SILURIAN TIMES
No. 12
A NEWSLETTER OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY

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

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CHAIRMAN'S CORNER

Dear Colleagues, 16th Jun, 2004

First of all, I would like to thank our colleagues of Argentina, Gilberto Acenolaza, Guillermo Albanesi, Silvio Peralta, Gladys Oterga, Guillermo Acenolaza and many others, who organized very successfully the Field Meeting of the Subcommission on Silurian Stratigraphy, which was run jointly with the 9th International Symposium on the Ordovician System and the 7th International Graptolite Conference in 2003. Their conscientious work and enthusiastic reception made a very deep impression on all who attended this meeting. It gave us a marvelous chance to examine the wonderful Ordovician and Silurian stratigraphical successions in Argentina. A great set of publications that was distributed at the meeting is also exciting.

The ICS has set a goal of completing definition of all global stages within the Phanerozoic with selection of GSSPs by 2008 and establishing a global chronostratigraphic time scale. The base of the Silurian System and the base of the Wenlock Series, two highlights, have been selected for restudy, which have seen successful results so far. For example, progress in the restudy of the graptolites through the Ordovician and Silurian transition at the Dob's Linn section and other superb sections have been made in the last four years. It is suggested that the biostratigraphical definition of the GSSP be revised. The lower part of the *Parakidograptus acuminatus* Biozone of Williams (1983) is marked by a primitive form of *Akidograptus ascensus* and *Parakidograptus praematurus* so the basal zone of the Silurian System should be recognized as the base of the *Akidograptus ascensus* Zone. The latter is overlain by the *acuminatus* Biozone (Mike Melchin and his colleagues). I have also noted that the restudy of the base of the Wenlock Series has been also proceeding well. New study shows that the GSSP of the Series at the type area has been documented to be correlated with the upper *Cyrtograptus centrifugus* Biozone or *C. murchisoni* Biozone (Mullins and Aldrige, 2004), rather than the base of the former Biozone. Further studies of Silurian stratigraphy, palaeontology, geochronology, biogeography, oceanography, and others either from the stratotype or from other sections around the world are encouraged.

The ICS has established two stratigraphic prizes, Digby McLaren Medal and the ICS Medal that will be awarded every four years at the International Geological Congress. The former will be awarded to honour a significant body of internationally important contributions to stratigraphy sustained over many years and the latter will honour high quality research in Stratigraphy by recognizing a singular major achievement in advancing stratigraphical knowledge. As a member of the ICS awards committee, I would accept nominations that you may wish to make (further details are available on the ICS website).

The two subcommissions of Ordovician and Silurian Stratigraphy voted to hold the 10th ISOS and 4th ISSS in Nanjing, China in 2007, where it will be hosted by Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. We are welcoming you all to attend this joint conference and you all will be welcomed warmly.

I am looking forward to meeting you in the near future.

All the best from Rong Jia-yu

EDITOR'S NOTES

This is my fourth and last issue of Silurian Times. My apologies to all readers for my tardiness in releasing this issue. I have found that other commitments do not permit me to do Silurian Times in a timely manner, so I have resigned as Secretary of the Silurian Subcommission. My thanks to Jacques Verniers, who will be taking over as the new Secretary and to the rest of the SSS membership for their support and patience with me during these past four years.

I wish to thank all of those who contributed to this issue and apologise to anyone whose contributions I may have inadvertently left out after such a long delay.

Mike Melchin

UPCOMING NEW WEB SITE FOR THE SILURIAN SUBCOMMISSION

All members of the Silurian Subcommission should note that a new site for the SSS will be available at some time early in 2005. This site is being designed and prepared by Fan Juanxuan and Zhao Hui at the Nanjing Insititute of Geology and Palaeontology, with input from the SSS executive. The site will have a very similar format to the new site for the Ordovician Subcommission. This new web site will be found at: http://www.silurian.cn/.

ANNUAL REPORT OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY (SSS) OF THE INTERNATIONAL COMMISSION ON STRATIGRAPHY FOR 2003

1. TITLE OF CONSTITUENT BODY and NAME OF REPORTER

Subcommission on Silurian Stratigraphy (SSS)

Submitted by:
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15 December 2003

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

- Rationalization of global chronostratigraphical classification.
- Intercalibration of fossil biostratigraphies, integrated zonations, and recognition of global datums.
- Establishment of magneto- and chemo-stratigraphic scales.
- Definition of Stage boundaries and restudy of global stratotype sections.
- Correlation of Silurian rock successions and events, including marine to non-marine.
- Climatic evolution and modeling.

The objectives satisfy the IUGS mandate of fostering international agreement on nomenclature and classification in stratigraphy; facilitating international co-operation in geological research; improving publication, dissemination, and use of geological information internationally; encouraging new relationships between and among disciplines of science that relate to Triassic geology world-wide; attracting competent students and research workers to the discipline; and fostering an increased awareness among individual scientists world-wide of what related programs are being undertaken.

3. ORGANIZATION

SSS is a Subcommission of the Commission on Stratigraphy.
Officers (chair, one vice-chair, secretary), voting members (15), and corresponding members (50). *(see Appendix for complete listing)*
Subcommission members represent a broad spectrum of specialized stratigraphical disciplines from those countries or regions where Silurian rocks are extensively studied in relation to fundamental and/or applied geological research. Current research activities and future plans are communicated through publication of an annual SSS newsletter *Silurian Times* in both hardcopy and as a web release.

3a. Officers for 2000-2005:

Chair: Rong Jiayu, Nanjing, China.
Vice-Chair: T. N. Koren', St. Petersburg, Russia.
Secretary: M. J. Melchin, Antigonish, Canada

4. EXTENT OF NATIONAL/REGIONAL/GLOBAL SUPPORT FROM SOURCES OTHER THAN IUGS

In kind support of the Chairman's Institute (Nanjing Institute of Geology and Palaeontology), and the Secretary's institute (St. Francis Xavier University).

5. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

Subcommission on Ordovician Stratigraphy. Co-sponsored meeting in Argentina and Joint working group on the restudy of the Ordovician-Silurian Boundary.

Possible collaboration on a proposed IGCP Project tentatively titled "Ordovician Palaeogeography and Palaeoclimate".

Graptolite Working Group. Co-sponsored meeting in Argentina and planning field meeting in Baltic region, 2005.

6. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2003

The eleventh issue of *Silurian Times* - the official newsletter of the Silurian Subcommission (edited by Secretary Mike Melchin) was circulated in June 2003 to all subcommission members, as well as a broad constituency of Silurian researchers around the world. This is the third 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. It is the first year that the documents was posted as an Adobe Acrobat PDF file, making it easier to download and print for SSS members. 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.

The field meeting of the SSS, was held in San Juan, Argentina in August, 2003, in connection with an Internation Symposium on the Ordovician System and an Internation Graptolite Conference. Field trips

and the conference sessions were well organized and well attended. Many thanks to the organizing committee in Argentina for their efforts in making this excellent conference happen. Accompanying this conference was the publication of the volume entitled “Proceedings of the 7th International Graptolite Conference & Field Meeting of the International Subcommission on Silurian Stratigraphy. INSUGEO, Serie Correlación Geológica. Comunicarte Editorial, Tucumán, Argentina” edited by G. Ortega and G.F. Aceñolaza.

The two GSSP restudy working groups commissioned by the SSS, lead by Mike Melchin (Canada) for the Base of Silurian; and David Loydell (UK) for the Base of Wenlock, made considerable progress. Several papers related to the GSSP for the base of the Silurian were presented at the SSS field meeting in San Juan, Argentina, in August, 2003. These papers summarized new graptolite and chitinozoan data from the current GSSP as well as new data from another section proposed for restudy, Wangjiawan, China. After the technical sessions, a workshop was held to discuss the GSSPs under study by the respective working groups. Fourteen members of the Ordovician-Silurian boundary working group were in attendance and, after the talks and discussion, a straw vote was held on the proposal presented by Mike Melchin, that the current GSSP (1.6 m above the Base of the Birkhill Shale at Dob’s Linn, Scotland) by retained, but the biostratigraphic definition be modified to reflect the revised biostratigraphy of the section. This proposal was unanimously endorsed in the straw vote, so the organizer of the working group, Mike Melchin, will send this proposal to the SSS titular membership for a formal vote. If ratified, the recommendation will be forwarded to the ICS for approval.

Only four members of the Llandovery-Wenlock working group attended the field meeting in Argentina, so it was not possible to make any formal recommendations concerning this boundary. However, the feeling among the members present, as well as the organizer of the working group (who was not in attendance, but sent his views by correspondence) was that the biostratigraphic level as defined at the current GSSP is significantly ambiguous and that other sections will need to be conisdered for restudy. Colleagues from the Czeck Republic were asked to investigate the possibility that at GSSP candidate section may exist in the Prague Basin.

New York State Museum Bulletin 493 (Title: "Silurian Lands and Seas---Paleogeography Outside of Laurntia" was released in May, 2003 . 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.

7. CHIEF PROBLEMS ENCOUNTERED IN 2003

None.

8. SUMMARY OF EXPENDITURES IN 2003 (ANTICIPATED THROUGH MARCH 2004):

Vice-Chair travel to the Field meeting in Argentina		$1,600
	TOTAL	$1,600

9. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR:

- Final vote on the proposal to maintain the current GSSP for the Base of the Silurian System, but with a revised biostratigraphic definition.
- Continued study of possible candidates and levels for restudy Base of the Wenlock Series.
- Continued study of evolutionary and ecological changes and rates of change through Silurian time.
- Integration with the proposed IGCP Project tentatively titled "Ordovician Palaeogeography and Palaeoclimate". This major international effort will seek to improve our understanding of climating, oceanographic, and biogeographic changes that too place through Early Paleozoic time.
- Continued refinement of correlation between fauna/floral groups and chemostratigraphic successions through the Silurian. Improved resolution in correlation between biostratigraphic zonations and radiometric time scale, especially at GSSP sections and other well-constrained stage and series boundaries.
- August 20-28, 2004. Florence, Italy. International Geological Congress. Several symposia and a workshop involve SSS members:
    - Special Symposium - The Geological Time Scale - Recent Developments and Global Correlations
    - General Symposium - Paleobiodiversity and major biotic changes in Earth history
    - Workshop Challenges and new directions in global stratigraphy
- Compilation and publication of *Silurian Times* **12**.
- Seek replacements for some retiring SSS titular members.

10. BUDGET AND ICS COMPONENT FOR 2004

(a)	Support for Chair to travel to IGC, Florence.	2,000
	TOTAL 2003 BUDGET REQUEST	**$2,000 US**

Potential funding sources outside IUGS

In kind support from the Secretary's Institute (St. Francis Xavier University) to cover the costs of production of *Silurian Times*. Additional support from the Chair's institute to cover the remaining costs of travel to IGC.

11. REVIEW CHIEF ACCOMPLISHMENTS OVER LAST FIVE YEARS (1999-2003)

See Accomplishments in 2003 (above) for additional details.

- Publication of "Silurian Cycles: Linkages of Dynamic Stratigraphy with Atmospheric, Oceanic and Tectonic Changes. New York State Museum Bulletin 491", edited by E. Landing and M. Johnson. These are, in part, the proceedings of the James Hall Symposium on the Silurian System, held in Rochester, NY, in August, 1996.
- SSS Field meeting in Madrid, Spain and field trip in southern Spain and Portugal - resulted in publication of "Proceedings of the Sixth International Graptolite Conference of the GWG (IPA) and the 1998 Field Meeting of the International Subcommission on Silurian Stratigraphy (ICS-IUGS). Instituto Tecnológico Geominero de España, Temas Geológico-Mineros, 23", edited by J.C. Gutiérrez-Marco and I. Rábano.
- The Sir Frederick McCoy Symposium (3rd International Symposium on the Silurian System) was held in Orange, Australia, July 2000. This excellent conference, which was held in conjuction with Australian Plaeontological Convention and the 2nd Australasian Conodont Symposium, resulted in the

publication of "Palaeontology Down Under 2000, Geological Society of Australia, Abstracts 61", edited by P. Cockle, G. Wilson, G. Brock, M. Englebretsen, A. Simpson, and T. Winchester-Seeto.

12. OBJECTIVES AND WORK PLAN FOR NEXT 5 YEARS (2004-2008)

See "Work Plan, Critical Milestones, Anticipated Results and Communications to be Achieved Next Year" , above, for additional information.

Meeting/field workshop schedule with themes and anticipated results:

- Proposed SSS Field Meeting, Gotland, Sweden, 2005. Visit classic Silurian localities in Gotland and discuss the wealth of biostratigraphic, paleoecological and chemostratigraphic data that have come from this region over the past two decades, and its integration and correlation with data from other regions of the globe.
- International Symposium on the Silurian System in Nanjing, China, in 2007, to be held in conjunction with an International Symposium on the Ordovician System. Field trips will focus on classic Silurian sections in South China, possibly including a section that has been proposed for restudy of the Base of the Wenlock Series.

APPENDIX - Names and Addresses of Current Officers and Voting Members

Subcommission officers

Chairman: Rong Jiayu**,** Nanjing Institute of Geology and Palaeontology, 39 East Beijing Road Nanjing, 210008, P R China, e-mail: jyrong@nigpas.ac.cn

V**ice Chairman**: Tatiana Koren', All-Russia Geological Research Institute (VSEGEI), Sredny Pr. 74, 199026, St. Petersburg, Russia, e-mail: koren@vsegei.sp.ru

Secretary: Michael Melchin, Department of Earth Sciences, St. Francis Xavier University, Antigonish, Nova Scotia, Canada, B2G 2W5, e-mail: mmelchin@stfx.ca

List of Voting Members

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FUTURE MEETINGS OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY

FIELD MEETING OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY 2005

THE DYNAMIC SILURIAN EARTH

GOTLAND, SWEDEN

submitted by

Mikael Calner, Mats E. Eriksson & Lennart Jeppsson

We are glad to announce that the Subcommission on Silurian Stratigraphy Field Meeting will take place on the island of Gotland, Sweden, in August 2005. Gotland is famous for its exceptionally well preserved fossils and carbonate platform strata ranging in age from latest Llandovery throughout Ludlow. The old, medieval parts of the town Visby and its 13th century ring-wall (limestone, of course) and churches are internationally recognised and were inscribed on the World Heritage List in 1995. Gotland is easily accessible by air from Stockholm or by high-speed ferry. For information of Visby and Gotland, pay a visit to www.gotland.net or www.gotland.se.

The field meeting will concentrate on the shallow-water carbonate system, related biotas, and their response to global change. As we all know, the view of the Silurian System as a calm period has been successively challenged: Paleontological, geochemical, and physical data accumulated over the last decade clash with the common view of the Silurian as a stable greenhouse Earth slowly recovering from the end-Ordovician glacial interval and associated extinctions. A theme for the field meeting will therefore be the global dynamics of this period of time. The meeting will highlight global signatures in the well preserved carbonate platforms that form the bedrock of the island. The three main Silurian global spikes in C and O stable isotopes are well constrained stratigraphically and their relationship to sequence and eventstratigraphic frameworks will be discussed. We particularly encourage mind provoking ideas and discussion topics.

Scientific sessions will take place at Gotland University located at the beautiful seaside of Visby in immediate connection with recreation areas, museums, restaurants, and the picturesque old town.

Field trips: Gotland is a relatively small island (ca 3 000 km^2) and outcrops are easily accessible along the coasts and inland cliffs. There will be excellent opportunities to study sedimentology, palaeoecology, and fossil communities from different palaeodepths and stratigraphical intervals. Because of the recent development and discussions of Global Stratotype Sections and Points (GSSPs) of the Silurian System (co-ordinated by Mike Melchin and David Loydell) one stop will be devoted to the Llandovery—Wenlock boundary in well exposed strata formed in distal platform settings. This interval moreover coincides with the profound and globally recognised Ireviken Event. Other stops will focus on carbonate platform response during faunal crises, e.g. during the middle Silurian graptolite extinction (the *lundgreni* Event a.k.a. a part of the Mulde Event). Drillcores through two Silurian event intervals will be available for study at the Allekvia Fieldstation, seven kilometres southeast of Visby.

Publications: All meeting abstracts will be published in an edited (by Calner and Eriksson) quotable volume that will be handed out at the beginning of the meeting. In addition, a special issue on the Dynamic Silurian Earth, devoted to shorter papers (four printed pages) will be published in the peer-reviewed Swedish Geological Society journal *GFF* (www.geologiskaforeningen.nu). Deadline for the latter submissions will be at the meeting. Detailed instructions to authors will be provided in the first and second circulars.

Important dates: A first circular detailing the meeting was distributed in mid-June 2004 to Silurian Times subscribers and was also be available on the GeoBiosphere Science Centre homepage (www.geol.lu.se) at Lund University. Participants will be limited to 50, giving first priority to Titular Members of the SSS.

Second circular & call for papers can be found at:

http://www.geol.lu.se/events/silconf.htm

Organizing committee: GeoBiospehere Science Centre, Lund University, Sölvegatan 12, SE-223 62 Lund, Sweden.
Mikael Calner: mikael.calner@geol.lu.se
Mats E. Eriksson: mats.eriksson@geol.lu.se
Lennart Jeppsson: lennart.jeppsson@geol.lu.se

International Symposium on the Silurian System
Nanjing, China, in 2007

This symposium will be held in conjunction with an International Symposium on the Ordovician System. Field trips will focus on classic Silurian sections in South China. More details will follow.

OTHER MEETINGS OF INTEREST TO SILURIAN SPECIALISTS

NORTH AMERICAN PALEONTOLOGY CONVENTION
JUNE 19-26TH 2005
DALHOUSIE UNIVERSITY
HALIFAX, NOVA SCOTIA CANADA
FOR DETAILS SEE:
http://meguma.earthsciences.dal.ca/napc/napc.htm

The Conference will consist of five days of talks and posters, with a choice of day trips mid-week, as well as major field trips pre- or post-conference. The day trips will be to some excellent sites within a two hour drive of Halifax, including the classic Silurian succession at Arisaig. The two main field trips will be:

Life After Snowball: The Mistaken Point Biota and the Cambrian of Avalon

The Mistaken Point biota (575-560 Ma) represents the oldest documented Ediacaran macrofossils. This 5-day, premeeting trip will examine coastal outcrops of the Avalon Peninsula, Newfoundland to elucidate the stratigraphic, environmental, and evolutionary context of the Mistaken Point biota.. Subjects for observation and discussion include: the Gaskiers tillite and the "Snowball Earth" controversy, early Ediacaran evolution, the origin of animal ecosystems, Ediacaran affinities, and the fate of the Ediacara biota. The final day of the trip will be devoted to examining the rich Cambrian record of the Avalon Peninsula, including the famous trilobite beds of the Manuels Formation. This trip will be led by Guy Narbonne, James Gehling and Doug Boyce.

Day 1 -- Gaskiers Tillite and the "Snowball Earth" debate (Harbour Main and St. Mary's). Also a brief visit to St. Shotts enroute to Trepassey for paleontologists who might otherwise be bored by a whole day without fossils. Night in Trepassey.

Day 2 -- Early Evolution of the Mistaken Point Biota: Drook to Mistaken Point Fms (Portugal Cove South to Mistaken Point). Night in Trepassey.

Day 3 -- Later Evolution of the Mistaken Point Biota: Trepassey and basal Fermeuse Fms (Long Beach to Cape Race). Finishing off at the Cape Race lighthouse and telegraph station would probably be well received. Late afternoon "liquid" discussion in the Trepassey Motel on the affinities and environments of the Ediacara biota. Evening banquet. Night in Trepassey.

Day 4 -- Aspidella and the final fill of the Avalon Basin (Ferryland). Finishing off with a tour of Colony Avalon would probably be well received. Night in St. John's.

Day 5 -- Cambrian of the St. John's Area. Fly to Halifax.

The Gaspe Bay (Quebec)

Tentatively, a 6-8 day trip will be comprised of stops in New Brunswick. The field trip would be comprised of: Day 1: travelling from Halifax to Dalhousie (with possible stops along the road ?) (overnight in Dalhousie?), Day 2: in and around Atholville (plants, etc.), and travel to Miguasha (overnight in the Miguasha area), Days 3 to 5: Miguasha (fishes, plants), and Port-Daniel area (reef and reef dwelling organisms), and travel to Gaspé (overnight in Gaspé), Day 6: Forillon Park (I can obtain permission if needed) and Cap-aux-Os (plants, invertebrate macrofauna) (overnight in Gaspé), Day 7: stop in Percé (brachiopods, trilobites) and New Richmond (stromatolites) while travelling back (overnight in northern New Brunswick), Day 8: traveling from northern New Brunswick to Halifax, with stop in the Bathurst area (Carboniferous outcrop). This trip will be led by Pierre Bourque and Patricia Gensel.

DEVONIAN VERTEBRATES OF THE CONTINENTAL MARGINS

IGCP 491 meeting in Yerevan, Armenia, May 23-25, 2005. Followed by a field trip on the Upper Devonian - Lower Carboniferous of Armenia, May 26-27, 2005. Contacts : vachik@khuistf.ac.ir OR vh_hai@yahoo.com (Vachik Hairapetian) ; fiszbit@uw.edu.pl (Michal Ginter).

SILURIAN LANDS AND SEAS

Orders for "Silurian Lands and Seas: Paleogeography Outside of Laurentia" (New York State Museum Bulletin 493, 400 p.) may be placed by sending a request to the following address:

New York State Museum
Publication Sales
Room 3140
C.E.C.
Albany, NY 12230

The cost of the volume is $54.95 plus $4 for shipping and handling. Method of payment may be by personal check (payable to the "New York State Museum") or by credit card. For more information, you may contact the publisher by e-mail at: nysmpub@mail.nysed.gov.

Plans are moving forward for publication of a third volume of Silurian research to be released as a bulletin of the New York State Museum. Markes Johnson and Ed Landing will edit a volume with the tentative title: "Silurian Lands and Seas - Paleogeography of Laurentia and Oaxacia." The volume will include manuscripts updated from presentations originally made regarding North America at the 1996 Second International Symposium on the Silurian System held in Rochester, New York. Six manuscripts are now in hand and are being circulated for reviews. The editors will welcome participation from other authors who would like to become involved with the project. Only one contribution has been submitted for Canada, for example, and some parts of the United States have yet to be represented. Please contact Markes Johnson via e-mail at: Markes.E.Johnson@williams.edu.

RESTUDYING A GLOBAL STRATOTYPE FOR THE BASE OF THE SILURIAN: A REPORT THE MEMBERS OF THE SUBCOMMISSION ON SILURIAN STRATIGRAPHY

Michael J. Melchin
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Since its ratification in 1985 the Global Stratotype Section and Point (GSSP) for the base of the Silurian has proven to be controversial. A widespread feeling that Dob's Linn, southern Scotland, has been unsuitable as a GSSP for this level led to a call by the membership of the Subcommission on Silurian Stratigraphy in 2000, to formally re-examine this stratotype. I was asked to organize a new Ordovician-Silurian Boundary Working Group (OSBWG) to organize this restudy.

The current state of our understanding of stratigraphy and biostratigraphy of Dob's Linn has been recently reviewed by Melchin (2001), including some new contributions to its biostratigraphy by Melchin and Williams (2000), based on new collections. These new collections have yielded a much more diverse graptolite fauna than has previously been recorded at Dob's Linn (Fig. 1). The newly discovered taxa include a number of biostratigraphically useful forms both below and above the GSSP. In addition, the fauna includes distinctive elements of both paleotropical and peri-Gondwanan regions, thus facilitating more precise global correlation between these regions. Also included in the collections immediately above the GSSP are specimens of *A. ascensus* that appear to be primitive, transitional forms, retaining features of the proximal end characteristic of their probable normalograpid ancestors (Fig. 2) (Melchin and Williams, 2000). This, together with the broader phylogenetic framework into which the akidograptines have recently been placed (Melchin, 1998), suggests a reasonable line of ancestry for these taxa, and that the Dob's Linn succession captures their evolutionary origin (Fig. 3). Thus, it appears that Dob's Linn is not only adequate for providing the graptolite succession necessary for the precise definition of the O-S boundary, it may be the best section in the world for this purpose.

In addition to the graptolite data, Jacques Verniers et al (2003), presented preliminary results of study of Chitinozoa from Dob's Linn. The most significant of the findings presented were that the samples yielded a readily identifiable fauna with significant biostratigraphic potential, and, more importantly, that the strata immediately below the GSSP level yielded *Ancyrochitina ellesbayensis*, the index fossil for the highest Ordovician chitinozoan biozone on Anticosti Island. This finding helps to add considerably to the level of precision in correlation between Dob's Linn and Anticosti Island. Underwood et al. (1997) showed that a clear and recognizable carbon isotope chemostratigraphic record could be derived from the section as well. Furthermore, some of the many bentonite layers present in the succession have proven to be radiometrically datable (Tucker et al., 1990).

Dob's Linn still possesses significant drawbacks as a global stratotype section. It is structurally complicated, relatively condensed (although not by comparison with many other graptolitic localities), and of limited extent in outcrop. Besides graptolites and palynomorphs, other fossil groups are very poorly represented.

My proposal to the new OSBWG was that the current GSSP be maintained, despite the physical shortcomings of the locality. However, the biostratigraphic definition of the boundary must be changed to reflect our new understanding of the distribution of taxa. In particular, the GSSP is marked by the base of the *A. ascensus* Biozone, defined by the first appearance of *A. ascensus* and *P. praematurus.* Several other biostratigraphically useful taxa make their first appearance low in the *A. ascensus* Biozone, including *Normalograptus lubricus*, *Akidograptus cuneatus*, and *Atavograptus ceryx*. This proposal was unanimously accepted by the members of the OSBWG. I am now in the process of preparing a more complete proposal which will circulated to the titular members of the SSS for a vote.

A number of research areas still require a significant amount of work. Additional stratigraphically well-constrained radiometric dates are needed to more reliably calibrate the absolute age of the O-S

boundary. There remain significant uncertainties related to the timing of the conodont and chitinozoan biozonal boundaries and the end of the C-isotope excursion relative to the graptolite biozonation. In addition, various possible sections and stratigraphic horizons should be tested for levels of uncertainty in the degree to which they can be regionally and globally correlated using constrained optimization (Sadler, 2001) or other quantitative methods. It may be possible to weigh the relative merits of possible GSSP candidates as measured by the precision with which they can be placed in a global composite succession.

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THE LLANDOVERY-WENLOCK BOUNDARY

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In *Silurian Times* **11** details were provided of two papers (then in press) that indicated that Ireviken Event Datum Point (IEDP) 2, which is coincident with the 'Golden Spike' at the current GSSP for the Llandovery-Wenlock boundary, does not correlate with the base of the *Cyrtograptus centrifugus* Biozone, but with a higher level in the graptolite biozonal sequence, at or near to the base of the *Cyrtograptus murchisoni* Biozone. One of these Loydell *et al.* (2003) has now been published; publication of the other (Mullins and Aldridge in press) is imminent. In addition, Männik (2003, p. 21) has suggested that IEDP 2 in the Ruhnu core, Estonia, lies within the *murchisoni* Biozone.

It was of course originally intended that the Llandovery-Wenlock boundary should be at the base of the *Cyrtograptus centrifugus* Biozone (Martinsson *et al.* 1981) and the vast majority of authors has used this level as the boundary.

At the Field Meeting of the International Subcommission on Silurian Stratigraphy in Argentina, the Titular Members present were unanimous in their view that stratigraphical stability would best be served by retaining the base of the *Cyrtograptus centrifugus* Biozone as that of the Wenlock and that therefore a new GSSP should be sought.

It is of course vitally important that any newly proposed GSSP is fit for the purpose. The section must, therefore, contain graptolites in sufficient numbers to delimit precisely the base of the *centrifugus* Biozone. It must also contain chitinozoans and/or conodonts to enable correlation into non-graptolitic sections, primarily in shallower water facies.

Possible GSSPs

Given that *Cyrtograptus centrifugus* and *Cyrtograptus insectus* (index fossil of the highest Llandovery graptolite biozone) were both first described from Bohemia, this might appear to be the obvious choice for a GSSP.
Unfortunately, because of the growth of the city of Prague, only one continuous section through the Llandovery-Wenlock boundary remains exposed in Bohemia. This is at Malá Chuchle-Vyskočilka. Petr Štorch visited the locality late in March. He reports that although the *murchisoni* (*bohemicus*) and *riccartonensis* biozones of the Sheinwoodian are both well exposed here on a steep slope, exposures of the biozones straddling the Llandovery-Wenlock boundary are currently, in general, less accessible and excavation would be required to expose the boundary satisfactorily. An additional potential problem here is the presence of a basalt sill which may influence significantly the quality of palynomorph preservation.

To assess whether it is worthwhile undertaking the necessary work to expose the boundary here, samples from the exposed part of the section are currently being processed (in Portsmouth, by Anthony Butcher) for chitinozoans.

Perhaps elsewhere in Peri-Gondwanan Europe there are good sections through the Llandovery-Wenlock boundary, that yield graptolites and conodonts and/or chitinozoans? Sections studied in Spain thus far have not been appropriate: the Corral de Calatrava section has a significant unconformity within it (the upper *lapworthi* through to *centrifugus* biozones are missing), whilst the El Pintado section (graptolites not yet studied in detail) does not yield either chitinozoans or conodonts.

Work is to commence this summer on sections in Wales that expose a similar sequence to that described from the Banwy River section by Loydell and Cave (1996), but that lack the structural complexity that this section possesses close to the Llandovery-Wenlock boundary. Results of this work will be presented in next year's *Silurian Times*.

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SILURIAN RESEARCH 2003-2004

G.L.Albanesi and G.Ortega (Argentina) - We are working on a new project about Silurian biostratigraphy of the Argentine Precordillera to provide a conodont-graptolite linkage for the La Chilca and Los Espejos formations, at Talacasto Range, San Juan Province.

Dick Aldridge (UK) - Administrative burdens and my continuing research on the Chengjiang and Soom Shale Lagerstätten have limited my work on the Silurian for the last couple of years, although I keep in touch through research students (David Gladwell, David Jones) and colleagues. Gary Mullins and I are currently co-ordinating an international project (phytoPal) to look at the record of phytoplankton throughout the Palaeozoic and into the early Triassic; the first workshop under this programme was held in Leicester in December 2003.

Howard A. Armstrong (UK) - Work is continuing on the Upper Ordovician-Lower Silurian succession of Jordan with a view to understanding environmental and biological changes associated with the Hirnantian glaciation. Sequence stratigraphy, stable isotopes and sedimentology will hopefully be published later this year. Ontogeny in Silurian coniform euconodonts is also occupying much of my research time. The revised edition of Microfossils will be published by Blackwell in July this year.

Richard A. Batchelor (UK) - I am compiling a major paper based on all geochemical data for Silurian and Ordovician metabentonites, in an attempt to identify a workable geochemical golden spike. Progress has been delayed due to a diversion into Proterozoic ash beds. Collaboration continues with Tarmo Kiipli (Estonia) on Silurian (and Ordovician) metabentonites.

D.E.Bates (Wales) - Current research: continues on retiolitids, with the paper on retiolitid evolution and classification with Anna Kozlowska and Alf Lenz. A paper is in preparation, with Anna Kozlowska, Jorg Maletz and Alf Lenz on the genus *Plectograptus*. Other work continues on other genera, including *Paraplectograptus, Eisenackograptus, Gothograptus, Holoretiolites, Spinograptus*. A paper is in preparation with Kate Saunders on the ultrastructure of the dendroid genus *Desmograptus*, and work is in progress on the ultrastructure of other dendroid genera.

Alain Blieck (France) - I have not been working on Silurian vertebrates last year, but collaboration with colleagues working with Silurian vertebrates is in progress. During the field trip of the Gross Symposium 2 (held in Riga, Latvia, September 2003) on both the Devonian of Latvia and the Silurian of Saaremaa,

Estonia, several samples were collected. They are mostly concerned with Silurian carbonates from Saaremaa. This material has been given to a first year Master's student of my university, for training work on Palaeozoic microvertebrate remains (preparation, drawing, SEM micrographs, taxonomy, biostratigraphy). Zivile Zigaite, a last year Master's student of Dr. V. Karatajute-Talimaa (Vilnius, Lithuania), has spent a week and a half in our CNRS research unit, last end of March, for working on Silurian microvertebrate remains from Siberia, Tuva and Mongolia.

Robert B. Blodgett (USA) - My current work in Silurian matters includes several manuscripts in progress on Alaskan Silurian fossils, including gastropods (with David M. Rohr) and brachiopods (with Arthur J. Boucot) from Prince of Wales Island, southeast Alaska. These are from the Alexander terrane, an accreted terrane comprising much of southeastern Alaska, and whose fossil fauna indicate that it probably originated as rift block derived from the margins of the ancient Siberian paleocontinent or the Urals. Another manuscript is planned describing the first bona-fide Silurian age scaphopods ever noted, also from Prince of Wales Island. Much of my current research activities are now being devoted to the development of an on-line paleontological database (URL address: www.alaskafossil.org) for the State of Alaska (supported by U.S. Congressional funding). This work is being done in collaboration with my colleague Dr. Zhang Ning from Corvallis, Oregon (formerly with the Nanjing Institute of Geology & Palaeontology). This website will present all available unpublished fossil data from U.S. Geological Survey sources (the so-called internal E&R reports), as well as from the published literature. To date we have entered data from over 3,000 localities, providing full taxonomic lists, available geographic information, as well as all comments provided by the individual paleontologists who have studied these collections. A rough estimate of 10,000+ more localities exist for the State. Alaska will be the first State for which such a paleontological database will exist. This database should be an invaluable tool for future geological investigations within the State, as well as a useful tool for paleontologists and paleobiogeographers.

Olga K. Bogolepova (Sweden) - I continue to work as an assistant coordinator and participant of the INTAS-NEMLOR (Northern Eurasian Margin & Lomonosov Ridge) project. This project focuses on the tectonic evolution of the Eurasian Arctic. The science involved in the NEMLOR project is directly relevant to the United Nation's Convention on the "Law of the Sea"(UNCLOS Article 76) as applied to the Arctic and the project brings together western (Sweden, UK, Germany and Norway) and the key Russian geoscientists who have been responsible for defining the geological basis for the UNCLOS claims in the Russian Arctic.

The 2004 fieldwork will target Novaya Zemlya; this area provides complete Vendian-Devonian sedimentary successions with a rich faunal content. My studies will focus on the Lower Palaeozoic sedimentary successions and palaeontology of the southernmost and northernmost Novaya Zemlya, that have both been correlated southwards into the Pai-Khoi and the Polar Urals and eastwards across the Kara Sea to northern Taimyr and Severnaya Zemlya. As usual, we are planning to collect all groups of fauna, and I invite those who are interested in these areas to contact me for further joint work and scientific exchange.

Heidi Caldon (Australia) completed an Honours degree on the Late Silurian Lau Event as expressed in the Coral Gardens Formation in the Broken River region of northern Queensland, giving special attention to algae, foraminifers, macrofaunas and sedimentology. She has commenced working towards a PhD on other Lau Event sequences in the Broken River region.

Mikael Calner (Sweden) - I continue my research on the well-preserved suite of carbonate platforms that evolved along the southern margin of the Baltic Shield and the East European Platform during the Silurian and which now can be studied on Gotland and in the East Baltic area. The research involves the study of carbonate and siliciclastic depositional environments as well as their interaction, unconformity development, and on a larger scale, the architecture and evolution of individual platforms. The cyclic

growth of platforms on Gotland is associated to at least seven moderate to major faunal extinction events, and long-term achievements include the establishment and integration of high-resolution sequence and event stratigraphic frameworks for the basin. This takes some time, I´m afraid. These frameworks will subsequently be compared with the development in remote basins. Three shallow drill cores have been recovered from Gotland this year and two additional cores will be brought up in May/June 2004. These are going through the stratigraphic intervals for the Mulde (Late Wenlock) and Lau (Late Ludlow) extinction events and will be sampled for C and O stable isotopes in order to establish continuous high-resolution curves and improve the correlation between the previously recorded North American excursions and coeval shifts in the Baltic Basin. I´m always interested in co-operations and interested researchers can contact me regarding these isotope curves. In another project (with Peter Dahlqvist, Lund University), I´m working on the Late Ordovician-Early Silurian stratigraphic succession of the Caledonian foreland basin in order to better tie stratigraphic changes to the Hirnantian glacial interval. This year I will be involved in the field excursion to Gotland during the opening meeting of the new IGCP 503 project on Early Palaeozoic Palaeogeography and Palaeoclimate (symposium-chair: Axel Munnecke, Erlangen). Together with Mats E. Eriksson and Lennart Jeppsson I form the organizing committee for the Subcommission on Silurian Stratigraphy Field Meeting on Gotland in August 2005 (see announcement in this issue of Silurian Times).

Brian Chatterton (Canada) - Hopefully, the large Palaeontographica Canadiana monograph on the Anticosti Island Silurian trilobites will appear shortly (I am waiting for the page proofs). It is by myself and Rolf Ludvigsen, and is supposed to be about 250 pages in length, and includes 85 plates of trilobites, including many complete, articulated specimens.

Chen Xu (China) - I am actively working on Ordovician-Silurian transition strata and graptolites. It includes the Hirnantian GSSP, latest Ordovician to earliest Silurian graptolite taxonomy and extinction-recovery-radiation events. From 2005, I am working on Darriwilian to "Caradocian" graptolites from Tarim, Western North China and Yangtze region. My co-workers include Zhang Yuandong, Fan Juanxian, Mike Melchin, Dan Goldman and Stan Finney. On the other hand, I am also working with Stig Bergstrom, Warren Huff, and M. Saltzman on Ordovician conodont bearing strata and isotope analysis. I have invited Stig for a short field work in Guizhou and Anhui in April, 2004. Dan Goldman is invited to visit Nanjing and work with me on the Darriwilian-"Caradocian" graptolites from April to May, 2005. I am planing to participate the coming 503 Project conference in Milwaukee in June. Will work with Art Boucot to complete editing of our Climate Book in Corvallis as well. Will participate the ICS meeting in Belgium in September. I am also try to apply a traveling support for a short visit to Bohemia for the O-S sections and then visit Poland afterwards in September.

Euan Clarkson (Scotland) - Although I'm mainly working with Swedish Cambrian trilobites these days, I still have an involvement with the Silurian of Scotland. David Harper, Lyall Anderson and I, as editors, are assembling a team of experts to produce a fully illustrated field guide to the geology and fossils of the Silurian rocks of the Pentland Hills, near Edinburgh. Hopefully we shall have all manuscripts and text ready by the end of 2004, with a view to publication in the Palaeontological Association's Field Guide Series in 2005. The relatively long introductory section by Euan Clarkson and Cecilia Taylor is already written. The main interest of this is that we have in the Pentland Hills a regressive sequence from relatively deep-water sediments to continental redbeds, with the growth of an offshore barrier system and a marine to brackish lagoon in the transitional sediments. Further chitinozoan biostratigraphical work, extending previous studies in the Pentland Hills, is planned in the future.

Robin Cocks (NHM, London, England) had another busy year. A paper (with Richard Fortey and Lee Chai-peng) was submitted on peninsular Malaysia and southern Thailand which integrated the many differing Cambrian to Devonian stratigraphies within a unified system, including the division of the hitherto Ordovician to late Silurian Setul Limestone in to four new formations. The many faunal records

across all groups were also reviewed, and it transpires that the anomalous allegedly "Silurian" record of the trilobite Dalmanitina malayensis Kobayashi is in fact yet another Hirnantian synonym of Mucronaspis mucronata. Another paper, with Trond Torsvik and now in proof, was submitted on 400 to 250 Ma global geography: this again combined both biostratigraphic and palaeomagnetic data to place the terranes as they moved through time. Work progressed on the late Ordovician Boda Limestone strophomenoids from Sweden and (with Leonid Popov) the late Ordovician Dulankara Formation brachiopod fauna from Kazakhstan. Several entries, including one on the Silurian, were written for the Academic Press Encyclopedia of Geology, to be published in November 2004.

Damian Cole (Australia) continues to work on conodonts from numerous small Silurian limestone bodies between Michelago and the Wombeyan Caves of New South Wales. A manuscript (with James Valentine) on early Ludlow inarticulate brachiopods from Murruin Creek is approaching submission.

Carlo Corradini (Italy) - The research on Silurian sequences in Sardinia and in the Carnic Alps continue. In the Carnic Alps I'm investigating the Orthoceras Limestone in the Italian side of the chain (with L. Simonetto, Udine, P. Serventi, Modena and M. Pondrelli, Pescara); in Sardinia research is mainly focused on conodont biostratigraphy of the Ockerkalk facies.

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) has almost finished a dissertation on the Late Ordovician to earliest Silurian rugose corals of Anticosti Island, Quebec. Raegan Porter (M.Sc. student) is conducting a paleoenvironmental and paleoecological reconstruction of a stromatoporoid/coral-rich Silurian unit in southern Manitoba. M.Sc. and Ph.D. projects on corals, paleoecology and stratigraphy are available (please see http://www.umanitoba.ca/geoscience/faculty/elias/elias.html).

Mats Eriksson (Sweden) - My research focuses on fossil scolecodonts (the jaws of polychaete annelid worms). Although all aspects of this microfossil group are of interest, my research is predominantly devoted to Ordovician and Silurian faunas from USA and Sweden. A variety of fields, such as taxonomy, biostratigraphy, event studies, paleoecology, and paleobiogeography, are embraced. In addition to the scolecodont research I work on Late Cambrian phosphatocopid and bradoriid arthropods from Sweden, as a member of the Lund Cambrian Research Group. My project 'Upper Ordovician and Silurian Scolecodont Biostratigraphy and Biodiversity, linked to Sequence and Event Stratigraphy' and my current research position are funded by the Swedish Research Council (VR).

Annalisa Ferretti (Italy) - My research on the Silurian cephalopod limestone biofacies of the Carnic Alps continues (together with Kathleen Histon). Within this topic, a paper on ooidal ironstones and laminated ferruginous deposits, tentatively regarded as microbial, is in press. Problematic remains from the Silurian-Early Devonian of Bohemia are currently under study (together with Enrico Serpagli).

Barry Fordham (Australia), now doing sustainability research at CSIRO in Canberra, continues his conodont studies in his spare time. His is currently collaborating with Bob Nicoll on a small Silurian? collection from the subsurface Adavale Basin, Queensland.

Terry Furey-Greig (Australia) is now employed as a biostratigrapher by the Petroleum Division of CSIRO. His work with Ruth Mawson and Andrew Simpson on biogeographic implications of Late Ordovician to Middle Devonian conodont faunas globally is presently on hold. He is continuing a modicum of part-time work on conodonts from previously neglected, Late Ordovician-Early Silurian

limestones, and with Masaki Umeda (Kyoto - radiolarians) who is providing matrix-ages for such occurrences.

Maurizio Gnoli (Italy) - In these years I continue to work on nautiloid cephalopods, mainly systematics and paleobiogeography.

Vachik Hairapetian (Iran) - I am a PhD student of vertebrate palaeontology in University of Esfahan (Iran). Although my main focus on Late Devonian – Early Carboniferous vertebrate micro-remains, but just recently I begun and have sampled a Silurian sequence in eastern Iran.

C.H. Holland - I continue to work on British Silurian cephalopods.

Lennart Jeppsson (Sweden) - The department was moved to another building in 2003 (see the list of addresses). Hence, many months was spent planning and leading the building of a new computerised laboratory for extraction of conodonts and other fossils.

1. Two long papers with Mikael Calner about the Mulde Event (and adjacent intervals) were published in 2003, and a shorter one is in press. Results include e.g.: 1. Isotope, conodont, graptolite, sediment, sea level, etc. data were placed in a high resolution stratigraphy, revealing the sequence of changes, from very shallow carbonate sequences to distal graptolitic alum shales. 2. A revised conodont zonation for the mid Homerian with a much higher resolution. It is correlated with the most detailed graptolite zonation through co-ocurring graptolite records. 3. A Homerian numerical time scale. 4. Both exinctions and isotope changes begun before a major sea level drop, falsifying the suggestions that sea level changes cause mass extinctions. 5. Similarly, the improved stratigraphy and correlation falsified the suggestion that isotope changes were not coeval. 6. The sea level excursion lasted less than 30 000 years and had an amplitude of at least 16 m, hence, other causes than a glaciation, the Gannarve Glaciation, can be ruled out.

3. A similar high resolution study of the Lau Event is in manuscripts.

4. A revision of the Högklint Fm, the Tofta Fm and the lowermost Slite Group is also in manuscripts. Some of the 3. + 4. manuscripts will be finished during 2004.

As a result of these and other conodont work, much of the correlations along strike on Gotland changes, in some cases considerably. Anyone discussing other faunas on Gotland and in need of a better stratigraphy are welcome to ask me about the probable age of particular localities (in the case of old collections, please include all data stored with the specimens, and other data that may be useful). Similarly, correlations with other areas can be improved.

I plan to spend most of my research time during the next 3-4 years with similar high resolution studies of selected events with weaker effects.

Markes E. Johnson (USA) - Plans are moving forward for publication of a third volume of Silurian research to be released as a bulletin of the New York State Museum. Markes Johnson and Ed Landing will edit a volume with the tentative title: "Silurian Lands and Seas - Paleogeography of Laurentia and Oaxacia." The volume will include manuscripts updated from presentations originally made regarding North America at the 1996 Second International Symposium on the Silurian System held in Rochester, New York. Six manuscripts are now in hand and are being circulated for reviews. The editors will welcome participation from other authors who would like to become involved with the project. Only one contribution has been submitted for Canada, for example, and some parts of the United States have yet to be represented. Please contact Markes Johnson via e-mail.

Dimitri Kaljo (Estonia) continues to work on Ordovician and Silurian isotope geology and rugose coral palaeontology. A joint project with colleagues from Vilnius and Tallinn (see ST 11) on the early Ludfordian isotopic and biotic event is close to completion.

Steve Kershaw (UK) - Work progresses on reefs and reef-related settings in Mid-Palaeozoic. Work with Yue Li (Nanjing, currently in Tokyo) on Ordovician and Silurian reefs continues, and further papers are being prepared, on the sequences in China. Graham Young, Bruno Mistiaen and myself are planning further work on growth banding in stromatoporoids and corals, and on intergrowths between stromatoporoids and corals.

Jiří Kříž (Czech Republic) – Current research for 2003 – 2006: Silurian Lunulacardiidae. Systematic, evolution, ontogeny, palaeoecology, biostratigraphy.

Current research activities of Štěpán Manda and Jiří Kříž for 2004-2007: Environment and palaeo-communities in the Ludlow of the Prague Basin (Perunica, Bohemia). The Prague Basin represents a world classic area of the Silurian marine environment where highly fossiliferous sediments were deposited in various environments. Ideal conditions exist here to study palaeo-communities, their evolution and relationship to the environment together with detailed sedimentation analyses. In the segmented basin of a rift type the sedimentation was influenced by significant synsedimentary tectonics and volcanic activity. Carbonate sedimentation proceeded on a relatively small isolated elevations surrounded by the sedimentation of black shale. The research of the isolated carbonate platforms facies development in the Prague Basin offers a possibility to set up the model of the facies development and to specify the eustatic oscillation before, during and after the important global mid-Silurian Kozlowskii Event (Ludlow, late Ludfordian). In the Prague Basin we have exceptional opportunity to study the evidence and consequences of the event in the shallow water palaeo-communities and carbonate sediments development and to explain rapid changes in the past marine ecosystem in this case. Simultaneously, the results of this study enable us to correlate the Kozlowskii Event better with the peri-Gondwana and with other regions of the Silurian carbonate sedimentation.

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

Alain Le Herisse (France) - Works continue on marine palynomorphs and especially acritarchs from Paleozoic successions from several parts of the world. The activity interests the upper Ordovician glacial and postglacial, from Gondwanan and peri-gondwanan situation and a paper is in preparation, in collaboration with Marco Vecoli, Florentin Paris, Mansour Al-Ruwaili, Dominique Massa and Axel Munnecke. Others papers are in progress on the Silurian and Devonian of South America (Brazil and Bolivia). Fundamental research is also connected to operational palynology, resulting in scientific training for biostratigraphers working in the industry, in palynological consusltancy and supervision of 2 PHD students.

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 Loydell (UK) - 2003 saw the completion of a large project on isolated *Streptograptus* and *Pseudostreptograptus* from the Llandovery of Sweden (with Jörg Maletz). Publication of a paper on the preservation of graptolite soft tissue is imminent. Current priorities, in addition to work on the Llandovery-Wenlock boundary (see separate report), are to complete work on graptolite material from

Estonia and Latvia (species identified during work with Viiu Nestor and Peep Männik), Spain (with Petr Štorch and Juan Carlos Gutiérrez-Marco) and Jordan (with Sebastian Lüning). Three Ph.D. students are nearing completion of their work: Andrew Mallett on the graptolite biostratigraphy of the Wenlock of southern Scotland, Stephen Doherty on the graptolite biostratigraphy of the Wenlock of North Wales, and Anthony Butcher on the chitinozoan biostratigraphy of the Llandovery of Illinois and of the lower Rhuddanian of Jordan.

Štěpán Manda (Czech Republic) completed in 2003 his Charles University studies and became the full time employee of the Czech Geological Survey, Prague as a specialist for the Lower Palaeozoic of Bohemia and for the Lower Palaeozoic cephalopods. Current research activity of Štěpán Manda for 2004: Silurian migrations of the nautiloid cephalopods to the Prague Basin, peri-Gondwana (Bohemia): an example genus *Phragmocreas* Broderip in Sowerby in Murchison, 1939

Peep Mannik - I continue to work on the evolution, ecology and taxonomy of Ordovician and Silurian conodonts from Baltic, Arctic regions and Siberia, and on conodont- based high-resolution stratigraphy. Joint studies of evolution and high- resolution stratigraphy of the Early Palaeozoic sedimentary basins in northern Baltica, Siberia and Laurentia palaeocontinents (with colleagues from Lund, Vilnius, StPetersburg, Syktyvkar, Ukhta, Ekaterinburg, Novosibirsk, Lubbock and Milwaukee) are going on.

David Mathieson (Australia) continues working on conodont faunas from small limestone intervals in the Cobar–Bourke region of western New South Wales.

Ruth Mawson (Australia) continues work on various Silurian conodont projects including colour alteration indices (CAI) vs. illite crystallinity patterns for the mid-Palaeozoic of eastern Australia and northernmost Pakistan (with Covadonga Brime and John Talent)..

Tatiana Modzalevskaya (Russia) - I'm actively working on Regional Silurian Stratigraphy of Urals, the correlation chart of which with other Russian Arctic regions the same, as Late Ordovician-Silurian hypostratotypes will be prepared till the end of the next year.

Peter Molloy (Australia) continues investigation of conodonts from various Silurian sequences in eastern Australia, principally from the Orange district of east-central New South Wales, focusing primarily on the Ireviken Event, especially at Boree Creek, New South Wales.

Petras Musteikis - Currently I was working on Silurian sequence stratigraphy in Lithuania, Silurian reefal carbonates and brachiopod communities distribution. Unfortunately, administration takes too much time, and it is almost no time for the science.

Viiu Nestor (Estonia) - I continue working on the biostratigraphy, taxonomy and ecology of Silurian chitinozoans in the East Baltic sections. At present I concentrate on Llandovery - Wenlock boundary problems in some Estonian cores. The integrated biostratigraphical study of chitinozoans and graptolites in the Telychian of the Ventspils core, Latvia is going on together with David Loydell (UK).

Ross Parkes (Australia) is close to submitting his voluminous PhD dissertation on the conodonts and sedimentology of the superbly exposed Silurian sequence at Quidong in SE New South Wales.

Jose Manuel Picarra (Portugal) - Lower Paleozoic stratigraphy of South Portugal (Ossa Morena Zone) and Silurian graptolites from Portugal. I have a joint project with Juan Carlos Gutiérrez-Marco ("The Silurian of the Galiza-Trás os Montes Zone, Portugal-Spain"). I continue the study of the Silurian graptolites of

the Armorican Massif (integrated in a Portuguese-French project with M. Robardet, R. Gourvennec and J. Le Menn).

Rong Jiayu (China) - I am continuing to study the latest Ordovician mass extinction and Early Silurian recovery. I have been studying the Late Ordovician and Early Silurian brachiopods, including pentamerids with Zhan Renbin from Nanjing Institute and Jisuo Jin from Western Ontario University. I have also started to study the Early-Middle Ordovician brachiopod radiation based on the data from South China.

Claudia Rubinstein (Argentina) - I continue working on Paleozoic palynomorphs (acritarchs, chitinozoans, cryptospores and spores) from Argentina and South America.
Current projects involve: The Ordovician and Silurian from Puna, Eastern Cordillera, Subandean Ranges and Famatina, in northwestern Argentina, with special emphasis in the Ordovician- Silurian boundary; The upper Ordovician to the middle Devonian from the Precordillera Basin in San Juan and Mendoza Provinces, Argentina, in collaboration with Philippe Steemans; The upper Silurian to the lower Devonian from Brazil, in collaboration with Philippe Steemans (Liege, Belgium) and Alain Le Herisse (Brest, France).

Valeri Sachanski - 1. Correlation of the Palaeozoic Terranes in Bulgaria and NW Turkey: Implications for theTectonic-Palaeogeographic Evolution of Northern Gondwana - Leaders: Goncuoglu, M. C., Yanev, S.; 2. Analisis de discontinuidades estratigraficas y su aplication ala correlacion del Paleozoico hispano-bulgaro - Leaders: Gutierres-Marco, J.C., Yanev, S.

Enrico Serpagli (Italy) - Current researches are mostly devoted on conodonts from Bohemian levels already dated with graptolites (with P.Storch) and on some problematic remains from the same horizons (with A,Ferretti).

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.

Connie Soja (USA) - In summer 2004, an NSF travel grant will allow me to conduct preliminary research on Silurian rocks in Salair (western Siberia) with Anna Antoshkina and in Mongolia with Chuluun Minjin. We hope to determine the extent of Silurian microbial-sponge reefs that may exist in both areas and what these indicate about changing environmental conditions in the Uralian seaway in the Late Silurian-Early Devonian.

2004 Pardee Keynote Symposium: Robert Riding and I are co-convening a special symposium at the 2004 GSA annual meeting in Denver on: Adversity, Advantages, Opportunities: Phanerozoic Stromatolites as "Survivor" vs. "Disaster" Taxa. This interdisciplinary forum will reexamine the role of stromatolites in Phanerozoic ecosystems, particularly the importance of post-Cryptozoic microbial communities; the biotic and abiotic agents that contributed to their development, decline, and preservation; and their co-evolutionary history with metazoans. As indicated on GSA's website, "these Pardee keynote sessions are special events of broad interest to the geoscience community. They represent hot issues on the leading edge in a scientific discipline or area of public policy, address broad fundamental issues, and are interdisciplinary. Selection is on a competitive basis." Silurian stromatolite reefs in Alaska, Baltica, and Siberia will be the focus of my talk; hope anyone who has an interest in Phanerozoic stromatolites will attend the symposium.

Des Strusz (Australia) continues to work steadily through the brachiopod fauna of the Yass Syncline, near Canberra, although a few side-tracks have slowed progress over the last year (not to mention the

difficulties of dealing with smallish smooth pentamerids). However a paper on that group is about ready for submission. A short paper with Tony Wright of Wollongong on small faunas from near Orange (important because closely tied in to graptolite zones) has been published. Please also note that, following a change in departmental name from Geology to Earth and Marine Sciences, there has been a change in e-mail address.

John Talent's (Australia) research continues to be focused on aspects of the Late Silurian Lau Event with Lennart Jeppsson, Andrew Simpson, Ruth Mawson, Peter Molloy and others, on stratigraphic alignments (conodont-based) connected with the Benambran Orogeny (broadly Llandovery) in eastern Australia, and on Late Ordovician–Llandovery brachiopods of the Pin Formation of Spiti, NW India (with Thomas Suttner, University of Vienna).

James Valentine (Australia) continues attacking brachiopods (especially inarticulates) across the early Wenlock Irevekin Event at Boree Creek in east-central New South Wales.

Viive Viira (Estonia) - Continuing work on Ordovician and Silurian conodonts.

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. Drilling of the Paleozoic rocks of this region was carried out in 2003. I am collaborating with Stephen Kershaw (Brunel University England) on paleobiology of Paleozoic corals and stromatoporoids. A manuscript accepted for publication 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.

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