International Organisation of Palaeobotany
(Homepage: www.palaeobotany.org)

IOP NEWSLETTER 95

August 2011

CONTENTS

The views expressed in the newsletter are those of its correspondents, and do not necessarily reflect the policy of IOP.

Please send us your contributions for the next edition of our newsletter (October 2011) the latest by October 15th, 2011.

IOP Logo: The evolution of plant architecture (© by A. R. Hemsley)

NOTE FROM THE SECRETARY

Dear colleagues and friends,

first of all I apologise for the delay in posting this newsletter issue. The IOPC IX 2012 in Tokyo is approaching quickly. I am very happy that the organisers have confirmed their ability to host IOP after the earthquake and Fukushima disaster (read pp. 2-3). In Tokyo we need to decide about the conference venue in 2016. In newsletter 94 we asked for offers to organise the conference. So far, however, we lack any offer. Please take time to think about and to discuss it with colleagues. Consider that it is not only lot of work coming with the organisation but also essential credit for you and your institution (read p. 4).
For student participants in Tokyo, I am proud to announce that IOP offers several **Mike Boulter student travel awards**, deadline for applications is February, 29th, 2012 (read p. 4)
This newsletter issue includes also some interesting book reviews (read pp. 13-16).
The next newsletter issue shall appear in time. So please, be prepared to send information to be included to ute.knoerr>>at<<smns-bw.de.

Enjoy this newsletter and kind regards

Johanna Eder

INFORMATION ON IPC/IOPC IX 2012 FROM THE ORGANISING COMMITTEE

IPC/IOPC 2012 in Tokyo - The Organising Committee repeats the invitation

On behalf of the Organising Committee (OC) of the IPC/IOPC 2012, I would like to express my heartfelt thanks to all of the IOP members and friends for extending us your kind words and various supports in relation to the 3.11 disaster and later Fukushima Power Plant collapse. Fortunately none of our regional members was injured nor seriously affected personally. Some institutions and laboratories in or near the main disaster area are affected by strong quake movement; things and equipments fallen, but few building damages. Tsunami hit only coastal areas far from our colleagues and related institutions. Some famous plant fossil sites are, however, damaged either by the quake or tsunami.

At the Conference venue, Chuo University in Tokyo, everything shook hard (it is said, because I was on a jet just descending to Tokyo International Airport), but nothing serious happened, though lab staffs could not return home on the same day because of traffic paralysation and electricity fall-down. All campus buildings are safe and the faculty systems function normally.

Fukushima Atomic Power Reactors exploded on 15 March, my birthday (3.11 is my wife's), and radiation levels in Tokyo and adjacent areas exceeded natural radiation amount, but were within a safe level. It should be noted that the Fukushima reactors still need serious care. However, citizens outside the evacuation area (30 km from the power station) continue normal life under stable and safe circumstances. Tokyo is 200 km away from Fukushima power plant and is safe. The OC observes that electric power supply necessary for air-conditioning will be provided in 2012.

According to social, economical and environmental destructions after 3.11, the OC had to wait for proper time to restart preparation activities for the 2012 meeting. **It is our great pleasure that we could start organising things again**.

The OC decisions made this week and subsequent announcement can be referred to below.

Harufumi Nishida

The IPC XIII/IOPC IX meeting in Tokyo in August 2012 as previously planned

We are very pleased to inform you that the IPC XIII/IOPC IX 2012 will be held at Chuo University, Tokyo in August 23 – 30 as previously planned. The Organising Committee made the following announcement, June 20th, 2011. Also, here, we like to give you some information including the updates on the schedules and so on.

1. We are preparing for a call for applications of **symposium proposals**, which will start in July and accept the applications **until 31 October 2011**.

2. Tokyo is the centre of business and politics of Japan, and the living and travelling expense is relatively high; however, Tokyo is also a place for a large number of college students and international and domestic visitors. Accordingly, a wide range of services and facilities is available and affordable for international visitors and conference participants. Please take a look at JNTO website (http://www.jnto.go.jp/eng/) for further practical information for the trip to Tokyo and its vicinity.

Additional information materials is available in the second circular that has appeared on our web site (http://wwwsoc.nii.ac.jp/psj3/en/index.htm).

We would like to appreciate for your further supports for a successful meeting in Tokyo in August 2012. See many of you in Tokyo soon!

Truly yours,

Hikaru Takahara

Secretary General of the joint IPC/IOPC meeting in Japan

Shinya Sugita

IFPS council of the Palynological Society of Japan, Vice-President of IFPS

Harufumi Nishida

Conference/Congress Member of IOP, Vice-President of the Organising Committee of IPC/IOPC 2012

The President of the Organising Committee announces the IPC XIII/IOPC IX meeting in Tokyo in August 2012

The Organising Committee of the IPC XIII/IOPC IX 2012 meeting is pleased to announce that the meeting will be held in Tokyo in August 23 – 30 as previously planned. As many of you already know, many parts of northern Japan had suffered major damages by the March 11 earthquake and tsunami this year. Those events and related accidents at the Fukushima nuclear power-plants are still affecting many lives in the region. Although the recovery from the disasters has been slow and hard in the region, the progress is steady and sure-footed by many volunteers and local people backed by various governmental agencies. As widely reported, the accidents at the Fukushima nuclear plants have affected the electric supply for many business and industrial activities in north-eastern Japan. Fortunately, the effects on the lives of more than 20 million people in Tokyo and its vicinity are very limited, and the radiation level in Tokyo is far below the safety thresholds (web site 1 and 2, see below). Since right after the disasters the Organising Committee has contacted various organisations and people related to the IFPS and IOP about possible options and contingency plans for a successful and safe meeting next year. All things considering, the Organising Committee has come to the conclusion that we will be able to hold safely the IPC/IOP meeting at the Chuo University in Tokyo next summer.

Because of the unexpected events our preparations for the conference are slightly behind the schedule. New information materials will be available in the second circular that will appear in our web site (web site 3) in July including updates on the whole program and our contingency plans in case of unexpected situations, and others.

Over the last three months we have received warm supports and encouragements from many members of the IFPS and IOP. We are grateful to all of you and appreciate further supports for a successful meeting in Tokyo in August 2012. See many of you in Tokyo soon!

web site 1:
http://www.mext.go.jp/english/incident/1303986.htm

web site 2:
http://ftp.jaist.ac.jp/pub/emergency/monitoring.tokyo-eiken.go.jp/monitoring/index-e.html

web site 3:
http://wwwsoc.nii.ac.jp/psj3/en/index.htm

Truly yours,
Norio Sahashi
President of the Organising Committee of the
IPC XIII/IOPC IX 2012
June 20th, 2011

MIKE BOULTER STUDENT TRAVEL AWARDS FOR IOPC IX

The International Organisation of Palaeobotany is planning to offer several travel awards to help student IOP members defray the cost of presenting their research at IOPC IX in Tokyo, Japan next year. All palaeobotany students who are members of IOP and will be presenting their research at IOPC are eligible to apply.

Awards will be in the amount of US $500.00 and will be presented to students following their presentation at IOPC IX. Students who do not attend the conference and/or do not make the presentation indicated in the application are not eligible for funds.

Applications are to be sent to the Secretary /Treasurer of IOP via e-mail attachment, johanna.eder>>at<<smns-bw.de latest by February 28th, 2012, and must include the following items.

1. A 1-2 page application letter indicating the title of the abstract that has been accepted with the student as the senior (presenting) author.
2. A copy of the accepted abstract.
3. A budget that includes a listing of costs for attending the conference and sources of funding that have been secured for all costs except the IOP Student Travel award.

RECALL FOR NOMINATIONS FOR NEW IOP EXECUTIVE OFFICERS AND FOR PROPOSALS TO HOST IOPC X (2016)

The Executive Committee is still seeking nominations for the President, three Vice Presidents, three Members at Large, and the Secretary /Treasurer/Newsletter editor. The next election will be held in 2012 and completed during IOPC IX in Tokyo. **Nominations must be made to the Secretary, in writing, before December 1st 2011**. Both, mailed (Johanna Eder-Kovar, Secretary / Treasurer IOP, State Museum of Natural History Stuttgart, Rosenstein 1, 70191 Stuttgart, Germany) and e-mailed < johanna.eder>>at<<smns-bw.de > nominations will be accepted. For more details please see IOP newsletter # 94.

If you or someone else you know may be interested in hosting **IOPC X,** think about it seriously, talk it over with your colleagues, discuss your anticipated proposal with the Secretary/Treasurer, and be prepared to respond to the "Call for Proposals", which will be included in a forthcoming Newsletter.

UPCOMING MEETINGS

International Conference on Computational Biology and Bioinformatics - CBB 2011
(October 28–30, 2011, Shanghai, China)

Please see for details Newsletter 94, February 2011
www.engii.org/cet2011/CBB2011.aspx

World Conference on Palaeontology and Stratigraphy - WCPS 2011
(November 28 – December 2, 2011, Nakhon Ratchasima, Thailand)

Please see for details Newsletter 94, February 2011

www.wcps2011.com

IPC XIII/IOPC IX 2012, TOKYO, Japan

13th International Palynological Congress
9th International Organisation of Palaeobotany Conference (August 23–30, 2012, Chuo University, Tokyo)

For more information please visit:
http://wwwsoc.nii.ac.jp/psj3/jp/index.htm

4th INTERNATIONAL PALEONTOLOGICAL CONGRESS

The history of life: a view from the Southern Hemisphere
Mendoza, Argentina, September 28th – October 3rd, 2014

The **4th IPC** will be an International Congress reflecting the directions of palaeontology in the 21st century. The meeting will be held in Mendoza, Argentina, an attractive and easily accessible city, that offers a wide range of opportunities to participants of all backgrounds.

Invitation to the EPPC 2014 in Padova

The Italian group of palaeobotanists and palynologists is very glad to be able to invite all of you to Padova in the year 2014 for the next EPPC.
Padua (Padova in Italian) is a picturesque, historic city in Northern Italy (about 40 km west of Venice), with a dense network of arcaded streets, large communal "piazza" (squares) and many bridges crossing the various branches of the Bacchiglione. It hosts the almost 800 years-old Università di Padova, which is famous for having had Galileo Galilei among its lecturers as well as important palaeobotanists of the XIX century: Abramo Bartolommeo Massalongo and Barone Achille de Zigno. All scientific sessions will be held at the new Department of Geoscience, and the famous Botanical Garden and Museum of Palaeontology will be involved in this conference. Field-trips are planned in the fascinating landscapes of the Dolomites, Sardinia, Emilia-Romagna, Latium and Tuscany. The conference date is planned to be end of August-beginning of September. In order to favour the attendance of young scientists it is intended to offer stays in University residences.

Hope to see you all in Padova,
The EPPC 2014 organizing group

REPORTS FROM PAST MEETINGS

IOP at IBC: A report on palaeobotanical activities at Melbourne

The International Organisation of Palaeobotany was well represented at the 2011 International Botanical Congress held July 23-30 in Melbourne, Australia. The introductory Plenary Lecture was presented by Else Marie Friis, who highlighted and outlined the progress that has been made in characterising the most ancient angiosperms over the past several years. Peter Crane represented us well in a Keynote Symposium where he discussed progress on resolving relationships of seed plants leading to the evolution of flowering plants. Much of the information presented in both lectures is included in the forthcoming "Early Flowers and Angiosperm Evolution" (Else-Marie Friis, Peter Crane and Kaj Pederson, Cambridge University Press, available October, 2011). Palaeobotanical papers were presented in 17 symposia and several e-posters.

As a result of encouragement by Margaret Collinson, Bob Hill arranged for an IOP social gathering at which a brief, informal General Assembly was held. Thirty-seven palaeobotanists were in attendance for a short program of business and a fine social hour. Thanks to Bob for his fine representation of IOP at the IBC, and for his organisation of the event. In the absence of Secretary/Treasurer Johanna Eder, Gar Rothwell convened the short business meeting.

Harufumi Nishida presented an update on plans to hold the Ninth International Organisation of Palaeobotany Conference August 23-30, 2012 at Chuo University in Tokyo, Japan. Despite the natural disaster from which Japan is recovering, the IOPC will be held as originally scheduled. Information about IOPC IX can be found at the conference web site
http://wwwsoc.nii.ac.jp/psj3/jp/index.htm.

Information about plans for IOPC IX is included in IOP Newsletter 94, which is currently available on the IOP web site, http://www.palaeobotany.org/. Pre-proposals for symposia will be accepted until August 31, 2011.

Alejandra Gandolfo announced the 4th International Palaeontological Congress ("The history of life: a view from the Southern Hemisphere"), to be held in Mendoza, Argentina September 28 – October 3, 2014. Information about this conference can be found at the conference website http://www.vertpaleo.org/source/blog/assets/content/FLYER%20-%204%20IPC.pdf.

Members were reminded to make nominations for the new IOP Executive. We will be electing a new President, new Vice Presidents, and New Members at large. Please send nominations directly to the Secretary/Treasurer at johanna.eder>>at<<smns-bw.de.

Members were also informed that we are in need of proposals to host IOPC X in 2016. As before, we probably will be holding a joint meeting with the International Palynological Congress. If we wish to have input to the venue for the 2016 meetings, we need to have proposals from our membership to host this event. Inquiries about how to make a proposal should be addressed to the Secretary/Treasurer at johanna.eder>>at<<smns-bw.de.

Bob Hill announced that our Australian membership has decreased considerably, because there is no active Regional Representative for the Austral-Asian Region. Bob graciously volunteered to take on that responsibility. The related question about submitting dues was also raised. Those who wish to either join IOP or renew their membership can now do so directly through the IOP Website. Simply go to the website at http://www.palaeobotany.org and

1. Click on "My Account". (If you don't remember your name and password, your name is your e-mail address. You will receive a temporary password via e-mail immediately. Input your e-mail address and temporary password and enter the "Members Area")
2. Click on "Renew Subscription" (bottom centre of page) and follow the instructions for "on line" payment of dues.

Our next General Assembly will be held at IOPC IX in Tokyo, Japan. We hope to see you there in August, 2012.

Gar Rothwell, President
International Organisation of Palaeobotany
Ohio University and Oregon State University

Summary of the 2011 meeting of the Nomenclature Section at the International Botanical Congress

The Nomenclature Section, held in conjunction with the XVIII International Botanical Congress, met at the University of Melbourne from 18-22 July 2011. The meeting was attended by ca. 200 delegates, most of them members of the International Association for Plant Taxonomy (IAPT). The Section meeting is largely devoted to amending the *International Code of Botanical Nomenclature*. The meeting this July produced several momentous changes that will have major impacts on the way scientists communicate and organize information about plants, fungi, and algae, including fossil taxa. This report will mainly highlight decisions that are relevant to paleobotanical nomenclature.

Four members of the Nomenclatural Committee for Fossil Plants (Martin Head, Chair, Heidi Anderson, Jiri Kvaček, and Patrick Herendeen, Secretary, and new member David Cantrill) attended the Nomenclature Section meeting. Prior to the meeting the Committee discussed and then voted on a number of Code modification proposals (published in Taxon) that were relevant to paleobotany. In addition, the Committee also discussed and voted on proposals to conserve a variety of names of fossil plants. Two reports on the Committee's activities and recommendation were published earlier this year (Herendeen 2011a, 2011b).

Title of the Code. Although not directly relevant to paleobotany, it is important to note that one of the decisions made by the Section involved altering the title of the *Code* to more accurately reflect its purview. Following the meeting in Melbourne it will be called the *International code of nomenclature of algae, fungi, and plants* (ICN). Although fungi and most groups of algae are not plants, these groups have traditionally been treated as plants for nomenclatural purposes.

Electronic Publication. After having rejected the idea in several previous meetings, the Section approved a set of proposals to allow the names of new taxa to be considered effectively and validly published in specified types of electronic journals and books. Throughout the history of botany, effective publication of names has been accomplished only by hard-copy print materials. The new article in the Code, effective 1 January 2012, allows names to be accepted when they appear either in electronically published journals or books or in conventional printed material. For more details readers are directed to a report of the Special Committee on Electronic Publication (Chapman et al 2010) and the formal proposals published in Taxon (Special Committee on Electronic Publication 2010).

Language of Validating Diagnosis or Description.
Twelve years ago the fossil plant community adopted the requirement of either English or Latin for the validating diagnosis or description of the name of a new taxon. This year the mycologists followed our lead and successfully adopted this rule at the Section meeting. Immediately after acceptance of the mycologists' proposal there was a motion from the floor to adopt the same rule for all groups treated by the Code. The motion was overwhelmingly accepted, with an effective date of January 1, 2012, after which either English or Latin must be used for the diagnosis or description for names of new taxa of all groups covered by the Code. While this does not represent a change for fossil plants since we adopted this requirement 12 years ago, it was widely recognized at Melbourne that our community broke the ice in this long-standing language controversy.

Subfossils. The Code mentions "subfossils" but there are no differences in nomenclatural rules or practices in the naming of subfossils and fossils. All rules that apply to fossil taxa also apply to subfossils. Therefore to simplify the Code subfossils has been removed from the text.

Morphotaxa and Plant Fossils. The most significant change for paleobotany and palynology was the adoption of the set of proposals authored by Cleal and Thomas (2010a, b) to eliminate the concept of morphotaxa from the Code. In discussing paleobotanical nomenclature, Cleal and Thomas (2010a) make a clear distinction between the naming of plant fossils and the names we use for "fossil plants," which are almost always hypothetical concepts, made up of multiple independently named fossil organs. They also present a review of the history on paleobotanical nomenclature as it relates to the naming of dispersed fossil plant organs, including form genera, organ genera, fossil taxa and morphotaxa. Cleal and Thomas (2010a) note that since its inception there has been considerable confusion surrounding the concept of morphotaxa and how it is implemented in paleobotanical nomenclature. For those not familiar with the concept, a morphotaxon is defined in the Code as "a fossil taxon which, for nomenclatural purposes, comprises only the one part, life-history stage, or preservational state represented by the corresponding nomenclatural type." With the elimination of morphotaxa we are left with the concept of "fossil taxa" which is any taxon that is based on a fossil type. Readers are encouraged to see Cleal and Thomas (2010a, b) for further details, and Herendeen (2011b) for a summary of the Committee's evaluation of the proposals.

It is important to understand exactly what the adoption of these proposals means, and does not mean, for the nomenclature of plant fossils. The naming of plant fossils will continue largely unchanged, except that it will no longer be necessary to decide whether a new taxon is a

morphotaxon, or simply a fossil taxon. It will still be permissible to establish multiple generic names for the various dispersed organs of a plant. For example, all of the organ names used for parts of what we refer to as the "Lepidodendron plant" are still acceptable, and nomenclatural priority applies within each (e.g., the genus name Lepidodendron has priority among names for arborescent lycopod bark of that particular taxon). But the names we use for whole plants are not governed by priority (e.g., the Lepidodendron tree). Paleobotanists are free to use which ever name seems most appropriate when referring to the whole plant. We formally name the parts, not the whole plants. There are two examples that will be associated with the modified Article 1 that help illustrate the newly revised Article.

Article 1 examples:

"*Ex. 3. Stamnostoma* A. Long (in Trans. Roy. Soc. Edinburgh 64: 212. 1960) is a fossil-genus that was originally described with a single species, *S. huttonense*, comprising anatomically-preserved ovules with completely fused integuments forming an open collar around the lagensostome. Rothwell & Scott (in Rev. Palaeobot. Palynol. 72: 281. 1992) have subsequently enlarged the circumscription of the genus to include also the cupules in which the ovules were borne. The name *Stamnostoma* can be applied to either circumscription or to any other that may involve other parts, life-history stages or preservation states, so long as it includes *S. huttonense*, but not the type of any earlier generic name."

"*Ex. 4*. The generic name *Sigillaria* Brongn. (Mém. Mus. Hist. Nat. 8: 222. 1822) was established for fossils of "bark" fragments, but Brongniart (in Arch. Mus. Hist. Nat. 1: 405. 1839) subsequently included anatomically-preserved stems within his concept of *Sigillaria*. Anatomically-preserved cones that may in part represent the same biological taxon are referred to as *Mazocarpon* M.J. Benson (in Ann. Bot. (London), ser. 2, 32: 569. 1918), whereas such cones preserved as adpressions are known as *Sigillariostrobus* Schimp. (Traité Paléont. Vég. 2: 105. 1870). All these generic names can be used concurrently in spite of the fact that they may, at least in part, apply to the same organism."

Literature Cited

Chapman, A. D., N. J. Turland, and M. F. Watson. 2010. Report of the Special Committee on Electronic Publication. Taxon 59: 1853-1862.

Cleal, C. J. and B. A. Thomas. 2010a. Botanical nomenclature and fossil plants. Taxon 59: 261–268

Cleal, C. J. and B. A. Thomas. 2010b. (101-103) Proposals to modify the provisions in the *Code* for naming plant fossils. Taxon 59: 312-313.

Herendeen, P. S. 2011a. Report of the Nomenclature Committee for Fossil Plants: 8. Taxon 60: 902-905.

Herendeen, P. S. 2011b. Report of the Nomenclature Committee for Fossil Plants: 7. Taxon 60: 921-923.

Special Committee on Electronic Publication. 2010. (203–213) Proposals to permit electronic publications to be effectively published under specified conditions. Taxon 59: 1907-1908.

Patrick S. Herendeen
Chicago Botanic Garden
pherendeen>>at<<chicagobotanic.org

OTHER ITEMS OF INTEREST

Honor's course in Palaeobotany

Gar Rothwell and Ruth Stockey will be teaching an honor's course in palaeobotany at Oregon State in the spring of 2012. They have been appointed to the graduate faculty and will continue to train graduate and undergraduate students.

Reference collection for palaeobotanical literature

Recently I have taken over the teaching of palaeobotany at the University of Portsmouth, which forms part of our BSc (Hons) Palaeobiology & Evolution degree course. I have restructured the

teaching (both class and practical), and in this first year of doing so have been successful in creating an appreciation of the subject in a group of self-confessed 'dinosaur nuts', resulting in at least one student now focussing on fossil plants for his final year dissertation. On a personal level, though a Palaeozoic palynologist by trade, I am also now focussing more on the inclusion of palaeobotany in my own research, with a number of project ideas beginning to germinate.

So, that was the news, now for the begging...! In order to increase our reference collection of palaeobotanical literature (and, more optimistically, specimens), I would be extremely grateful if any IOP members could send me spare reprints of their papers on any and all aspects of palaeobotany (in either paper or electronic format). Also, if any departments or individuals might have surplus specimens that could be spared, of any kinds of plant fossils, I would gladly reimburse postage costs: perhaps a 'specimen exchange' could be also be arranged if we have other fossil material that may be of use in return.

I look forward to corresponding, and hopefully collaborating, with many of you in the future.

Dr. Anthony Butcher, School of Earth and Environmental Sciences, University of Portsmouth, UK.

Successful cultivation of extant lycopsids

Jeff Benca, an undergraduate in the lab of Caroline Strömberg, has built up an extensive teaching and research collection of extant lycopsids at the University of Washington Botany Greenhouse in Seattle. Through developing successful cultivation and propagation techniques for terrestrial Lycopodiaceae, he has established many species in greenhouse culture with which he is prospecting for functional analogs of homosporous lycopsids of the Late Palaeozoic and studying the effects of temperature on modern lycopsid leaf physiognomy. The aim of this collection is to establish and circulate extant members of Lycopodiaceae, Selaginellaceae, and Isoetaceae among researchers, academic greenhouses, conservation venues, and botanical gardens in the United States and abroad in the coming years, thereby increasing accessibility of modern representatives to students, researchers, conservationists, and the general public. Jeff is currently working on a paper covering sporophyte cultivation and propagation techniques for terrestrial Lycopodiaceae and collaborating with Doug Ewing of the UW Botany Greenhouse; Ashley Field of James Cook University; and Chad Husby of the Montgomery Botanical Center on a paper covering techniques for growing epiphytic *Huperzia*. For his service to the University of Washington and Puget Sound community Jeff was awarded the George and Barbara Akers Scholarship in 2010.

References

Strullu-Derrien C., Kenrick P., Rioult J.P. and Strullu D.G., 2011. Evidence of parasitic Oomycetes (Peronosporomycetes) infecting the stem cortex of the Carboniferous seed fern *Lyginopteris oldhamia*. *Proceedings of the Royal Society B,* 278, 675-680.

SCIENTIFIC NOTES

Spectrometric Connectivity and Seed-Fern Reconstruction

Ulrike Werner-Zwanziger, Department of Chemistry, Dalhousie University, Halifax, Nova Scotia, Canada, e-mail Ulli.Zwanziger>>at<<dal.ca.

Erwin L. Zodrow, Palaeobiological Laboratory, Cape Breton University, Sydney, Nova Scotia, Canada, e-mail erwin.zodrow>>at<<cbu.ca.

After more than 100 years of collecting particularly Permo-Caboniferous seed-fern fossils (Scott, 1923), only a handful of reproductive organs incontestably connected with foliage are known, though hundreds of seed-fern species have been described (*vide Fossilium Catalogus*). It is obvious that collectors' luck coupled with the vagaries of nature did not get us anywhere (and it won't!), which suggests as an alternative the scientific approach through hypothesis testing (Pearson, 1892).

In the International Year of Chemistry 2011 (UNESCO, 2011), it is appropriate to turn to the fossil molecules in plants.
We have been experimenting with ^{13}C NMR for a number of years, particularly singling out an ovule (Figure 1) that is physically associated with seed-fern foliage (Figure 2) of early Cantabrian age in the Sydney Coalfield, Canada.

Figure 1 Ovule, 8 cm long with cuticles (*Trigonocarpus grandis*).

The NMR spectra of these two plant organs are intriguingly similar (Figure 3), i.e., implying similarity of certain molecular characteristics.

Figure 2 Seed-fern foliage, 9-10 cm long (*Alethopteris pseudograndinioides*).

To deduce plant connectivity based on NMR spectra one first has to understand whether the detected chemical species are original to the plant material, or introduced by the natural processes occurring during Earth history, or by the chemical laboratory processes of liberating the coalified frond foliage from the rock and macerating it to get the cuticle. Even in the latter case, the detected chemical species are related to the chemical structures of the plant material as it is presented in modern times.

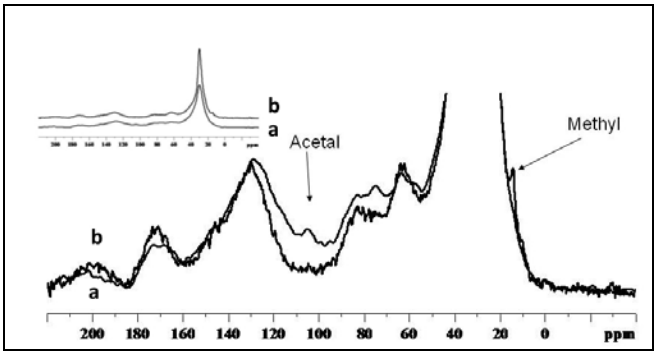

Figure 3 ^{13}C CP/MAS NMR spectra of the ovule (a) and the seed-fern (b)

A prerequisite for deducing connectivity based on NMR spectra is an identical, or at least similar, fossilisation history for the test organs in terms of thermal, geochemical and lithological histories. Based on the similarity of the ^{13}C cross-polarisation (CP)/Magic Angle Spinning (MAS) NMR results for the ovule (Figure 3 a) and associate foliar cuticles (Figure 3 b), we hypothesise spectrometric connectivity as a proxy for organic connection. If confirmed, this has implications for whole-plant reconstructions, and systematics.

While the ^{13}C NMR spectra of the cuticles of the ovule and the associated frond cuticles are very similar, there are also differences pointing to the different functions: The cuticles of the fronds show more saturated aliphatic chains and terminating methyl groups indicative of the hydrophobic frond-surface layer. Only the cuticles of the ovule, on the other hand, show signals in the acetal spectral region (around 104 ppm), a chemical group found, for example, in polysaccharides, which are the chemical building blocks of cellulose and starch, i.e., the structural components or energy-storage materials of plants.

References

Pearson, K. 1892. The Grammar of Science. Walter Scott, London. pp. 493.

Scott, D.H. 1923. Studies in Fossil Botany. Vol. II Spermophyta. A. & C. Black, Ltd, London, pp. 446.

Unesco, 2011. Natural Sciences Quatertly Newsletter, 9(2), April-June 2011.

Chemometric Approach Using Functional Groups as a Tool for Studying Coalification Pattern in a Seed Fern (Pennsylvanian, Canada)

José A. D'Angelo, IANIGLA-CCT-CONICET-Mendoza, Avda. Ruiz Leal s/n Parque Gral. San Martín and Instituto de Ciencias Básicas, Universidad Nacional de Cuyo, M5502JMA - Mendoza, Argentina.
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The International Chemometrics Society (ICS) defines Chemometrics as 'the science that relates measurements made on a chemical system or process to the state of the system via application of mathematical or statistical methods'.

Figure 1
Compression segment of a neuropteroid seed fern after HF liberation from the rock matrix, noting gradation of black (opaque) to light-brown (translucent) colours. Sydney Coalfield, Canada.

In our chemometric studies we use mainly Fourier transform infrared (FTIR) spectrometry to investigate late Palaeozoic-early Mesozoic fossils of diverse preservation modes (summary D'Angelo et al., 2010). Lately, we experimented with larger contiguous frond sections of compressed seed ferns, e.g., Figure 1, to investigate coalification (maturity) pattern by evaluating functional-group data using methods of principal component analysis (Figure 2). Included in the evaluation are the compression pinnules (opaque and translucent), cuticles obtained from some of the opaque compressions (by Schulze's maceration process), and vitrain samples from the associated coal seams.

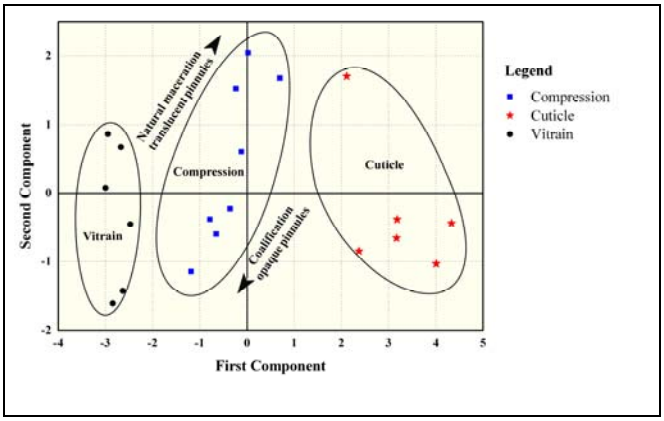


Figure 2 Principal component analysis: plot of component scores. Ellipses around the samples are for clarity only.

We summarise the results as follows:

1. We are surprised at the high degree of variability of coalification over a 22-cm frond segment. In effect, two preservation types are present (1) opaque pinnules, and (2) translucent pinnules (resembling more naturally macerated cuticles), in addition to stages intermediate between the two.
2. Opaque pinnules contain higher contents of aromatic compounds that show a higher condensation of the aromatic nuclei along with some variation in both ring size and degree of aromatic substitution.
3. Translucent pinnules, in contrast are characterized by a relatively higher contents of aliphatic and oxygen-containing compounds.
4. Cuticles are characterised by carbonyl contents

and straight and long hydrocarbon chains indicative of the biomacromolecule cutin. As a matter of fact, the translucent pinnules resemble the cuticles more than they do the opaque pinnules.

5. The present results suggest caution in the interpretation of preservation types, especially when taphonomically oriented.

References

D'Angelo, J.A., Zodrow, E.L., Camargo, A., 2010. Chemometric study of functional groups in Pennsylvanian gymnosperm plant organs (Sydney Coalfield, Canada): Implications for chemo-taxonomy and assessment of kerogen formation. Organic Geochemistry, 41: 1312-1325.

JOB OPPORTUNITY

Postdoctoral Position in Montpellier

A two-year postdoctoral position in palaeobotany will open in 2012 at AMAP (botAnique et bioinforMatique de l'Architecture des Plantes - http://amap.cirad.fr/fr/index.php), a Research Unit specialized in plant architecture in Montpellier, France. This position is granted by the French ANR project "TERRES" (Global perspectives on the terrestrialization process). The palaeobotanical part of this multidisciplinary project is aimed at better understanding patterns of land plant evolution during the Devonian in relation to early terrestrial ecosystem evolution, and palaeoenvironmental and palaeoclimatic changes.

The work will involve the setting up of a database of Devonian plants, a task complemented either by the description of new Devonian plants, or by the phylogenetic analysis of a particular group (e.g. the Cladoxylopsida). Expected results are the following: 1) improve the sequence of land plant evolutionary events occurring in the Devonian and examine its temporal correlation with other terrestrial and marine changes; 2) evaluate more accurately the palaeogeographic coverage of significant taxa and improve the quality of data provided to the biogeochemical and climate modelers.

The postdoctoral position is scheduled to begin in 2012, before July if possible. Salary is between 1200 and 1350 euros /month. Interested persons should send a letter of application and a CV to:

Brigitte Meyer-Berthaud
AMAP
CIRAD, TA-A51/PS2
Boulevard de la Lironde
F-34398 Montpellier cedex 5
France,
or an e-mail at the following address:
meyerberthaud>>at<<cirad.fr. Please note that e-mails with attached files over 3Mb will not be delivered.

BOOK ANNOUNCEMENT

Molteno Sphenophytes: Late Triassic Biodiversity in Southern Africa

This will be our seventh volume (planned for publication in early-mid 2012) in the ongoing account of the fossil flora of the Late Triassic Molteno of South Africa. The first three volumes in the series (1983, 1985, 1989) were published through A.A. Balkema in Rotterdam, Holland, the following three (2003, 2007, 2008) in the Strelitzia monograph series of the South African National Biodiversity Institute (SANBI). The aim of the middle volume in each of the trilogies was to see the Molteno flora in broader context: in the '*Prodromus*' (1985), in southern African context; in the '*Brief History*', in global context. The Molteno collection on which this research is based was begun by ourselves in 1968 and now amounts to close on 30,000 curated slabs representing 100 assemblages from 69 localities (areas to 1 km diam.) around the extensive 400 by 200 km outcrop of the formation.

What emerges from these studies is that the Molteno appears to represent the peak of plant diversity – when considering all ranks from species and genus through families to orders and classes – since the colonisation of the continents back in the early Silurian some 425 million years ago. This is especially so for the gymnosperms. The peak of

diversity came in the wake of the greatest of all global extinctions at the close of the Permian (251 mya); and it was during the radiation of new diversity that followed that both the dinosaurs and mammals emerged, and likewise, probably, the forerunners of the angiosperms.

The Molteno horsetails (sphenopytes), true to the diversity of the overall flora, are rich, compellingly rich. We say this with the endearing term 'goofies' irresistibly in mind. Meaning something like intransigent, the word (or rather its meaning here) was coined by Conrad Labandeira (see below), who has for the past decade been regularly visiting and studying the plant-insect interactions in the Molteno. After considerable back and forth, we have settled on recognising 8 genera and 23 vegetative species (often dominant elements of the flora, from 59 of the 100 assemblages), along with 5 genera and 12 species of strobili (extremely rare elements of the flora, from 13 assemblages). The emphasis throughout is on untangling as best as one can the natural diversity that occurred back in the Molteno floodplain biome – with a strong emphasis on extensive sampling from numerous localities, and on the affiliation of organs. We include two colour sections in the volume: the first with rendered sketches of the sites yielding types and/or strobilus specimens (and their interpreted habitats); the second, of 50 plates, covering the fertile specimens and their supposed affiliates.

Over the next few years, we plan to complete the write up of the flora. This will include volumes on the rich diversity of insects found at some half of the plant sites (with palaeoentomology colleagues); and on the role of the insects in the ecology of the seven recognised habitats characterising the biome (by Conrad Labandeira from the Smithsonian in Washington).

Last year (2010), our collection went on what we have come to refer to as the '*Molteno Great Trek*'. Now well over double the size, it has found its way back to its place of origin at the Bernard Price Institute for Palaeontology at the Witwatersrand University in Johannesburg. This 75 km journey down the highway from Pretoria to Johannesburg was not without its tribulations. Happily, however, the Molteno plants (and accompanying insects) are now safe and sound under the watchful care of Prof. Marion Bamford (plants, Deputy Director) and Prof. Bruce Rubidge (animals, Director) of the BPI. And they await a flow of research visitors from around the globe. We offer our sincerest thanks to BPI for taking the Molteno collection under its wing; and we thank all those at SANBI over the previous decades who encouraged its growth and supported its research.

ANDERSON, J.M. & ANDERSON, H.M. 1983. *Palaeoflora of southern Africa. Molteno Formation (Triassic)*, Vol. 1: Part 1, *Introduction*, Part 2, *Dicroidium*. Balkema, Rotterdam. 227 pp.

ANDERSON, J.M. & ANDERSON, H.M. 1985. *Palaeoflora of southern Africa*. *Prodromus of South African megafloras, Devonian to Lower Cretaceous*. Balkema, Rotterdam. 423 pp.

ANDERSON, J.M. & ANDERSON, H.M. 1989. *Palaeoflora of southern Africa*. *Molteno Formation (Triassic), Vol. 2: Gymnosperms (excluding Dicroidium)*. Balkema, Rotterdam. 567 pp.

ANDERSON, J.M. & ANDERSON, H.M. 2003. *Heyday of the gymnosperms: systematics and biodiversity of the Late Triassic Molteno fructifications*. Strelitzia 15. National Botanical Institute, Pretoria, 398 pp.

Dr. John M Anderson, Pretoria, South Africa
Dr. Heidi M Anderson, Dorrigo, New South Wales

BOOK REVIEWS

Die fossile Makroflora der Unterkreide (Hauterivian) von Manja in Südwest-Madagaskar Farne und Schachtelhalme (Filicatae und Equisetatae)

By Appert, O. (2010) Schweizerische Paläontologische Abhandlungen, Basel:129 pp.

A review by **Dr. Heidi Anderson**, Honorary Palaeobotanist, BPI Palaeontology, University of the Witwatersrand, South Africa.

Mesozoic ferns from eastern Gondwana localities have become much better known over the past decade due to some significant large publications. Appert published on the Jurassic ferns of Madagascar in 2002, followed by Holmes with two papers on the Triassic Nymboida ferns of Australia in 2000 and 2003, and then the Anderson & Anderson's with their book on the Triassic Molteno ferns of Southern Africa in 2008. Before 2000 there was the beautiful petrified *Osmunda* described from Antarctica in 1998 by Phipps *et al.*, while South America's ferns were fairly well known based largely on the publications by Herbst.

The new publication on the Lower Cretaceous ferns and Equisetum of Madagascar (Malagasy) by Appert 2010 documents many exciting new discoveries from that portion of Gondwana. It is a quality produced book that is a pleasure to study. Perusing the contents of this book carries one back to an ancient time when those delicate fronds were part of a living ecosystem. Otto Appert is one of those rare individuals who has devoted his life to the study of palaeobotany while having to pursue a livelihood. He has personally spent ages collecting these fossil plants and has taken great care in describing and photographing their details. Remarkably his first major publication on fossil plants from Madagascar (back in 1973) was a monograph on the ferns and Equisetum of the Upper Jurassic of Manamana which initiated the high standard of his research in all subsequent works.

This is the first taxonomic work on the Lower Cretaceous flora (Hauterivian) of Manja in SW Madagascar and describes the ferns that constitute an important and diverse element in the collections. An apparent minor element of the flora, *Equisetites* cf. *lateralis* is included in this monograph. These are all illustrated by 24 high quality plates and 27 precise drawings. The flora is dominated by Bennettitales and also includes hepatophytes, pteridosperms, coniferophytes and a few angiosperm leaves.

The ferns are represented by an impressive diversity of 17 genera and 24 species (16 named and 8 not) including 4 new genera and 11 new species. These occur in 10 known families and an unknown one. The eusporangiate ferns include one new species of *Marattia* while the balance are all leptosporangiate ferns. The Osmundaceae dominate with four established genera and three new species, the Matoniaceae with three genera and species, including one new genus and species. The Dipteridaceae has two genera and four species of which *Hausmannia madagascariensis* is a new species and shows amazing details of epidermal preservation. The remaining six families (Weichseliaceae, Gleicheniaceae, Schizaeaceae, Hymenophyllaceae, Dicksoniaceae, Polypodiaceae) each include one genus and one or two species. All these ferns are described and compared at length with all other relevant fossils and their living representatives. The fronds are preserved as delicate impression fossils and do not have cuticles. However the preservation of one species as fusain has allowed the study of the leaf epidermis by peels which revealed the stomata. The German text is supplemented by an English diagnosis of the new genera and species in accordance with ICBN rules.

Appert includes an interesting chapter on the taphonomy and palaeoecology of these ferns. Of particular interest is the new genus and species *Gleichenimorpha monostigma* with its allochthonous remains most commonly preserved as fusain. The xeromorphic nature of the small pinnae (with amazingly numerous tightly packed stomata) support the view of their growth in a drier habitat with frequent fires. Note this unusual preservation as fusain has permitted the study of epidermal details. Most of the other fossil ferns are believed to have been growing close to where they were deposited, i.e. in a semi-autochthonous state as indicated by well-preserved nature of the delicate fronds. He also described four different fern rhachises which show the vascular scars of the leaf stalk and suggested that these were transported some distance from their original place of growth.
This monograph is an essential reference for all researchers of fossil ferns and is also a valuable book for other workers interested in the evolution and diversity of ferns.

Published in German and available from the publisher:
Schweizerische Paläontologische Abhandlungen.
c/o Naturhistorisches Museum, CH-4001 Basel.
Email: pal.abh>>at<<bluewin.ch
Price is Euro 122,- or Swiss Francs 145,-

Fossil Plants from Republic: A Guidebook

By Kathleen B. Pigg, Melanie L. DeVore & Karl E. Volkman, Stonerose Interpretive Center, Republic, Washington.

A review by **Steven Manchester,** Florida Museum of Natural History

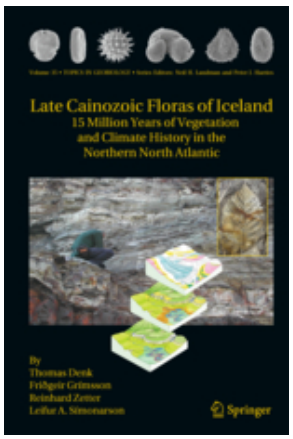
The town of Republic, Washington, in the northwestern United States, originated as a gold-mining and timbering community in the early 20th century, but in recent years has become a tourist destination for families and hobbyists interested in trying their hand collecting fossil plants from the local Eocene shales made famous by generations of palaeobotanists including E.W. Berry, R.W. Brown, J.A. Wolfe, W. Wehr, K.R. Johnson, and colleagues. Unlike many fossil localities which are kept secret from the public, or where collecting is forbidden (even on so-called public lands), amateurs are welcomed and encouraged to collect fossils from the classic Boot Hill locality in the town of Republic. Through continuing collaboration between amateur collectors and the professional palaeontological community (initiated through diplomacy of the late Wesley Wehr), the Republic flora has grown to become one of and best known Eocene floras in North America. The Stonerose Interpretive Centre (http://www.stonerosefossil.org/), named in recognition of the fossil rosaceous leaves and flowers found nearby, provides logistical and interpretative services about the site and regional natural history, and maintains an extensive educational outreach program. Visitors to the local fossil site are registered into the Stonerose Strata database and required to show their discoveries to Stonerose personnel who help them with identification. They are asked to donate those specimens deemed important for research, and are given a certificate and kept informed of research and publication of their fossils. Donor information is recorded for each specimen acquired this way, and appropriate credit is given in resulting displays and publications.

Until recently, available literature on the palaeobotany of Republic has been scattered in various technical journals of limited accessibility to the general public. This new book, designed with Stonerose Interpretive Centre visitors in mind, is a combination field guide and coffee table book with gorgeous colour imagery of the fossil plant megafossils from Republic. Although designed mainly as a guidebook to help amateurs to recognise and identify the fossils that they may recover during their visit to the outcrop at Republic, the quality of illustrations and descriptions and the overview of pertinent literature, make this an essential volume for the library of any palaeobotanist interested in Tertiary floras. The Introductory section discusses the types of fossil plants preserved in lacustrine deposits, explains fundamental methods of taxonomy and nomenclature as applied in palaeobotany, and presents the basic terminology applied in the description of fossil leaves. Well illustrated dichotomous keys provide a direct means for the identification of species that are common in the Republic leaf flora. The meat of the book, pages 21 to 78, consists of a series of full-page illustrated synopses of more than 50 leaf, cone, flower, fruit, and seed taxa representative of the flora. In each instance the taxon is illustrated by one or more high-resolution colour photos of the best available specimen(s), enlargements of critical details, and a listing of major identifying features. The format is both aesthetically pleasing and useful, with a straight-forward approach that would be nice to see applied to other fossil sites.

Available from http://www.stonerosefossil.org/ for US $30, including shipping.

Late Cainozoic Floras of Iceland — 15 Million Years of Vegetation and Climate History in the Northern North Atlantic

By Denk, Th., F. Grimsson, F., Zetter, R. and Símonarson, L.A. (2011) Springer Topics in Geobiology, Vol. 35., 854 pp., 410 illus., 54 in color. ISBN 978-94-007-0371-1. Hardcover, US $209,-



A review by **Steven R. Manchester** and **Terry Lott**, Florida Museum of Natural History

This is a thorough, well written and beautifully illustrated book bringing alive the geologic and palaeobotanical history of Iceland. Eleven sedimentary rock formations spanning the past 15 million years, containing over 320 plant taxa, are described and interpreted with regard to climate change and biogeographic relationships. The changing vegetation types are well documented both by megafossils (leaves, cone scales, fruits, seeds) and microfossils (spores and pollen), from lacustrine sediments.

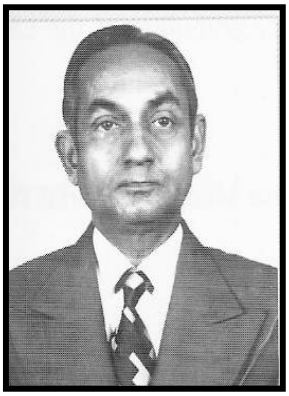
Chapter 1 provides an introduction to the nature and geology of Iceland, discussing the origin, geographic position, presently exposed geology, climate patterns and modern vegetation. This book builds on a long history of prior work on the palaeobotany of Iceland, briefly reviewed in Chapter 2. Chapter 3 on systematic palaeontology provides detailed descriptions and figure references for all of the taxa, and is the foundation for the treatment of individual floristic horizons in subsequent chapters. The descriptions for megafossils and microfossils are well detailed and informative, and the accompanying photographs are superb. Especially breathtaking are the beautiful pollen and spore images which were obtained using precision techniques in order to illustrate the same individual grains by both light microscopy and SEM.

Chapters 4 to 11 detail the geologic setting, taphonomy, floristic composition, vegetation types, ecology, climate and biogeographic relationships of successively younger fossil floras, beginning with 15 MA floras representing the mid Miocene climatic optimum (Ch. 4), the 12 MA floras including the well known classic palaeobotanical horizons of the Brjanslaekur-Selja Formation (Ch. 5), and the cooler and markedly more herbaceous flora of 10 MA (Ch. 6). At 9-8 MA an impoverished broad-leaved deciduous forest is seen as the regional vegetation surrounding a caldera lake (Ch. 7); 7-6 MA floras document the spread of boreal vegetation (Ch. 8); the 5.5 MA cool temperate flora with clear North American biogeographic affinities is taken to indicate a functioning Greenland-Iceland-North Atlantic Land Bridge (Ch. 9); and the 4.4-2.6 MA warm temperate flora shows indications of episodic cooling and a biogeographic shift to mixed Atlantic-Pacific affinities of (Ch. 10). With exception of the earliest Pleistocene (2.4 MA) flora, the remaining 2.4-0.8 MA Pleistocene floras reviewed are similar to Iceland's modern flora, and reflect the shift to modern climate and environmental conditions.

The analytical portion of this book concludes with interpretation of the biogeographic history of Iceland via the North Atlantic Land Bridge (Chapter 12), and examination of the climatic evolution in the North Atlantic from 15 MA to the present (chapter 13). The final chapter presents for the first time in print, 85 pages of painstakingly accurate pencil drawings the fossil leaf flora prepared under the direction of A.G. Nathorst by Carl Hedelin and Thérèse Ekblom between 1885 and 1910. These were prepared to be published in treatment of Nathorst's planned treatment of the Tertiary floras of Iceland. It is interesting to compare the drawings with state-of-the art photographic images of many of the same specimens treated in this book. Although Nathorst did not live to complete this project, the present volume could be considered a dream-come-true.

OBITUARIES

In memorian Dr. Mahendra Nath Bose



The plant scientists, palaeobotanists deeply mourn the sad demise of Dr. M.N. Bose former Director of Birbal Sahni Institute of Palaeobotany, Lucknow, India.

Dr. Bose contributed a lot to the development of the Birbal Sahni Institute of Palaeobotany. He possessed a kind and soft personality, at the same time he was a person of strict discipline. His contributions have enriched the knowledge about the plants of the past, Mesozoic in particular. In his death we have lost a true lover of plant science.

May his soul rest in peace in the heavenly abode!

Dr. Mahendra Nath Bose

Date and Place of Birth: March 3rd, 1925, Jainagar-Mojilpore, West Bengal
Sad Demise: 27th April, 2011
Parents: Satyendra Nath Bose (Father), Kalyani Bose (Mother)
Spouse: Smritikona Bose
Children: One son, two daughters

Education:
M. Sc. (Botany) Lucknow University 1947, Ph.D. Lucknow University 1952

Professional Career:
Lecturer (1949-1956) Birbal Sahni Institute of Palaeobotany, Lucknow

Reader (1946-1961) Birbal Sahni Institute of Palaeobotany, Lucknow

Assistant Director (1961-1977) Birbal Sahni Institute of Palaeobotany, Lucknow

Director (1980-1985) Birbal Sahni Institute of Palaeobotany, Lucknow

Visiting Scientist (1986-1990) Geology Institute, University of OSLO, Norway

Fellow:
Indian National Science Academy, 1982 (New Delhi); Indian Academy of Science, 1982 (Bangalore); Palaeobotanical Society, 1970 (Lucknow).

Memberships:
Member Norwegian Academy of Science and Letters; Hon. Corr. Member Belgian Royal Academy of Science.

Scientific Contribution:
Major contribution has been on the Mesozoic Palaeobotany of India and Palaeozoic and Mesozoic Palaeobotany of Zaire.

Studies on the fossil flora of Zaire led to revision of the classification of the Lukuga Group.

Work on the Mesozoic Flora of India coupled with palynological data has shed further light on the Mesozoic stratigraphy of India.

Worked on the Lower Cretaceous plants of Antarctic region.

Made significant contributions on the fossil clitellate cocoons and Sciadopitys-like leaves.

Monographs of Indian species of *Ptilophyllum, Otozamites, Weltrichia, Dictyozamites,* and Mesozoic flora of Kachchh.

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