SILURIAN TIMES
No. 11

A NEWSLETTER OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY

SUBCOMMISSION ON SILURIAN STRATIGRAPHY
INTERNATIONAL COMMISSION ON STRATIGRAPHY
INTERNATIONAL UNION OF GEOLOGICAL SCIENCES

CONTENTS OF SILURIAN TIMES No. 11:

CHAIRMAN'S CORNER

28th May, 2003
Nanjing

Dear Colleagues,

I am very pleased to know that the new issue of the SILURIAN TIMES for 2003 is in the final stage of compilation and editing and will be sent to all Silurian geologists soon. The SILURIAN TIMES is a window or channel for the SSS by which you may disseminate the outcome of your scientific research and may communicate your work on various fields of the Silurian story that you are conducting with each other. Taking this occasion, I wish to thank all members who have submitted their reports for SILURIAN TIMES and to Mike Melchin who spent a lot of time and energy for the organization and edition.

As far as I know there are a considerable number of papers and some books on Silurian stratigraphy, paleontology, climatology, plate tectonics, and others, which have been published recently. All of them are of significance to our knowledge of the Silurian. Among them, there is one book "Silurian Land and Sea" edited by E. Landing and M. E. Johnson that has just come out in The New York Museum Bulletin No 493 this May. It includes papers dealing with the Silurian paleogeography of many regions presented at the Silurian Symposium held in Rochester in 1996. Another is the book "Telychian Rocks of the British Isles and China" edited by H. C. Holland and M. G. Bassett and issued by National Museums and Galleries of Wales in Geological Series No. 21 (August, 2002). This book includes Precision in Stratigraphy, Stratigraphy Data, Palaeontological Data, Facies and Palaeogeography and Palaeobiogeography of the Telychian in British Isles and South China.

The next Silurian field meeting will be held together with the Ordovician Symposium and Graptolite Symposium in Argentina in the August. I was told that many Ordovician and Silurian geologists and biologists are going to participate in this conference. I am looking forward to meeting you in Cordoba, Argentina, a beautiful place with many enthusiastic people.

All the best,

Rong Jia-yu, Chair

EDITOR'S NOTES

This is my third issue of Silurian Times. Silurian Times 9 and 10 are now available online as pdf downloads, as is this issue. In response to one question that I received regarding long-term accessibility of these pages on-line, my plan is to keep each issue that I do accessible for at least as long as I am editor. Beyond that, access will depend on the choices made by the next editor and also, presumably, changes in the internet and the way such documents may be delivered in the future. If you wish to have a permanent copy of any of these issues of ST, the best bet is to either save them to your own computer or else to print them as a hard copy. Having them available as pdf files will make this much easier.

I wish to thank all of those who took the time and effort to contribute to this issue.

Mike Melchin

ANNUAL REPORT OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY (SSS) OF THE INTERNATIONAL COMMISSION ON STRATIGRAPHY FOR 2002

1. Title of constituent body

Subcommission on Silurian Stratigraphy (SSS)

2. Summary table of Silurian subdivisions

Source: Holland, C.H. and Bassett, M.G. (1989). A Global Standard for the Silurian System, National Museum of Wales, Geological Series No. 9, p. 24.

System		Series	Stages
Silurian	Upper	Pridoli	(no subdivisions)
		Ludlow	Ludfordian Gorstian
	Lower	Wenlock	Homerian Sheinwoodian
		Llandovery	Telychian Aeronian Rhuddanian

No changes or additions to this scheme have been made during the last seven years. As recently as the last biennial meeting of the SSS in Spain in 1998, the membership confirmed its majority support for the status quo. New officers of the subcommission did not take the decision to reopen nominclatural questions after July 2000 at the biennial meeting of the SSS in Australia, July 2000. However, they did agree that some boundary stratotypes required re-examination (see below).

3. Overall objectives

a) Elaboration and improvement of the standard global stratigraphical (SGS) scale for the Silurian System, including definition of boundaries and the selection of Global Stratotype Sections and Points (GSSP) under IUGS guidelines.

b) Refinement of international correlation within the Silurian System, with particular emphasis on development of a generalized scheme of zonal fossils (left-hand column) for global applications.

c) Stimulation of research and international cooperation, with particular emphasis on the coordination of working groups focused on various zonal fossils such as graptolites, conodonts, chitinozoans, etc.

d) Evaluation and integration of new approaches to the correlation of Silurian strata on a global scale.

4. Organization

The SSS is a subcommission of the International Commission on Stratigraphy, consisting of 15 Voting and 48 Corresponding members. Voting members are selected to achieve regional representation and a balanced stratigraphic expertise. Corresponding membership is open to all individuals demonstrating a commitment to scholarship in Silurian stratigraphy.

Officers:

Chairman: Rong Jia-yu (Nanjing Institute of Geology and Palaeontology, Academia Sinica, Nanjing 210008, People's Republic of China).

Vice-chairman: Tatjana N. Koren (All Russian Geological Research Institute –VSEGEI, Sredny pr. 74, 199026, St. Petersburg, Russia).

Secretary: Michael J. Melchin (Department of Geology, St. Francis Xavier University, P.O. Box 5000, Antigonish, Nova Scotia B2G 2W5, Canada).

The SSS Treasury is maintained as a separate organizational account at St. Francis Xavier University.

5. Extent of national/regional/global support of projects

Membership in the SSS is represented by specialists from 29 countries and from all continents except Antarctica. Most of the major regions of the world with extensive exposures of Silurian strata are covered, especially Eurasia, North America, South America, Australia, and Africa.

The 3rd and 2nd International Symposia on the Silurian System (convened in Rochester, N.Y. in August 1996 and in Orange, New South Wales (Australia) in July 2000 under sponsorship of the SSS) enjoyed significant financial support from educational institutions, private science foundations, and corporate sponsors. Institutional support will also be provided for the upcoming Silurian Field Meeting in Argentina (August, 2003). Ongoing grant support exists for symposia publications through the cooperation of the New York State Museum (Albany) and the Australian Museum (Sydney).

Substantial national-based support was contributed for other SSS field meetings in Australia (2000), Spain and Portugal (1998) Austria (1994), the Czech Republic (1992), Estonia (1990), Australia (1986), the Ukraine (1983), Norway (1982), Canada (1981), and the United Kingdom (1979, 1989).

6. Interface with other international projects

SSS members are very active in the IPA international research groups on graptolites, brachiopods, conodonts, chitinozoans, and vertebrates. In addition, there is considerable overlap of the activities of many SSS members with the Subcommission on Ordovician Stratigraphy, particularly regarding the events surrounding the Late Ordovician mass extinction event and subsequent biotic recovery. The 2003 SSS field conference is being held in connection with the

International Graptolite Conference and an International Symposium on the Ordovician System in Argentina. Several of the field trips at that conference are planned to encompass the interests of all three of the groups meeting at that conference. In addition, a joint working group of the Ordovician and Silurian Subcommissions is currently working toward a restudy of the GSSP for the base of the Silurian System

7. Accomplishments and products generated in 2002

The tenth issue of *Silurian Times* - the official newsletter of the Silurian Subcommission (edited by Secretary Mike Melchin) was circulated in April 2002 to all subcommission members, as well as a broad constituency of Silurian researchers around the world. This is the second year that the newsletter was produced as a world-wide web document and it forms the main part of a new WWW Site for the SSS. Almost all SSS members were able to read the document in this way and relatively few copies needed to be circulated through the normal postal system. By this means, the SSS continues to realize substantial savings in postal costs. In addition, this form of transmission of Silurian Times means that all researchers and members of the general public who have an interest in the Silurian System can learn of the activities of the SSS. In addition, updates to the site can be posted at intervals other than the annual time of delivery so that the news can remain more current.

A decision was made that some the GSSPs of the Silurian System should be re-examined in light of the experience that researchers have had in using these GSSPs as well as new information that had become available since they were established. This decision was based on discussions that took place at the most recent meeting of the SSS in Australia (July 2000), and subsequently received the support of the majority of titular members. It was also decided that initially two stratotypes should be restudied, possibly with others to follow. The two that are being restudied are the Base of Silurian and Base of Wenlock. Full discussions of the rationale for conducting these restudies can be found in the Silurian Times web site at:
http://iago.stfx.ca/people/mmelchin/os-gssp9.htm
and: http://iago.stfx.ca/people/mmelchin/lw-gssp9.HTM.

Two SSS titular members have been asked to organize new boundary restudy working groups: Mike Melchin (Canada) for the Base of Silurian; and David Loydell (UK) for the Base of Wenlock. They have been given the mandate to organize a working group with broad representation internationally as well as among researchers in the various biostratigraphic and stratigraphic fields that bear upon problems of international correlation. The process of forming these working groups has begun. The working group for the base of the Silurian will be meeting at the Silurian Subcommission Field Meeting in Argentina to discuss progress on research on the project. The working group on the base of the Wenlock has tentatively adjourned its work until more work can be completed on the biostratigraphy of the current stratotype and/or other candidate sections are proposed.

New York State Museum Bulletin 493 (Title: "Silurian Lands and Seas---Paleogeography Outside of Laurntia" is now at the printer. Release is promised before the end of December 2002. The Bulletin consists of eleven contributed papers that cover Silurian paleogeography, plate tectonic assembly, stratigraphy, and biogeography in North Africa, southern and central Europe, China, Kazakhstan, the Baltic region (including Scandinavia), Avalon, the Russian "Far East," northern Siberia, Australia and New Guinea, and the Himalayan countries and southeast Asia. The editors believe that Bulletin 493 will reach the same international audience (and sales) that Bulletin 491 has achieved. We also anticipate that the world-wide coverage and thoroughness of Bulletin 493 mean that it will also receive the same enthusiastic reviews in national and international journals

that Bulletin 491 received. Bulletins 491 and 493 will find their way to every "serious" earth history library.

The first and second circulars for the next field meeting of the SSS, in Argentina in 2003, in connection with an Internation Symposium on the Ordovician System and an Internation Graptolite Conference, were distributed in 2002. Field trips itineraries are planned to include many well-known Silurian localities in the Argentine Precordillera. Mike Melchin has been asked to serve as Technical Programme Co-ordinator for the in-house portion of the Silurian Field Meeting, with assistance from Argentine colleagues. Information pertaining to this conference can be found at: http://iago.stfx.ca/people/mmelchin/isos-igc-sss1.HTM.

8. Chief problems encountered in 2002

None.

9. Work plan for 2003

As noted above, the boundary working groups were established to restudy the GSSPs at the Base of Silurian and Base of Wenlock. As noted above, the working group on the base of the Wenlock has tentatively adjourned its work until more work can be completed on the biostratigraphy of the current stratotype and/or other candidate sections are proposed.

In the case of the base of the Silurian the current GSSP is being restudied to see if it adequately serves its purpose of providing a precise frame of reference for workers taking a variety of approaches in stratigraphic correlation. These studies will particularly consider information that has come to light since the establishment of these GSSPs. If such study finds that the current GSSP does not provide an adequately precise and useful point of reference for international correlation, then the task of seeking an alternative GSSP will be undertaken. One such alternative section has already been proposed, the Wangjiawan section in the Yichang area of China. Progress on the restudy of the current GSSP and also new data on the proposed alternative candidate will be presented at the SSS field meeting in August in Argentina.

In addition to the work on GSSPs, the SSS executive is also concerned with the relative scarcity of reliable geochronological dates that are biostratigraphically well constrained within the Silurian System. At the present time, a small group of Ordovician and Silurian workers are compiling all available data on radiometric dates applicable to the calibration of the Silurian time scale as part of the production of the next edition of The Geologic Time Scale for Cambridge University Press. They have also been developing new means of integrating biostratigraphic and geochronologic data into a composite, linear time scale. Once this work has been completed, the SSS executive will consider ways to improve the situation by encouraging its members to collaborate in projects that provide new calibrations for Silurian time. This will also be one consideration of the working groups restudying GSSPs.

Publication of "Silurian Lands and Continental Margins, Exclusive of North America" by the end of 2002 will permit work to begin on the third volume from the James Hall Symposium, "Silurian Lands and Continental Margins of North America".

The secretary plans to provide web-based archival access to previous issues of Silurian Times, once the new issue is released early in 2003. The plan is to have these available as PDF downloads from the Silurian Times web site. Technical difficulties in delayed this process.

11. Financial statement for 2002

Income (U.S. dollars)	
1. Carryover from 2000	22.27
2. 2001 ICS subvention	200.00
Total operating funds	$222.27

Expenditures	
1. Production & mailing of newsletter	35.00
2. Purchase of software (Adobe Acrobat, full version) for archival storage and deliver of Silurian Times	100.00
(total cost was $220.00, the remainder was paid from M. Melchin's research funds)	
3. Student technical assistant for archival storage and delivery of Silurian Times (10 hrs @ $8/hr)	80.00
Total expenditures for 2001	$215.00
Net balance at the end of 2000	$7.27

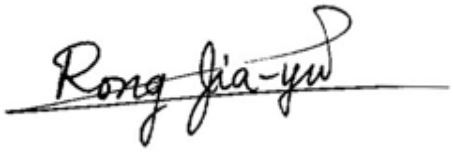
12. Budget for 2003

1. Airfare for SSS Chair to attend the SSS Field Meeting (Nanjing, China to San Juan, Argentina)	requesting	2000.00
2. Airfare for SSS Vice-Chair to attend the SSS Field Meeting (St. Petersburg, Russian to San Juan, Argentina)		2000.00
Total Budget for 2002		$4000.00

ALLOTMENT REQUESTED FROM ICS FOR 2003 - $4000.00

Name of Chairperson: Rong Jia-yu

Signature of Chairperson:



Date: December 2, 2002

Address: Department Nanjing Institute of Geology and Palaeontology, 39 East Beijing Road
Nanjing, 210008, P R China

Telephone: 025-3282169
Telefax: 025-3357026
e-mail: jyrong@nigpas.ac.cn

Titular members SSS:

Rong, Chairman (China)
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FUTURE MEETINGS OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY

After the Field Meeting of the SSS in San Juan, Argentina, in August, 2003, the following future meetings of the SSS have been proposed.

It has been proposed that the Subcommissions on Ordovician and Silurian Stratigraphy hold a joint symposium in China in 2007, to be hosted by the Nanjing Institute of Geology and Palaeontology. The executives of the SOS and SSS support this proposal, which will be presented at the Ordovician Symposium and Silurian Field Meeting in San Juan, Argentina.

Given the four-year gap between the 2003 field meeting and proposed 2007 Silurian Symposium, the membership was asked for possible suggestions for another field meeting in 2005. A number of members expressed interest in such a meeting and the following suggestions have been proposed, which can be discussed in San Juan:

Bulgaria – discussed at SSS field meeting in Spain
Mongolia – proposed by Minjin Chuluun – could be either in 2004 or 2005.
Gotland – A large field excursion is already being planned for 2005 by Mikael Calner and colleagues and they suggest that this could be a good candidate for a SSS field meeting.
Arctic Canada – suggested by L. Sherwin (would be very expensive and logistically difficult – ed.)
Welsh Borderlands - suggested by L. Sherwin
Sardinia - suggested by L. Sherwin

SILURIAN SERIES: A COMMENT

by Dimitri Kaljo

The series question was raised by colleagues from the German SSS in the last issue of the Silurian Times. They noted that the major points of concern were the high number of Series in the Silurian System (4) and that the Pridoli is not differentiated into stages, as well as the extremely unequal length of the individual Series. It was also noted that the Silurian is one of the shortest systems (less than 30 Ma) in the Earth's history.

Most of these items have been voiced also earlier, especially the shortness of the Silurian Period and a too high number of series, but inequality of the corresponding epochs seems to be a novel problem even if also met in other situations. All these concerns are real and I suggest that the Silurian Subcommission should return to this discussion. On the other hand, two aspects of the motivation used by Maletz et al. cannot be accepted without reservations.

The first is their "fundamental principle of hierarchical balance" with a prescribed number of subdivisions for the whole Phanerozoic. Standard (= internationally agreed) stratigraphy is a combined result of two aspects - primary processes in nature, which have produced different evolutionary stages, and history of studies beginning with the first classical papers and including decisions on the so-called commission boundaries. Bearing this in mind, it would be too optimistic to follow strictly the "fundamental principle", even if we would like to do so.

The second reservation I would like to make concerns radiometric ages. Surely the progress in this field has been great and I myself have used these ages several times for different purposes. But the dating

could hardly serve as a primary basis for evaluation of the validity of series and stages. Maletz et al. demonstrated variability of datings; I prefer 443 Ma for the age of the O/S boundary used by IGCP 410, the Pridoli became a series when its duration was 7 Ma (Harland et al 1982), etc. Therefore it seems more appropriate to look for geological reasoning of decisions, of course, not forgetting radiometric ages. Colleagues suggest three series, but why not two: Lower (= Llandovery) and Upper (= Wenlock + Ludlow)? It would be more sound according to the above "principle" and radiometrically. As you remember the SSS subdivided (unofficially) Silurian System into two subsystems with the boundary below the Ludlow.

REPORT ON THE ORDOVICIAN-SILURIAN AND LLANDOVERY-WENLOCK BOUNDARY WORKING GROUPS – A PROPOSED PROCEDURE

by MIKE MELCHIN, Department of Earth Sciences, St. Francis Xavier University, Antigonish, NS B2G 2W5, Canada, mmelchin@stfx.ca, with contributions from Rong Jiayu, David Loydell, Felix Gradstein, and Stan Finney.

As the members of the Subcommissions on Ordovician and Silurian Stratigraphy meet in Argentina this year, no doubt one of the items of discussion will be issues relating to the restudy of the boundary stratotypes for the Base of the Silurian and Base of the Wenlock. The members of the SSS should be aware that the move to form working groups to restudy these boundaries was presented to the executive of the International Commission on Stratigraphy at its meeting in Italy in 2002 and the ICS gave its approval for these working groups to proceed.

One issue that has arisen as a result of these discussions with the ICS executive is that of procedures for these working groups. Since these are the first efforts ever to formally restudy a GSSP, there are no formal procedures in place. After discussions with the executive of the ICS and SSS, I wish to propose a formal procedure for discussion at the joint meeting in Argentina that may be applicable at least to the working groups of the Silurian Subcommission. It seems to be generally agreed that the first order of business of a GSSP restudy working group should be to consider the existing GSSP in light of: how it has been used in practice since it was ratified; new data from that section that have come to light since its ratification; and new data from other sections that bear on the question of the utility, completeness, etc., of the GSSP.

It is suggested that the GSSP restudy working groups should consider adopting a generally two-stage procedure. The first stage should consider two questions. 1) Does the current GSSP adequately serve its purpose as providing a precise and unambiguous reference point for international correlation? 2) Does current evidence show that GSSP corresponds with the biostratigraphic level cited in its definition? If the answer to both questions is affirmative, then no further consideration may be necessary and the working group can propose that the current GSSP be maintained, unchanged in its definition. However, if there is serious contention of either question then it will be necessary to consider possible changes, either to the definition of the existing GSSP, or to the level and/or location of the GSSP itself. For example, Melchin and Williams (2000) proposed that the location and level of the GSSP was adequate, but that the biostratigraphic definition needed to be revised in light of new graptolite data from that section. Such changes could be discussed and voted on. In the case of the Llandovery-Wenlock boundary, the currently available evidence suggests that the GSSP does not coincide with the biostratigraphic level cited in the definition of the boundary. Is it in the better interest of stability to maintain the current GSSP using a different biostratigraphic level than previously employed for global correlation, or to find a new GSSP that clearly and precisely defines the biostratigraphic level that has been in common usage since the GSSP was first approved? The answer to this question will guide future deliberations of the working group.

It is proposed that the voting take place first within the boundary restudy working group, and then within the voting membership of the Subcommission on Silurian Stratigraphy. The results of these votes will then be forwarded to the ICS for consideration and approval.

If the GSSP restudy working group and the voting membership of the Subcommission(s) have decided that the current GSSP is not an adequate point of reference for precise international correlation, then the second stage for the boundary working groups should be the search for alternative GSSP candidates. In this case, the procedures adopted should be the same as those for a boundary working group for a new GSSP. However, an additional constraint on that search should be the need to maintain, as much as possible, stability in usage of the biostratigraphic level for the stage boundary.

The list of membership of these boundary working groups should be sent to the titular membership of the SSS for approval so that any gaps or imbalances in representation may be corrected. Once approved, the list of members should be sent to ICS for their records.

I look forward to discussion on this issue at the Silurian Field Meeting in San Juan and welcome any other comments by correspondence.

THE LLANDOVERY-WENLOCK BOUNDARY

David K. Loydell, School of Earth and Environmental Sciences, University of Portsmouth, Burnaby Road, Portsmouth PO1 3QL, UK (David.Loydell@port.ac.uk) (with a contribution from Fu Li-pu).

PROJECTS

The last year has seen the completion of two projects that have a significant bearing on the biostratigraphical position of the Llandovery-Wenlock boundary. It is interesting that similar conclusions were reached independently.

One of the conclusions of Loydell, Männik and Nestor's integrated biostratigraphical study of the Aizpute-41 core, Latvia was that the base of the Wenlock (i.e. Ireviken Event Datum Point 2) lies at or near the base of the *Cyrtograptus murchisoni* graptolite Biozone.

Mullins and Aldridge (in press) re-examined Mabillard's palynological slides and residues from Hughley Brook, and were able to demonstrate that the 'golden spike' lies at a level within the upper part of the *Margachitina margaritana* chitinozoan Biozone. This level they correlate, based largely on recently documented graptolite-chitinozoan co-occurrences, with a level in the upper *Cyrtograptus centrifugus* or lower *Cyrtograptus murchisoni* graptolite Biozone. Only 256 mm above the 'golden spike' is the first appearance of *Cingulochitina bouniensis*, a chitinozoan that in both the Banwy River section and Aizpute-41 core appears at a very high level in the *murchisoni* graptolite Biozone.

Both studies indicate that the 'golden spike' lies approximately one graptolite biozone higher than previously thought, i.e. close to the base of the *Cyrtograptus murchisoni* graptolite Biozone rather than at the base of the *Cyrtograptus centrifugus* graptolite Biozone.

The base of the Wenlock: a summary of current practice

Current practice can be summarised as follows.
Graptolite workers generally use the base of the *Cyrtograptus centrifugus* Biozone as the base of the Wenlock.
Conodont workers use Ireviken Event Datum Point 2 as the base of the Wenlock. This correlates approximately with the base of the *Cyrtograptus murchisoni* graptolite Biozone.
Chitinozoan workers have generally used the base of the *Margachitina margaritana* chitinozoan Biozone as the base of the Wenlock. This correlates with a level low in the *Cyrtograptus insectus* graptolite Biozone.

Clearly the current situation is unsatisfactory. Discussions now will centre on the most desirable level for the boundary, bearing in mind that the original intention (Martinsson *et al.* 1981) was for the base of the Wenlock to be coincident with the base of the *Cyrtograptus centrifugus* graptolite Biozone.

Fu Li-pu reports that he has been studying the Ziyang section of Llandovery and Lower Wenlock in the Qinling region since 1980 (see Fu, 1986). He found a good sequence of the Llandovery-Wenlock boundary with good collection of graptolites. In particular, he has found five zones of *Cyrtograptus* across the boundary in this section.

References.
Fu, Li-pu . 1986. Graptolite zones of upper Ordovician to middle Silurian in a continuous section at Ziyang, Shaanxi, China. *In* Hughes, C. P., Rickards, R. B. and Chapman, A. J. (eds). Palaeoecology and Biostratigraphy of Graptolites. Geological Society, London, Special Publication, 20, 131-134.
Loydell, D. K., Männik, P. and Nestor, V. in press. Integrated biostratigraphy of the lower Silurian of the Aizpute-41 core, Latvia. *Geological Magazine*.
Martinsson, A., Bassett, M. G. and Holland, C. H. 1981. Ratification of standard chronostratigraphical divisions and stratotypes for the Silurian System. *Lethaia*, **14**, 168.
Mullins, G. L. and Aldridge, R. J. in press. Chitinozoan biostratigraphy of the basal Wenlock Series (Silurian) Global Stratotype Section and Point. *Palaeontology*.

MACQUARIE UNIVERSITY CENTRE FOR ECOSTRATIGRAPHY AND PALAEOBIOLOGY (MUCEP) ACTIVITIES

by John Talent

The principal recent activity of the MUCEP group during the past year was hosting the **First International Palaeontological Congress (IPC2002)**, held at Macquarie University on 11-17 July 2002. About 450 palaeontologists participated in 24 symposia (in four parallel sessions) and 12 pre- and post-conference excursions, including one on the Ordovician-Silurian graptolite succession of SE Australia, and one on the mid-Palaeozoics of the Broken River region of NE Queensland. The last, the largest excursion associated with IPC2002, attracted 61 participants from around the globe; all returned from the excursion saturated with Silurian data…

Important among the many events connected with IPC-2002 was an art exhibition, *Palaeographia*, in the Macquarie University Vice-Chancellor's Gallery. The staff of the Gallery, in collaboration with Andrew Simpson, zestfully and imaginatively amassed appropriate art pieces for this exhibition: pottery with palaeontologic motifs and paintings ranging from whimsical items inspired by palaeontology to scientific illustration, reconstruction of landscapes from the deep past, and aboriginal bark paintings depicting

extermination of the megafauna. Because of Andrew's involvement, the Silurian figured well in *Palaeographia.* The Vice-Chancellor, incidentally, graciously provided the "ice-breaker" party during which Congress participants, mostly unwittingly, ate their way through mouth-watering elements of the Australian fauna and flora.

We are profoundly grateful to International Palaeontological Association for their faith in IPC2002 and the team which brought it to fruition. Above all we are grateful to the MUCEP staff, research associates, students and friends who organised the technical program and skilfully managed registrations, finances, accommodation, displays, transport, publicity, dealt with deluges of requests for personalised invitations, and organised the associated program for science teachers, and a splendid program for accompanying persons. Numerous friends provided accommodation for the overflow of participants. This massive input enabled IPC2002 to be mounted at a fraction of the cost of meetings employing professional conference-organising companies.

IPC2002 was dedicated to demonstrating that the palaeontologies are not only alive but burgeoning as new and ever more exciting linkages develop across an increasingly broad spectrum of the sciences. Most importantly, this gathering provided a unique opportunity for dialogue, for sharing information about positive and innovative programs that are helping expand the boundaries of our science, and giving the palaeontologies greater cultural significance. It was hoped that IPC2002 would be bright, multicoloured, and overflowing with imagination and humour. In all respects it exceeded our hopes! The next International Palaeontological Congress (IPC2006) will be in China.

Papers from the Third International Symposium on the Silurian System (the Sir Frederick McCoy Symposium) held in conjunction with the *Palaeontology Down Under* meeting at Orange, in east-central New South Wales in July 2001, are presently being edited by Greg Edgecombe, Zerina Johanson and Yong Yi Zhen of the Australian Museum. The volume will be published later this year by the Royal Society of Victoria.

See SILURIAN RESEARCH and SILURIAN PUBLICATIONS below for the research and contributions of individual members of this group.

PUBLICATION ANNOUNCEMENT: SILURIAN LANDS AND SEAS: PALEOGEOGRAPHY OUTSIDE OF LAURENTIA

New York State Museum Bulletin 493, edited by Ed Landing and Markes E. Johnson, vi +400 pp., 240 figs. 2003

Silurian Lands and Seas is the only up-to-date synthesis of plate tectonics, paleogeography, biotic distribution, and geologic history of the 20 million year-long Silurian Period. In-depth contributions by 44 specialists recreate the geologic history of this important interval in earth history in eleven important regions world-wide. A product of the Subcommission on Silurian Stratigraphy, Silurian Lands and Seas is a profusely illustrated volume that will be a major addition to collage and university libraries. It will be used in earth history research and courses for undergraduates, graduate students and professionals in paleogeography, tectonics, stratigraphy, sedimentology, paleontology, and natural resources.

Contents:

South America (Peru, Bolivia, Brazil, Argentina) – M.V. Caputo
North Africa (Morocco, Tunisia, Algeria, Libya, Niger, Chad, Sudan, Mauritania, Guinea, Guinea Bissau) – P. Legrand
Gondwanan Europe (Iberia, France, Sardinia, Austria, Germany, Czech Rebublic) J. Kriz, J.M. Degardin, A. Ferretti, W. Hansch, J.C. Gutierrez-Marco, F. Paris, J.M. Picarra-D-Almieda, M. Robardet, H.-P. Schonlaub, and E. Serpagli.
Australia and New Guinea – J. Talent, R. Mawson, and A. Simpson
South Asia (Afghanistan, Pakistran, India, Nepal, Tibet, Shan State, Burma) – J.A. Talent and O.N. Bhargava
China – Rong, J.-Y., Chen, X., Su, Y.-Z, Ni, Y.-N., Zhian, R.-B. Chen T.-E., Fu, L.-P, Li, R.-Y., and Fan J.-X.
Southwest Siberia (Altai-Sayan fold-belt) – E.A. Yolkin, N.V. Sennikov, N.K. Bakjarev, N.G. Izokh, and A.G. Klets
Kazakhstan – T.N. Koren', L.E. Popov, K.E. Degtjarev, O.P. Kovalevsky, and T.L. Modzalevskaya
East Siberia – Y.I. Tesakov, N.N. Predtetchenshy, V.G. Khromych, A.Ya. Berger, and E.O. Kovalevskaya.

For ordering information please visit the following website: www.nysm.nysed.gov or e-mail: nysmpub@mail.nysed.gov

ANNOUNCMENT OF PUBLICATION ARRANGEMENT FOR THE INTERNATIONAL COMMISSION ON STRATIGRAPHY

Lethaia, an international journal of palaeontology and stratigraphy, long identified as the official journal of the International Palaeontological Association is now also **The Official Journal of the International Commission on Stratigraphy.**

As you are aware, following the ICS meeting in Urbino, the ICS executive has been exploring opportunities to develop a single, identified publication outlet for ICS products. I am pleased to announce that at a meeting in Copenhagen on 27 May the Board of Lethaia Foundation and the executive committee of the ICS agreed to a publication arrangement. A draft of the Memorandum of Understanding is attached.

The benefits to ICS of this arrangement are threefold. Subcommission activities generate a multitude of published products (scientific articles, proceedings volumes, thematic books, monographs, correlation charts, etc.) that are widely dispersed in the literature, involve a great variety of publishers, and differ greatly in format, distribution, and circulation. Although Subcommission products can still be produced by publishers other than Lethaia, publication in Lethaia will ensure a common, high quality format for ICS publications, a common place to find ICS products, and, in turn, a clearer identification, greater distribution, and increased visibility of ICS publications. Thus, the activities of the ICS Subcommissions will have greater visibility. And, should the publication arrangement result in increased subscriptions to Lethaia, ICS will receive royalties that will be returned to the Subcommissions as support for their scientific activities and publications. Lethaia, in turn, should benefit. With the increased scope of its publications, it will appeal to a wider audience and subscriptions are expected to increase significantly.

Felix Gradstein asked me to work with David Bruton of the Lethaia Foundation Board to develop this publication arrangement. Now that it is a reality, I call upon you, the leaders of the Subcommissions, to make it a success, that is, to generate products and to direct them to Lethaia for publication. After all, it is not the ICS executive but the members of Subcommissions that generate the science that results in

published products, and it will be the activities and products of the members of the Subcommissions that will be highlighted and supported through publication in Lethaia. I request that you distribute this announcement to all members of your respective subcommissions and that you actively solicit and and promote publications in Lethaia. I will continue as a liaison between ICS and the Lethaia Foundation Board and Editorial Office, working to coordinate publication of ICS products in Lethaia. I request that you inform me of all submissions and ideas for potential submissions, although authors and editors of ICS publications will work primarily with the Lethaia editorial office and Editor-in-Chief Svend Stouge through the submission to publication process.

For further details see: http://www.micropress.org/stratigraphy/lethaia.htm

Sincerely,
Stan Finney
2nd Vice-Chair of ICS

Editor's note: The readership of Silurian Times should be aware (if you are not already) that C.H. Holland, M.G. Bassett, and R.B. Rickards wrote a stimulating commentary in *Lethaia* on the proposals of the Silurian Subcommission to restudy some of the Silurian GSSPs. (Holland, C.H., Bassett, M.G. & Rickards, R.B. 2003: Stability in stratigraphy. *Lethaia 36*, 69-70). A reply, by M.J. Melchin, Rong Jiayu, F. Gradstein, T. N. Koren', and S. C. Finney, will appear in the next issue of *Lethaia*.

SILURIAN RESEARCH - 2002-2003

Anna I. Antoshkina (Russia) continues the work on Silurian sedimentology, sequence stratigraphy and on Lower Paleozoic depositional environments, and on Paleozoic reef paleoecology throughout the North of the Urals and Timan-northern Ural region. Together with Constance Soja we plan to continue joint research on Silurian reefs of the Urals, Alaska and Siberia.

Chris Barnes (Canada) - I am completing recent field-based Lower Paleozoic conodont studies in the Canadian Cordillera, based on four detailed platform-to-basin transects in the southern, central and northern Rocky Mountains (with Leanne Pyle). Several papers and a major monograph have appeared recently, are in press or in preparation. Shunxin Zhang is completing her Research Associate project using my extensive conodont database to relate conodont biostratigraphy, biofacies and biogeography to the pattern of eustasy and tectonism that affected northern Laurentia in the early Paleozoic. Several papers, recent or in press, deal with conodont taxonomy, evolution, cladistics, paleoecology and the response of the conodont communities to eustatic change. The conodont geochemistry of Lower Paleozoic conodonts, as a proxy for ancient paleoceanography is under further investigation in a new project with Julie Trotter (Australian National University). Work completed, nearing completion or in process includes: Ashgill to Wenlock conodontds from the Canadian Arctic with David Jowett; Nd isotope work (with Cindy Wright and Stein Jacobsen, one paper published, one in preparation).

Richard A. Batchelor (UK) - Following a spell as a Leverhulme Research Fellow, I have now assembled a large geochemical dataset on metabentonites. New Sr and Nd isotope data on apatite microphenocrysts are helping to constrain volcanic sources for Silurian metabentonites. The isotope data in apatite supports analyses of biotite phenocrysts, and all this information is being compiled in an attempt to define a geochemical golden spike for selected Silurian metabentonites.

D.E.B Bates (Wales) - Work in progress: work continues on late Silurian retiolitids, with a number of papers in preparation. One on their evolution and classification, with Anna Kozlowska-Dawidziuk and

Alf Lenz, has just been submitted for publication. A paper on the ultrastructure of Dendrograptus, using the field emission microscope, has been accepted for the forthcoming Graptolite conference in Argentina. In addition, a paper on the stolon system of Desmograptus, with Kate Saunders, is in preparation.

Alain Blieck (France) - During 2002, I have been working weakly on Silurian vertebrates. However, study of Upper Silurian and Devonian vertebrates from Severnaya Zemlya, Russia, is going on with Dr. V.N. Karatajute-Talimaa (Institute of Geology and Geography of Lithuania, at Vilnius), and Drs. E. Mark-Kurik and T. Märss (Tallinn Technical University, Estonia).

Ol'ga K. Bogolepova (Sweden) – I am involved in a new INTAS-NEMLOR (Northern Eurasian Margin and Lomonosov Ridge") project (2002-2005), I am continuing to work in the Russian high Arctic. The Novaya Zemlya expedition planned for this year has failed unfortunately, so, more time will be spent with collections and unfinished papers on the Severnaya Zemlya Archipelago. If given resources to attend the Argentina meeting, I will present new data from this particular territory. If not, a manuscript on the Silurian faunas and palaeogeography of this area is almost completed and ready for publication.

C.E. Brett (USA) - (1) University of Cincinnati graduate student Stephanie Fuentes, and I are making detailed comparisons of the offshore to onshore faunas in very similar environments prior to and immediately following the Late Ordovician extinction. The samples are derived from similar depositional sequences in mixed siliciclastic-carbonate successions from the Cincinnati Arch and Ontario. (Upper Ordovician: upper Richmondian: Drakes Formation, Ohio, Ky, and Georgian Bay Fm., Ontario; Lower Siluirian Rhuddanian-?Aeronian: Cabot Head Fm. Ontario and Brassfield Fm. Ohio-Ky). Findings to date include: a) obvious taxonomic change with a few major groups disappearing, but most families and some genera (including the dominant bryozoan Helopora, several brachiopods and most bivalves) persisting. b) no statistically significant difference in taxonomic richness (adjusted for differences in sample size); however, some Silurian samples are more diverse than the most diverse Ordovician samples. c) no significant difference in ecological properties (e.g. same number of guilds and same relative dominance of guilds). d) Silurian taxa showed slightly greater partitioning by environment and systems tracts than did those of the Late Ordovican, counter to our expectation; however, e) the Silurian assemblages from Ontario are more similar to those from Ohio than are the Ordovician assemblages of these areas. Hence, despite its recognition as one of the great mass extinctions, the Late Ordovician crisis in eastern North America appears to have relatively little ecological effect; taxonomic diversity was recovered rapidly following the event and Silurian "recovery" faunas are neither less diverse nor more eurytopic than their Ordovician counterparts. However, Silurian associations may have been somewhat more geographically broad-ranging. (2) A second project, with former student Dave Ray, involves comparative study of deposiitonal sequences in the Lower Silurian (Llandovery-Wenlock) of the Cincinnati Arch region vs. those of the Appalachian Basin. We have been able to recognize probable counterparts of most third and fourth order depositional sequences in both areas, and these show very similar patterns. They are correlative within the constraints of existing biostratigraphy; moreover, we have discovered several previously unknown K-bentonites, which will help in testing correlations.

Carole Burrow (Australia) – I was awarded an Australian Research Council Postdoctoral Research Fellowship for 2002-4, focussing on the distribution and phylogeny of Silurian-Devonian acanthodians and placoderms. Although most of the material I am working with is Devonian, the Silurian has not been abandoned or forgotten. My redescription of the Silurian gnathostomes from the Silverband Formation, the Grampians, Victoria is due for publication in the next Alcheringa, and a paper on a small acanthodian fauna from the Roberts Mountains Formation (Pridoli), Nevada is in press with the Journal of Vertebrate Paleontology. A paper (with a partly Silurian focus) attempting to sort out the relationships of acanthodians with dentigerous jaw bones has been submitted for inclusion in the special IPC-2002 Fossils and Strata volume dedicated to Palaeozoic fish.

Mikael Calner (Sweden) – I continue my research on Gotland. The project focuses primarily on the suite of carbonate platforms that evolved along the southern passive margin of the Baltic craton during the Silurian and which now can be studied on Gotland and in the East Baltic area. As during previous years, the initiation, diversification and termination of successive platform generations and the controls on this evolution is under study. The cyclic growth of platforms on Gotland is associated to at least seven faunal extinction events, and long-term achievements include the establishment and integration of high-resolution sequence and event stratigraphic frameworks for the basin (with M.J. Eriksson and L. Jeppsson). The various sub-projects are based on field-studies in natural outcrops, quarries and drillcores. Good news is that three drillcores (40 mm) through parts of the Ludlow interval will be recovered during the spring 2003. This interval is characterized by complex sedimentary changes, faunal extinctions and substantial changes in stable isotopic evolution.

Chen Xu. (China) - My current research projects are 1. Latest Ordovician-earliest Silurian graptolite extinction and recovery, 2. A study of the Ordovician and Silurian stratotype sections in China.

Euan Clarkson (Scotland) has now retired after nearly 40 years teaching at the University of Edinburgh, along with his long-term colleague and friend Cecilia Taylor. Together with David Harper (Copenhagen), they have been much involved in understanding the Silurian sedimentary succession in the Pentland Hills and elsewhere in Scotland. The three Silurian areas in the Pentland Hills form the easternmost end, in Scotland, of a chain of Silurian inliers extending from western Ireland to Scandinavia. All these were deposited along the south eastern shore of the Laurentian continent, and all show a continuous marine regression. This is well demonstrated in the nine Scottish Silurian inliers, from Girvan in the west to the Pentland Hills in the east, with the replacement of marine by semi-arid desert sediments in early Wenlock time. In each inlier, however, the sedimentary facies are rather different. Most particularly, contrasts in types of Silurian shoreline have been demonstrated in recent years. At the eastern end of the Girvan area (Knockgardner), for example, an open high-energy shoreface prevailed until the onset of semi-arid desert conditions. In the Pentland Hills, on the other hand, an offshore barrier system formed, partially isolating a broad, shoreward lagoon. The richly fossiliferous sediments which were deposited therein were initially fully marine, but thereafter the faunas show dramatic evidence of fluctuating salinity, and generally very quiet water conditions. This sequence is, in our view, one of the most instructive Siluriuan sequences anywhere in the world, where successive palaeoenvironments associated with a regresive sequence and the development of a chain of barrier islands can be appropriately shown. Many of the fossils have now been described or at least identified, with brachiopod work nearing completion by Emma Gallacher (Ph. D. National University of Ireland Galway), and bivalves and bryozoans described by Edinburgh University M. Sc students Elisabeth Geldart (2000) and Stuart Stephen (1994) respectively. These add to the work of previous years in which trilobites, nautiloids, the mollusc *Pterotheca*, ostracodes, crinoids, echinoids, graptoloids and dendroids have all been described in modern terms. A fully illustrated guidebook in the Palaeontological Association's Field Guide series is currently being written by Euan Clarkson, David Harper and Cecilia Taylor, with estimated date of publication in 2005.

Robin Cocks (NHM, London, UK) has had another fruitful year. Eight papers were published. Scripts submitted include an Ordovician/Silurian Earth Science Reviews offering on a global review of faunas relevent to understanding terrane positions (now in proof), a paper with Petras Musteikis revising the strophomenoids, plectambonitoids and orthotetoid brachiopods of Baltica, with special reference to their occurrence in the boreholes of Lithuania in Acta Palaeontologia Polonica, a paper with Roger Cooper on a new Hirnantian Fauna from New Zealand in NZ Journal of Geology and Geophysics, and a paper with Trond Torsvik on interactions between terrane-specific faunas and palaeomagnetic data, accepted in the Webby et al. (eds) Ordovician Diversification Event book. There are two further papers with Trond in advanced draft, and joint work continues with other authors, including Richard Fortey and Leonid Popov. I am also currently one of the three overall editors for a new Academic Press Encyclopedia of Geology, to be published next year.

Damian Cole (Australia) continues to work on conodonts from numerous small Silurian limestone bodies in the vicinity of Michelago and the Wombeyan Caves of New South Wales. Terry Furey-Greig continues work on Ordovician and Silurian conodont faunas from the Tamworth Belt of northeastern New South Wales, and (with Ruth Mawson and Andrew Simpson) on biogeographic implications of Late Ordovician to Middle Devonian conodont faunas globally. David Mathieson is working on conodont faunas from small limestone intervals in the Cobar-Bourke region of western New South Wales, and Ross Parkes is well advanced with a PhD on the corals, conodonts and sedimentology of the superbly exposed Silurian sequence at Quidong in SE New South Wales.

Bob Elias (Canada) - I'm studying various aspects of corals and environmental change during the Ordovician radiation, mass extinction, and Early Silurian recovery. Research with Graham Young focuses on the diversity, paleoecology, community structure, and morphologic trends of coral faunas. A collaborative project is underway with Graham, Godfrey Nowlan, Dave Rudkin and others on a spectacular Late Ordovician-Early Silurian archipelago with rocky shorelines, exposed in the Churchill area of northern Manitoba. Adam Melzak (Ph.D. student) is working on the Late Ordovician to earliest Silurian rugose corals of Anticosti Island, Quebec. M.Sc. and Ph.D. projects on corals, paleoecology and stratigraphy are available (please see http://www.umanitoba.ca/geoscience/faculty/elias/elias.html).

Mårten J. Eriksson (Sweden) – I started my Ph-D studies in September 2002 and focus on the sedimentology, especially the formation and significance of unconformities, in the Hemse Group (Ludlow) on Gotland, Sweden. My main aims are to interpret the depositional development during the interval as well as to put it into a sequence stratigraphic framework. The framework will form a part in the ongoing analysis of the Silurian Baltic basin and I work together with and/or in close contact to Mikael Calner and Lennart Jeppsson.

Barry Fordham (Australia) – I am now leading interdisciplinary research at CSIRO on all-sector systems and long-term futures analyses at national, global, and subnational scales. However, he continues conodont research, including Silurian collections from central and north Queensland.

Fu Li-pu (China) has been studying the Ziyang section of Llandovery and Lower Wenlock in the Qinling region since 1980. He found a good sequence of the Llandovery-Wenlock boundary with good collection of graptolites. In particular, he has found five zones of Cyrtograptus across the boundary in this section.

Maurizio Gnoli (Italy) - During this year I continue to study Silurian nautiloid cephalopods, but at present I start to study, besides Silurian nautiloids, also Ordovician ones and probably I'll extend the geographic area at the circum-Mediterranean terranes.

Mark Harris (USA) - I am working with Peter Sheehan, Leho Anisaar, Linda Hints, Peep Männik, Jaak Nõlvak, and Madis Rubel on a project to place the Estonian Late Ordovician-Early Silurian faunal communities within a sequence stratigraphic framework. Our goal is to compare the Estonian sections to our prior work in the Great Basin of the western United States. We have described numerous cores, and we have submitted a paper on the Ordovician facies and sequence framework. We are currently working on a similar interpretation for the Silurian units.

Kathleen Histon (Austria) - Systematic study of the nautiloid fauna from the Carnic Alps as well as a joint study of the Cephalopod limestone development with Annalisa Ferretti (Modena, Italy) and Hans Peter Schönlaub (Vienna, Austria) continues. Analyses of K-bentonites found from the Llandovery through to the Pridoli in the Carnic Alps are almost completed. A sequence stratigraphy study of the Silurian of the Carnic Alps in cooperation with Carlton Brett (Cincinnati, USA) and Hans Peter Schönlaub (Vienna, Austria) is in progress.

Lennart Jeppsson (Sweden) - During 2002 I have worked on: 1. Together with Mikael Calner: The necessary to get 2 long papers about the Mulde Event (the 'lundgreni event' is one of its effects) accepted and proof-read. These deal with high resolution stratigraphy, conodonts, conodont and graptolite stratigraphy, sediments, event and sequence stratigraphy, extinctions - especially in conodonts and graptolites, stable isotope changes and improved correlations of 'middle' Homerian strata. One result is that we can show that major extinctions preceded a sea level drop. The amplitude and duration of the sea level excursion was that of a glaciation. See the first 2003 issues of Transaction of the Royal Society of Edinburgh Earth Sciences. and Geological Magazine. 2. A project together with John A. Talent, Ruth Mawson, Andrew J. Simpson, Anita Andrew, David Whitford, Julie A. Trotter, Carlo Corradini, Olof Sandström, Ann-Sofi Jeppsson, Claes Bergman, Mats Eriksson, and Doris Fredholm: High resolution correlations of the middle Late Ludfordian and The Lau Event. The project integrates a revised conodont stratigraphy with higher resolution, stable isotope changes, sedimentary changes and extinctions in many different major taxa. 3. The O. s. rhenana Zone can be subdivided into subzones. Identification of these along the belts of outcrops on Gotland results in major revisions of the local stratigraphy. After that is done, the ranges of other taxa, too, becomes much shorter and less overlapping. Another probable Silurian event is also identified, splitting the previously unusually long Vattenfallet Secundo Epsode. 4. Several other projects have also progressed during the year. During 2003, I plan to continue working on these projects, hoping to finish the manuscripts resulting from 2 and 3, above. The relocation of the department (across the adjoining streets) will necessitate building a new acid laboratory, hopefully even more efficient. That relocation will also cause some address changes, in May or June.

Jisuo Jin (Canada) - 1) Taxonomy, evolution, paleoecology of Ordovician-Silurian brachiopods of Anticosti Island; 2) Early Silurian reef-dwelling brachiopods of the Hudson Bay region and their paleoecological and paleobiogeographical significance; 3) Biostratigraphy and paleoecology of Late Ordovician-Early Silurian shelly benthos, Manitoulin Island and the Bruce Peninsula (joint with doctoral student Chris Stott); 4) Collaborative research with Rong Jiayu and Zhan Rebin (Nanjing Institute of Geology and Palaeontology, China) on Ordovician-Silurian brachiopods of China.

Markes Johnson (USA) continues to study the paleoecology of rocky-shore and rocky- island deposits of all geological ages, including the Silurian. An outstanding example of an Ordovician-Silurian archipelago from Manitoba, Canada was described recently in journal articles by Johnson (2002) and Nelson and Johnson (2002). See list of references. He also had a book published in 2002 by the University of Arizona Press under the title: "Discovering the Geology of Baja California - Six Hikes on the Southern Gulf Coast." The book (220 p.) describes his discovery with students from Williams College of a Pliocene archipelago from the Gulf of California in Mexico. Paleoislands may be used to illustrate profoulnd differences between windward and leeward facies. Transgression of paleoislands with resistant rocky shorelines also may be used to gauge local to global changes in sea level.

Dimitri Kaljo (Estonia) - I am currently dividing my time between Ordovician and Silurian isotope stratigraphy and rugose coral palaeontology. Together with T. Martma and Lithuanian colleagues (A. Brazauskas, D. Kaminskas, P. Lapinskas) we began last year a carbon isotope and palaeontology based Ludlow correlation project. The first results seem to be promising.

Steve Kershaw (UK) continues to work on Silurian reef projects. The following are ongoing: 1) Lower Silurian reefs in south China with Yue Li, Nanjing Institute 2) Growth banding in stromatoporoids and corals, with Graham Young, Winnipeg 3) Stromatoporoid assemblages in Ludlow of Gotland, with Olof Sandstrom, Lund.

Mark Kleffner (USA) - I continue to work on my joint project with James Barrick, a revision of a conodont-, graptolite-, and chitinozoa-based Silurian chronostratigraphy. I actually thought I was

finished, but discovered that additional revision to two small portions of the chronostratigraphy were required. I now hope that it is totally revised and that the manuscript text will also be completed by the end of this summer. I am also currently working, or hope to soon begin working on, joint Silurian conodont projects with James Barrick, Lennart Jeppsson, Michael Murphy, and Stig Bergstrom.

Tatiana Koren' (Russia) - Continuing work on the Upper Ordovician and Lower Silurian graptolites from the drill cores of Scania, Sweden with short paper in press in the Abstracts of ISOS-IGC-FM SS, 2003. Presently the systematic descriptions of Scanian diplograptids from the O/S boundary beds (the *persculptus* to *acuminatus* Biozones) are under preparation. Systematic studies of the Ludlow neocucullograptids from Kyrgizstan with notes on their biostratigraphy and phylogeny are submitted to Alcheringa. New project on the Lower Silurian graptolites from the drill cores in the Kaliningrad district started jointly with Anna Sujarkova. The work will be focused on systematics and biostratigraphy of the Llandovery and Wenlock part of the graptolite-bearing sequence.

Anna Kozlowska-Dawidziuk (Poland) - Work continues on retiolitids (Wenlok-Ludlow) from Polish part of the East European Platform; Ludlow graptolites from Arctic Canada with Alf Lenz, Plectograptus with Denis Bates; integrated paper (isotopes, geochemistry, organic matter, graptolites and acritarchs) with E. Porebska and M. Masiak about the lundgreni Event has been submitted for publication. Work also continues on retiolitids with D. Bates and A. Lenz for the next volume of the graptolite Treatise - a paper on a new classification of the retiolitids has been submitted for publication.

Jirí Kríz (Czech Republic) - Telychian bivalves of Spain - entirely new Bivalvia dominated communities from the two localities in the Telychian of Spain collected by Juan Gutierrez Marco several years ago. Monograph is almost completed and before summer 2003 will be submitted for press.

Philippe Legrand (France) - I continue the study of the Lower Silurian Graptolites in Algerian Sahara and in Saudi Arabia.

Alain Le Hérissé (France) - I am currently working on the period from Ordovician to the Devono-Carboniferous boundary, on organic-walled microfossils, acritarchs and other microalgae. Several joined studies concern the evolution of palynological tracers during glaciation-deglaciation on the North-Gondwanan margin during the Late Ordovician, and the evolution of the diversity during the Ordovician and Silurian in relation to eustatic, climatic and paleogeographic changes. Recent published papers are concerned with taxonomy of Silurian forms and paleoecology, biostratigraphy and biogeography of Late Silurian to early Devonian assemblages from Western Libya, North Africa.

Alfred Lenz (Canada) - Work, in collaboration with Anna Kozlowska-Dawidziuk, Polish Academy of Sciences, Warsaw, is progressing on the Ludlow and Pridoli graptolites of Arctic Canada, our largest project to-date. In collaboration with Anna Kozlowska-Dawidziuk, who works with me on the graptolites, Paula Noble, University of Nevada @ Reno, working on radiolarians, Simon Poulson, University of Nevada, Reno, USA working on geochemistry, particularly carbon 13 analysis, and Monica Masiak, Polish Academy of Sciences, Warsaw, working on palynomorphs, a project is under way to integrate the biostratigraphic distributions of the various biota with geochemistry in the late Wenlock and Lower Ludlow basinal sequences in Arctic Canada. Finally, as part of our efforts to revise the retiolitid section of the Treatise on Invertebrate Paleontology, Denis Bates, University of Aberystwyth, Wales, Anna Kozlowska-Dawidziuk, and I have just finished preparing a paper on a revised classification of the Silurian retiolitids. PhD student Sherrill Senior (co-supervised by Mike Melchin) is well advanced in her study of a very large collection of cyrtograptid graptolites of the Arctic Islands.

Steve LoDuca (USA) - Work continues on the taphonomy, systematics, and evolution of Silurian noncalcified algae, especially dasyclads, and on the sedimentology and stratigraphy of the distinctive

Konservat-Lagerstätten that yield them. Descriptions of several new and surprisingly morphologically complex Silurian noncalcified dasyclad taxa are currently underway in collaboration with Don Mikulic and Joanne Kluessendorf (Illinois and Wisconsin material), Denis Tetreault (Ontario material), and Mike Melchin (Arctic Canada material). Research also continues in the areas of (1) evolutionary constraints on dasyclad form (using biophysical modeling in conjunction with empirical data from Silurian taxa) with Ernest Behringer (Department of Physics, EMU), and (2) taxon-specific stable carbon isotopic compositions of Silurian "organic macrofossils" (especially algae and graptolites) with Lisa Pratt.

David K. Loydell, (UK) - Taxonomic work is continuing on Llandovery graptolites from Sweden (with Jörg Maletz), Estonia and Latvia (species identified during work with Viiu Nestor and Peep Männik) and Spain (with Petr Štorch and Juan Carlos Gutiérrez-Marco).

Michael Melchin (Canada) - I am continuing to focus my research efforts, with a number of students and colleagues, on the biostratigraphy, phylogeny, and biodiversity changes of Late Ordovician and Early Silurian graptolites. I am currently working mainly on Hirnantian and Llandovery faunas from Arctic Canada, China (with Chen Xu, Fan Juanxuan, and Chuck Mitchell), and Scotland (with Henry Williams and Fan Juanxuan. Eugene MacDonald is in the process of submitting his PhD thesis on Late Ordovican and Early Silurian Radiolaria from Arctic Canada. Work also continues on co-ordination and writing of the next volume of the graptolite Treatise.

Tatiana Modzalevskaya (Russia) - I'm actively working on studying the earliest terebratulids from Russia and adjacent territories. Their appearance is established in the Upper Silurian (level of transgrediens graptolite Zone) in the Middle Asia (Turkestanian Ridge). The Atlas on Silurian and Early Devonian fauna of Severnaya Zemlya Archipelago (brachiopods, ostracods) is prepared for publication by A.F.Abushik, I.O.Evdokimova and T.L.Modzalevskaya.

Peter Molloy (Australia) is attacking conodonts and has been working his way centimetre-by-centimetre through a superb sequence spanning the early Wenlock Irevekin Event at Boree Creek (with James Valentine, dong brachiopods). Peter is involved in investigation of conodonts from various Silurian–Early Devonian sequences elsewhere in eastern Australia and northern Pakistan.

Gary Mullins (UK) - I am now just finishing a joint project with Dick Aldridge, David Siveter, Ken Dorning, Stewart Molyneux and Ruth Richards on the acritarchs of the Wenlock and Ludlow Series of the respective type areas. A paper on the acritarchs of the type Ludfordian Stage is soon to be published in the journal Palaeontology (Richards & Mullins, in press). We also continue to work on projects relating the temporal changes in the abundance, species composition and diversity of the acritarchs with the proposed large scale palaeoenvironmental fluctuations in the Silurian. An early Ludlow crisis in the acritarchs (where they decline by 78%) has been identified. This bioevent was probably caused by an abrupt change in the oceanic environment that sequentially affected different groups of organisms, including the prasinophytes and graptolites (Mullins, Aldridge & Siveter, in press). I have also concluded my examination of the chitinozoans recovered by John Mabillard and Dick Aldridge from the stratotype section for the base of the Wenlock Series (Hughley Brook, Shropshire). The diversity is higher than described in their paper (Mabillard & Aldridge, 1981) and several biostratigraphically diagnostic taxa have been observed, including a species of Pterochitina which may prove important in recognizing the boundary elsewhere. The chitinozoans also indicate that the base of the Wenlock Series does not coincide with the base of the centrifugus graptolite Biozone and that it is probably younger than previously considered (Mullins & Aldridge, in press).

Viiu Nestor (Estonia) - I am still studying Silurian chitinozoans. At present I am involved in a project dealing with stratigraphy and boundaries of the Wenlock Series in the northern East Baltic and correlation with adjacent regions.

Gladys Ortega (Argentina) - I am working on graptolite faunas of the La Chilca (Ashgill-Llandovery) and Los Espejos (Wenlock-Prídolí) formations from the Argentine Precordillera. A new paper on Silurian graptolites of Subandean Ranges (northwestern Argentina) and Bolivia was recently published.

Florentin Paris (France) - Beside my main activity as co-editor of a volume in press in Columbia University Press (IGCP n° 410 final volume: "The Great Ordovician Biodiversification Event", B. Webby et al. eds.), I had some other activities on Late Ordovician-Early Silurian chitinozoan assemblages from northern Gondwana regions (mainly Brittany, Czech Republic, Algeria, Libya and Saudi Arabia). I supervised the thesis of A. Bourahrouh on the impact of the Late Ordovician glaciation on organic-walled microfossils (including chitinozoans) and on their Early Silurian recovery (PhD Thesis of Rennes University, April 2002). Another part of my activity concerned high-resolution chitinozoan biostratigraphy and palaeoenvironmental reconstruction of Middle and Late Silurian deposits from outcrops and from the subsurface of western Libya (paper with J.C. Jaglin) and SE Algerian Sahara (biostratigraphic data for the PhD thesis of M. Henniche). Several internal reports for oil companies were made on these strata, and a couple of papers are in preparation on their chitinozoan assemblages.

José Manuel Piçarra (Portugal) - Lower Paleozoic stratigraphy of South Portugal (Ossa Morena Zone). Silurian graptolites from Portugal (with cooperation of J.C. Gutiérrez-Marco) and Armorican Massif (Portuguese-French cooperation, project "O Devónico em Portugal e no Maciço Armoricano: estratigrafia de alta resolução, bioestratigrafia e paleogeografia. Implicações na parte sudoeste europeia da Cadeia Varisca", with R. Gourvennec, J. Le Menn, M. Robardet, T. Oliveira and Z. Pereira). Portuguese-Morocco project.

David C. Ray (UK) – Over the past year I have been investigating the likely stratigraphic distribution of exception preservation within the Much Wenlock Limestone Formation (upper Wenlock) of the Dudley inliers, West Midlands, England. Based upon comparisons between museum collections and collections made at exposure I have determined a strong correlation between relative sea-level change and preservation potential. In particular, it is now possible to correlate many museum specimens (mainly pelmatozoans and trilobites) to narrow stratigraphic intervals and in some instance individual beds within the Dudley inliers. In addition, I have been attempting to correlate the sequence stratigraphic framework developed from the Dudley inliers to the type sections along Wenlock Edge, Shropshire; the initial results of which are looking most encouraging.

Michel Robardet (France) - I have been working 1) on the Lower Paleozoic (mainly Ordovician, but also Silurian) of the "Castillan branch" of the Iberian Cordillera (NE Spain), within a Spanish Research Project led by J.C. Gutiérrez-Marco (Madrid, Spain). 2) on the Ordovician-Silurian transition in the SE Armorican Massif of western France, with J.M. Piçarra (Beja, Portugal) and F. Paris (Rennes, France) within a French-Portuguese joint project. A recent artificial section shows the uppermost part of the Ordovician (clast-bearing glaciomarine deposits with chitinozoans) and the lower and middle parts of the Llandovery (graptolitic black cherts ("phtanites"), from the base of the Rhuddanian up to the lower part of the Telychian (see publication Piçarra et al. 2002). 3) on two chapters of the book "Geology of Spain" published by the Geological Society of London: Chapter 4 Ordovician (including the Ordovician-Silurian boundary, with J.C. Gutiérrez-Marco and other colleagues from Madrid (see publication Gutiérrez-Marco et al. 2002); Chapter 5 Silurian (see Robardet and Gutiérrez-Marco 2002). 4) on a publication that proposes an alternative approach to the Variscan Belt of southwestern Europe, based on the pre-orogenic paleogeographical constraints, many of them concerning the Ordovician (see Robardet 2002).

Rong Jiayu (China) - I have studied mid-Ashgill Holorhynchus from the Badajilin Formation (mianly mid Ashgill, Upper Ordovician), Ejin, western Inner Mongolia with Zhan Ren-bin and Jin Jisuo. This is the first record of this genus in China. I am also very interested in the survival and recovery of brachiopods

after the latest Ordovician mass extinction. A paper on the Silurian Biostratigraphy of China (Rong Jia-yu and Chen Xu) will be published in Science Press, Beijing later this year. This paper has been involved in a monograph, called "Biostratigraphy of China" edited by Zhang Wen-tang et al. This monograph includes about 13 papers from Sinian (latest Pre-Cambrian) to Quaternary,written in English.

D.M. Rudkin (Canada) recently established a new agreement with the Government of Nunavut for interim custody of fossil collections, and research has now resumed on the systematics and paleoecology of reef-associated trilobite faunas in the Lower Silurian (Telychian) Attawapiskat Formation, based on extensive new sampling on Akimiski Island, Nunavut; Jisuo Jin (University of Western Ontario) is looking at the diverse brachiopod assemblages, and Jan Ove Ebbestad (Uppsala Univerity) is studying the gastropod fauna. Funding support (including National Geographic Committee for Research and Exploration) is in place for further fieldwork on the Lower Silurian of the Hudson Bay and James Bay lowlands (Ontario) in 2003; target areas include the Ekwan and Severn rivers and the Hudson Bay coast west of Wabuk Point (Severn River, Ekwan, and Attawapiskat formations), and the Sutton Ridges area (Precambrian-Silurian contact relationships). Preliminary work on a probable naraoiid arthropod from the Upper Silurian (Pridolian) Bertie Formation of southern Ontario with Jean-Bernard Caron (University of Toronto) and Stu Milliken is complete and a final ms is now in preparation. I am undertaking an initial assessment of a diverse eurypterid assemblage from the Lower Silurian Eramosa beds, Bruce Peninsula, Ontario, as a subproject of Peter von Bitter's work on conodont systematics, biostratigraphy, paleoecology, taphonomy in the Eramosa. I also have an ongoing joint research project with Bob Elias (University of Manitoba and Graham Young (Manitoba Museum) on Ordovician-Silurian sequences near Churchill, Manitoba (paleoecology of shallow marine-rocky shoreline biotas).

Ivan Sansom (Australia) - I have been continuing work on Early Palaeozoic vertebrates, covering a range from the Late Cambrian through into the Silurian. Recent Silurian work has been focussed on Lower Silurian faunas from the Tarim Basin (Xinjiang, China) together with Nian zhong Wang (IVPP, Beijing) and Moya Smith (KCL) with a couple of manuscripts just about ready to submit on these fish. In addition, a couple of papers discussing diversification patterns of Palaeozoic fish and the evolution of the vertebrate skeleton have been published over the past year.

Lawrence Sherwin (Australia) - Now mapping Silurian strata in the Taralga district of southern NSW and working with Tatiana Koren' on a revision of the Early Silurian graptolite fauna of Bungonia, first reported by Naylor (1936).

Andrew Simpson (Australia) continues work on conodonts of the Late Silurian Lau Event, especially through part of the Coral Gardens Formation in the Broken River region of northern Queensland, with Lennart Jeppsson, John Talent, Ruth Mawson, Heidi Caldon and others, making comparisons with synchronous sequences elsewhere, principally Gotland. Several manuscripts are already in draft stage. A short paper on the lost Ordovician-Devonian carbonate platform in the Georgetown region, adjacent to the Broken River region, is close to seeing the light of day, as is one on the Late Silurian to Early Devonian Nowshera limestone in Pakistan.

David J. Siveter (UK) - My research on Silurian ostracods (especially myodocopes), world-wide, continues, as does research on the Konservat-Lagerstätte from the Silurian (Wenlock) of Herefordshire, UK (jointly with Derek Siveter and Mark Sutton, Oxford) and Derek Briggs (Yale).

Derek Siveter (UK) – Since the discovery of the Herefordshire Lagerstatte (Briggs, Siveter, Siveter 1996) my Silurian research has concentrated on studying the remarkably preserved soft-bodied fauna that this deposit contains. This is collaborative work together with Derek Briggs (Yale), David Siveter (Leicester) and Mark Sutton (Oxford). The animals are studied by reconstructing 'virtual fossils' by means of the computer. The process is slow, but the results fully justify the time spent. A chelicerate (*Offacolus*), a

polychaete (*Kenostrychus*) and a vermiform mollusc (*Acaenoplax*) are the three invertebrates, all of them preserved in three dimensions that have been reconstructed and published on so far. There are many others either in the process of or awaiting reconstruction. The exceptional preservation is unusual in that the replacement mineral is calcite. Funding was secured in August 2002 for a further three years work on this fauna (see Briggs *et al*. 2001; Orr *et al*. 2000a, 2000b, 2002; Sutton *et al*. 2001a, 2001b, 2001c, 2001d, 2002). Other Silurian – based research in the last few years has included, together with Dick Aldridge (Leicester), Phil Lane (Keele), Douglas Palmer (Cambridge) David Siveter (Leicester) and Nigel Woodcock (Cambridge), the production of a book on some 120 important Silurian geological localities in the UK (Aldridge *et al*. 2000).

Connie Soja (USA) - I continue to pursue research on Siluro-Devonian microbialites, especially those in Alaska, Russia, and Australia that illuminate the ecologic importance of post-Cryptozoic stromatolites and have helped reconstruct the paleogeography of the Alexander terrane. An NSF/AAAS travel grant will allow me to plan future research in Siberia and Mongolia with Anna Antoshkina (Russia), Chuluun Minjin (Mongolia), and Brian White (USA).

Petr Štorch (Czech Republic) - Over the past two years I have been less involved with Silurian affairs. However I have a new project on integrated conodont-graptolite biostratigraphy of the Barrandian. Sardinia and Carnic Alps started this year in collaboration with Ladislav Slavik and Italian colleagues from Modena (Enrico Serpagli a.o.). A new research student, Sergio Piras (jointly supervised with Enrico Serpagli) starts field-work based studies on Ludlow graptolites in Barrandian. Another new project will deal with Llandovery graptolites of East-Bohemian Hlinsko Zone (with Petr Kraft). Current projects involve O/S boundary graptolites of Carnic Alps (with H.-P. Schönlaub), Aeronian graptolites of Libya (with Dominique Massa) and early Silurian graptolite-bearing sections in Spain (with Juan Carlos Gutierrez-Marco and David Loydell).

Des Strusz (Australia) continues to plug away at the Silurian brachiopod faunas of the Yass syncline. The strophomenates are due out in April 2003, and work is well under way on the pentameroids. Meanwhile, collaboration with Lawrence Sherwin of the NSW Geological Survey produced a discussion poster for the First International Palaeontological Congress at Macquarie University. Following Tim Munson's move to Darwin, work on local Silurian coral faunas is at a standstill, unfortunately.

John Talent's (Australia) period as president of the International Palaeontological Association concluded at IP-2002. Having this behind him, as well as IPC2002, and IGCP 421 (North Gondwana mid-Palaeozoic biodynamics; joint-leader with Raimund Feist, Montpellier), has enabled him to pick up the threads of several Silurian, principally conodont-based and brachiopod-based projects with Ruth Mawson, Peter Molloy, Andrew Simpson and other colleagues. Principal among these projects are conodont correlations and chemostratigraphy in Gotland and Australia through the Lau Event (Late Silurian) (with Lennart Jeppsson), and stratigraphic alignments (conodont-based) connected with the Benambran Orogeny (earliest Silurian) in eastern Australia. Papers on correlations of the Silurian of Australia and New Guinea (with Ruth Mawson and Andrew Simpson), and of India and adjoining regions (with O.N. Bhargava, Chandigarh) appeared recently. Another (with Covadonga Brime and Ruth Mawson) on conodont CAI data and Kübler Indices for the Late Ordovician–Silurian–Devonian–Early Carboniferous sequences of the Townsville hinterland in northeastern Australia is in press.

Alan T. Thomas (UK) - Paul Smith and I have been supervising a Ph.D. by Liam Herringshaw on Problematica and minor fossil groups from the Much Welock Limestone Formation. Liam's work has focussed on the starfish, an unusual crinoid with a very weakly calcified calyx, machaeridians, rostroconchs and Cornulites. His thesis will be submitted in the next few months. Another Ph.D. student, Jane Veevers, has begun work on the sequence stratigraphy and process sedimentology of the Silurian-Lower Devonian of the Welsh Basin.

James Valentine (Australia) is attacking brachiopods and has been working his way centimetre-by-centimetre through a superb sequence spanning the early Wenlock Irevekin Event at Boree Creek, with Peter Molloy, doing conodonts.

Sarah Jane Veevers (UK) - Sequence stratigraphical, sedimentological and palaeomagnetic studies of Silurian to Lower Devonian rocks in the Welsh Basin. The first phase of my project has focused on the most completely preserved Silurian sequence in southwest Wales, in the Marloes Block. This sequence comprises the Skomer Volcanic Group, an unconformity-bounded volcaniclastic sequence, the top of which dates from the early part of the late Llandovery, overlain by the Coralliferous Group, a marine transgressive sequence of latest Llandovery to very early Wenlock age. This is overlain by the regressive Gray Sandstone Group of early to mid-Wenlock age, which passes conformably upwards into the continental Old Red Sandstone. Work so far has concentrated on the description of facies at the unconformity of the Skomer Volcanic and Coralliferous groups and in detailed analysis of the facies in the lower part of the Coralliferous Group. In future work I plan to extend the stratigraphical range of my studies to embrace the whole of the Silurian in south Wales. Using southwest Wales as a reference section, work will then be extended to other parts of the Welsh Basin and Borderland.

Jacques Verniers (Belgium) - A project was started to look at the chitinozoans from the Ordovician-Silurian transition at the Dob's Linn section. In collaboration with Mike Melchin and Henry Williams we are dissolving pieces from graptolite-bearing slabs and from own sampling in collaboration with Euan Clarckson. First results shall be presented at the ISOS-SSS-IGC 2003 meeting in San Juan, Argentina.

Wang Xiaofeng (China) - I am continuing to work on the Ordovician and Silurian around the Yangtze Gorges area, China. The main research focus to center around the Middle/ Lower Ordovician boundary and the Ordovician / Silurian boundary together with my group, consisting of Chen Xiaohong (chitinozoan), Wang Chuanshang (graptolite), Li Zhihong (conodont), Zhou Zhiqian (trilobite) and He Weihong (geochemistry). Two principal progress were made as below: 1. Our studies further confirmed that the Huanghuachang section fulfills the requirements for a GSSP. The Huanghuachang section, 12km of NE Yichang, possesses one of the most complete and well-represented sequences across the Lower and Middle Ordovician boundary interval in the world. Both cool water (NAR) and warmer water (NAMR) conodonts are all found in the Lower Dawan Formation. The proposed GSSP for the Middle Ordovician base is exposed in the roadside, at the base of Bed 19, 2.6m above the base of the Dawan Formation,

coinciding with the FAD of *Baltoniodus triangularis* (Lindstrom, 1955), and 0.2 m below the level with FAD of *Tripodus laevis* Bradshow, 1969, associated chitinozoans of the *C. langei / C. brevis* Zone, graptolites of the *C. deflexus*/ D. *protobifidus* Zone, acritarchs of the *Arbusculidium filamentosum – Aureotesta clatirata A*.Z., brachiopods of the *Leptella* Zone and trilobites of the *Pseudocalymene cyclidrica* Zone across the boundary interval. The boundary proposed can be easily recognized and correlated globally with high precise (Wang et al., 2002). 2. The Ordovician/ Silurian boundary is well developed around the Huangling Arch in the Yangtze Gorges area with a continuous sedimentary succession bearing *persculptus* to *vesiculosus* graptolite Biozones. Based on our research of long time and assessment of all sections exposed in the area we agree the proposal of the Wangjiawan section as potential GSSP for the Ordovician/ Silurian boundary (Chen & Rong, 2002).

Graham Young (Canada) – I'm continuing to work on Paleozoic paleoecology, and on coral diversity and distribution before and after the Late Ordovician extinction event. Collaborations with Bob Elias examine diversity, community structure, and morphology of Late Ordovician and Early Silurian coral faunas. A large field project with Bob, Dave Rudkin, Godfrey Nowlan, and others assesses paleoenvironments around a unique Late Ordovician-Early Silurian archipelago in the Churchill area of northern Manitoba. We anticipate completing fieldwork for this project in 2003. I am collaborating with Stephen Kershaw (Brunel University England) on paleobiology of Paleozoic corals and stromatoporoids. A recently submitted manuscript establishes a classification system for growth banding and related features, through a comparison of Ordovician material from southern Manitoba and Silurian fossils from Gotland, Sweden.

Jan Zalasiewicz (UK) - I am currently working on a variety of mainly graptolite-based projects. The second folio of the Atlas of Graptolite Type Specimens is being compiled by Adrian Rushton, Mike Howe and myself, and should be ready by the summer, while the long-delayed UK graptolite range chart hopefully will also see the light of day in the not-too-distant future. Mark Williams, Phil Wilby and I are looking at graptolite preservation, Alex Page being due to start a PhD on this topic in the autumn. Dating of various events in UK Silurian basins is being studied by exploiting authigenic monazite (with Jane Evans) and strain-fringe micas around graptolites (with Sarah Sherlock).

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NEW NAMES AND ADDRESS CHANGES

[Note: for all the (hopefully) most up-to-date e-mail addresses, see E-MAIL ADDRESSES below]

Fu Li-pu

Xi'an Institute of Geology and Mineral Resources
Xi'an, Shaanxi, CHINA

Jisuo Jin
Department of Earth Sciences
University of Western Ontario
London, ON N6A 5B7 CANADA

Sarah Jane Veevers
Earth Sciences
Department of Geography, Earth and Environmental Sciences
University of Birmingham
Edgbaston
Birmingham
B15 2TT, UK

Julie A. Trotter
The Australian National University
Research School of Earth Sciences
Earth Environment
Mills Road, Canberra, ACT 0200 AUSTRALIA

E-MAIL ADDRESSES

Guilermo Acenolaza - insugeo@unt.edu.ar
Aicha Achab - achab@NRCan.gc.ca
Dick Aldridge - RA12@leicester.ac.uk
Fernando Alvarez - fernando@geol.uniovi.es
Anna Antoshkina - Antoshkina@geo.komisc.ru
H.A. Armstrong - h.a.armstrong@durham.ac.uk
Esther Asselin - EAsselin@nrcan.gc.ca
R.A. Astini - rastini@satlink.com
William Ausich - Ausich.1@osu.edu
Gudveig Baarli - Gudveig.Baarli@williams.edu
C.R. Barnes - crbarnes@uvic.ca
J.E. Barrick - ghjeb@ttacs.ttu.edu
Jim Basinger - jim.basinger@sask.usask.ca
Michael Bassett - mike.bassett@nmgw.ac.uk
Richard Batchelor - rab@st-andrews.ac.uk
Denis Bates - deb@aber.ac.uk
J.L. Bendetto - jbenedetto@com.uncor.edu
Michael Benton - mike.benton@bristol.ac.uk
Claes Bergman - bec@hkgemfs.hkr.se
Stig Bergström - stig@geology.ohio-state.edu
Bill Berry - bberry@uclink4.berkeley.edu
Tatyana Besnosova - Beznosova@geo.komisc.ru
Alain Blieck - Alain.Blieck@univ-lille1.fr
Robert Blodgett - blodgetr@bcc.orst.edu
Olga Bogolepova - olga.bogolepova@pal.uu.se
Art Boucot - boucota@bcc.orst.edu
Pierre-André Bourque - bourque@ggl.ulaval.ca
Margaret Bradshaw –
m.bradshaw@geol.canterbury.ac.nz
P.J. Brenchley - pat@bbrenchley.fsnet.co.uk
Carlton Brett - brettce@email.uc.edu
Thomas Broadhead - twbroadhead@utk.edu
Frank Brunton - brunton@sciencenorth.on.ca
Edsel Brussa – ebrussa@ciunsa.edu.ar
Carole Burrow - CBurrow@zoology.uq.edu.au
Mikael Calner - Mikael.calner@geol.lu.se
Deirdra Cantrell - cantr004@bama.ua.edu
Robin Cantrill - rcantril@postoffice.utas.edu.au
M.V. Caputo - caputo@nautilus.com.br
Brian Chatterton - bchatter@gpu.srv.ualberta.ca
Chen Xu - xuchen@jlonline.com
Lesley Cherns - cherns@cardiff.ac.uk
Gina Christodoulu -
Gina.Christodoulou@Geol.lu.se
Minjin Chuulin - minjin@must.edu.mn
Alfredo Cingolani -
ccingola@cig.museo.unlp.edu.ar
Euan Clarkson - EUAN@glg.ed.ac.uk
Robin Cocks - R.Cocks@nhm.ac.uk
Paul Copper - pcopper@nickel.laurentian.ca

Carlo Corradini - ccorr@unimo.it
Peter Crowther - peter.crowther.um@nics.gov.uk
Alfredo Cuerda - acuerda@sinectis.com.ar
Tim de Freitas – tdefreitas@talisman-energy.com
Enrique Díaz Martínez - diazme@inta.es
Richard Diecchio - rdiecchi@gmu.edu
Steven Driese - sdriese@utk.edu
Greg Edgecombe - greged@amsg.austmus.gov.au
Diane Edwards - edwardsd2@cardiff.ac.uk
Rein Einasto - einasto@gi.ee
Bob Elias - eliasrj@ms.umanitoba.ca
Maria Eriksson - mariae@geo.su.se
Mats Erikssson - Mats.Eriksson@geol.lu.se
Frank Ettensohn - fettens@pop.uky.edu
Robert Fakundiny - rfakundini@mail.nysed.gov
Fan Jun-xuan – jxfan@jlonline.com
Annalisa Ferretti - ferretti@unimo.it
Stan Finney - scfinney@csulb.edu
Barry Fordham - Barry.Fordham@csiro.au
Jiri Fryda - fryda@cgu.cz
David Gelsthorpe - dng1@leicester.ac.uk
Maurizio Gnoli - gnolim@unimo.it
Yngve Grahn - grahn@uerj.br
Alexander Gubanov - Alexander.Gubanov@pal.uu.se
Juan Carlos Gutiérrez Marco - jcgrapto@eucmax.sim.ucm.es
Jonas Hagstrom - jonas.hagstrom@geo.su.se
Wolfgang Hansch - Wolfgang.Hansch.Mus.HN@t-online.de
David Harper - dharper@savik.geomus.ku.dk
Mark Harris - mtharris@csd.uwm.edu
William Harrison - william.harrison_iii@wmich.edu,
Rachel Heath - arjay_h@yahoo.co.uk
Kathleen Histon - Cathleen.Histon@cc.geolba.ac.at
Anette Hogstrom - anette@ucrac1.ucr.edu; ahogstrom@hotmail.com
Charles Holland - hepwholl@tcd.ie
M.P.A. Howe – M.P.Howe@bgs.ac.uk
Jana Hutt - jolyonjana@btinternet.com
Magdalena Iordan - antoneta@ns.igr.ro
Mikael Jacobsson - Mikael.Jacobsson@Geol.lu.se
John Jell – j.jell@earth.uq.edu.au
Lennart Jeppsson - lennart.jeppsson@geol.lu.se
Fredrik Jerre - Fredrik.Jerre@astrazeneca.com
Jisuo Jin - jjin@uwo.ca
Markes Johnson - Markes.E.Johnson@williams.edu
Paul Johnston - Paul.Johnston@gov.ab.ca
Anna Jones - anna@sherborne11.fsnet.co.uk
Dimitri Kaljo - kaljo@gi.ee
Donatas Kaminskas - Donatas.Kaminskas@gf.vu.lt
Stephen Kershaw - Stephen.Kershaw@brunel.ac.uk
Guennadji Kisselev - anna@dean.geol.lgu.spb.su
Mark Kleffner - kleffner.1@osu.edu
Joanne Kluessendorf - jkluesse@uiuc.edu
Tania Koren - tkoren@mail.wplus.net
Anna Kozlowska-Dawdziuk - akd@twarda.pan.pl
Petr Kraft - kraft@natur.cuni.cz
Jiri Kriz - kriz@cgu.cz
Jeff Kuglitsch - kug@globaldialog.com
Philippe Legrand - legrandblain@wanadoo.fr
A. LeHérissé - alain.le.herisse@univ-brest.fr
Oliver Lehnert - lehnert@geol.uni-erlangen.de
Alfred Lenz - aclenz@uwo.ca
Pierre Lespérance - lesperap@magellan.UMontreal.CA
Steven LoDuca - geo_loduca@online.emich.edu
Darrel Long - dlong@nickel.laurentian.ca
David Loydell - david.loydell@port.ac.uk
Robert Lundin - robert.lundin@asu.edu
Eugene MacDonald - ewmacdon@is2.dal.ca
Jorg Maletz - jorgm@acsu.buffalo.edu
Andy Mallett - Andy.Kaz@btinternet.com
Peep Männik - mannik@gi.ee
Tiiu Märss - marss@gi.ee
Ruth Mawson - rmawson@laurel.ocs.mq.edu.au
Sandy McCracken - samccrac@NRCan.gc.ca
Mike Melchin - mmelchin@stfx.ca
Carl Mendelsohn - mendelsn@beloit.edu
Donald Mikulic - mikulic@isgs.uiuc.edu
Giles Miller - G.Miller@nhm.ac.uk
Charles Mitchell - cem@nsm.buffalo.edu
Tania Modzalevskaya - modz@IB2567.spb.edu
Stewart Molyneux - SGM@wpo.nerc.ac.uk
Gary Mullins - glm2@leicester.ac.uk
Mike Murphy - MamurphyD@aol..com
Petras Musteikis - Petras.Musteikis@gf.vu.lt
Heldur Nestor - hnestor@gi.ee
Viiu Nestor - vnestor@gi.ee
Paula Noble - noblepj@unr.edu
Brian Norford - bnorford@NRCan.gc.ca

Godfrey Nowlan - GNowlan@NRCan.gc.ca
James Ogg - jogg@purdue.edu
Gladys Ortega - gcortega@arnet.com.ar
Jeffrey Over - over@geneseo.edu
Florentin Paris –
Florentin.Paris@univ-rennes1.fr
John Peel - John.Peel@pal.uu.se
Silvio Peralta - speralta@unsj.edu.ar
José Manuel Picarra - jose.picarra@igm.pt
Elzbieta Porebska -
porebska@geos.ing.uj.edu.pl
Helga Priewalder - hpriewalder@cc.geolba.ac.at
David Ray - daveray01@yahoo.com
Jürgen Remane - jurgen.remane@geol.unine.ch
John Richardson - jbr@nhm.ac.uk
Barrie Rickards - wagreen@esc.cam.ac.uk
Susan Rigby – SUE.RIGBY@glg.ed.ac.uk
Michel Robardet –
Michel.Robardet@univ-rennes1.fr
Rong Jia-yu - jyrong@nigpas.ac.cn
June Ross - ross@biol.wwu.edu
Madis Rubel - rubel@math.ut.ee
Claudia Rubenstein - rubicaro@supernet.com.ar
David Rudkin - davidru@rom.on.ca
Jennifer Russel-Houston –
Jen.Russel-Houston@shell.ca
Valeri Sachanski - valeri@geology.bas.bg
T.M. Sanchez - tsanchez@com.uncor.edu
Ivan Sansom - I.J.Sansom@bham.ac.uk
Hans Peter Schönlaub - schhp@cc.geolba.ac.at
N.V. Sennikov - sennikov@uiggm.nsc.ru
Enrico Serpagli - serpagli@unimo.it
Peter Sheehan - sheehan@csd.uwm.edu
Lawrence Sherwin -
sherwinl@minerals.nsw.gov.au
Andrew Simpson - asimpson@els.mq.edu.au
David Siveter - DJS@leicester.ac.uk
Derek Siveter - derek.siveter@earth.ox.ac.uk
Ken Soehn - ksoehn@mac.com
Constance Soja - csoja@mail.colgate.edu
Azzedine Soufiane - asoufiane@inrs.uquebec.ca
Rob Stallard - rob@silurian.com
Ronald Stieglitz - stieglir@uwgb.edu
Carl Stock - cstock@wgs.geo.ua.edu
Petr Storch - storch@gli.cas.cz
Sven Stridsberg - Sven.Stridsberg@Geol.lu.se
Paul Strother - strother@bc.edu
Des Strusz - dstrusz@geology.anu.edu.au
Stuart Sutherland – ssutherland@eos.ubc.ca
John Talent - jtalent@laurel.ocs.mq.edu.au
Lech Teller - l.teller@twarda.pan.pl
Y.I. Tesakov - tesakov@uiggm.nsc.ru
A.T. Thomas - A.T.Thomas@bham.ac.uk
Judi Thorogood - Judethorogood@hotmail.com
Julie Trotter – Julie.Trotter@anu.edu.au
Susan Turner - s.turner@mailbox.uq.edu.au
Charles Underwood – c.underwood@bbk.ac.uk
Adam Urbanek - urbanek@twarda.pan.pl
Fons VandenBerg –
Fons.VandenBerg@dpi.vic.gov.au
Sarah Jane Veevers – sxv212@bham.ac.uk
J.M.J. Vergoossen -
J.M.J.Vergoossen@biol.rug.nl
Jacques Verniers - Jacques.Verniers@rug.ac.be
Viive Viira - viira@gi.ee
Wang Xiaofeng - wxfeng@public.yc.hb.cn
Rodney Watkins - rw@mpm.edu
Brian White - bwhite@science.smith.edu
Rosie Widdison - rewiddison@hotmail.com
Mark Williams - Mark.Williams@bgs.ac.uk
S. Henry Williams - hwilliam@petro-canada.ca
Mark Wilson - mark.wilson@ualberta.ca
Brian Witzke - bwitzke@igsb.uiowa.edu
A.D. Wright - a.wright@qub.ac.uk
Tony Wright - awright@uow.edu.au
Ryszard Wrona - wrona@twarda.pan.pl
Evgeny Yolkin - yolkin@uiggm.nsc.ru
Graham Young - gyoung@cc.UManitoba.CA
Jan Zalasiewicz - jaz1@leicester.ac.uk
Matthew Zimmerman - zimmer@mines.unr.edu