



SIL news

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The International Association of Theoretical and Applied Limnology (Societas Internationalis Limnologiae Theoreticae et Applicatae, SIL) promotes and communicates new and emerging knowledge among limnologists to advance the understanding of inland aquatic ecosystems and their management.

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Lake Werowrap, in Victoria State, Australia in a dried-up state. The lake, located in an explosion crater or maar, is highly alkaline and moderately saline when full. Photo was taken during the mid-congress Salt Lakes and Otway Ranges tour.

Material for the next issue should be sent to the Editor for **June 22**:

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Contributions on a PC formatted disk, in any standard word processor or DOS (ASCII) text, or as email attachments, will assist the Editor.

XXVIII SIL Congress 'Down Under'

by
Richard D. Roberts

continued on next page



A serene view of the Clayton central campus area at Monash University during the SIL Congress.

About 700 limnologists travelled ‘Down Under’ to Monash University in Melbourne, Australia for the XXVIII SIL Congress held from February 4th to 10th. This convivial meeting was organized by a team headed by Ian Campbell and Richard Marchant. Many of us from the northern hemisphere were pleased to have some time away from snow and ice. The days when the temperature reached 40°C, however, made some of us think about the pleasures of more moderate weather. A wide range of papers covering topics from microbes, aquatic chemistry and physics to management and policy issues for many regions of the world, were presented in seven parallel sessions.



SIL Congress participants view Lake Corangamite, during the Salt Lakes and Otway Ranges tour. Lake Corangamite is the largest lake in Victoria and the largest permanent body of inland saline water in Australia. It is a volcano-tectonic basin, collapse having occurred over a very large area.

A highlight of the meeting, I think many will agree, was the lively barbecue that was accompanied by abundant and very good Australian wines and an exceptional local band. The mid-congress excursions, that allowed participants to see a bit more of Australia, were rated as excellent by all participants, in fact so much so, that many of us wished it had been possible to participate in more than one!



Marlene Evans of Environment Canada admiring Lake Corangamite while on the Salt Lakes and Otway Ranges tour.

In addition to the diverse and excellent contributed oral and poster presentations, there were seven plenary lectures and also the Baldi and Kilham lectures. *Jack Talling* of the Freshwater Biological Association, Ambleside, UK gave the **Baldi Lecture** on ‘Freshwater phytoplankton: accessible, microbial, influential population dynamics’ based on his extensive experience with phytoplankton in African and English lakes. The **Kilham Lecture** was presented by *John Melack*, University of California, Santa Barbara, USA. He addressed the ‘Ecological dynamics in saline lakes’ using data from Ethiopian saline lakes and Mono Lake, California from which he and his colleagues have an extensive database.

The **Plenary Lectures** were given by the following:

- ◆ *Jay O’Keefe* of Rhodes University, South Africa: Instream flow requirements, the ecological reserve, and the 1998 South African Water Act;
- ◆ *David Hamilton*, for *Jorg Imberger*, of the University of Western Australia: Bouyancy effect in a stratified lake;
- ◆ *Graham Harris* of CSIRO, Australia: Australian limnology: process, pricing and policy;
- ◆ *David Dudgeon* of the University of Hong Kong: The most endangered ecosystems in the world? Conservation of river biodiversity in Asia;

- ◆ *Masahisa Nakamura* of the Lake Biwa Research Institute, Japan: Lake Biwa watershed transformation and the changes in water environments over past decades;
- ◆ *Ken Cummins* of the South Florida Water Management District, USA: Riparian-stream macroinvertebrate linkage; and,
- ◆ *Ian Bayly* of Monash University, Australia: The life of temporary waters in Australian gnammas (rock-holes).

1st General Assembly:

The *August Thienemann-Einar Naumann medals* were awarded to:

- ◆ *Colin Reynolds* of the Freshwater Biological Association, UK, for his work on phytoplankton dynamics;
- ◆ *Tom Northcote* of the University of British Columbia, Canada, for his research on fish populations; and,
- ◆ *Christian Lévêque* of CNRS, France, for his research in tropical Africa and his syntheses on fish biology and diversity.

2nd General Assembly:

Three student prizes for oral presentations were awarded by Paul Boon. During the presentation of these, he pointed that all three recipients were female and challenged male students to do better at the next congress!

The awards were presented to:

- ◆ *Nanna Buessing* (with *M.O. Gessner*) of EAWAG, Switzerland for their paper, 'Microbial biomass and production in a littoral reed stand';
- ◆ *Nicole Barbee* of the University of California at Santa Barbara, USA for her paper, 'The role of benthic grazers in a tropical lowland stream'; and,
- ◆ *Kim Jenkins* (with *A. Boulton*) of the University of New England, Australia for their paper, 'Colonization pathways of microinvertebrates following flooding in a dryland Australian river'.

Robert Wetzel informed participants that a series of problems had plagued the publication of the Proceedings, volume 27, from the Dublin Congress but that these had been resolved. Members should receive them in two to three months. It was also noted that those members requesting the proceedings on CD will receive these after all volumes have been distributed as it is not cost effective to place each volume on a separate

CD and mail them to members. Due to the resignation of Bill Williams as SIL Editor for health reasons, Robert Wetzel has agreed to act as Editor for the Australian Congress Proceedings. He will be assisted in this task by Jack Jones and Bert Cushing of the USA. The Proceedings from this Congress will be sent to the publisher within 12 months and will be published within 18 months. Applications and/or nominations for SIL Editor are now being sought.

The 2004 SIL Congress will be held in Helsinki, Finland while that for 2007 will convene in Montreal, Canada. The SIL International Committee agreed that decisions for future congresses should only be made up to six years in advance. Therefore, no decision was taken regarding two proposals received to host the 2010 Congress. The proposals were received from Israel and South Africa. Details of these proposals will be presented to SIL members in future issues of *SILnews*.

Carolyn Burns, outgoing President of SIL, thanked Robert Wetzel for his extraordinary contributions to SIL as General Secretary-Treasurer, a position he has held for 35 years. She also thanked Ian Hamilton and Richard Marchant and their local organizing committee for the production of a very successful Congress in Melbourne. Incoming President, Gene Likens, thanked Carolyn on behalf of all SIL members for her stewardship of SIL during her two terms as President. The recent SIL election produced two new Vice-Presidents, Winfried Lampert of Germany and Brian Moss of Great Britain.



SIL Congress participants view Lake Corangamite during the Salt Lakes and Otway Ranges tour.

Photo courtesy of Marlene Evans.

Thank you to Ian Bayly, Monash University for providing us with information about Australian saline lakes.

Announcements

Annie Duncan (1926 - 2000)

Dr. Annie Duncan, better known to her colleagues as Nan, died on 3rd October 2000. This was fifteen months after a cerebral haemorrhage abruptly halted her activity, when she was found at 11 p.m. in her laboratory collapsed over her computer. She died as Emeritus Reader in Ecology and Leader of the Hydroacoustic Unit at the Royal Holloway Institute of Environmental Research, University of London. Nan Duncan has left at least 80 publications, 61 of them co-authored with 43 different scientists from 12 different countries (16 by Czechs, 12 by Poles, 10 by people from UK and 10 by Austrians, 7 by Brazilians, 4 each by scientists from Sri Lanka and The Netherlands, 3 by a German, 2 by a Spaniard, others by a Japanese and a Frenchman). Nan Duncan left much more than that. She left a notion of co-operative work in science, and of an urge to fill the gaps and crush the barriers between people from different areas and different domains. The three of us, who have signed this tribute to her memory, have different recollections of Nan. Different was the time of the first contact with Nan, different was the impact of Nan on each of our scientific lives, and different were our ways of encountering this distinguished and very unique personality.

Nan was a person with a mission to achieve, and a need to push things forward. She never stopped being eager to see unknown places and meet different people. Deep-rooted in her Scottish heritage, her highland songs and by-the-campfire dances being a legend to her friends. Nan was always open to diversity of indigenous life, to unknown sermons, and new flavours of native food and drink. She was ready to gulp a glass of Polish vodka the Russian way, or to sip good Chilean red wine for hours in an overnight scientific dispute, often freely shifting between English, Russian, French, Spanish, Portuguese and Polish. Speaking different languages was as natural to Nan as enjoying different climates, different foods and different drinks. She acquired her linguistic skills by starting early in her life, first in Russia where her father went to work before the outbreak of the Second World War.

The War left Europe divided by the Iron Curtain. As a person with a mission, Nan was one of the first “Western” scientists to cross this barrier. In the early 1960s, she made several visits to Warsaw, each time spending several hours inside

her small VW beetle waiting for Customs to search for forbidden newspapers with “western propaganda” smuggled for Polish friends. These stopovers on the border between West and East Germany were long-lasting but not long enough to make German friends. That happened later. The early 1960s, however, were a time for making friendships with Poles. That was how Nan came across one of us.

When driving her beetle between London and Warsaw, Nan found herself in the middle of a new idea that would later become one of the first programmes to successfully (though unintentionally) undermine the system forced upon Central Europe by the Yalta agreement. The central idea of the International Biological Programme (IBP) (1966-1972) was the assessment of productivity in different habitats world wide, and a search for methods to enhance primary production and improve the channels of energy transfer through food webs. The Programme needed skillful physiologists, ecologists and systems scientists willing to grasp the complexity of ecosystems then becoming new research objects. And Nan was there. Moreover, she was not only in the midst of the ideas and methods needed to execute the Programme, she was also in the centre of the Programme’s geography, since the midpoint was the Iron Curtain. Soon, Nan was living the most intense of her many lives. She was needed everywhere, and she tried to be in every place that her skills were needed, and to get to each meeting that could be important. She made many friends in Czechoslovakia, Russia, Austria, Germany, Italy, Norway, France and the Netherlands. One of us treasures the memory of a typical journey of that time, in April 1967, from Liblice near Prague, Czechoslovakia, to Warsaw in Nan’s ever-trustworthy car. The Liblice conference on “The methods for the assessment of secondary productivity in fresh waters” (IBP, Handbook No. 17, 1971) was over and Nan hurried to Warsaw to continue her experimental work. She had two student companions for the long drive, one from Holloway and one from Warsaw. The early April nightfall caught Nan high in the mountains on the approach to the Czech-Polish border, the checkpoint closing for the night. Not a soul spoke English or Polish, but Nan succeeded in getting a room in a small hotel. That was the way of learning that Nan could speak Czech, also. Her Czech, however, was not as fluent as Polish or Russian - the hotel room had only a single double bed.

After six years of activity that shimmered with all possible colours of life, all shades of tempers and attitudes, a variety of intellects, and diversity of languages heard throughout the meetings, the IBP was over. It happened overnight. What was left, however, were the piles of data from a large number of habitats from around the world, including those from lakes and reservoirs. Though the data was summarized in the IBP Synthesis volumes, there was still a huge quantity of detailed information that could be used to explore the mechanisms and relationships on which those summaries were built. Nan was there to do something about that and this is where she met another of our trio.

As a result we had a meeting in Oslo. Nice summer days of working on the data and nice evenings of washing out the daytime labour with wine. There were ten of us gathered at the Zoological Museum of the University of Oslo. Ten scientists from five countries, England, Poland, Japan, Austria and Norway. Not that many. The time would come, however, when each of those two numbers would dramatically increase. Nan, determined to make use of this priceless data, forced us all to work hard and to have a joint paper for publication. The paper was pushed further forward at subsequent meetings that Nan organised in Edinburgh, London, and Warsaw. It finally emerged in the Norwegian Journal of Zoology in 1976 as a "Review of some problems in zooplankton production studies" (Bottrel *et al.* 1976). In spite of its candid title, the problems were solved rather than created, and this was probably why that paper started to gain a wide audience. According to the "Web of Science", the number of its citations is 470.

Having achieved her goal of a joint paper, Nan did not stop there. She brought us together again in Lunz am See in Austria, where Alois Herzig and the Österreichische Akademie der Wissenschaften gave us a great treat. Nan decided that our informal IBP plankton ecology group from Oslo should now become the Plankton Ecology Group (PEG), be SIL affiliated. Peg came later under the INTECOL umbrella as well. The meeting in Lunz in May 1977 followed up the Oslo achievement with a goal of recalculating all existing data on zooplankton production, using the same methods, to make the estimates fully comparable. This was too much, however. The draft of the paper was never published. The better side of the meeting was the process rather than the output. It was also the time at which the third of us joined the club and soon became Nan's good friend. Funny that all

three of us were brought together by Nan. She never hid her pride in creating new friendships between scientists from the two sides of the Curtain, which due to people like Nan, was thinning and becoming less iron-like with each year.

The second paper by PEG was an inspiration from that Lunz meeting. The idea was pushed forward during the next meeting in Pallanza at Lago Maggiore, where Riccardo de Bernardi, supported by Livia Tonolli and the gorgeous spring of 1978, allowed Nan to have us in orderly ranks again. Five more PEG meetings took place before the paper eventually appeared in *Archiv für Hydrobiologie* as "The PEG model of seasonal succession of planktonic events in fresh waters" (Sommer *et al.* 1986). Another citation phenomenon with a total of 375 citations. There were many later PEG meetings, in Czechoslovakia, The Netherlands, Germany, Norway, France, Canada, UK, Finland, Zimbabwe and Austria, many of them producing a summary paper or a volume. Nan did not always have time to attend them because, by then, she was busy in other places, i.e., reservoirs and lakes in Russia, Sri Lanka, Brazil, Austria, the Philippines, Lake Washington at Seattle, Schöhsee at Plön, and also on her beloved Thames Reservoirs of London. However, her mission was already completed. New people from many countries came to the subsequent PEG meetings, different people but the goal was the same as that introduced by Nan Duncan at the time of the IBP and the first PEG meetings, to get results that can be trusted and compared with each other. With similar goals in mind, Nan continued her scientific career when starting new chapters of her life. She did not have enough time to conclude the last chapter, a new love and new adventure with the hydroacoustic approach to fish ecology, the data from which are as difficult to compare and comprehend, as were those on zooplankton productivity 30 years ago. We will miss Nan as she is no longer with us to share her powerful driving force and to incite us with her kindness and generosity, so much needed in cooperative work in science.

Maciej Gliwicz

University of Warsaw, Poland

Petter Larsson

University of Bergen, Norway

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Max Planck Institute of Limnology, Ploen, Germany

Selected publications of Annie Duncan

Duncan, A., Cremer, G.C. & Andrew, T. 1970. The measurement of respiratory rates under field conditions during an ecological study on zooplankton. *Polskie Arch. Hydrobiol.* **17**(30):149-60.

Grodzinski, W., Klekowski, R.Z. & Duncan, A. (Editors) 1975. *Methods for Ecological Bioenergetics*. IBP Handbook no 24. Blackwells Scientific Publications Oxford. 367 pp.

Bottrell, H.H, Duncan, A., Gliwicz, Z.M., Grygierek, E., Herzig, A., Hillbricht-Ilkowska, A., Kurasawa, H., Larsson, P., & Weglenska, T. 1976. A review of some problems in zooplankton production studies. *Norwegian Journal of Zoology.* **24**:419-56.

Schiemer, F., Duncan, A. & Klekowski, R. 1980. A bioenergetic study of a benthic nematode, *Plectus palustris* de Man throughout its life cycle. II. Growth, fecundity and energy budgets at different densities of bacterial food and general ecological considerations. *Oecologia (Berlin).* **44**:205-212.

Duncan, A. 1985. Body carbon in *Daphnia* as an indicator of the food concentration in the field. In: Lampert, E. (Ed.) *The role of food limitation in structuring zooplankton communities*. *Arch. Hydrobiol. Beih. Ergebn. Limnol.* **21**:81-90.

Sommer, U., Gliwicz, Z.M., Lampert, W. & Duncan, A. 1986. The PEG-model of seasonal succession of planktonic events in freshwater. *Arch. Hydrobiol.* **106**:433-71.

Duncan, A. & Guisande, C. 1993. Further trade-offs in *Daphnia* vertical migration strategies. *Arch. Hydrobiol. Beih. Ergebn. Limnol.* **39**:99-108.

Duncan, A. (Guest Editor). 1998. Shallow water fisheries sonar. *Fisheries Research* **35**(1-2):154 pp.

Dr. Annie Duncan's personal library

The late Dr. Annie Duncan (Nan) had a huge collection of books, journals and reprints of scientific papers in her personal library at her home and at Royal Holloway, at the University of London. As Sri Lanka was one of the countries that she liked very much and had visited frequently and in which she had many limnological friends, it was decided that she would be happy to see all her books sent to Sri Lanka when she died.

At the time that Nan became ill in July 1999, she was serving as the coordinator of a research project on evaluation of trophic relationships in Asian reservoirs and lakes. This project was funded by the European Union under the INCO-DC (International Co-ordination with Developing Countries) programme. The University of Kelaniya, Sri Lanka where the Centre for Tropical Reservoir Fisheries and Limnology (Amarasinghe and Fernando 1998; Amarasinghe 2000) has been established, was one of the partner institutions of this project. A library has been established in this centre with books, journals and reports received from Canada, Australia and USA. The materials from Nan's personal library which have also been sent to the University of Kelaniya will further expand the collection. They will be extremely useful to the graduate students and researchers in Sri Lanka for their literature surveys. As Nan's books, journals and reprints are frequently used by researchers who visit the centre, her service to limnology will be remembered among the scientific community forever.

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References Cited:

Amarasinghe, U.S. and Fernando, C.H. 1998. A centre for tropical reservoir fisheries and limnology. *SILnews* **25**:6-8.

Amarasinghe U.S. 2000. A centre for tropical reservoir fisheries and limnology. *SILnews* **31**:9.

The World Water Council declares three new initiatives for putting the World Water Vision into action

The leading non-governmental organisation established as an international water policy think-tank has formulated three new initiatives for implementing the World Water Vision. Founded in 1996, the World Water Council (WWC) has more than 200 member institutions, representing more than 50 countries, scores of international organisations, governmental agencies, the private sector and NGOs.

The first of the Council's triennial meetings, the First World Water Forum, was held in Marrakech, Morocco in 1997. The Second World Water Forum was held in The Hague, The Netherlands in March 2000. The Vision for World Water, Life and Environment in the 21st Century was first announced in Marrakech on March 22, 1997. "We are proud that the Vision was successfully completed on target and presented at the Second World Water Forum. We are also pleased to see that the Tenth Stockholm Water Symposium has continued the efforts of the Vision of making water everybody's business", stated Dr. Abu Zeid, President of the World Water Council.

The three new initiatives of the World Water Council include: (1) Establishing Monitoring Systems for the World Water Vision in Action Monitoring will be facilitated by the establishment of a World Water Vision Monitoring Secretariat, with branch offices located in key locations around the world. With the help of various collaborating organisations, international societies and national members of the World Water Council, these satellite offices will carry on the task of collecting regional information for a clear understanding of their particular water situation. Regional analyses will then be compiled to provide a complete World Water Vision Monitoring Report, which will be issued every year.

Information in this report will be disseminated through the media, thereby quickly reaching the public. Effective monitoring at both the world and regional levels will enable the Council to better evaluate the impact and effectiveness of the World Water Vision, building on its success and minimizing any shortcomings.

(2) Stimulating Policies for the Financing of Water Development and Protection. Due to the realities of the world today, financing is always a top concern, and no World Water Vision would be complete without intense research into this area. The World Water Council proposes to unleash the power of

the private sector, focusing on an enabling environment with a regulatory, legal and institutional framework that will promote and protect investments. The Council will take the lead in researching and identifying the appropriate policy framework at global and local levels that will ensure the proper flow of funding and proper provision of water services to all segments of society.

Money is available, but to attract investors a predictable, transparent regulatory framework and reasonable returns on investments must be provided. The establishment of a global risk management fund will further help to protect potential investors.

The Council will work to ensure adequate policies are in place to replace fear and suspicion with mutual trust, reliability and equity for all. The poor and disadvantaged should be assured adequate service at affordable costs.

(3) Creation of World Commission on Water, Peace and Security. Conflict resolution and prevention begins by fostering a better environment of awareness, cooperation and communication. The creation of the World Commission on Water, Peace and Security will provide an opportunity for third party mediation of shared water disputes. The role of the Commission will be to assist nations in current and potential transboundary water disputes by providing an independent opinion to help bridge the gap between concerned parties to ensure "win-win" solutions.

The Commission will also work toward global improvement in socio-economic and environmental sustainability. In addition to proactively mediating surface and groundwater conflicts, the Commission will promote management practices that ensure efficiency, equity and sustainability of the world's water resources. These efforts will benefit all segments of the population and help to conserve the ecosystems upon which everyone depends.

WWC's World Water Express, Stockholm 2000 Special Bulletin, August 2000:3-4.

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Announcements continued

Sanitation Connection: a web-based Environmental Sanitation Network Launched

The World Health Organisation (WHO), the United Nations Environmental Programme (UNEP), the Water and Sanitation Program (WSP), the Water Supply and Sanitation Collaborative Council (WSSCC); and, the International Water Association (IWA) have formed an international partnership to offer a comprehensive Internet resource to environmental sanitation practitioners. This major web-based network on all aspects of environmental sanitation was launched in November 2000 and is known as the Sanitation Connection. It is comprised of an easy-to-access web portal and an ever-growing number of authoritative articles and links for the practitioner on environmental sanitation issues, and focuses on authoritative information on technologies, institutions and financing. The web address is: www.sanicon.net.

Users can click on the topic which interests them, to read a short overview article, with references and links to web-based source material. In the first phase, the primary language will be English but it is intended to include other languages as the resource develops.

UNEP developed the concept of a web-based network as part of its Global Programme of Action (www.gpa.unep.org) to reduce land-based pollution of the marine environment, while WHO's mandate (www.who.int/water_sanitation_health/index.html) is to reduce water-related diseases, of which effective sanitation - above all for the world's poor - is a key element.

Financial support for the development of the Sanitation Connection has been received from the international development department of the British Government (DFID), through the Global Water Partnership, UNEP, WSP and the WSSCC.

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Book Donations

The Center for Reservoir Limnology and Fisheries of Kelaniya University, Sri Lanka was previously highlighted in *SILnews* 31:9. Several limnologists, including C.H. Fernando and the late Nan Duncan have donated books and other scientific information to the Center. The limnologists here welcome further donations. The University has set aside funds for surface transport of these donations.

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Limnology job and studentship notices

Notices on the availability of limnologically-oriented jobs and graduate student opportunities are now accepted for publication in *SILnews* and displayed on the SIL web site at www.limnology.org. There is no charge for the service at this time, which is available to SIL members and non-members.

Persons submitting notices should note the 4 month lead-time for the print edition of *SILnews*; those advertisements with short deadlines should be directed to the web site only.

Submissions should include: 1) a short title describing the position (job or studentship), 2) location and duration of the position, 3) closing date for applications, 4) a short paragraph describing the position, including any citizenship, educational or employment prerequisites; and, 5) information on where potential applicants may obtain further information, including names of contact persons, telephone numbers, fax numbers, e-mail addresses, and web site addresses, where appropriate.

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.

Submissions for the SIL web site should be sent by e-mail to webmaster@limnology.org or by fax to +1 (204) 474-7650, attention: *Gordon Goldsborough*.

Environmental News and Issues

Accidental contaminant spills from gold mines in large rivers – a global nuisance with special emphasis on the Danube and IAD



Figure 1 – Map of the Danube-Tisza-River-System, with the locations of Baia Mare and Baia Borsa gold mine accidents.

Apart from the nasty oil spills by broken tankers in oceans (e.g., “Exxon Valdes” in Alaska 1996, “Erika” along the Bretagne in France 1999) or by pipelines leaking into large rivers (e.g., Iguacu in Brasil, July 2000) we can find, in steady though irregular intervals, ill news about accidental spills from mines in aquatic environments around the world. So, this type of severe pollution is a global problem, too! Would you like confirmation? Well, here are some prominent and recent examples, and this list is not complete by far:

- ◆ 1991 - gold mine cyanide and heavy metal spill in Summitville, Colorado, USA;
- ◆ 1995 - repeated gold mine cyanide spills in Omai and Essequibo Rivers, Guyana;
- ◆ 1996 - heavy metal sludge spill from copper and zinc mines in Manila rivers, Philippines;
- ◆ 1998 - heavy metal spill into a national reserve from a zinc mine in Aznalcollar, Spain; and, finally in
- ◆ January/March 2000 - cyanide and heavy metal spills into headwaters of the Tisza River in Baia Mare and Baia Borsa, Romania (Figure 1).

Since the latter were affecting a major tributary to the Danube, the International Association for Danube Research (IAD) was also involved. These accidents demonstrate that pollution remains a severe problem in the Danube basin.

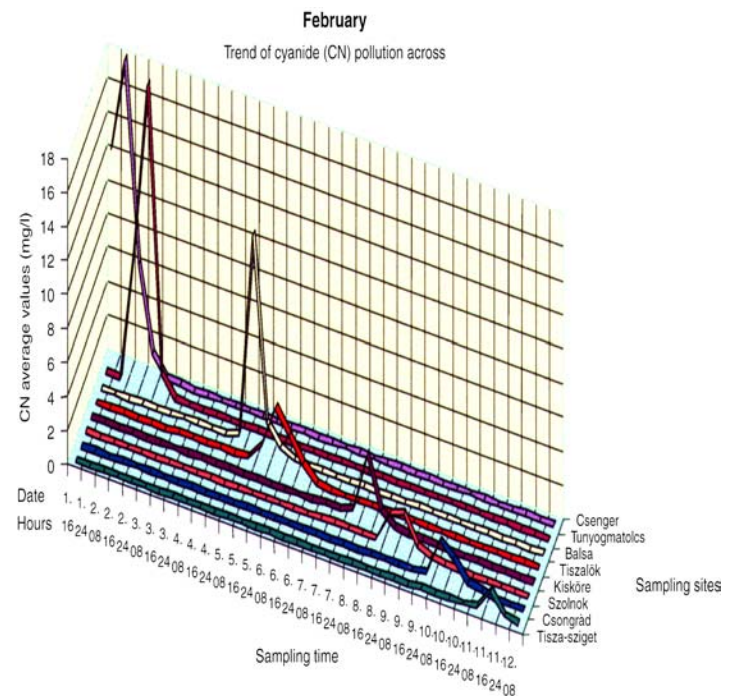


Figure 2 – Cyanide pollution in the Tisza River across Hungary, showing mean concentrations (Hungarian Ministry of the Environment, p. 25 from UNEP/OCHA 2000). Similar features were measured for Cu and Zn concentrations.

The Baia Mare gold mine cyanide spill

When the dam of the Aurul tailing pond broke on January 30, 2000, induced by heavy rainfall, about 100,000 m³ of water and sludge, contaminated with cyanide and heavy metals, were released into the Szamos-Tisza River system. Sodium hypochlorite treatment in order to neutralize the cyanide, may have further contaminated the rivers. The concentration wave of cyanide and heavy metal, travelling at 2.1-2.9 km/h in the Tisza and Danube, could well be tracked downstream as exemplified in Figure 2. The peak maximum concentrations in Csenger (Hungary) were 32.6 mg/L CN-,

continued on next page

18 mg/L Cu, and 0.962 mg/L Zn, respectively (UNEP/OCHA 2000). Obviously, the cyanide was partly diluted and evaporated during downstream transportation, so that the Danube downstream of Belgrade was seemingly spared (0.07 mg/L CN- at Iron Gate I). However, the heavy metals are deposited and accumulated in the sediments (e.g., 1.7 g Cu/kg dw, 0.55 g Pb/kg dw, and 2.7 g Zn/kg dw in the Lapos River just downstream of the broken dam). While these peak concentrations were diminished by a factor of ten some 30 km downstream, the heavy metals remain a long-term threat to the aquatic ecosystem.

The benthic fauna was seriously affected in the River Szamos, but the impact further downstream remained debated (BLW 2000). An amount of 1,240 tons of killed fish were reported for the Hungarian Tisza (UNEP/OCHA 2000), including many carp, pikeperch, catfish and sterlet (WWF 2000). The appearance of ill eagles demonstrated some food chain effects. While the toxicity tests performed one month after the accident revealed a rapid recovery of bacteria, algae and benthic fauna, some toxic potential was found for *Lemna minor* at some sites in the Tisza (BLW 2000).

The gold mine Baia Borsa heavy metal spill

A few weeks later, on March 3, 2000, a second accident occurred in a similar way at Baia Borsa, where heavy metals instead of cyanide were accidentally discharged. The peak concentrations measured at Tiszabecs were 0.86 mg/L Cu, and 2.9 mg/L Zn and Pb (Tittizer 2000). The fish fauna was also killed to a great extent, and the sediments were spiked with heavy metals in concentrations far above tolerable limits.

The various expert groups involved in these two spills unanimously formulated the following conclusions and recommendations:

- ◆ To map Romanian mines to identify sources of environmental threats and to develop management schemes for the prevention of pollution accidents.
- ◆ To install automatic monitoring and early warning stations at country borders, including continuously working bioassay systems (tests with bacteria, algae, *Daphnia*, mussels, and fish).
- ◆ Long-term monitoring should be done to document environmental damage caused by cyanide and heavy metals, and to study the recolonization of benthos and fish, and the regeneration of the river ecosystem.

- ◆ Establish an international commission for the protection of the River Tisza with participation of Romania, Ukraine, Slovak Republic, Yugoslavia and Hungary to set political and juristic standards of water conservation.

Obviously, these recommendations apply to any mining activity across the globe.

What can limnologists learn and do about accidental toxic spills?

The Baia Mare accident exemplifies the typical spill event. The disaster was detected by local people when the fish kill was apparent; the responsible authorities and companies started, with some lag time, control and remedy measures; the international alarm system worked quite well; the publicity in the media was enormous; the reaction was very emotional and there was a lack of sound data; national and international experts invaded; the upstream countries and mining companies tried to downplay the effects, while the downstream countries tended to exaggerate the damage; the whole apparition was over after a few weeks – and, then there was silence. There is silence, still. In the best case, some of the published reports will make it from official governmental offices to the politicians. Recommendations are provided, but the implementation of measures is mostly very slow, if ever effective. Time is “healing” the ecological damage, and people forget until the next spill shock.

As scientists we may think about resilience of aquatic ecosystems. We may do research on pathways of toxic chemicals within organisms and quantify bioaccumulation rates. We may track heavy metal species in sediments and determine limit concentrations. We may even apply GIS systems to map hot spots, and develop new methods to build up stable dams, but there is another dimension: the reality displaying the political willingness; the insufficient legal back-up; and, the economy. Who will pay the costs of spill damage if there is no insurance, if local people struggle for survival? In consequence, scientists need to transfer their knowledge to the public and convince society to perform environmental protection. Combatting the causes (i.e., prevention of accidents through safe mining reservoirs) deserves priority over combatting the effects (i.e., cleaning up the mess).

IAD - in brief

- ◆ IAD has observer status in the International Commission for the Protection of the Danube (ICPD,

founded in October 1998); the EU Water Framework Directive is drafted and ready for ratification.

- ◆ The IAD expert group meeting held November 16-18, 1999 in Mosonmagyaróvár/ Hungary provided, amongst other times, a new publication strategy of selected research areas in Arch. Hydrobiol. Suppl., Large Rivers (Editor, M. Dokulil).
- ◆ The meetings of the IAD country representatives in April and September 2000 yielded some structural changes of IAD and a new general secretary, Dr. Meinhard Breiling (breiling@breiling.at). Further, sponsoring of SIL membership and young scientists to participate at the SIL Congress in Melbourne 2001 were initiated.
- ◆ The 33rd IAD Conference was successfully held September 3 - 9, 2000 in Osijek, Croatia. Proceedings are available from Dr. Janja Horvatic (jhorvati@pedos.hr).

References

BLW 2000. Bericht über die Untersuchungen an Szamos und Theiss (Ungarn) nach dem Cyanid-Unfall (Report on the investigations of Szamos and Tisza (Hungary) upon the cyanide accident). Bayer. Landesamt für Wasserwirtschaft (BLW), München, Germany.

UNEP/OCHA 2000. Cyanide spill at Baia Mare, Romania. Assessment Mission Romania, Hungary, Federal Republic of Yugoslavia, February 12 – March 6, 2000. United Nations Environment Programme, UNEP/Office for the Co-ordination of Humanitarian Affairs, OCHA. Geneva, March 2000. (<http://www.unep.ch/roe/baiamare.htm>)

Tittizer, T. 2000. Dienstreisebericht der EU-Kommission über die Auswirkungen des Cyanid-Unfalls in Baia Mare (Report of the EU-Commission on the effects of the cyanide accident in Baia Mare). Bundesanstalt für Gewässerkunde, Koblenz, March 20, 2000, Germany.

WWF 2000. Tisza cyanide spill must not recur. Pamphlet issued by WWF Hungary Programme Office, Budapest (panda@wwf.hu).

Jürg Bloesch
President of IAD
EAWAG, Switzerland
www.iad-sil.com

Reports on Working Groups Biological Monitoring

The meeting of the SIL Working Group on Biological Monitoring was held jointly with the IUBS Committee on Biomonitoring and the University of Karlsruhe at Karlsruhe, Germany from 26 September - 2 October 1999. The meeting was attended by 40 participants from nine European countries and Argentine, Egypt, PR China, India, Indonesia, Japan and Taiwan.

Extended abstracts of the contributions have been prepared and edited. A list of authors and titles is available upon request. Anyone interested in single reprints of the papers can contact me or Michael Marten.

Information on further activities of this Working Group will be given to the WG members and will be published in SILnews.

Very likely we shall have a symposium on field bioassaying of the quality of lakes and rivers at Karlsruhe in the fall of 2001 in the city of Karlsruhe. If you are interested in attending this meeting, please e-mail: W.Schmitz-Weingarten@t-online.de or contact Michael Marten at: Michael.Marten@lfuka.lfu.bwl.de.

Wolfgang Schmitz
Chairperson



Max Bothwell of Environment Canada practicing to become a didgeridoo virtuoso after the SIL Congress in Australia.

Letters to the Editor

You've seen the country - now read the science! We were delighted to see so many overseas researchers make the long journey to Australia to attend the 28th Congress of SIL. For many delegates it was their first time on this southern continent. It was striking to hear scientists comment on the limnological parallels and contrasts that they found in comparisons with research in their homelands — and it was testament to the global nature of our International Society of Limnology.

Those who attended the 28th Congress received a complimentary copy of the latest issue of the journal *Marine and Freshwater Research*. This was a special single-theme issue of the journal, entitled 'Frontiers in Catchment Biogeochemistry', describing the intricate relationship between land use and water quality in this unique landscape. The inclusion of papers from the northern hemisphere set this material in a global context, and the range of papers illustrated the multi-disciplinary of landscape-level limnology at the beginning of the 21st century.

The journal's editor and the 'freshwater' members of the journal's Advisory Committee are members of SIL and were present at the Congress, where it was a pleasure to renew old contacts and forge new ones. In addition to the primary research papers that *Marine and Freshwater Research* has traditionally published, we are now actively encouraging submission of reviews and viewpoints; there were some fruitful discussions with Congress participants who are planning to submit these to the journal. All material published in the journal passes through rigorous international peer review. There are no page charges.

For further information about *Marine and Freshwater Research*, including details of submission of manuscripts, please consult the website at <http://www.publish.csiro.au/journals/mfr> or send an e-mail message to ann.grant@publish.csiro.au.

Ann Grant

Editor, Marine and Freshwater Research

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Book Reviews

Theoretical Reservoir Ecology and its Applications

Edited by J.G. Tundisi and M. Straškraba
586 pp., 1999
Backhuys Publishers, AH Leiden, The Netherlands
Soft cover
ISBN 90-5782-034-X
Dutch Guilders 160.00 / US\$ 80.00

This book is a synthesis of the materials presented and discussed at a five day workshop held at the Hotel Colina Verde, São Pedro, São Paulo State, Brazil, from January 26 to 30, 1999. The editors of this volume have extensive experience of the limnology and functioning of reservoirs and lakes and this book is a timely addition to the growing body of knowledge on reservoir limnology and management. The book was printed in Brazil in 1999, under the joint copyright of the International Institute of Ecology, The Brazilian Academy of Sciences and Backhuys Publishers.

The volume consists of a short preface by the editors, followed by twenty-six chapters and an address list for the first authors of each chapter. Most of the chapters deal with reservoirs located in South America and Europe, with additional contributions on, and comparisons to, reservoirs in North America, Australia, southern Africa and the Middle East.

The overall appearance and “feel” of the book is pleasing and the diagrams, tables and equations are clearly laid out and labelled. External reviewers and the editors have reviewed each chapter. Unfortunately, closer inspection reveals that several typographic errors have crept through the editing process whilst some unusual examples of English language usage appear in a few of the chapters. These could perhaps have been eliminated by a more rigorous editorial approach. The different shades of grey used for the lines in some of the diagrams are difficult to resolve, possibly because the original diagrams were prepared in colour.

The different chapters in this book highlight and confirm several important principles of the theoretical limnology and ecology of man-made reservoirs, and demonstrate recent advances in our understanding of how these ecosystems function. As such, the book provides an important source of theoretical and practical information aimed at improving our understanding of how reservoir ecosystems function, as a basis for their sustainable management. The concepts, case studies and examples provide useful information for students, aquatic scientists and water quality managers who are engaged in seeking sustainable solutions to reservoir problems and their ecological and economic impacts.

The editors emphasize that man-made reservoirs differ from natural lakes in several aspects, most of which are related to the patterns of operation and use of reservoirs. This is of course

true. Clearly, the basic principles and mechanisms that underlie ecosystem structure and functioning are common to both lakes and reservoirs; however, the altered *ecological expression* of these mechanisms in reservoirs is largely due to the very different hydrological and hydraulic processes that pertain. This point is made most elegantly in the chapter on phytoplankton assemblages written by Colin Reynolds. Perhaps the most important additional conclusion to be drawn from this body of work is that, despite more than a century of research on reservoirs, we are seldom able to predict with accuracy and confidence the exact ecological outcomes of external forcing functions. Indeed, we still rely heavily on the site-specific experience and insight of individual scientists and ecologists when it comes to predicting specific outcomes in a particular lake or reservoir system.

For the future, reservoirs will continue to play a central role in almost all aspects of water supply and hydro power generation throughout the world. However, the World Commission on Dams has recently called attention to the wide range of problematic issues that are associated with the construction and operation of reservoirs. Consequently, the importance of appropriate reservoir and catchment management strategies cannot be over-estimated. These must always be based on sound scientific principles which, in turn, require a continuing investment in appropriate reservoir research programmes. Several authors have stressed the enormous control exerted by catchment hydrological processes and reservoir operating rules on the retention time within individual reservoirs and cascades of reservoirs. These processes often display enormous ranges of variation during an annual cycle, as well as between years, and they must be thoroughly understood if reservoir management is to be cost-effective and successful. It is here that modelling studies will continue to play a vital role in testing the consequences of possible management options. In this regard, recent enhancements in the DYRESM suite of models continue to demonstrate the superiority of this approach to reservoir management.

Overall, this book provides an important source of up-to-date information on almost all aspects of reservoir ecosystem functioning. Whilst the prime emphasis of the case studies is on South American and European reservoirs, most of the information is also relevant to reservoirs located in other parts of the world. With its relatively low price (US\$ 80.00), I can recommend this book as a useful and affordable addition to the technical libraries of educational institutions, engineering and environmental consultancies and water resource management agencies.

Peter Ashton
Council for Scientific and Industrial Research (CSIR)
Environmentek
South Africa

Identification and Ecology of Limnetic Plankton Ciliates

W. Foissner, H. Berger and J. Schaumburg

793 pp., 1999

Published and edited by Bavarian State Office
for Water Management, Munich

ISBN 0176-4217

US \$55.00

This large and lavishly illustrated book deals with the ecology and taxonomy of planktonic ciliates on a worldwide and comprehensive basis, with particular attention to the description of species (pp. 65 - 730). Keys, illustrations and comments on the ecology, distribution and taxonomy of 112 species are given. The result is a comprehensive text that will be useful to a wide variety of limnologists and others interested in the ciliates, for whom, until the appearance of this book, ciliate identification has often been at best an exercise in iconography. The authors have assembled, reviewed and added to the widely dispersed literature on planktonic ciliates. The result is a comprehensive monograph for which we owe them a considerable debt.

Ciliates play an important - and often underestimated - role in the trophodynamics of the plankton of lakes, but for the most part it has been difficult to focus upon the exact species involved because no comprehensive and easily available identification guide existed. That is no longer the case, and there is now no excuse for the sloppy taxonomy that has unfortunately bedevilled many ecological studies of the ciliates to the present.

There are four sections - of quite different length. After a brief introduction (1 page), methods for investigating planktonic ciliates and an examination of the species concept with regard to ciliates are discussed (18 pages). Then follows a larger section on general ecology (34 pages). The next section is the core of the book (668 pages), comprising text and illustrations dealing with identification, descriptions, and ecology of 112 individual species, and prefaced by 14 general identification keys, 12 special keys and several keys to the major ciliate groups. Finally, there is a short glossary of ciliate morphology, and an extensive bibliography and a full index.

The book should be present on the shelves of all self-respecting limnologists (and certainly in the libraries of their institutions). No special knowledge is required in its use and

I am certain that it will be of immense help in limnology training courses (not to mention invertebrate zoology courses). I thoroughly recommend the book and thank the authors for the immense effort that has gone into its production. Lastly, but not least, it is cheap - an unusual feature in the modern book world! It is only US \$55.00, a bargain in any currency. The book can be ordered through reputable booksellers or directly through: Wasserwirtschaftsamt Deggendorf, Schriftgutverstandelle, Postfach 2060, D-94460 Deggendorf, Germany.

W.D. Williams

University of Adelaide, Australia

Management and Conservation of the African Great Lakes

by Ruud C.M. Cruul

107 pp., 1998

UNESCO/IHP Project M-5.1, UNESCO Publishing
7 Place de Fontenoy, 75352 Paris 07 SP

Fax: (33-1) 45 68 57 37, www.unesco.org

ISBN 92-3-103593-2

125 FF

Management and Conservation of the African Great Lakes is a compendium of information about three important and interesting aquatic ecosystems, lakes Victoria, Tanganyika and Malawi. At 107 pages, it is not the largest book on African lakes. However, not being a collection of chapters, it manages to be comprehensive and complete within its limited scope. Hydrology is stressed as a foundation for biological and management issues. It is written for the non-specialist, with insets to explain concepts or to provide relevant comparisons to other large lakes.

Chapters 1 to 4 are brief, only a few pages each. Chapter 1 sets the hydrological stage, introducing basic hydrological concepts and the global problem of water supply in 4 pages. Chapter 2 takes a basin by basin approach to describing the three rivers systems in which the lakes are located, and their importance. Chapter 3 reviews human impacts on the lakes, with abundant references to other systems. Chapter 4 provides a history of limnological research on the lakes.

Chapter 5 is the largest in the book, and compares the limnology and hydrology of the three lakes. I found it

readable if unembellished. It contains abundant facts and citations, but generally avoids the more difficult issues concerning why and what if. It is an excellent entry point for someone wanting to learn about these lakes, both as a summary and guide to the literature. Among the subjects one might expect to be covered more completely, but which are dealt with briefly or not at all, I would list biodiversity (in general and of fishes in particular), processes going on in the drainage basins that affect the lake, wetlands, littoral zones, and human health issues.

Chapter 6 addresses management and conservation, primarily from the point of view of institutions and approaches, culminating in recommendations of a general organizational nature. The five appendices are a significant part of the book. Appendix V, which provides information on the many projects in progress or recently completed, may be the most useful to limnologists. The References section is extensive, and particularly strong in their inclusion of the grey literature which is a significant part of the total for these lakes.

There are few errors in the book, and none are serious. One of the more obvious is a table (5.6.1) listing major phytoplankton, that designates Lake Malawi's dinoflagellates as cryptophytes. There are a couple of puzzling statements that beg further explanation; for example, that evaporation from the lakes is highest at night when air temperatures are lower than water temperatures (p. 47) or that nutrients may limit productivity in the tropics despite high temperatures allowing rapid recycling (p. 51). These are symptomatic of the brevity with which most topics are presented.

I was generally pleased with the book, have found it useful, and would recommend it as an introduction and guide to the literature for students and practicing limnologists.

William D. Taylor
University of Waterloo
Canada

Aquatic Ecosystems of Mexico: Status & Scope

Edited by: M. Munawar, S.G. Lawrence, I.F. Munawar and D.F. Malley
435 pp. 2000, Hardbound
Backhuys Publishers, Leiden, The Netherlands
ISBN 90-5782-051-X
Dutch Guilders 250.00/US \$125.00

Aquatic Ecosystems of Mexico: Status & Scope reflects the desire of diverse Mexican researchers to find international venues to publish their work. The wide scope of the book includes work from freshwater to marine researchers in universities across the country as well as government agencies. The cooperative efforts between Mexican researchers and researchers from other countries is evident.

The book is divided in two parts: Freshwater Ecosystems and Marine Ecosystems. A wide range of themes is presented in descriptive papers fairly equally divided between both types of ecosystems.

J.E. Mestre's background paper regarding the political and social basis for Mexico's water issues status is particularly valuable. He identifies two key issues for Mexico's water problems. One, "population and economic activity concentrate in the higher plateaus where climate is temperate but water is naturally scarce or has become scarce by severe pressure". And two, the magnitude of the National Water Commission's (a federal agency) mandate. The Commission is responsible for monitoring, surveillance and law enforcement along with water planning; water management, meteorology, infrastructure studies, and regulation of financial resources among others. The result is an agency unable to cope efficiently with all its responsibilities and with little commitment toward the protection of the ecosystem.

The remainder of the book covers a wide scope of scientific topics: overviews of water resources; metal and other pollutants; coliform, *Vibrio cholerae* and other pathogenic occurrences; limnological descriptions; ciliates; *Artemia* and *Brachionus* studies; algae and fauna of calcareous ecosystems; natural disturbances; aquifers; subtidal communities; mangroves; coral reefs; fish distribution; and, coastal lagoons.

This book represents an arduous and successful work from the editorial group. Their linguistic editing was a time consuming and difficult task worth mentioning - nevertheless a few misspellings are present and some collaborative institutions were left out. This will be a useful book for Mexican aquatic scientists, engineers and policy makers and others interested in the state of water sciences in Mexico.

Laura Davalos-Lind
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State of Lake Erie: Past, Present and Future

Edited by M. Munawar, T. Edsall, and I.F. Munawar
552 + xvi pp., 1999

Backhuys Publishers, Leiden, The Netherlands

ISBN 90-5782-018-8

Dutch Guilders 280.00/US \$140.00 (hardbound)

The contributed chapters in the book were initially presented by authors at a symposium on Lake Erie held at the International Association of Great Lakes Research Conference at Erindale College, University of Toronto, May 1996. The book is dedicated to two Canadian scientists, Joseph H. Leach and Henry A. Regier, researchers who have made outstanding contributions to the study of limnology and fisheries of the Laurentian Great Lakes, particularly Lake Erie. The book title is taken from a chapter heading in Noel Burns' 1985 book, "Erie the Lake that Survived". Following editorial comments, a forward by C.E. Herdendorf, preface by J.R. Vallentyne, and biographies of Henry Regier (Zimmerman *et al.*) and Joseph Leach (Nepszy), the book chapters are arranged into four sections: "The changing ecosystem" (14 chapters), "Invasion of exotics" (5 chapters), "Contaminants" (2 chapters), and "Emerging approaches and techniques" (6 chapters).

This book is about change. Since the 1972 Great Lakes Water Quality Agreement (GLWQA) between Canada and the United States of America, nutrient loads into Lake Erie have declined. In response to nutrient reduction attributed to both phosphorus abatement programs (GLWQA target goals were achieved in the mid-1980s) and the filtering capacity of dreissenids (mussels invaded Lake Erie in the late-1980s), there has been a continuous decline in primary production, resulting in an oligotrophication of Lake Erie. Kay and Regier suggest that eastern Lake Erie never flipped out of its benthic-dominated oligotrophic phase, but they describe historical shifts from oligotrophy to eutrophy (dominated by a pelagic association) and a return to oligotrophy in the western and central basins where the benthic association is an artificial one dominated by species of invaders. Various authors document changes in Lake Erie associated with oligotrophication such as the decline in the "food bank" (Munawar *et al.*), changes in contaminants (Haffner and Koslowski), changes in bottom fauna (Manny and Schloesser, Edsall *et al.*) and the exploitation of fish stocks (Nepszy, Ryan *et al.*). Other events independent of oligotrophication include invading species (MacIsaac) and the loss or change in habitat (Minns and Bakelaar).

Topics covered ranged from physical limnology and climate change to data compilations at all trophic levels. Data summaries on Lake Erie are provided from studies conducted intermittently from 1968 until 1997. Although sampling techniques, station location, and season sampled differed among lake cruises and research programs, authors summarize spatial patterns over time of constituents in the western, central, and eastern basins of Lake Erie with respect to nutrients (Charleton *et al.*), phytoplankton biomass and composition (Munawar and Munawar), planktonic ciliates (Lynn and Munawar), microbial food web structure (Munawar *et al.*), and zooplankton composition and biomass (Johannsson *et al.*). Use of consistent methodology enabled researchers to establish a comparable database for phytoplankton photosynthesis between Lake Erie and other lakes in the province of Ontario (Millard *et al.*).

Chapters with detailed synopsis and interpretation of changes in Lake Erie include a review of research contributions on Lake Erie (Leach), relationships between zooplankton community changes and ecosystem function (Johannsson *et al.*), biological invasions (MacIsaac), and trends in fish stocks within a changing trophic state and food web (Ryan *et al.*, Dermott). Climate change scenarios are presented in two chapters (Schertzer, Quinn and Croley). Anticipated warmer climate leads to decreased lake levels as well as to the extent and duration of ice cover that protects shoreline from waves that could increase erosion and alter year class strength of fish (Quinn and Croley). Another contribution examines the effects that macroinvertebrate burrowing activities may have on smearing the historical sediment record (Matisoff). Di Maio *et al.* describe a useful technique, change-point regression analysis, to assess rates of change using an example of contaminant concentrations in herring gull eggs.

A recurring question throughout the book asks if the decline in abundance of fish species can be attributed to the reduction in productivity or to human exploitation. This issue mirrors an historical controversy that began in the late 1920s when researchers debated whether or not declines in fish stocks could be attributed to pollution or overfishing (see Leach). Given that chlorophyll yield per unit of phosphorus is lower in Lake Erie than in other Ontario lakes (Millard *et al.*), is there enough food in Lake Erie to support the fish stocks? Charleton argues that even a return to gross pollution levels of the 1960s (by deliberately releasing sewage effluent from sites in the western basin) would have little effect on secondary productivity in the central and eastern basins, and would be clearly an undesirable prospect. Although declines in fish harvest in the 1990s have been attributed to *Dreissena* spp.

(Ryan *et al.*), the decrease in the size of eastern smelt populations were associated with a change from larger to smaller-sized plankton species before the arrival of zebra mussels (Dermott *et al.*). Results of Lake Erie ecosystem model simulations suggest that changes in fish community structure are due more to variation in walleye abundance than to variation in phosphorus loading (Locci and Koonce). Also, results of bioenergetics modeling showed that walleye accounted for the largest fraction of rainbow smelt mortality (Einhouse *et al.*), suggesting that management actions may provide a short-term solution to the problem of declining stocks especially for highly valued fish species (Ryan *et al.*).

This book would have benefited greatly from a synthesis chapter for each of the four sections as well as an overall synopsis of the book. Nevertheless, many readers will appreciate the detailed reviews and historical data summaries. Although some authors attempted to discuss mechanisms underlying ecological changes in Lake Erie, the reader is often left with insufficient information to understand why changes have occurred. For example, many authors examined changes in Lake Erie before and after the invasion of zebra mussels. Some changes are presumed to be attributed to dreissenids; others are not. Unfortunately, results of manipulative experiments to test effects of dreissenids on various components of the lake are not presented in the book. Lake Erie has changed and will continue to change; but, what are the mechanisms underlying the changes and could these changes have been predicted?

The price will deter most individuals from purchasing a copy, especially since there are many editorial (including authorship errors) and spelling errors that detract from the book. If you work on Lake Erie or other large lakes, I suggest that you encourage your library to buy this book. Regardless of some drawbacks in the publication, it is clear that a large lake can undergo rapid, extensive ecological change.

Acknowledgements

I thank J. Ciborowski, T. Johnson and H. MacIsaac for discussions about the book.

Reference

Burns, N.M. 1985. Erie: The lake that survived. Rowan and Allanheld, Totowa, N.J.

Lynda D. Corkum
University of Windsor
Canada

Wetlands for the Future: Contributions from INTECOL's V International Wetlands Conference

Edited by A.J. McComb and J.A. Davis
780 pp., 1998
Gleneagles Publishing, PO Box 41, Glen Osmond, SA 5064,
Adelaide, Australia
ISBN 1 87553 04 5
AUS \$90.00

The International Union of Ecologists (INTECOL) sponsored the fifth International Conference on Wetlands in 1996 at the University of Western Australia. This book is a collection of 56 invited chapters from selected presentations at the conference, organised into nine topical areas of scientific and management interest. Although not all inclusive, the book provides an excellent overview of some relevant topics in wetland science and management today. Consistent with the theme of INTECOL, the book provides an international perspective of wetland issues with individual chapters contributed by distinguished experts from around the world.

The information disseminated in this book is clearly consistent with the goal of facilitating better management of global wetland resources. Aside from some formatting inconsistencies, the chapters are well written and easy to follow. A major strength of the book is that several chapters examine wetland threats from perspectives that are rarely addressed in scientific studies. Wetland studies tend to focus on technical issues and rarely consider economic, social, and cultural influences that represent the most serious threats to global wetland resources. A perspective based on economic, social, and cultural factors is provided in several sections of the book, including an especially stimulating chapter by the late G.E. Hollis. Remaining chapters provide more discipline-specific contributions in wetland science using case studies and theoretical analyses of specific wetland types and geographic settings around the world. The book provides an excellent overview and introduction to the disciplinary diversity of wetland science for students and young professionals in addition to providing information that veteran scientists should find useful.

Ned H. Euliss, Jr.
U.S. Geological Survey
Northern Prairie Wildlife Research Center, USA

Australian Freshwater Ecology: Processes and Management

Andrew J. Boulton and Margaret A. Brock
300 pp., 1999
Gleneagles Publishing, P.O. Box 41, Glen Osmond,
SA 5064 Australia
ISBN 1 875553 05 3
Aus \$50.00

Australian freshwater ecology is relatively young science. Since the mid-1980s however, there has been a tremendous upsurge in interest in aquatic ecology and water management in Australia. This interest is especially pertinent given that Australia's mean annual runoff is only 1% of the world's total. This fact has resulted in the well known description of Australia as "the driest inhabited continent". This book, in convenient soft-cover form, provides a concise and well written overview of the state of Australian wetlands. The author's efforts to integrate management issues with basic science questions is very relevant to today's research mandates. A tremendous amount of information is conveniently summarized in this book.

The book is organized into three main sections. The first section provides a brief overview of wetland diversity in Australia as well as detailing the unique physico-chemical attributes that give water its special characteristics and provide a mechanistic basis for its fundamental role in global and regional hydrological cycles. The second part of the book emphasizes physical, chemical and biological processes in standing and running waters and in temporary waters. The third and final section focuses on broad scale management issues at larger scales (i.e., catchments and drainage basins). Throughout the various sections there are numerous asides (placed beside the main text in outlined boxes) that furnish specific details on issues that, although related to the main body of the text, are often tangential. These boxes, most often the outcome of contributions by other authors, provide interesting and useful information that serve, not only to round out the main text, but to intrigue and excite the reader to further inquiry.

Mechanistically, the book has very few spelling mistakes. There are numerous photographs and figures throughout. However, the photographs, in particular, were sometimes too small; perhaps an unavoidable outcome of the smaller page-size format (17 x 25 cm). Further, it would have been very useful if detailed maps showing the places named in the book had been included. Without such maps this reader found it difficult in places to orient the place names to the locations

within Australia. The references cited in the various chapters are appropriate, extensive and, for the most part, up-to-date.

This is a very opportune publication given the recent Societas Internationalis Limnologiae (SIL) meeting in Melbourne, Australia (February 2001). This book provides a timely and extremely valuable synthesis of the current state of aquatic ecology and water management in Australia. The issues covered in this book extend well beyond those specific to Australia, making it very well suited to aquatic biologists who want to understand more about the cycling of material through food webs. I would definitely recommend this book to anyone interested in limnological research and/or the integration of ecology and process-driven management at large spatial scales.

Michael T. Arts
National Water Research Institute
Canada

Calendar of Events

Seventh International Polychaete Symposium.

2 - 6 July 2001
Háskólabíó, Reykjavik, Iceland
Contact: Elin Sígvaldadóttir
Icelandic Institute of Natural History
Box 5320
125 Reykjavik, Iceland
elin@ni.is
Phone: ++35 4-5629822 or ++35 4-5626611-209
Fax: ++354-5620815
www.nattfs.is/7IPCI/

Second Symposium for European Freshwater Sciences (SEFS-2).

8 - 12 July 2001
Toulouse, France
Contact: Prof. Sovan Lek
CESAC
Université Paul Sabatier Toulouse-III
118 route de Narbonne
F-31062 TOULOUSE cedex 04, France
lek@cict.fr
Phone: +33 5 61 55 86 87
Fax: +33 5 61 55 60 96
http://quercus.cemes.fr/~sefs

Ecology of wetlands and shallow lakes:

Alternative stable states, anthropogenic influences, and management options.

15-19 August 2001
Delta Marsh, Manitoba, Canada
For information: Dr. L. Gordon Goldsborough
University of Manitoba Field Station
(Delta Marsh), Winnipeg, MB
Canada R3T 2N2
ggoldsb@cc.umanitoba.ca
Phone: (204) 474-7469
Fax: (204) 474-7650
www.umanitoba.ca/faculties/science/delta_marsh/meetings

Ninth International Symposium on Microbial Ecology (ISME-9): Interactions in the Microbial World.

26 - 31 August 2001
Amsterdam, The Netherlands
Contact: ISME-9 Secretariat
Eurocongres Conference Management
Jan van Goyenkade 11
1075 HP Amsterdam, The Netherlands
isme9@eurocongres.com
Phone: +31 20 6793411
Fax: +31 20 6737306
www.eurocongres.com/isme9

International Phosphorus Transfer Workshop (IPTW) 2001.

28 August - 1 September 2001
Plymouth, Devon, England
Contact: Jo Chisholm
IGER North Wyke
Okehampton, Devon EX20 2SB, UK
IPTW.2001@bbsrc.ac.uk
Phone: +44 1837 883503
Fax: +44 1837 82139
www.iger.bbsrc.ac.uk/igerweb/NWNew/IPTW/
iptw2001.htm

ABUDIV2001 - Diversity, complexity, abundance, resemblance, scale dependence: Theories, methods, applications.

28 August - 2 September 2001
Balatonfüred, Hungary
Contact: Dr. Judit Padisák
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www.terra.hu/abudiv

ECORAD 2001- International Congress on the Radioecology-Ecotoxicology of Continental and Estuarine Environments.

3 - 7 September 2001
Aix-en-Provence, France
Contact: ECORAD 2001, IPSN-DPRE - Bât. 02
rue Auguste Lemaire B.N. n°6
92265 Fontenay-aux-Roses, Cedex, France
ecorad.2001@ipsn.fr
Phone: 33 (0) 1 46 54 79 06
Fax: 33 (0) 1 46 54 72 90
www.ipsn.fr/ecorad2001

International Conference on the Impacts of Environmental Factors on Health.

10 - 12 September 2001
Cardiff, United Kingdom
Contact: Susan Hanley, Conference Secretariat
Environmental Health Risk 2001
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, United Kingdom
shanley@wessex.ac.uk
Phone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
www.wessex.ac.uk

River Basin Management 2001.

11 - 13 September 2001
Cardiff, Wales, UK
Contact: Susan Hanley
Conference Secretariat RBM 2001
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, UK
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Phone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
www.wessex.ac.uk/conferences/2001/river01/

20th Colloquium of the Association of French Speaking Diatomists (ADLaF).

11 - 14 September 2001
Antwerp, Belgium
Contact: Bart van de Vijver & Inge van Dyck
Secretariat and organisation of the colloquium
ADLaF
Universiteit Antwerpen (RUCA)
Department of Biology
Section of Polar Ecology
Limnology and Paleobiology
Groenenborgerlaan 171
B-2020 Antwerp, Belgium
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Phone: +32 3 218 04 16
Fax: +32 3 218 02 95
http://perso.club-internet.fr/clci/diatom-ADLaF.htm

Parameter selection in modelling aquatic community structure - International workshop.

15-16 September 2001
University of Namur, Belgium
Contact: Dr. Jean Pierre Descy
Chargé de cours
Unité de Recherches en Biologie des Organismes
Laboratoire d'Ecologie des Eaux Douces
Département de Biologie
FUNDP
Rue de Bruxelles 61
B-5000 Namur, Belgium
Jean-Pierre.Descy@fundp.ac.be
Phone: 32 81 724405
Fax: 32 81 230391
www.fundp.ac.be/urbo/descy.htm

Sixth International Conference on Modelling, Measuring and Prediction of Water Pollution.

17 - 19 September 2001
Rhodes, Greece
Contact: Gabriella Cossutta, Conference Secretariat
Water Pollution 2001
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, United Kingdom
gcossutta@wessex.ac.uk
Phone: 44 (0) 23 80 293223
Fax: 44 (0) 23 80 292853
www.wessex.ac.uk

International Conference on Water Resources Management.

24 - 26 September 2001
Halkidiki, Greece
Contact: Sally Walsh, Conference Secretariat
Water Resources 2001
Wessex Institute of Technology
Ashurst Lodge, Ashurst
Southampton, SO40 7AA, United Kingdom
slwalsh@wessex.ac.uk
Phone: 44 (0) 238 029 3223
Fax: 44 (0) 238 029 2853
www.wessex.ac.uk

9th International Conference on the Conservation and Management of Lakes.

11 - 16 November 2001
Shiga, Japan
Contact: Shiga Prefectural Government
Environmental Policy Division
4-1-1 Kyomachi, Shiga, 520-8577, Japan
lake2001@nsl.pref.shiga.jp
Phone: 81-77-528-3466
Fax: 81-77-528-4849

2002

The Fourth International Ecohydraulics Symposium: Environmental Flows for River Systems. An international working conference on assessment and implementation.

3 - 8 March 2002
Cape Town, South Africa
To access the first announcement for this conference, please visit the website at: www.southernwaters.co.za. The website contains an interactive electronic response form for those wishing to receive the second circular. If you cannot access the website, please contact the Conference Organisers by e-mail at: conference2002@southernwaters.co.za or by fax at: ++27-21-6503887

9th International Symposium on the Interactions between Sediments and Water (IASWS).

5 - 10 May 2002
Banff Springs Hotel, Canada
Contact: Dr. Ellen Petticrew
University of Northern British Columbia
3333 University Way
Prince George, BC
Canada, V2N 4Z9
iasws@unbc.ca
Phone: 1 (250) 960-6645
Fax: 1 (250) 960-5538
www.wsc.monash.edu.au/iasws/ninthconference.html

The Third International Symposium Speciation in Ancient Lakes (SIAL-2002).

2 - 7 September 2002
Irkutsk, Russia
Contact: Oleg A. Timoshkin
Vice-Chair of the Organizing Committee
Limnological Institute SD RAS
Baikal International Centre for Ecological Research
Ulan-Batorskaya, 3
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