --and that these congresses are more diverse and more collaborative. Hopefully, all such new ideas and suggested changes will be applied soon and bear fruits early so that SIL develops into an even better platform for scientific progress through more contacts and meetings.

The sad part in the newsletter is that some of our very renowned colleagues passed away in the recent past. I have included three obituaries in this newsletter: Dr. Ruth Patrick (USA) who died recently at the age of 105 years recently, Dr. Tom Berman (Israel) who met with an accident while in Hawaii Islands and Dr. Jurgen Benndorf (Germany) who had died already a couple of years ago.

This newsletter also contains both reports and announcements of the working group meetings. The less active working groups are also welcome to contribute more to the newsletter of their more recent research activity and publications. SIL members are also welcome to suggest any structural changes in the newsletter to improve it readership further.

**Ramesh D. Gulati**  
(Editor, *SILnews*)

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# Minutes of the 32<sup>nd</sup> SIL Congress (4-9 Aug.2013), Budapest, Hungary, 2013

## (Meetings of the Executive Committee, National Representatives, and General Assembly)

I. **Executive Committee** (present and newly elected) – 4 August (Sunday), Luncheon and meeting, 13:30 – 16:40. Present: The President, Brian Moss, Vice-President, Judit Padisak, the incumbent Executive Committee (President, Yves Prairie, General Secretary-Treasurer, Tamar Zohary, Vice-presidents: Vera Huszar, Sally McIntyre, David Livingstone). The Editor, Jack Jones, and Business Manager, Denise Johnson, were present by invitation.

A. Apologies for absent members. There were apologies from the Secretary-General Treasurer, Morten Sondergaard and Vice presidents, Ellen Van Donk and Brij Gopal

B. Welcome and congratulations to the incoming executive committee

C. The President outlined the Agenda for the International Committee Meeting. There were two developments of these Agenda.

The first was a request for the formation of a working group on Inland Waters of Tropical Asia to be organized by Brij Gopal, with sponsorship for short training courses from SIL. There was no dissent to the formation of the group and it was suggested that there could be ways of formulating proposals for Tonolli Awards that might be usable in a training context.

The second included developments concerned with *Inland Waters* notably an approach from Taylor and Francis to enter into a partnership in which Taylor and Francis would produce and market the journal. The matter was discussed at length but it was decided that the offer should not be accepted because SIL would lose independence and changes in the nature of publishing would likely obviate subscription-based publishing in the near future. The Publications Advisory Committee however, would further investigate the matter and possible alternative options. It would also look into the possibility of acquiring the copyright and digitally scanning the *Verhandlungen*.

Incumbent Vice-Presidents Sally McIntyre and David Livingstone suggested that they exchange chairpersonships of the Publications Advisory Committee and the Awards (Tonolli and Wetzel) Committee and this was agreed. Thus, David Livingstone would chair the Publications Advisory Committee and would lead the initiative of acquiring copyright for the *Verhandlungen* and digitizing the older volumes.

The financial statements were presented briefly. A deficit of > USD10,000 in SIL's running costs could be partly attributed to the fact that most SIL members (2/3) didn't pay their membership dues for 2013, and many of those didn't pay for 2012 either. Collecting membership fees should receive a higher priority and the involvement of national representatives is crucial. Since members can pay by credit card, the Nat. Reps no longer know who paid. It was suggested that the national representatives should have on-line access to the status of payment of members of their own country. This can be done using DropBox or similar on-line tools.

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II. First meeting of the Executive Committee and National Representatives (**International Committee**) – 4 August (Sunday), 17:00 – 19:00

A. The President greeted National Representatives

B. The Acting General Secretary – Treasurer (Brian Moss) reviewed the status and activities of SIL over the past triennium including membership and finances.

C. The Acting General Secretary – Treasurer presented motions from the Executive Committee.

1. Membership decrease: Membership continues to decrease, as is the case currently with many scientific societies. The major increase in the 1960s and 1970s is being mirrored by a decline about one career generation later. The floor was open for suggestions to increase membership.

a) S. Liu (China) suggested that for China, salaries are not high and that SIL should allow China to pay the developing country rate as membership fees were not affordable. There was discussion on this since the economy is growing rapidly in China. Susan Kilham suggested to base membership on salary for China. The Chinese representatives would bring back salary information for the next meeting.

b) Because many members were in arrears, methods of payment were discussed, including a direct debit system. This would be investigated. Members who were not up-to-date in payment should be contacted by Denise directly as well as by their national reps.

c) Decreases in dues were proposed to attempt to boost membership among young scientists as follows: \$5.00 membership for students in developed countries, free membership to students in developing countries, half dues membership for people within three years of obtaining a PhD.

2. Finances: Finance statements were circulated with the Agenda and questions responded to. SIL has increased in overall value over the triennium because of re-evaluations in its stocks, and donations made to the Tonolli, Kilham and Wetzel Funds but were slightly in deficit in its income/expenditure account over the past triennium. A motion to accept the accounts was proposed and seconded and passed without dissent.

3. Subscriptions: SIL will increase dues by 10% (\$93.50) for the next three years. The possibility of where to set levels of membership dues would be discussed in the next meeting.

4. Journal: *Inland Waters* has been expertly and enthusiastically edited by Jack Jones, David Hamilton, and the editorial board, and has been established as a mainline journal. The Editor was warmly thanked for his services. The publishing environment is changing rapidly towards Open Access publication. This means that it is likely that subscription journals will disappear and that SIL could meet the costs of publication by charges to authors and their institutions. In turn this raises issues of what future society subscription rates should be because much of SIL's income is presently spent on publishing the journal. There are options to maintain dues at their present level and spend more funds on maintaining SIL's niche of aiding developing country scientists or of reducing them.

There are issues of whether to move immediately to an open access journal or to do it more gradually as a hybrid journal. A tipping point will come for journals when the number of open access papers tops 50%, when libraries may feel it not worth continuing a subscription and there will be a difficult period in moving from the present case of most articles being published under restricted (to the members and subscribers) access to one in which virtually everything is published open access. SIL needs to consider the flow of submissions and the welfare of scientists in less developed countries and of retired members who do not have access to grant and contract funds but who may still have material they wish to publish. It was proposed that SIL moves towards publishing *Inland Waters* as an open access journal in a carefully phased way. Immediately,

open access will remain at present charges (\$600 per paper) with extra page charges beyond a threshold of 6 rather than the present 8 pages and a larger charge being made for non-SIL members (say \$800. For SIL membership rates, the first author must be a member of SIL). The Executive Committee will monitor progress and make a decision when to move to complete open access, probably within the next three years, at which point a decision could be made by the Executive Board on reduction of membership dues.

SIL will eventually move *Inland Waters* from being a subscription journal, as at present, to Open Access. There were concerns that Open Access charges are high, even some developed countries might not be able to afford them and that this might influence the flow of manuscripts. For this reason *Inland Waters* would encourage open access submissions but remain a subscription journal, accepting articles under the current system until such time as the flow of open access articles increased sufficiently. It was felt that since open access was being promoted by governments and funding agencies and was of net advantage to all but commercial companies and societies with well-established lucrative subscription journals, its emergence was inevitable and that the system would adjust.

This could eventually lower SIL membership rates and there was a need to give the Executive Committee the leave to adjust subscription rates during the triennium if necessary.

5. Newsletter: *SILNews* has been ably edited by Ramesh Gulati and is now compiled by the FBA. Formerly Chris Schneider compiled it but savings are now expected. There is a feeling that it may be read less widely now that it is published electronically, but printing and postage costs are high. Views were sought and it was felt that the electronic version is read as much as the printed version. Members were encouraged to submit information for publication.

6. SIL encourages working groups and they cost nothing. However, only one appears to be currently active (Plankton Ecology). Aquatic Primary Production had its last workshop in 2008. That on Conservation and Management of Running waters has disbanded and that on Periphyton of Freshwater Ecosystems has no coordinator. Despite requests for information on current activity, no response has been received from the coordinators of the groups on Ancient Lakes, Aquatic Birds, Aquatic Invasive Species, Aquatic Microbial Ecology, Biodiversity, Biological Monitoring, Ecohydrology, Macrophytes, Physical Limnology, Saline Inland Waters, Wetlands, and Winter Limnology. There is a suggestion that replacement groups based on geographic regions may be useful as a platform for organization of meetings between the Congresses, because of the costs of intercontinental travel. Views were sought and it was suggested that we add students to working groups.

7. Committees: It was proposed to revise committee structures and memberships. One committee that appears now to have no real remit (Conservation) should be discontinued and the remit and title of the Committee on Developing Countries expanded to consider regions and meetings. Vice presidents, who previously had no substantial defined role, were proposed as chairs of some of these committees.

8. Medals and lectures: Item of Report: Nauman-Thienemann medals will be awarded at this Congress to John Downing, Jacob Kalf and Sam Lake. The Baldi lecture would be given by Robert Naiman and the Kilham lecture by Catherine Pringle. At the 2016 Congress, the Baldi lecture will be given by Richard Battarbee and the Kilham by Ole Seehausen.

9. Changes to Statutes: No changes to the Statutes are proposed bar a minor amendment to include both genders in the nature of the

General Secretary-Treasurer: Statute 11 e) The General Secretary-Treasurer, in addition to his [or her] responsibilities for all business matters, shall be ex officio a member of all committees. It was not felt that this was a serious enough change to necessitate formal acceptance by the General Assembly.

10. Next Congresses:

Italy (2016: Prof R. Bertoni)-Efforts will be made to lower congress rates.

China (Zhengwen Liu) is proposing to take the 34<sup>th</sup> SIL Congress in 2019

S. Korea (Gea-Jae Joo) is also proposing to take the 34<sup>th</sup> SIL Congress in 2019. China and Korea were asked to present proposals at the next meeting of the Committee.

Germany is proposing to hold the 35<sup>th</sup> Congress in 2022 since it will be the 100<sup>th</sup> anniversary of SIL and SIL was started in Germany.

There is continuing concern about the frequency and costs of Congresses. Views were sought on whether the Congresses should be held on a two-yearly basis, and on whether the current practice of franchising organization solely to a local committee with little influence for the Executive Committee should be changed. The experience of past congress organizers should be made available to intending ones, perhaps through a manual. This matter would be taken up at the Second meeting of the Committee.

11. Motions to be put to the General Assembly were as follows:

a) Publication of *Inland Waters* will move to complete open access, by a gradual process, determined by article submission rate and on terms favourable to the membership.

b) The Executive Committee is given leave to adjust membership subscriptions during the triennium if a situation is reached where the journal becomes substantially self-supporting through publication charges.

c) Membership subscriptions will be reduced to \$US 5 for students registered for degrees but yet not having attained the degree. For three years post-PhD, subscriptions will be levied at half of the full rate. Reductions for developing countries will apply in addition.

d) To compensate for expected inflation in the coming triennium, membership subscriptions will be increased by 10%.

e) The Conservation Committee will be disbanded, the Committee for Limnology in Developing Countries will be renamed the Committee for Regions and Meetings and the Tonolli Memorial Committee will be renamed the Awards (Tonolli and Wetzel) Committee. Proposals for membership of all committees have been reviewed and accepted by the International Committee and those proposed.

12. Any other business:

a) SIL is still looking for someone to promote a link on the SIL Website for open forums.

The Ex. Committee/National Representative meeting was adjourned by President Brian Moss at 19:00 hrs.

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### III. Opening Ceremony – 5 August (Monday) 09:00

The President called the meeting to order and introduced those who gave the official welcome, Prof. Dr. Peter Biro and Mr. Peter Kovacs.

The President then read the list of members who had died during the triennium, all of whom had been members for long periods and the

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meeting stood for a moment of silence. He then awarded the Naumann-Thienemann Medals and the recipients, John Downing, Jacob Kalf and Sam Lake each responded with their thanks and comments. The President then opened the First General Assembly with a combined Presidential Address and Report of the Acting General-Secretary-Treasurer. The elected General Secretary-Treasurer had been indisposed and was unable to be present and the President had deputized for him since late 2011.

A. President Moss expressed appreciation of the local organizing committee, particularly Dr Viktor Toth, who had undertaken organization of a great many of the details, the officers of the Society, the Editor, Jack Jones, the Senior Associate editor, David Hamilton, the editorial board, Bill Lewis for his investment advice, Ramesh Gulati for his editorship of SIL News, and Gordon Goldsborough for his management of the web site. He also thanked Denise Johnson for her administration of the affairs of the society, and Karen Rouen and Simon Pawley of the Freshwater Biological Association for their sterling service for *Inland Waters* and the National Representatives. He recounted the history of Hungary, its present geographical and financial circumstances and the considerable talents of its citizens in the sciences and the arts, and found them to be useful metaphors for the state of a small scientific society in the modern world.

The President turned to the wisdom of its founders who had anticipated many of the problems for inland waters over fifty years ago and then reported on the state of membership and the finances. Membership is declining as the major cohort of recruitment in the 1960s and 1970s now comes to retire and this is a common feature of many, if not all scientific societies at present. He reported that about two-thirds of the membership was in arrears and that this had major implications for cash flow and the extent to which the Society could fulfill its particular niche of helping promote research in the least well-endowed countries. The Society had increased in value but only because of re-evaluations of its investments and gifts to the Tonolli, Wetzell and Kilham funds. He acknowledged a particularly generous contribution to the latter by Prof Dr Susan Kilham.

The President then turned to the reasons for the decline in membership and believed that it was due to the fact that the original reasons for belonging to a Society (an inexpensive printed journal, contacts and availability of meetings) had now been superseded by the ready availability of electronic files through institution libraries subscribing to bundles of journals, easy electronic communication and a plethora of meetings, Conferences and Workshops. He felt that a redefinition of the role of Societies was needed to cope with a changing world. He then outlined the options for Inland waters, discussed the state of subscription and open access journals and recounted the thinking that had led the International Committee to propose a steady move towards complete open access over the next few years. He also indicated that open access would have implications for subscription rates, which might be reduced, but that in the interim, a strategy to attract new members would include free membership for students in developing countries, a US\$5 subscription for students elsewhere and a 50% of full dues rate for young scientists for three years following their award of a PhD. He screened the motions listed in the Minutes of the International Committee that would be voted on at the Second General Assembly.

Finally he turned to the roles that he believed scientific societies might have in the future. The world faced major environmental problems, all of them interconnected and linked with water availability

and quality but which were under-recognized by current governments, who were largely ill-equipped to solve them. He saw a major role for scientific societies in educating the public, were they able to vastly improve their communication skills and eventually in leading reform. He believed that with a large number of small societies, each with problems of survival, a structure that united them at three levels of national, regional and international would serve to give them a new role. At the national level, society meetings offer an opportunity for students to give their first public presentations and for information on postdoctoral and other employment opportunities to be exchanged; at a regional level, opportunities for more complete work to be presented are given and there might also be an employment-exchange role. At the regional and international levels, there is more opportunity for becoming involved in influencing governmental policy, whilst providing opportunities for integrating work through more far reaching presentations, such as the named lectures and plenaries. Membership could be organized such that a person could belong to the combined structure at all three levels with a combined subscription being collected at the national level (this works well for SIL in Canada, Switzerland, Austria and Germany) and appropriate amounts passed up through the regional and international levels to maintain them. He proposed this for consideration and discussion in the future and concluded that the Earth's problems could be solved but that new structures at all levels would be needed, structures that would also ensure the survival of Societies as collegiate enterprises, a role that has proved valuable in the past and which needs to be conveyed to potential new, young members.

B. The President adjourned the meeting at 11:10 hrs.

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IV. **Second Meeting of the National Representatives** – 8 August (Thursday), 18:00-18:45, continued at 11:00-12:15 hrs. on Friday 9 August

A. There were three items for discussion:

1. The establishment of a small committee to be convened by the incoming President to maintain liaison between the Society and future congress organizers for help in organization and to ensure that costs were minimized. This was agreed.

2. A revised system for allocating dues such that the present classification into developed, newly industrializing and developing countries (the latter paying half-dues) be replaced by one based on the World Bank rankings of Gross Domestic Product (Gross national Income) per capita. It was proposed that countries with GDP per capita greater than \$25000, based on Year 2012 rankings pay full dues, whilst those with \$US 25000 or lower would pay half dues. All countries presently paying half-dues would continue to do so but some additional countries would enter the list, including Brazil, China (other than Hong Kong and Macau), India, Greece and Portugal. There would be some financial impact on the society, but most members come from the wealthier countries. Reductions for young scientists (within three years of PhD) in the least wealthy part of the list would apply additively (they would pay 25% dues). The appropriate pages on the web site would need extensive revision. This was agreed.

3. Presentations were made by Prof. Dr. Joo on behalf of South Korea and Prof. Dr. Liu on behalf of the People's Republic of China for future Congresses. It was decided that as an experiment during the period 2017-2022, Congresses would be held on a biennial basis (2018, 2020, 2022). For various good reasons both PR China and South Korea wished to hold the 2018 Congress. Both countries provided compelling

presentations. The representatives of PR China and South Korea then withdrew. The incoming President (Prof. Dr. Prairie) suggested that it might be prudent not to make a decision pending establishment of business plans from both potential organizers. However, the meeting felt that a decision should be made and subsequently decided that China should be selected, not least because encouragement to China had been given at the previous Congresses and Prof. Dr. Liu had organized a successful meeting partly under the SIL banner in Nanjing and a successful international meeting for Shallow Lakes in Wuxi. South Korea was encouraged to make a bid for the 2020 Congress.

V. Second General Assembly – 9 August (Friday), 16.40 hrs.

A. President Moss called the General Assembly to order.  
B. The motions notified during the First general Assembly were screened together with small modifications: as follows:

1. Publication of *Inland Waters* will move to complete open access, by a gradual process, determined by article submission rate and on terms favourable to the membership.

2. The Executive Committee is given leave to adjust membership subscriptions during the triennium if a situation is reached where the journal becomes substantially self-supporting through author publication charges.

3. Membership subscriptions will be reduced to \$US 5 for students registered for degrees but yet not having attained the degree. For three years post-PhD, subscriptions will be levied at half of the full rate. Reductions for countries paying reduced dues will apply in addition.

In setting subscription rates, countries with Gross Domestic Products (Gross National Incomes) per capita of US\$ 25000 or lower (based on the World Bank list for 2012) will pay 50% of the full rate for categories of ordinary member, 3-yr post PhD member, and retired member.

To compensate for expected inflation in the coming triennium, membership subscriptions will be increased by 10%.

4. The Conservation Committee will be disbanded, the Committee for Limnology in Developing Countries will be renamed the Committee for Regions and Meetings and the Tonolli Memorial Committee will be renamed the Awards (Tonolli and Wetzell) Committee. Proposals for membership of all committees have been reviewed and accepted by the International Committee and those proposed.

A. Congress Advisory Committee will be set up to ensure that experiences in organising past Congresses are passed on to future Congress organisers.

5. The next Congress will be in Torino, Italy in 2016. Thereafter an undertaking has been given to China for the 34<sup>th</sup> Congress to be held on an experimental two-year cycle in 2018.

The motions were presented en bloc and agreed by the Assembly

C. President Moss then handed over the podium to the incoming President, Prof. Dr. Yves Prairie, who addressed the Assembly, thanked the local organizers, the outgoing President and Executive Committee and SIL's Business Manager, Mrs. Denise Johnson, and closed the 32nd Congress at 17:15 hrs.

### Prof Dr Brian Moss

President/Acting General Secretary-Treasurer in lieu of Morten Søndergaard

## Is something rotten in the state of our scientific writing?

### BRIAN MOSS

School of Environmental Sciences, University of Liverpool, Liverpool, UK

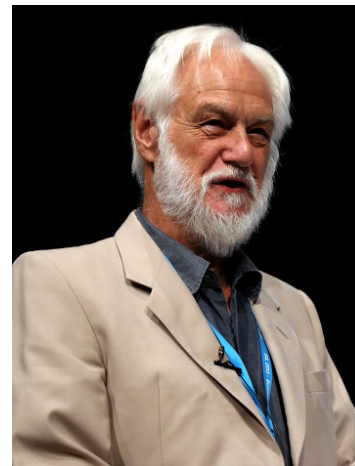
### The problem

I wonder if I am the only one to find many scientific papers hard to read because they are often tediously written and full of jargon and over-used phrases. Often I have to read the titles of recent ecology papers several times to work out what they mean. Kai Sand-Jensen (2007) certainly sympathises in his paper: *How to write consistently boring scientific literature*. Maybe there are many more of you reticent to admit it. A few years ago I wrote a letter to the Bulletin of the British Ecological Society concerning the jargon contained in a paper published in one of the Society's journals. The abstract was five times shorter and much clearer when I re-wrote it in plain English. I asked why the editors had ceased to edit and expected a great deal of outrage. I did not get any. All I got were a couple of emails from older members of the Society, concurring with me. It might seem that younger generations do not care if their writing is obscure.

More seriously, W.H. Schlesinger (2010), in an editorial in *Science*, made a plea on the same theme: *...despite producing an enormous amount of new information, ecologists are often unable to convey knowledge effectively to the public and to policy-makers. Unless the discoveries of ecological science are rapidly translated into meaningful actions, they will remain quietly archived while the biosphere degrades*. Schlesinger may have been arguing for a different sort of literature for communication to the public, but it strikes me that if ecologists care little to write without jargon among each other, they are unlikely to be much disposed to be clear where anyone else is concerned.

Style manuals, attempting to guide the writing of scientific papers, have been encouraging the use of straightforward English for many years, but the advice is largely unheeded. See Woodford (1967) and Ludbrook (2007) for the same message, forty years apart. My impression, and I think that of many others with long experience, is that, in the last few decades, as the volume of publication has increased, the quality of the writing has deteriorated. The consequences may be that ecological science is even more ignored outside its groups of specialists, and that Schlesinger's fears are justified. My aim here is to establish more objectively whether my impressions are justified, and if so, to examine some of the reasons and consequences.

I used the *Web of Science* to create a stratified random sample of papers published between 1960 and 2012. I entered the search terms 'phytoplankton ecology', 'stream invertebrate ecology', 'freshwater fish ecology' and 'eutrophication' to determine the total number of papers published each decade in these areas, and then used random numbers to select a sample, within each decade, treating 2010-2012 as representative of the current decade. My intention was ten papers from each search area from each decade, making 240 in all. I could only obtain



five papers available in my University library for phytoplankton ecology from the 1960s but occasionally I found I had inadvertently selected an extra paper for a decade, so the sample was eventually 239. I also looked at the statistics of numbers of papers and authors in *Freshwater Biology*, using the journal's web site.

My aim was to measure how clear the abstracts of the papers in my sample were, with the criteria that they should be immediately understandable to any interested reader, no ecological training being assumed. The abstracts should therefore be self-contained, free from jargon, and use words in the sense of the standard dictionaries. This was a way of establishing as absolute a baseline as I could and meant that I had to be very tough on technical terms that could be replaced by familiar ones, even though the terms might be second nature among ecologists. I removed the title, author and date from every abstract, leaving only code numbers to identify them, and examined them in random order, rewriting them where necessary. I recorded the time I took, the number of words before and after rewriting, and the number of changes made, using a standard protocol. The time taken gave useful information because often much of it was spent in working out what the authors were trying to say, rather than in the mechanics of correction. I worked under standard conditions when I could not be interrupted and was not tired. I did not change the factual content of the abstracts and assumed that the authors had best represented the content of their paper, though sometimes I doubted this.

I compiled an index for 'obscurity', which was the product of the percentage change in number of words (with sign being ignored), the time taken (in seconds) to rewrite the abstract, and the number of changes made, all three normalized per word of the original abstract. To minimise possible drift in standards, I completed the task over two consecutive weeks. I checked my consistency by taking, a month later, a random sub-sample of 10% of the papers and independently repeating the process. There were high positive correlations between the first and second passes ( $r = 0.71$ ,  $n=24$ ,  $P<0.0001$ ). Of course, what I did is open to the criticism that I could not replicate myself as critical reader, without persuading other people to find the time to repeat the exercise, but I did standardize my methods as much as I could and I would like to see the exercise repeated. Many people complain of poor standards of writing, but no one, as far as I know, has previously attempted to produce other than anecdotal evidence. This, at least, is a start.

The papers came from 131 different journals, and the lead authors from forty countries (Table 1). There has been a prominent increase in numbers of both journals and countries represented in publishing since the 1960s (Jinha, 2010), and there was a more or less steady increase in the number of journals in my sample in each subsequent decade. The total number of papers (in the four categories searched) has increased linearly by decade with an  $r$  value of 0.99 ( $n=6$ ,  $P<0.0001$ ). A similar pattern was obtained for annual increases in *Freshwater Biology* with  $r = 0.96$ ,  $n = 40$ ,  $P<0.0001$ . Scientific publishing has proliferated in the last half century, with more than fifty times as many papers likely to be published in the current decade as in the 1960s. Jinha (2010) reckons there are about fifty million scholarly articles now in existence. There is even a suite of journals about academic publishing itself.

Table 1. Background data on the sample of papers examined. FWB, *Freshwater Biology*. \*Values for 2010-2019 projected from numbers in 2010-2012.

Decade	Number of journals in sample	Total publications (in <i>Web of Science</i> )	No of countries represented in sample	Mean number of authors per paper in sample	Number of papers in FWB	Mean number of authors per paper in FWB
1960s	18	896	8	1.5		
1970s	30	16274	12	1.81	580	1.58
1980s	28	23458	18	2.18	622	1.94
1990s	29	30192	17	2.7	993	2.43
2000s	33	44073	21	3.88	1655	3.47
2010s	36	50358*	19	3.98	1898*	3.99
Totals	131	165251	40		5748	

The number of authors per paper in my sample increased with time too, but there was a better fit to an exponential curve ( $y = 1.197 e^{0.21x}$ ,  $r = 0.98$ ,  $n = 6$ ,  $P<0.0001$ ) than to a linear one. The relationship was very similar for *Freshwater Biology* ( $y = 1.22 e^{0.243x}$ ,  $r = 0.99$ ,  $n = 5$ ,  $P<0.0001$ ). These curves are based on means ( $x$ ) per decade. Inspection of the data on a yearly basis for *Freshwater Biology* shows an obvious exponential rise ( $y$  (years from 1970) =  $1.34 e^{0.026x}$ ,  $r = 0.96$ ,  $n = 42$ ,  $P<0.0001$ ), but a plot of year versus the range of number of authors per paper during that year (Fig. 1) shows a notable change. There was a fairly steady increase in range of number of authors per paper until the end of the 1990s then wild shifts between years from 1998, with ranges (smallest to largest) averaging 17.5 from then on, compared with an average of 4.7 between 1971, the first publication year, and 1997. A steady linear increase in number of publications has thus been overlain by an exponential increase in number of authors per paper, and a marked variation in numbers, year by year, in the last decade or so.

Analysis of the quality of the abstracts in my sample suggests a continuing deterioration in the effectiveness of communication. The range of values of my index of obscurity was large (from 0.0003 to 22.7) and the range was obviously larger in more recent decades than in former ones, so to equalize the variances I transformed the index to log values. The data show a marked and steady increase in obscurity from the 1960s onwards (Fig. 2) with  $r = 0.51$ ,  $n = 239$  and  $P<0.00001$ . It might be argued that I simply preferred the writing style acquired when I was a young scientist and that recent styles are simply different, not inferior. I would disagree with this. There were poor and well-written abstracts from all decades and I altered some from the last few years as little as those from the 1960s. The one that I altered most came from 1987. I worked to strict criteria that would be characteristic of good writing of any period. There is nothing specific to a particular time about the clearest writing; it is always free of jargon, simple in structure, immediately understandable and logical in arrangement.

### The explanation

Reasons for the increased obscurity are inevitably speculative. The research environment in the 1960s was very different from that at present. There was certainly pressure to publish, but it was not nearly so strong as now. Scientists worked alone or in small groups; there was no business ethos in universities and research institutions, and there was little pressure to bring in funds from grants and contracts. In the

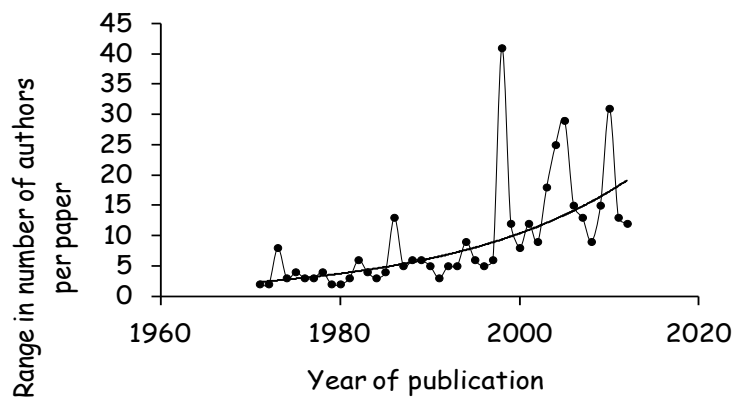


Fig. 1. Change in the range of numbers of authors per paper (greatest minus least), of papers published in *Freshwater Biology* year by year. The fitted curve is exponential ( $r = 0.79$ ,  $P < 0.0001$ ).

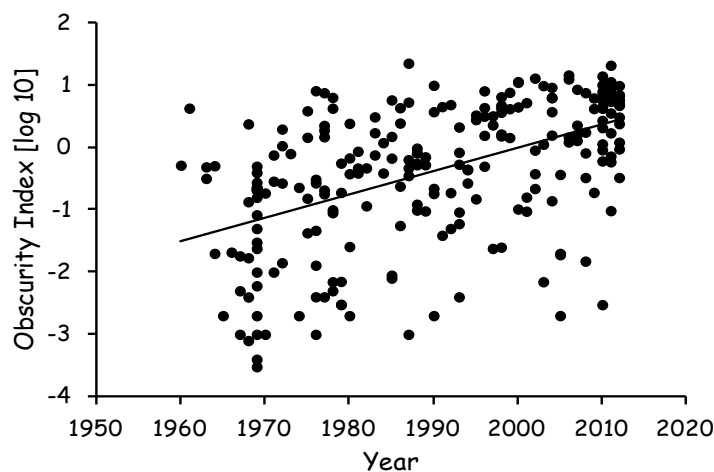


Fig. 2. Relationship between obscurity of an abstract (log scale) and the year of publication in a random sample of 239 papers in freshwater ecology. The index was calculated as the product of percentage change in number of words, number of changes made per word and time spent (seconds per word) in rewriting the abstract to a clarity understandable by any intelligent person. The fitted line is a significant ( $P < 0.00001$ ) linear regression.

UK, the institutions were to a large extent allocated funds as a block grant to support research. External grants were available for very large projects but it was possible for most workers to do their research based on the institution's own funds. The European Union Frameworks for research were not then in place. In the UK all this was to change with the Rothschild report (1971) and in particular with the Conservative governments of the 1980s, which greatly reduced the block grants previously given to institutions for research. Research was increasingly to be determined by the needs of government and its agencies, and business, and the funds remaining to the Research Councils for fundamental research had to be allocated on a highly competitive basis. From the 1980s also, the European Union began to invest more in research, again with a strong applied bias, and with a philosophy of collaboration among the member states. In North America, there had long been a tradition of funding research through external grants, but funds were readily available to support this and there was no parallel

influence to that of the European Union. Perhaps in consequence, the distribution of number of authors per paper, for papers of European origin in my sample, is more skewed to the higher values than that for North America. Only 15% of North American papers had four or more authors, compared with 34.8% for Europe.

The increased number of papers produced per decade is likely linked to increased research funding from all sources but perhaps also to greater demand to publish in recent years. In the mid-twentieth century, senior colleagues discouraged publication until a solid paper could be produced. In recent years there have been pressures to publish every scrap of information, regardless of whether it really adds something fundamentally new. Papers published with many authors (now a prominent trend, see Fig. 1) often come from workshops and meetings trying to create a summary or synthesis from data also published elsewhere. Inevitably all this activity must mean that, with the requirement to raise funds, and other pressures on time generated by an increasingly bureaucratic university and research institute system, the attention given to quality writing has diminished. One long-standing editor, to whom I showed this article, commented on what he saw as a sense of desperation among authors to make what is often routine sound important, and his own increasing cynicism about the novelty of the work submitted to his prestigious journal. All this may have had the effect of introverting science, with less thought given to the clarity of the papers. Based on the times I took to improve the abstracts, it would take only an hour or two, a trivial time compared with that in carrying out the work, to clarify a whole paper but the trends are clearly in the wrong direction and there is a need to explain and remedy this.

However, a willingness to reverse the trend, on the part of the scientific community, cannot be automatically assumed. The panoply of papers, often attractively written (for example Wells, 2004, Sand-Jensen, 2007, Ludbrook, 2007) about how to write well seems to be ignored. The message and the methods have been around for decades so we need to probe more deeply as to why they have not been adopted by many authors. Jargon and obscurity give intimations of power; many individuals prize volume of publication just as those in other endeavours prize the acquisition of wealth; and the values of science have been forced into the same mould as those of management. Therein may lie the rise of obscurity referred to in a recent newspaper article on office jargon as 'a maddeningly viral kind of *Unspeak engineered to deflect blame, complicate simple ideas, obscure problems, and perpetuate power relations*' (Poole, 2013). Science has become a business and is paying the price of increased funds; there are plenty of entrepreneurial scientists taking advantage of the situation, even to the extent, I understand, of having their grant proposals and papers written, or at least 'polished' by professional companies.

The trend might only be reversed by an imposed change in the cultures of editing and publishing, and of appointment and promotion within institutions. Many contemporary editors may see a very different role for themselves compared with those fifty years ago, when editors did a great deal of detailed rewriting. There are still some editors in the classic mode and I have no wish to offend them by generalization, but overall, editors should again begin to edit, rather than just make decisions on the basis of referee reports.

The proliferation of journals is not necessarily a desirable trend, nor is the slavish insistence of University managements (they used to be called administrations, a different concept), on high levels of publication in journals with high citation indices. All this does is to



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## 32<sup>nd</sup> Triennial Congress of the International Society of Limnology (SIL) in Budapest (4-9 August 2013)

Organizing a congress for the International Society of Limnology, dealing with the most urgent scientific questions relating to aquatic environment and climatic changes, comprising twenty two scientific topics, addressing not only the aquatic scientist but also to the wider public, presented a number of challenges for the Local Organising Committee. Despite these challenges, however, the 32<sup>nd</sup> triennial SIL Congress entitled “Diverse water – Rich life” went off very well and turned out to be a great success.

For five days, from 4<sup>th</sup> and 9<sup>th</sup> August 2013, some 460 scientists from 47 countries gathered together at Budapest. The daily deliberations were preceded by plenary talks on subjects of general importance and changing significance. The participants demonstrated the importance of understanding the problems related to different aspects of inland waters.

The scientific program was a rich mix of scientific formats, ranging from memorial lectures, to plenary speeches featuring famous speakers and thought-provoking topics. The Baldi Memorial Lecture was given by Robert J. Naiman from the School of Aquatic and Fishery Sciences, University of Washington and Centre of Excellence in Natural Resource Management, USA, University of Western Australia, Australia with the title “Complexity and the Restoration of River Ecosystems”. The Kilham Memorial Lecture by Cathrine M. Pringle from the Odum School of Ecology, University of Georgia, USA was titled “How resilient are neotropical stream ecosystems to species loss and climate change?”.

The authors of plenary presenters are outstanding limnologists

- John A. Downing (Association for the Sciences of Limnology & Oceanography; Department of Ecology, Evolution and Organismal Biology, Iowa State University), with the following title: “Limnology and Oceanography: two estranged twins reunited by global change”.

- Martin Dokulil (Institute for Limnology, University Innsbruck), with the title: “Impact of climate warming on European inland waters”.

- László Somlyódy (Department for Sanitary and Environmental Engineering, Budapest University of Technology and Economics). The title of his talk was “Eutrophication and water level variability of shallow lake Balaton: Evaluation of risks and trade-offs”.

- Henri Dumont (Ghent University), talked on “Limnology meets Marine Biology in West Eurasia’s brackish water lakes”.

- Luigi Naselli Flores (Department of Biological, Chemical and Pharmaceutical Sciences and Technologies, Università degli Studi di Palermo) with the following title: “Morphological analysis of phytoplankton as a tool to assess ecological state of aquatic ecosystems”.

In addition to these lectures, the scientific program comprised 287 oral and 117 poster presentations. Sessions were all held under one roof in the exquisite Budapest Congress Centre, where we had numerous lecture rooms reserved daily for 8 parallel sessions covering the 22 topics of the congress, ranging from molecular biology and biodiversity to biogeochemical cycles and limnology at global scales.

In addition to the scientific program, we successfully organised several mid-congress excursions. Hungary abounds in sites and attractions to visit, whether you prefer to visit historical landmarks and natural phenomena, or you are more interested in special activities like fishing, thermal spas or horse-riding. Our visitors had the opportunity to see natural submontane streams typical of Hungary, small (lpolym) and large (Danube) rivers and the largest shallow lake of Central

intensify competition for some journals and spawn others to take up the slack. The more prominent journals would not be under such pressure if their editors insisted on higher standards of writing, clearer and more concise papers, and papers that contained really new material. Repetitions of ideas that were original in the middle of the last century (McIntosh 1986) seem now to be presented almost as divine revelation. In my sample of 40 papers from the last three years, I had anticipated discovering some idea completely new to me, but I was disappointed.

The research assessments carried out to measure research in British Universities about every five years since 1986 have required submission for inspection of around one substantial paper per year by each researcher. That is a reasonable rate of publication if all publications are to be of high quality. Universities and research institutions could support an improvement in standards by agreeing to consider only a researcher’s nominated ten best publications for promotions and appointments. Provided the list of ten had a continuing turnover, such a system would promote high quality and clearer writing (because appointments and promotions committees, which usually include people from a range of disciplines, could be expected to read most of the publications and would not be impressed by obscurity). The only losers would be the proliferating commercial journals on increasingly narrow topics that would no longer be needed. The gains would be to the quality of communication to a wider audience, to improving morale among ourselves (who has not been depressed by the sheer weight of the current literature?) to University library budgets, to women with careers interrupted by maternity leave, and to science itself, which would be saved from its current fate of being sucked into a self-serving maelstrom of essentially business activity. We might also begin to have more influence on how the planet is managed. But a cynic might argue that the current pressures have been deliberately placed on science to reduce its influence. Winston Churchill (Churchill, 1965) believed that scientists should be on tap but not on top. Taps spend most of their time turned off.

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Europe, Lake Balaton.

The Congress Dinner on the 8<sup>th</sup> of August was held in the rolling hills of the Domony Valley, about 50 km from Budapest, where all services selected for our entertainment were provided successfully. At the site we found not only beautiful scenery, but also enjoyed a sumptuous dinner with typical Hungarian dishes, drinks and music. After dinner when it had become dark, a popular equestrian show entertained us all for more than an hour.

The congress also enabled participants to build and strengthen networks, allowed them to share and exchange information. This will help the congress delegates to utilise the acquired knowledge in furthering our understanding of inland waters. During the Student Forums young scientists had the possibility to talk face-to-face with well-known limnologists and board members of the SIL.

The best oral presentation of a scientist under the age of 35 was won by Stephanie Palmer (Canada) with her presentation in the “Remote sensing and GIS in limnology” session entitled: “Evaluation of MERIS chlorophyll-a retrievals and time series for Lake Balaton,

Hungary”. The best poster presentation of a scientist under the age of 35 was won by Pavel Svoboda (Czech Republic) presented in the “Ecology of the Benthos” session entitled: “Relative contribution of neutral and niche-based processes to desmids communities at a local spatial scale”.

The organising committee of the Congress hopes that you will keep good memories of the congress in Budapest. Last, we are happy to pass on the baton to our colleagues from Turin, Italy, who will host the 33<sup>rd</sup> SIL congress in 2016.

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## Obituaries

### **RUTH PATRICK (1907-2013)**



Ruth Patrick has died, at the age of 105 years, having made numerous, significant contributions to our understanding of aquatic ecosystems and specifically the ecology of diatoms in them, and the impacts of environmental pollution generally.

Born at Topeka, Kansas, USA on 26 November 1907, Patrick's

life-long interest in nature was cultivated at an early age by her father, who gave her a microscope when she was 7 years old. After graduating from the Sunset Hill School for Girls at Kansas City, she attended Coker College at Hartsville, South Carolina, earning a baccalaureate degree in 1929. She went on to the University of Virginia where she obtained masters and doctoral degrees, the latter in 1934. Beginning in 1933 as a graduate student, she became associated with the Academy of Natural Sciences at Philadelphia, an affiliation that would persist for over 70 years. Patrick was an early specialist in the study of diatoms, and an advocate for their use in monitoring aquatic pollution. Initially a voluntary curator of microscopy at the Academy, Patrick undertook to unify its diverse diatom collections into a single, comprehensive herbarium that would become one of the largest in the world. In 1945, she was given a paid position and, two years later, she established the facility's limnology department—renamed the Patrick Center for Environmental Research in 1983.

In 1948, Patrick led a pioneering study on the relationship between diatom species abundance and water quality in rivers, based initially on studies in Pennsylvania but later expanded to South Carolina, Louisiana, Tennessee, Texas, and elsewhere. Her work led eventually to more than 200 scientific papers and several books. Among her most important contributions were two treatises, published in 1966 and 1975, on the diatoms of the United States, co-written with the late Charles W. Reimer. For over 35 years, she also taught limnology and botany at the University of Pennsylvania.

Patrick served on the board of directors for the DuPont Company (the first woman to do so) and the Pennsylvania Power and Light Company. She advised US Presidents Lyndon Johnson and Ronald Reagan on pollution issues, and served on panels of the National Academy of Sciences, the US Department of Interior, and others. Her exemplary scientific achievements were recognized by numerous awards, including a Lifetime Achievement Award from the American Society of Limnology and Oceanography (1996), the Pennsylvania Award for Excellence in Science and Technology (1970), the Eminent Ecologist Award from the Ecological Society of America (1972), the Gold Medal from the Royal



Zoological Society of Belgium (1978), and the Benjamin Franklin Award for Outstanding Scientific Achievement (1993). Elected to the National Academy of Sciences in 1970, and the American Philosophical Society in 1974, she received the National Medal of Science from US President Bill Clinton in 1996 and was inducted into the US National Women's Hall of Fame in 2009. She held 25 honorary doctorates.

Ruth Patrick died at Lafayette Hill, Pennsylvania, USA on 23 September 2013, having outlived two husbands. She is survived by a son, several stepchildren and grandchildren, and numerous diatomists in the US and around the world whose careers she had mentored.

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"Ruth Patrick, a Pioneer in Science and Pollution Control Efforts, Is Dead at 105," *The New York Times*, 24 September 2013, page B17. <http://www.nytimes.com/2013/09/24/us/ruth-patrick-a-pioneer-in-pollution-control-dies-at-105.html> (accessed 21 October 2013).

### Tom Berman (1934-2013)

Prof. Tom Berman always wanted to see the Galapagos Islands. At the age of 79 he managed to get there for the first – and last time in his life. He died on 13 April while hiking alone on a nature trail in one of the islands. Apparently he took off from the main path and fell on his forehead. To his last day he was healthy, professionally active and extremely productive.

Tom was born in 1934 to a Jewish family in the Czech republic. Just before the onset of World War II, in 1939, his parents had the amazing foresight and courage to send Tom, their 5-year old son, alone, on the "Kindertransport" train with several hundred other refugee kids, from Prague to Holland, then by ferry to London, to foster families in Britain. This saved Tom's life, while his parents and nearly all other family members perished in the Nazi concentration camps. Tom was lucky to have a new home and was raised by loving foster parents in Scotland. As a teenager Tom immigrated to Israel in 1952, and settled in Kibbutz Amiad. He later studied Agriculture for his BSc at Rutgers University (1956-1960), and continued with PhD studies in Microbiology at MIT (1960-1964). During his stay in the USA he married Debby, whom he met earlier in Israel and had 2 daughters. The young family returned to Israel and Kibbutz Amiad in 1964 where his third daughter was born.

In Israel, being a young and promising scientist, he was invited to establish the Kinneret Limnological Laboratory as one of the research laboratories of the then new Israel Oceanographic & Limnological Research Ltd. He was one of the founders of the Kinneret Limnological Laboratory in the late 1960s, its director from 1969-1970 and again from 1986 till his retirement in 1999, a research scientist at the lab in between his terms of directorship, and an active emeritus researcher after his retirement.

Jointly with Collete Serruya, Tom formulated the basic, interdisciplinary approach of limnological research based on extensive long term lake monitoring that would become a hallmark of the Kinneret Lab policy over the years. They fostered the close ties between monitoring and research, understanding that this combination forms both the basis for future research and the basis for recommendations regarding the management of the lake as a main source of drinking water for the State of Israel. This approach provided an example of how to conduct ecosystem research and contribute to the Kinneret Limnological Laboratory becoming well known internationally.

Throughout his career, Tom nurtured research ties with limnologists and oceanographers all over the world. In the pre-internet era, he did this by spending several sabbatical years at other research institutes (1970-71: Scripps Institute of Oceanography, California; 1976/77: University of Georgia, USA; 1982: Bigelow Laboratory for Ocean Sciences, USA; 1985/86: the University of Hawaii; 1991: the Institute for Meerekunde, University of Kiel, Germany; 1993: Institute for Ecosystem Studies, Millbrook, NY), by additional short-term visits as research fellow in other countries, by participating in many international scientific meetings, and by hosting overseas guests at the Kinneret Limnological Laboratory.



*Photo of Dr. Tom Berman taken during a hike on a trail surrounding Lake Kinneret (Israel) with members of the Kinneret Limnological Laboratory in March 2013 (about a month before Tom's death).*

Tom Berman was an active and prolific microbial ecologist, with a feel for where the scientific wind is blowing and making sure he is always at the frontier. He made major contributions in a wide range of fields. He was one of the first to demonstrate that alkaline phosphatase activity could be used as an indicator of algal P limitation. He pioneered in studies of algal extracellular release of DOC. He discovered deep chlorophyll maxima in Lake Tahoe and in the Eastern Mediterranean, and boasted for the deepest Secchi disc record ever made (54 m, in the Eastern Mediterranean). He studied the uptake of inorganic N and P by phytoplankton and bacteria, and later explored the role of DON and DOP as nutrient sources for phytoplankton in freshwaters. He was one of the pioneers in studies of Protista and the microbial loop. He developed C flux models for Lake Kinneret. Recently he initiated studies of transparent exo-polymers (TEP) in freshwater and their role in desalination technology. Tom Berman published nearly 200 articles in peer-reviewed journals, his most cited articles are listed below.

Tom had a great sense of humor. As a limnologist that grew up in Scotland he published an unsolicited paper in the *Journal of Irreproducible Results*, entitled: On the nature and numbers of monsters in Loch Ness.

Tom was one of the founding fathers of SIL's Group on Aquatic Primary Productivity, GAP (jointly with Mitsuro Sakamoto, Zvy Dubinsky and Max Tilzer) and its first chairman, from 1980 till 1992. Through its bi- or triennial International Workshops, GAP introduced the concept of true "work" meetings where both freshwater and oceanic researchers bring specialized equipment and carry out collaborative "state of the science" studies during the Workshop that are then published after peer-review.

At the SIL meeting in Budapest in August 2013 a special session was held to commemorate Tom. After an opening presentation entitled 'Tom - the man and the scientist', with photos from his long scientific career, colleagues and past-time students gave presentations on scientific topics MASHIKIM to Tom's research interests, and highlighting Tom's input to those studies, whether direct or indirect. The room was full throughout the session, during some lectures there were no seats available.

Tom was a gifted writer, and wrote not only science but also English poetry of which he published 2 volumes ("Shards", and "Rambles"). Tom Berman left behind his wife Debby, his three daughters, Ilana, Rena and Ora and seven grandchildren.

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### Tamar Zohary

Kinneret Limnological Laboratory,  
Israel Oceanographic & Limnological Research

## Prof. Dr. Jürgen Benndorf (12 October 1941-30 October 2011)

We wish to commemorate our scientific teacher and mentor, Prof. Dr. Jürgen Benndorf, who passed away shortly after his 70<sup>th</sup> birthday on October 30, 2011, in Dresden, Germany. He has been full professor for Limnology at Technische Universität Dresden (TU Dresden) from 1993 to 2008.

Jürgen Benndorf was internationally an highly recognized researcher. He published more than 170 scientific papers in international and national scientific journals. Within SIL, he is certainly the best known for his seminal papers on lake biomanipulation and food web control which were among the very first propagating this eco-technology to improve the quality of standing waters. With this work, Jürgen Benndorf also expressed his deeply rooted motivation that scientific research, in its best form, can help resolving practical problems. Thus, Jürgen always argued that basic and applied researches should not be considered distinct branches, but need fruitful discussion and exchange across disciplines. His personal scientific career reflects this duality. He studied biology at Leipzig University (1962-1967), and obtained his Ph D. (Dr. rer. nat.) in hydrobiology at Technische Universität Dresden in 1971. During the subsequent years as assistant and docent, Dr. Benndorf developed unique scientific

contributions such as the calculation of phosphate elimination using one of the first mathematical simulation models for pelagic processes in lakes (SALMO).

Jürgen Benndorf was very active to propagate his scientific achievements. Under the difficult publishing conditions in East Germany before the re-unification in 1990, he became co-editor of the 'Limnologica', an internationally established and acknowledged limnological journal. This journal has continued to keep the dual scope on basic and applied limnology, following the original intentions of the pioneering editors, including Jürgen Benndorf.

Jürgen Benndorf was also a highly appreciated university teacher. His lectures on Basic and Applied Limnology and Biochemical Ecology were constantly among those ranked highest by his students, primarily because he was teaching theory and practice in an elegant, unified way. Furthermore, he actively managed and substantially contributed to the re-organization of the hydrosience department at Dresden University after Germany's re-unification. During this time, Jürgen continuously argued that students of hydrobiology can profit from the strong interdisciplinarity with students of water engineering and vice versa, which is now typical for the education at TU Dresden. Accordingly, many of his students hold now prominent positions in the fields of water research and management. Also after his retirement in 2008, Prof. Benndorf continued as an active member of the scientific community and contributed by mentoring students.

We have lost in Jürgen Benndorf an active researcher, teacher and a mentor who strongly influenced the scientific development of many of us. Jürgen Benndorf was well known as critical thinker, enthusiastic opponent in discussions, as a man with clear principles, and a passionate trout angler. We will honour him in memory.



Jürgen Benndorf 2011

**Thomas Mehner**, Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB) Berlin and Neuglobsow, Germany  
**Thomas Petzoldt**, WG Limnology, TU Dresden, Germany

## Announcements

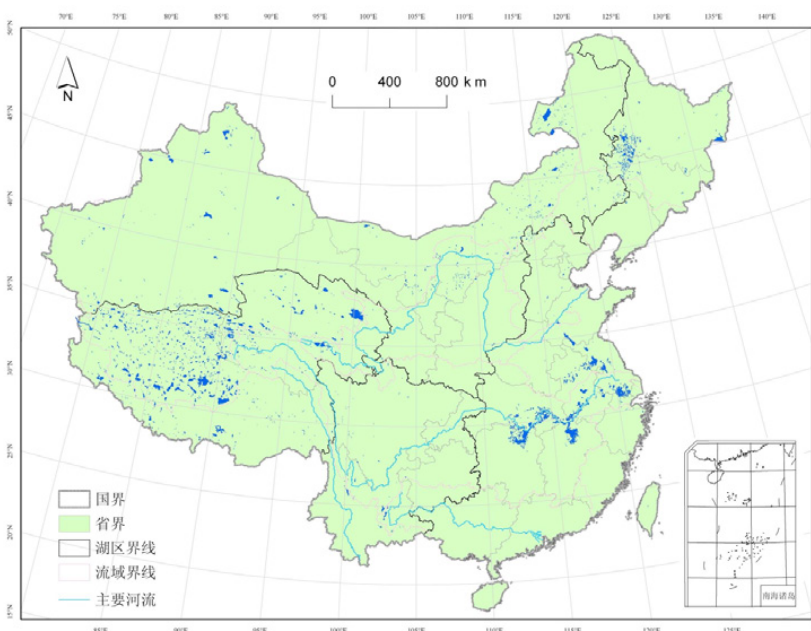
### 34<sup>th</sup> SIL Congress will be held in 2018 in China

During the 32<sup>th</sup> SIL Congress in Budapest, Hungary, it was decided that as an experiment during the period 2017-2022, Congresses would be held on a biennial basis (2018, 2020, 2022). Both PR China and South Korea wished to host the 2018 Congress. Prof. Dr. Joo on behalf of South Korea and Prof. Dr. Liu on behalf of the People's Republic of China. They presented their plans for hosting the Congress in 2018 at the meeting of the Executive Committee and National Representatives (International Committee). It was subsequently decided that China should organize the 34<sup>th</sup> SIL Congress in 2018.

China has almost all kinds of inland waters, including large rivers, e.g. the Yangtze River and Yellow River, large shallow freshwater lakes such as Lake Taihu and Lake Boyang, Saline lakes such as Lake Qinhai, deep lakes including lake Fuxian and Tianchi, alpine lakes (Lake Lugü), and endorheic lakes (Lake Ulungure).

Due to increased human activities, especially in the past 30 years, the ecosystems of many inland waters have been facing different degrees of degradation. The problems include species invasion, eutrophication, damming, overfishing, and increase in salinity. Limnological studies on these lakes provide a fundamental basis for solving these man-made problems. Meanwhile, the problems in different kinds of inland waters in different climate regions also provide unique chances for the development of limnology. China needs limnology and limnology needs China.

If you have any suggestion please contact Prof. Dr. Zhengwen Liu (zliu@niglas.ac.cn)



Distribution of lakes (>1 km<sup>2</sup> in surface area) in China (provided by Dr. Ronghua Ma from the Institute of Geography and Limnology, Chinese Academy of Sciences)

## 8<sup>th</sup> International Shallow Lake Conference “Ecology of Shallow Lakes in a Fast-Changing World”

Turkey will be hosting the shallow lakes conference for the first time during 12–17 October, 2014 in Antalya, Turkey, which forms a natural bridge between the old world continents of Asia, Africa and Europe, and due to its continental character, has earned the title of Asia Minor. Turkey is home to a vast diversity of habitats and species and it has an immensely mixed culture produced by its geographical location and rich history.

The guiding theme of the 8th International Shallow Lakes Conference is “Ecology of Shallow Lakes in a Fast-Changing World”. The main purpose of the triennial conference on shallow lakes is to provide us more information on recent developments and achievements of studies on shallow lakes ecology. The conference provides an opportunity to discuss the more recent results of researches on shallow lakes. The conference will open possibilities of exchange of ideas and result in initiation of new collaborative studies. We expect more than 400 participants from about 40 countries to attend the Conference. Exclusive keynote lectures followed by oral and poster presentations on the ongoing researches will provide the opportunity to discuss topics ranging from molecular level researches to ecosystem level studies in shallow lakes.

### The Scientific topics include:

- Food webs along gradients in latitude, longitude and altitude
- Interspecific interactions
- Structure, functions and metabolisms of polar, temperate, subtropical, tropical and arid ecosystems
- Interactions of multiple stresses
- Hydrological constraints and salinity
- Eutrophication and harmful algal blooms
- Adaptation, plasticity and evolution of organisms
- Theoretical developments
- Ecosystem services and goods
- Biodiversity and invasive species
- Water Framework Directive and other legislations
- Restoration, conservation, recovery and sustainability
- Paleolimnology
- Ecosystem modelling



### Host City Antalya

Antalya is a thriving modern city on the Mediterranean coast and is heart of tourism in Turkey. The city's international airport offers excellent international and domestic transportation facilities. Antalya with a perfect climate and a splendid harmony of nature and history with world-renowned archaeological sites is home to ancient civilizations for thousands of years and offers one of the most stunning coastlines of Turkey. The organising committee is preparing mid-conference excursions, which will provide an excellent opportunity to the conference participants visit regions of exceptional archeological and natural heritage.

Please note that the deadline for Abstract submission is 1 April 2014 and for further details visit the conference website: [www.shallow-lakes2014.org](http://www.shallow-lakes2014.org)

### Conference Chair

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Jose M. Montoya, Spain  
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## Announcement of 12<sup>th</sup> International Conference on Salt Lake Research – July 14-18, Langfang City, China



The 12<sup>th</sup> International Conference on Salt Lake Research will be held from July 14-18, 2014 in Langfang City, China. This conference will bring together international specialists in limnology, sedimentology, geology, geochemistry, biology, ecology, and conservation issues to present the latest results of research on saline lakes. Topics to be discussed during the five-day conference include: salt lake records and globe change; the ecological system of salt lakes and their biology; salt lake geology and chemistry; surveying, exploration and sustainable utilization of ancient and modern salt lakes; environmental protection of salt lakes, wetlands and other saline environments. These and other related topics will be presented as lectures and in poster presentations. A number of travel grants will be available to help students and young scientists from outside China to attend the meeting. Prizes will be available for the best student presentations, including the prestigious W.D. Williams Award of the International Society for Salt Lake Research. It is the intention to publish the proceedings of the meeting in a special issue of the Chinese Science Bulletin (Springer).

The conference will be held in the framework of the triennial conferences of the International Society for Salt Lake Research (ISSLR) (<http://isslr.org/>). The primary purpose of the ISSLR is to establish effective liaison between persons interested in any aspect of inland saline waters, to encourage these interests, and to educate the public in the scientific use, management, and conservation of salt lakes. The series of triennial international salt lake symposia started in 1979 in Adelaide, South Australia under the aegis of the International Association for Limnology (SIL). At the conference held in Beijing in 1994, the previous informal association was renamed the International Society for Salt Lake Research, and in January 2000 the ISSLR was incorporated in California, USA. The most recent triennial conferences were held in Perth (Western Australia) in 2005, in Salt Lake City (Utah, USA) in 2008 and in Córdoba (Argentina) in 2011.

The venue of the 12<sup>th</sup> International Conference on Salt Lake Research will be the Convention Center of Grand Epoch City, Xianghe, Langfang City, Hebei province, China, situated about 60 km southeast of Beijing Capital International Airport. The city walls of Grand Epoch City are a copy of those of the Forbidden City in Beijing. The beautiful Yuan Mingyuan and Prince's residence and courtyard houses reflect the essence of ancient Chinese culture and the unique Chinese architecture.

Two post-conference field trips are planned: a seven-day tour to the Qinghai salt lakes and a four-day trip to the salt lakes of Inner Mongolia.

We are looking forward to welcoming you in China in July.

**Mianping Zheng** and **Fanjing Kong** – Key Laboratory of Saline Lake Resources and Environments, Ministry of Lands and Resources, Beijing, People's Republic of China

**Aharon Oren** – The Institute of Life Sciences, The Hebrew University of Jerusalem, Jerusalem, Israel

E-mail address for inquiries: [ISLC2014@hotmail.com](mailto:ISLC2014@hotmail.com)

Conference website: <http://csle.cags.ac.cn/2014icslr/>

### Symoens Prize for Tropical Limnology

In 1992 the Belgian Royal Academy for Overseas Sciences set up a Fund for a triennial Prize of 2,500 EUR, named 'Jean-Jacques & Berthe Symoens Prize for Tropical Limnology'. The Fund is intended to reward the author of a memoir of great scientific value on a subject relating to tropical limnology.

The Prize was awarded for the sixth time in 2011 to Mr Bert Van Bocxlaer (Research Unit Palaeontology, Ghent University, Belgium) for his dissertation "Palaeobiology and Evolution of the Late Cenozoic Freshwater Molluscs of the East African Rift". Next award will take place in 2014.

Information about this Prize may be obtained from: Royal Academy for Overseas Sciences, Avenue Louise 231, B-1050 Brussels, Belgium. Tel. +32-2-538 02 11. Fax +32-2-539 23 53. E-mail: [kaowarsom@skynet.be](mailto:kaowarsom@skynet.be). Website: [www.kaowarsom.be](http://www.kaowarsom.be)

### New institute leadership of the Research Institute for Limnology, Mondsee/University of Innsbruck, Austria

On September 1<sup>st</sup>, 2012 the Institute for Limnology was transferred to the University of Innsbruck, now named Research Institute for Limnology, Mondsee (ILIM). Following this reorganization the staff members have voted a new institute leadership consisting of Rainer Kurmayer as head and Martin Hahn as deputy head until the next election period in February 2017.

We are very happy to report that the rebuilding process of ILIM is scheduled to be finished in summer 2014. Soon afterwards the new building will offer increased possibilities in research and cooperation at the lake side. A new guest room facility is devoted to support short and longer term research guest visits and teaching of students.

Kind regards from the institute,

**Rainer Kurmayer**  
**Martin Hahn**

**Dr. Sabine Wanzenböck**  
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## Reports

### 13<sup>th</sup> Symposium on Aquatic Microbial Ecology (SAME 13), on the path to SIL 2016 in Torino, Italy

The road to the SIL Congress 2016 in Torino (Italy) is long and made up of many steps. Both national and international conferences preceding the SIL Congress in 2016 offer opportunities for publicizing the main event and are a testing ground for its organizational structure.

The SAME 13 conference is an example of one such preceding meeting, which was held from 8 to 13 September 2013 in Stresa (Italy), on Lake Maggiore, a few km from the Institute of Ecosystem Study (CNR ISE) that will host this conference. The SAME 13 has been a great success both from the scientific and organizational points of view. In fact, the number of participants has doubled compared with the previous SAME. There were in total 460 participants from 58 countries. In the course of a week, a complex and accurate picture of the state of global research on the microbial ecology of our planet's waters was presented.

What emerged was the great dynamism of researches in aquatic microbial ecology despite an overall scarcity of funding and adequate infrastructure, afflicting especially the less wealthy and economically afflicted countries. Thus, it became clear that large and expensive trans-oceanic cruises and great polar expeditions are certainly not the only frame in which aquatic microbial ecology can or will have to develop. An increasingly wide space is left to less expensive "in house" research which, thanks to the latest cutting-edge technologies, promises to allow us to take a fundamental leap forward in our understanding, and therefore management, of the "water-world" in the next 5-10 years. In addition, the proliferation of subfields in life sciences from the 1980s that led scientists to become increasingly specialized in narrower disciplines and their techniques seemed a bit outdated. The present day request is for a research approach that combines the same team skills in genetics, microbiology, ecology, evolution biology, chemistry and physics. In other words, there is a renewed appreciation of interdisciplinary approaches that prefigure significant changes in scientific research on environmental issues in the coming years. This call for interdisciplinary research is received well in limnological research, which has always been characterized – it is hardly necessary to recall it – by cross-disciplinarity since its early days. Also for

this reason, the SIL Congress in Torino in 2016 promises to produce insights into the intersection of sciences involved in limnology, following from the themes that the SAME 13 has opened up.

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### Lake Balkhash, Kazakhstan: Can we predict its future from our knowledge of the past and present developments?

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<sup>2</sup> Netherlands Institute of Ecology

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<sup>4</sup> KazGidromet, Kazakhstan

Lake Balkhash (Fig. 1) is a terminal lake in eastern Kazakhstan, located in a desert. Its area varies with its water level and is 17000-22000 km<sup>2</sup>. The lake extends from east to west by ca 588-614 km, and is from 9-19 km wide in its eastern section and 74 km wide in its western section. In the 1960s, maximum depth was 26.5-27.0 m, and the volume was 122 km<sup>3</sup>. Lake Balkhash is divided into two relatively independent sections: a wide and shallow western section and a deep (to 27 m) and narrow eastern section. These sections are connected by the narrow (3.8-4.2 km) and shallow (2.8-3.3 m) strait of Uzun-Aral. Climate in the region is arid, sharply continental. Annual evaporation over the lake is 950-1200 mm and annual precipitation is 150 mm. The Balkhash catchment has an area of 500000 km<sup>2</sup>. The largest river in the basin is River Ili entering the lake's western part and contributing ca 80% of total annual inflow averaging 15.6 km<sup>3</sup>. Other large rivers are Karatal, Lepsy, Aksu and Ayaguz entering the eastern part and contributing 6.4 km<sup>3</sup> per year (Fig. 2). Because of division into two sections of unequal size, with most inflow into the western section, salinity in West Balkhash is low (1.1 g/l), whereas in East Balkhash, salinity is higher (4.3 g/l) (Aladin, Plotnikov, 1993). Almost fresh water of the western lake part is used for drinking and industrial supplies. Ionic composition Balkhash water is distinctive. The proportion of chloride is 2-3 times lower than the proportion of chloride in the sea. However, the proportions of potassium, calcium, magnesium, sulphate and carbonate/bicarbonate ions are significantly higher. In eastern Balkhash, the proportion of potassium ions is very high in comparison with other waters. The lower proportion of calcium ions, especially in comparison with the Aral and Caspian seas, also is notable (Anon., 1984). Of special note, ionic composition of Balkhash water (high concentrations of potassium and magnesium; compared to other large saline continental water bodies) is considered to be unfavorable for the biota (Karpevich, 1975).

The western part of Balkhash has a freshwater salinity zone. Eastern Balkhash refers to transitional brackishwater-freshwater salinity zone (Fig. 2). They are divided by  $\delta$ -horohaliniticum. In the western part of the lake freshwater and euryhaline aquatic hydrobionts are predominating, but in the eastern part freshwater organisms are disappearing (Aladin, Plotnikov, 2013).



A plenary lecture during SAME 13 at Congress Palace in Stresa (Italy)





Figure 1. Lake Balkhash, satellite image (10-20-2013 MODIS).

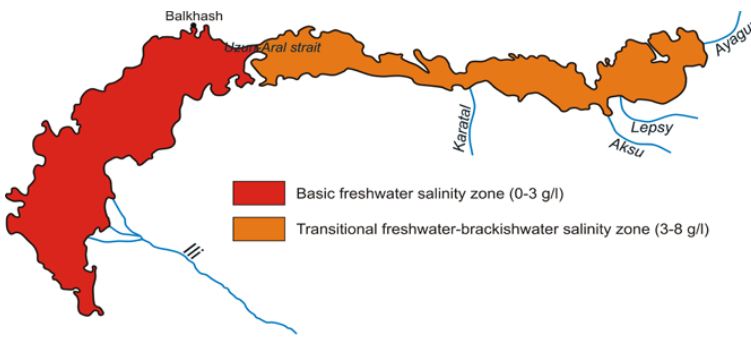


Figure 2. Salinity zones in Lake Balkhash.



Figure 3. Balkhash Mining and Metallurgical Combine.

The level of Lake Balkhash is characterized by significant cyclical fluctuations and depends mainly on the flow of the rivers flowing into it. Changes in the level under current conditions depend not only on natural factors that determine the amount of runoff, but also on the mode of Kapchagay hydroelectric and irrevocable water consumption at the top of Ili River basin in China and in the basins of rivers Karatal, Lepsy and Aksu (Malkovskiy, 2008).

There are 206 species of algae recorded in Balkhash. Half of them are diatoms. Most algae are freshwater forms or euryhaline forms. Zooplankton consists of 54 species: 5 protozoans; 28 rotifers, 11-18 cladocerans, and 8-11 copepods. A regular change in zooplankton species composition occurs from west to east. In the western part, freshwater and euryhaline forms predominate, but freshwater forms disappear eastwards and are replaced by more tolerant to salinity. The recent zoobenthic fauna of Balkhash basically consists of introduced species. In the 1950s and 1960s, some species of polychaete worms, mysids, amphipods and mollusks were introduced. The composition of the zoobenthos is different in the eastern and western parts of the lake. In the western part the main species are oligochaetes, mollusks, mysids and amphipod. In eastern

L. Balkhash there are no polychaetes, amphipods, mysids. The dominant components here are chironomids, oligochaetes, and mollusks. There is fishery in Lake Balkhash, with 21 species of fish present. The original fish fauna, however, consisted of only 4 species. Other fish inhabited the deltas of the rivers. In 1930-1960s a series of introductions was made. Of these, several species have become the principal of the fishery (Karpevich, 1975; Anon., 1984).

In 1967 an extension of irrigated areas began and in 1970 the Kapchagay Reservoir on River Ili began to fill. As a result, water withdrawal from the river basin has increased, and from about 1974 a new regressive period began which caused decrease in the lake level and intensified earlier anthropogenic pressures on the lake ecosystem. The basin's water resources have also decreased due to natural climate aridity. This resulted in the flow of the River Ili decreasing. Water losses have also increased. Relative increases in the amounts of water during the period 1979-1981 did not reverse the trend and by the beginning of 1983 the level of the lake was at 341.0 m a.s.l. An increase in lake salinity has also been observed, resulting not only from changes in the hydrological balance, but also from a rise in the salinity of the River Ili (from 0.25-0.37 to 0.42 g/l) after the regulation of its flow. By 1978, the salinity of Balkhash had increased from 1.12-4.31 to 1.42-5.14 g/l. (Samakova, 2003; Malkovskiy, 2008). From 1998 until 2005 there was a sharp increase in the level of Lake Balkhash. This was due to increased water inflow in the lake due to increase of humidity in this area, increasing the air temperature, as well as receipt of additional water in Ili River due the melting of mountain glaciers. Since 2006, the lake level began to drop again, but in 2010 situation has changed, the lake level rose by 20 cm.

It would be unwise to assume that the threat has gone. Increase in river pollution and salinization continue, and the concentration of certain toxic substances such as nitrates, pesticides, heavy metals (copper, zinc and cadmium) and carcinogenic substances are also increasing. Relatively favorable state of water resources of the river Ili in recent years does not remove from the agenda the question of maintaining Lake Balkhash as a single water body keeping its level not less than 341.0 m a.s.l. The situation can change for the worse, similar to that observed in the 1970s, when it was low-water period and lake level dropped significantly and there was threat of salinity increasing above the permissible limit. It is very likely that relentless water consumption in river Ili basin will increase further, especially in China. Another factor is the ongoing anthropogenic climate change. Only if natural water resources will increase due to increase of precipitation in mountains in winter, and if water consumption will not increase further, will the water level of Balkhash Lake not decrease to less than 341 m a.s.l. Existing prognoses are not optimistic. According most of them the level of Balkhash after 10 years will drop below 341 m. Reduction of water inflow to the western L. Balkhash will lead to a drop in the lake level below the critical level of 341 meters and to significant increase in the salinity that would complicate the use of water for the water supply of the city of Balkhash, Balkhash Mining and Metallurgical Combine (Fig. 3) and other industries requiring the use of fresh water.

There is a project to maintain the hydrological regime in western L. Balkhash by separating it from eastern L. Balkhash by a dam and sluice in the Uzun-Aral Strait. Thus, the water supply to eastern Balkhash will be limited (Anon., 1984; Malkovskiy, 2008). In other words, it is proposed to sacrifice the Eastern part of this unique water body which will become a shallow hypersaline lake (Aladin, Plotnikov, 1993).

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## SIL Working Group on Ecohydrology, Symposium Report International Symposium: Ecohydrology, Bio- technology & Engineering: Towards Harmony between the Biogeosphere and Society on the basis of Long-Term Ecosystem Research.

17-19 September 2013, Łódź, Poland

The **International Society of Limnology** promotes and communicates new and emerging knowledge among limnologists to advance the understanding of inland aquatic ecosystems and their management. One of its 17 **Working Groups is focused on Ecohydrology**, defined as a sub-discipline of hydrology focused on biological aspects of the hydrological cycle (Zalewski et al., 1997). Ecohydrology provides not only scientific understanding of the hydrology/biota interplay, but also a systemic framework on how to use ecosystem processes as a tool for Integrated Water Resources Management, complementary to existing hydrotechnical solutions (Zalewski, 2010). Ecohydrology has also been in the focus of the **UNESCO International Hydrological Programme (UNESCO IHP)**, which in 1997 has adopted **ecohydrology** as one of the fundamental concepts reflected in its strategic development plans, and in the coming VII phase of the project (2014–2021), as one of its five key Themes.

Integration of scientists and practitioners working around the water sector, shifted ecohydrology towards transdisciplinary science, which focuses on sustainability and reaching common social goals. Its progress towards the ability to build system solutions (e.g., Zalewski, 2000; Wągner et al., 2009; Wągner and Breil, 2013) can now develop a dialogue on the integration of efforts with technologists (engineers) and social and economic scientists to contribute to ecologically sound solutions for harmony between the biogeosphere and humanity. Strengthening this dialogue was one of the goals of the **International Symposium on Ecohydrology....**, held in Łódź, Poland, on the **17<sup>th</sup>-19<sup>th</sup> September 2013**. The conference was attended by 210 participants from 31 countries: there were 95 oral presentations and 50 posters dealing with interdisciplinary topics.

The symposium was **organized** by the European Regional Centre

for Ecohydrology u/a UNESCO of the Polish Academy of Sciences, University of Lodz, Project Life + EnvEurope (LIFE08 ENV/IT/000399) and Marshal's Office of the Lodz Region (Poland), in cooperation with: Institute for Water Resources of the U.S. Army Corps of Engineers, Rivers & Coastal Group of the Chartered Institution of Water and Environmental Management (U.K.), International Society of Limnology (SIL), International Centre for Coastal Ecohydrology u/a UNESCO (Portugal), Municipal Company of Water Supply and Sewage System in Lodz (Poland), Collective Wastewater Treatment Plant in Lodz (Poland) and Infrastructure Company in Lodz (Poland), LTER-Europe Network and the projects listed below the text. The **Chairman of the Symposium Steering Committee** was Prof. Maciej Zalewski and the **Convenor of the Symposium** was Dr. Iwona Wągner, both representing ERCE UNESCO PAS and the Department of Applied Ecology, University of Lodz, Poland.

On the first day of the Symposium, prominent key-note speakers, gave talks on various aspects of sustainability in the context of water resources and its management. The general remarks were provided by **Mr Alemayehu Tegenu, Minister of Water and Energy of the Federal Democratic Republic of Ethiopia**, and by Prof. **Alessandra Pugnetti**, the Coordinator of the EnvEurope Project, from National Research Council in Italy. The opening speeches, giving the European and global perspectives for the need of integration of ecohydrology with other disciplines, were given by Prof. **Giovanni Bidoglio**, Head of the Water Resources Unit of the Institute for Environment and Sustainability, Joint Research Centre (EC), Dr. **Enrique Playán**, Coordinator of the Water Joint Programming Initiative – MINECO (Spain) and the representatives of UNESCO IHP and Prof. **Johannes Cullmann** (Chair of the Intergovernmental Council of the UNESCO IHP from Germany) and **Mr. Giuseppe Arduino**.

The global perspective for the Symposium discussions was provided by Prof. **William J. Mitsch** (Florida Gulf Coast University, Professor Emeritus of the Ohio State University) Chair of the 4th International EcoSummit (Ohio, USA, 2012). He delivered a lecture on the opportunities and challenges for transdisciplinary integration of ecological engineering. Presence of Prof. Mitsch has also provided a bridge for the 2012 Ecosummit in Columbus and the next Ecosummit to be organised in 2016 in Montpellier (France), which will continue to focus on the repairing of the planet including an emphasis on fragile ecosystems that are susceptible to climate change. This lecture was followed by a talk by the former President of SIL, Prof. **Brian Moss**, who discussed the future of the human civilisation in the context of the role of freshwater resources and biomes, as the important provision of environmental services, so vivid in the face of the global challenges and changes. Can the natural biomes provide services if stressed, fragmented, overexploited? Can we replace the natural biomes with Anthromes? Where are the limits of human actions and what are the possibilities of compensation or prudent management. These were the questions posed by Prof. Moss in his speech.

Other Key-note speeches on the first day dealt with complementary aspects of water-based cooperation and transdisciplinarity and were given by: representative of hydro-engineers – Prof. **Robert A. Pietrowsky**, Director of the Institute of Water Resources (IWR) of the U.S. Army Corps of Engineers (U.S.A.) and Dr. **Graham Piper**, Chairman of the Chartered Institution of Water and Environmental Management (CIWEM), Rivers & Coastal Group (U.K.) who were also representing the co-organisers of the Symposium. Prof. **Michael Mirtl**, Chair of European Long-Term Ecosystem Research Network, Head of the Department for Ecosystem Research and Monitoring Environment Agency in Austria and Prof. **Patrick S. Bourgeron**, the head of the



Opening speech by Prof. Maciej Zalewski, the Chairman of the SIL Working Group on Ecohydrology (photo. P. Dobrowolski)



Plenary lecture given by the former President of SIL Prof. Brian Moss (photo. P. Dobrowolski)

International Long-Term Ecological Research (ILTER) from the Colorado University (U.S.A.) and gave a long-term ecosystem processes perspective to the further Symposium discussions. Dr. **Holger Robrecht**, the Deputy Regional Director, ICLEI European Secretariat, Freiburg, Germany brought into the picture the challenges related to the global urbanisation process. There were also representatives of biotechnologists: **Joanna Mankiewicz-Boczek** from European Regional Centre for Ecohydrology u/a UNESCO of the Polish Academy of Sciences, and economists: Dr. **Jakub Kronenber** from the Sendzimir Foundation Board and University of Łódź. Finally, the first day's proceedings were summarised by the honorary guest of the Symposium, Prof. **Jun Xia**, Past President of International Water Resources Association (Dean of The Research Institute for Water Security, Wuhan University and Chinese Academy of Sciences).

During the second and third day, the Symposium covered a wide range of themes related to the transdisciplinary dialogue: there were 7 parallel sessions, 2 Forum and 3 Workshops. The discussions were focused on:

- Integration of environmental knowledge and engineering for identification of key challenges and potential solutions for sustainability;
- Analysing long-term ecological trends and forecasting ecosystem status in the face of global change;
- The perspective of integrating Ecohydrology and biotechnologies with engineering approaches;
- Urban Ecohydrology;
- Harmonizing ecosystem potential with societal needs on the basis of mapping human impact and ecosystem services;
- The necessity & opportunities for the enhancement of resilience of socio-ecological systems under conditions of increasing uncertainty; and
- Systemic solutions and modeling in river basin assessment & management.

There were also two technical trips: a pre-conference technical trip (on the 16<sup>th</sup> September) visiting demonstration sites of the Life+ ECOROB Project (1) on application of ecohydrological biotechnologies at the Pilica River basin, and a mid-symposium technical filed trip (on the 18<sup>th</sup> September), visiting demonstration sites of the EU project SWITCH and POiG (2) and Life+ Project EH-REK (3) on ecohydrological rehabilitation of urban rivers.

We believe that, following the idea of the United Nations "International Year of Water Cooperation", the Symposium provided not only a wide-open transdisciplinary, international forum for discussing the ecologically sound solutions for water management and environmental

sustainability, it was also an important step towards development of a new paradigm for integrative, transdisciplinary, problem-solving science. This dialogue is the future of the human existence on the Earth, especially now, in the Anthropocene, when almost 70% of the Earth's surface has been highly modified by humans, covered by "novel ecosystems", in the face of approaching the global carrying capacity, population growth and climate instability. The Symposium was intended to be a step forward towards better understanding of the complex interplays in this area and their use towards reversing the degradation of the biosphere and its harmonization with society.

Using the momentum, the Organizers would like to proceed with formulation of the integrative environmental science paradigm, which should help to achieve harmony between the biogeosphere and humanity. For this, the *Ecohydrology & Hydrobiology* journal (<http://www.elsevier.com/journals/ecohydrology-hydrobiology/1642-3593>) will publish papers of the Symposium participants, which will extend the scope of the Symposium and facilitate further steps in binding science and implementation. This special Issue of the journal will also include a paper on the conclusion and synthesis, which will focus on the emerging areas of collaboration between research, policy and practice, key challenges and foreseen problem-solving approaches, that can guide our activities towards building European Research and Technology Infrastructure.

The symposium was organised within the UN International Year of Water Cooperation (2013), under the auspices of the International Hydrological Programme of UNESCO (UNESCO-IHP), Ministry of Science and Higher Education of the Republic of Poland and Polish Academy of Sciences. Director of the Division of Water Sciences and Secretary of UNESCO IHP, professor Blanca Jimenez-Cisneros, accepted the invitation to chair the Scientific Committee of the Symposium and deliver the opening lecture.

More information: <http://www.ecohydrologyengineeringociety2013.org/>

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<sup>1</sup> Project Life+ ECOROB, Ecotones for reducing diffuse pollution ECOROB LIFE08 ENV/PL/000519 and Project Life + EH-REK

<sup>2</sup> 6 FP EU Project SWITCH (IP 6 PR UE, GOCE 018530 2006-2011) Sustainable Water Management in the City of the Future; Project POIG „Innovative resources and effective methods of safety improvement and durability of buildings and transport infrastructure in the sustainable development” (512/040003)

<sup>3</sup> Life + EH-REK, Ecohydrologic rehabilitation of recreational reservoirs “Arturówek” (Łódź) as a model approach to rehabilitation of urban reservoirs” LIFE08 ENV/PL/000517

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## How Cormorant impact the Kinneret Ecosystem (Israel)?

### 1. Introduction

#### 1.1 European Cormorant Population

The Great Cormorant (*Phalacrocorax carbo*) is a known world wide migratory bird. Their seasonal migration take them to Israel during November-March and back to Europe for breeding during spring-summer.. They feed on fish throughout the year and catch their prey by diving. Their diving lasts normally 20-30 seconds and they bring the prey to the lake surface. Fishermen and fishery managers see the cormorants as their competitor. The conflict between cormorants on one hand and fisheries and lake management on the other, is focused at both, commercial landings and waterquality protection. The cormorant damage to fishery and lake management is drastic in Europe and in other countries (Takahashi, et al 2006 ;Natsumeda et al. 2010). The cormorant population in Europe has increased during the last 25 years, due to the implementation of endangered birds-protection policy adapted by the EU (European Union) and un limited food resources.

An International workshop organized by FAO-EIFAC in Brussel (2008) was attended by representatives from 24 European countries. The final report was submitted the same year (FAO/EIFAC 2008). The rational of this workshop included the need for long-term proposal of aquatic ecosystems and aquaculture sustainability under the threat of damage caused to fish by cormorants. The increase of cormorant population in Europe during the last 25 years to up to 1.8 million birds was accompanied by severe damages to aquaculture, fish population in lakes and irreversible negative changes to vegetation were discussed as well as the lack of an international program for research and monitoring. The lack of instructions for appropriate management was also indicated.

Nevertheless, a recommendation was documented in the final report to permit shooting of about 43,000 birds annually. The feeding habits of cormorants were indicated in the final report: these include a daily ration varying between 300 and 1000 gram/bird/day with a more common daily ration values of around 700 grams/bird/day (Gremillet et al.1995; Hatch et al2000).

### 1.2 Predation Rate Monitoring

Several methods for the study of cormorant feeding rates were discussed (FAO/EIFAC 2008): 1) Energy balances of birds in captivity; 2) Gut content analysis of birds killed by shooting; and 3) Analysis of freshly collected pellets, which were egested by the cormorants in their night sleeping site. These pellets as well as regurgitates are egested by the birds early in the morning and if freshly collected they are considered to reflect the complete diet of the previous day. Great cormorants regurgitate undigested material that includes bones, scales and otoliths, which can be analyzed microscopically. There are several factors which lead to an under-estimation of the food actually ingested :the birds ‘vomit’ more than one time a day at different sites. If fish number and their size identification are based on otoliths material vomited by the cormorants, it should be taken into account that otoliths of small fishes are modified and are therefore under-estimated because of their softer and soluble otoliths (McKay et al. 2003).

## 2. Cormorants in Israel

The avifaunal list of Israel includes Great Cormorants for many years. The old shallow lakeHula located northern to Kinneret was densely populated by cormorants (Photo No.1). Fish aquaculture development in the Hula Valley (northern part of Israel) attracted cormorants to the region and fish predation by was intense. During 1950-1990 cormorants densely populated the Hula valley causing damage to aquaculture and to the *Tilapia* populations in Lake Kinneret. However, their successful deportation from northern Israel pushed them to other parts of the country. Active deportation of cormorants by the farmers was carried out again and the birds found a refuge in Lake Kinneret (Photos 2,3).

### 2.1 The Crisis of Tilapia Fishery in Lake Kinneret

During 2007-2008 Tilapias fishery in Lake Kinneret severely collapsed and landings declined from 200-400 tons annually to <10 tons in 2008. We identified several causative factors for this decline: 1.reduction of Tilapias’ stocking; 2. fishermen used illegal nets (small mesh-sizes); 3. ecological changes of disappearance of the bloom forming *Peridinium* and increased biomass of *Cyanobacteria*; 4. outbreak of the cyprinid Lavnun (*Mirogrex terraesanctae*, Kinneret Bleak) causing strong competition between Bleaks and *Tilapia* for their zooplankton food resources; 5. an outburst of mysterious viral disease that infects mainly *Tilapia* (NODA virus, blind eye disease); and 6. Intensification of cormorant predation (preliminary results are available) and probably catfish predation (not yet thoroughly studied) of *Tilapia*’s fingerlings. These factors cause damage to fishermen’s income and ecologically to the system and therefore make fisheries management in Lake Kinneret complicated, also because of the introduction of exotic *Mugil* and native *Tilapia* together. 7. natural fluctuations of *Tilapia* assemblages.

### 2.2 Kinneret Food-Web implications

The changes of the phytoplankton community structure affected both water supply and the pattern of energy flow through the food web. The

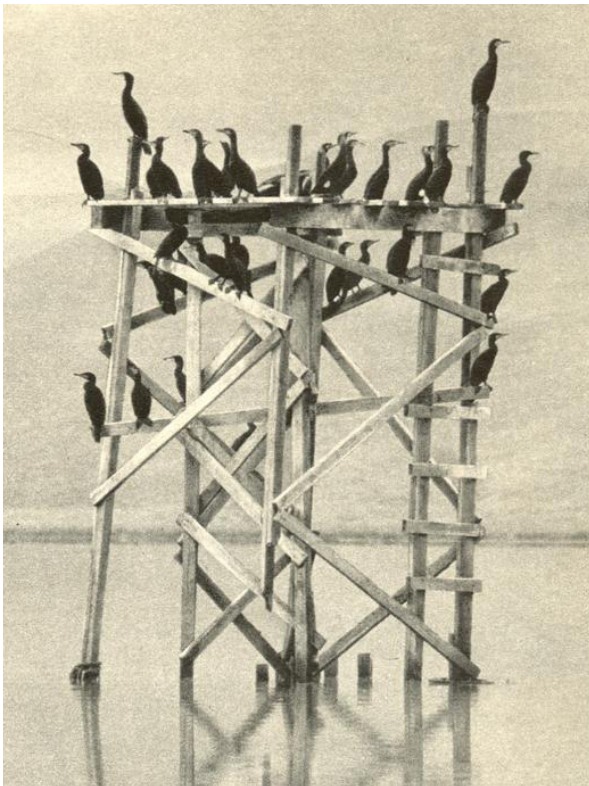


Photo No.1: Cormorant in Lake Hula ,1950.Photo: P. Merom.

major stock of phytoplanktonic carbon, the *Peridinium* bloom, was replaced by nano-phytoplanktonic components, mainly *Aphanizomenon ovalisporum*. Because of these changes, zooplankton became major food resource for *Tilapia* competing with Bleaks. *Cyanobacteria* species included toxic species causing safe supply difficulties (*A. ovalisporum*). Proposal for fish population reclamation was formulated including reduction of cormorant predation pressure from *Tilapia* population.

### 2.3 Kinneret Cormorant Study

The National Authority of Nature and Park Protection, studied the potential impact of cormorant and its preliminary results are documented in a report ( Artzi et al.1911, in Hebrew). About 5000-7000 Great Cormorants were monitored in the Kinneret region. The birds utilized several sites with big trees and bushes as resting stations at night and day, and they continuously came in big flocks throughout early morning and noon time daily from all resting sites to prey on fish in the lake (Photo 3). The food consumed by cormorants was studied by collecting pellets daily in one of the several night sites. Bleaks were found to be dominant in the food content of cormorants during October-November and later, (December February) sub-commercial sized *Tilapia*s was main food item: 324 gram/day/bird. Considering that 5000 cormorants were active during 100 days when *Tilapia*s were dominant prey and the cormorant daily ration is 324 gram/day/bird, the cormorant theoretically removed 162 tons of the fish biomass from the lake. Nevertheless we have to take into account that the preyed fishes are below commercial size of 100 g per fish, that is to say that the potential damage is at least twice as high (320 tons) because of natural fish growth up to or above minimal legal size permitted of >200g/fish. Fish specimen weighing 100g, if not preyed, might grow up to at least 200g/fish, which can be then legally marketed. Consequently, the commercial value of such predation losses by cormorants is between 1.5 and 3.0 million US\$.



Photo No. 2: Cormorants drying their wings. Photo: Wikipedia.



Photo No. 3: Flock of Cormorants in Lake Kinneret, 2012, Photo: M. Gophen

Such a damage to fishermen's income and to the lake ecosystem can be reduced by a physical deportation of the cormorants. The ecological contribution of *Tilapia* to the ecosystem aimed at water quality protection is done through the consumption of *Peridinium* biomass which has gradually reappeared recently.

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## The ‘moving sown fields’: Anyone interested?

In addition to its historical value, I am interested in *Historia Natural y Moral de las Indias* (1590) for a different reason. In this classic, Spanish Jesuit missionary and naturalist José de Acosta wrote about the floating gardens of Aztec, famously known as the *chinampas*. This is probably the first mention of this mysterious buoyant structure in the literature. Acosta called these floating structures as “sementerá movediza” or “moving sown field” (O’Mack, 1990-1991).

Floating islands or suddes made up of intertwined decaying vegetation mixed with soil and debris are a natural phenomenon (John *et al.*, 2009). Such forms have been studied all over the world for their ecological significance. Besides the *chinampas* of Tenochtitlan Lake (Mexico), both natural and artificial floating beds are used for agriculture in many tropical wetlands of the world (IUCN Bangladesh, 2005; Sidle *et al.*, 2007; John *et al.*, 2009; Irfanullah 2013; Mushatq *et al.*, 2013). As a traditional practice, floating gardening is often associated with specific indigenous communities who gave these floating bodies different names. The Hanjís community of Dal Lake of Kashmir (India) call it *radh*, the Intha tribe of Inle Lake of Shan (Myanmar) calls it *kaing*, the people of Kuttanad area of Kerala (India) call it *pontha*, and the people around Loktak Lake of Manipur (India) call it *phumdi*. In the central and coastal wetlands of Bangladesh, artificially made floating beds are called *dhap* or *baira* (IUCN Bangladesh, 2005).

The construction materials, size and shape of artificial floating gardens vary a lot. In Bangladesh, for example, water hyacinth is now used as the main component of such a floating structure (IUCN Bangladesh, 2005; Irfanullah *et al.*, 2008; Irfanullah, 2009). It is piled up in rectangular, compact, thick structure. Decomposed water hyacinth and other vegetation, sometimes mud, make the top layer of a bed. Once rotten, seedlings are raised and vegetables and spices are grown during monsoon. Application of fertilizer and pesticides is totally absent or minimal. Simplicity, high cost-benefit ratio and low opportunity cost are the beauty of this technology.

### The attention

Floating gardening attracted different people for different reasons. Historians love its link with the civilization. Anthropologists love its indigenous aspects. Nature enthusiasts enjoy the wild beauty of floating islands and associated wetland biodiversity. Development practitioners find the beds as a low-cost tool to grow food for starving community in monsoon season (IUCN Bangladesh, 2005; Irfanullah *et al.*, 2008; Irfanullah, 2013). Economic opportunity and demand encouraged smart farmers to transform this traditional practice into a commercially viable agro-business (IUCN Bangladesh, 2005; Swe, 2010). Environmentalists see this as an opportunity to manage invasive weeds, thus maintaining natural water flow (Sinolinding *et al.*, 2013). This form of gardening is also considered to reduce the sufferings of the people from flooding (Irfanullah *et al.*, 2011).

### Adaptation to climate change

In recent years, floating gardening has become a widely talked about climate change adaptation option – almost a “climate celebrity” (Irfanullah, 2013). The obvious reasons for such attention are two-fold. Climate variability is changing the rainfall and hydrogeological patterns in deltaic, sub-tropical countries, like Bangladesh. This would consequently cause extended flooding and waterlogged conditions, more



Seedling raising on floating beds in southern Bangladesh, Banaripara, Barisal district. Photo: Haseeb Md. Irfanullah



Vegetable harvesting from floating gardens in Mohishkhucha, Lalmonirhat district, Bangladesh. Photo: A.Z.M. Nazmul Islam Chowdhury



Floating gardens with red amaranth in Muksudpur, Gopalganj district, Bangladesh. Photo: IUCN Bangladesh

frequently. Floating gardens offer additional arable space under such adverse conditions. Different types of vegetables (e.g. amaranths, spinach and okra) and spices (e.g. chilies and turmeric) can be grown on these beds to meeting the needs of people of the wetlands. In addition, these beds provide space to raise seedlings of rice and vegetables (e.g. gourds, beans and cabbages). As a result, farmers can get ready with the seedlings of winter crops and get on with agriculture as soon as flood water recedes and land emerges. But, since floating gardening is completely dependent upon rainfall (for water to come in and water hyacinth to grow in it) and since the cultivation mechanism is poorly understood, floating gardening might be a limited adaptation choice under uncertain climate regime (Irfanullah, 2009, 2013).

Systematic research is one of the priorities before promoting floating gardening as an adaptive option (Irfanullah, 2013). But, the Government of Bangladesh is currently implementing a US\$ 1.6 million project on floating gardening, involving 12,000 farmer families without any research component. This agro-practice is a classic case of “mass fascination” without reality check (Irfanullah, 2013).

### Ecologist's interests

Aquatic ecologists have not shown much curiosity in floating agriculture. Studies on interactions between man-made floating gardens and their host ecosystems are not many. A recent study on Dal Lake (Kashmir) shows how floating gardening causes low transparency, low oxygen concentration, exclusively bicarbonate-based alkalinity, and high nitrate-N due to fertilizer application in the water (Mushatq *et al.*, 2013). Relationship between floating gardens and zooplankton of Dal Lake was demonstrated by another study (Siraj *et al.*, 2006 in Mushatq *et al.*, 2013).

Despite positive benefits, excessive floating gardening hampers natural balance of the ecosystems. For example, around 93% of the recent reduction of the surface area of Inle Lake (Myanmar) was due to floating gardening (Sidle *et al.*, 2007). Massive conversion of lake area also took place in Dal Lake (Fazal and Amin, 2013). Excessive use of fertilizers and pesticides on floating beds is a major water pollution concern (Mushatq *et al.*, 2013). Restrictions have, therefore, been imposed on further extension of floating gardening in some wetlands (Swe, 2010).

Decomposition of the floating beds is a major environmental concern, especially in the stagnant waters. Main construction material of such a garden, i.e. water hyacinth, is a good absorber of heavy metals. This raises the question of heavy metals entering the food chain. Good growth of water hyacinth is an indicator of highly nutrient-rich water. Such aquatic plants also harbour water-borne pathogens. Farmer's health and hygiene and phytosanitation are related to these facts. Aquatic ecologists, in collaboration with agriculturists and other experts, may look into these concerns. They may even contribute to the question how this agro-system would react under changing climatic conditions and variability.

### Postscript

Floating gardens are just fascinating! Gene C. Wilken, the author of *Good Farmers*, once called the *chinampas* “One of the most charming and durable fables of the New World” (Wilken, 1985 in O'Mack, 1990-1991). I always wondered why we are so much mesmerized by floating gardens. I now believe, besides its sheer simplicity, we are fascinated by the floating garden as it offers us ‘land’ when we do

not expect it. As terrestrial animals we always find it intriguing to get additional space to play with.

Floating gardening also symbolizes our dominance over the water. Aquatic ecology can help us to understand the present reality and prepare us for the future.

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## SIL WG Plankton Ecology Group: progress and upcoming meetings

At the 32<sup>nd</sup> SIL Congress in Budapest (4-9 August, 2013) the working group of the Plankton Ecology Group of the SIL came together. There was a short overview of the PEG activities since the last household meeting at the 31<sup>st</sup> SIL Congress in Cape Town (2010).

The PEG held a WG Meeting in Mexico City (Mexico) from 12 to 18 February, 2012. This Meeting was organized by Prof. SSS Sarma and Prof. S. Nandini. The proceedings of this meeting are to be published in *Inland Waters* early next year. An update of the 25-year old PEG model (Sommer et al. 1986) recently appeared as a spin-off of the PEG Symposium "Predictability of plankton communities in an unpredictable world" held from 7 to 9 April, 2010, in Amsterdam under the auspices of the Royal Dutch Academy of Arts and Sciences (Sommer et al., 2012). The proceedings of the Amsterdam PEG meeting appeared in March 2013 in *Freshwater Biology* 58: 455-623 (Special Issue: Plankton Dynamics in a Fast Changing World, guest editors Lisette N. de Senerpont Domis and Miquel Lürling).

The next PEG Workshop is planned during 7 - 11 September 2014 at the Institute of Biology, University of Białystok, Białystok, in NE Poland. It will be hosted by Prof. Andrzej Górniak (hydra@uwb.edu.pl). More information about this workshop is provided in SILnews 62, June 2013 (SIL WG Plankton Ecology Group: Announcement).

In Budapest, several plankton ecologists expressed their interest in organizing a thematic PEG meeting, which is strongly encouraged by the WG, as such meetings are generally thematic in nature and have the objective to both discuss and prepare critical review papers emerging out

of these working group deliberations.

The WG also had a change in Chair: Miquel Lürling, who has been the WG Chair since 2004, decided to stand down PEG man. The WG elected Dr Lisette de Senerpont Domis from the Netherlands (email: L.deSenerpontDomis@nioo.knaw.nl) as new WG chairperson.

The PEG is a very informal scientific group and is among the oldest working groups of the SIL. The group has arranged many scientific meetings and workshops, with the primary interest to both exchange ideas and information and encourage an integrated approach to the science of plankton ecology. In order to preserve all information about past meetings and particularly that from the early PEG activities, all plankton ecologists, especially those from the first few meetings, are kindly invited to send this information to the PEG office (L.deSenerpontDomis@nioo.knaw.nl or to miquel.lurling@wur.nl), so that we can archive this important information.


### Lisette N. de Senerpont Domis, WG chair

Droevendaalsesteeg 10, 6708 PB Wageningen, The Netherlands  
Email: L.desenerpontdomis@nioo.knaw.nl

### Miquel Lürling

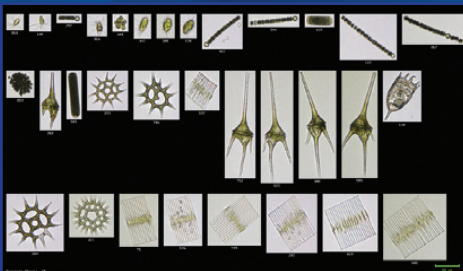
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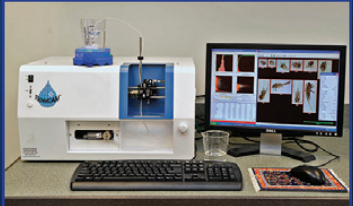
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Submissions may be edited for length and clarity. Those deemed inappropriate to the SIL mandate will be rejected at the discretion of the *SILnews* Editor or the Webmaster. Submissions for the print edition of *SILnews* should be sent to the editor at the address on the cover of this issue.

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