INTERNATIONAL COMMITTEE FOR COAL AND ORGANIC PETROLOGY · ICCP

ICCP news

FOUNDED 1953

NEWS OF THE INTERNATIONAL COMMITTEE FOR COAL AND ORGANIC PETROLOGY

No. 16 January 1998 Aachen

Letter of the Editor

Dear member of the ICCP.

at first I have to apologize for the late appearance of this number of the ICCP news. Generally one issue of our news comes out after the annual meeting at the end of the year, and you may have missed it this year. There are two reasons that this issue is late. The first one depends on the date of our last meeting which was - at the end of October - relatively late in the year. The second one depends on the editor, that is to say myself. Because the meeting was so far away from my home I took the liberty and combined the meeting with an extended tour through the two New Zealand islands and the eastern part of Australia. Moreover I had to act during and after the meeting on behalf of the General Secretary (see minutes) which was time consuming.

Consequently the spring number of the news will also be later this year than usual. The dead line for number 17 with the last informations about the next meeting is end of April. That allows the print and distribution of the next number early enough before the next meeting starts.

Hoping that you are understanding the situation I send you best wishes for 1998.

Monika Wolf

Dead line for the next issue of the ICCP NEWS is April 30, 1998

Minutes of the 49th Meeting of the ICCP held in Wellington, New Zealand October 20-24, 1997

prepared on behalf of the General Secretary
by
Monika Wolf

1. General Course of the Meeting

The 49th meeting of the ICCP took place at the Science House of the Royal Society of New Zealand, Wellington. It was attended by the President, Prof. Dr. Lemos de Sousa, the Vice President, Prof Dr. Kwiecinska, one Honorary Member, Prof. Dr. Geoff Taylor, and further 33 ICCP members. Also two guests took part in the meeting. The participants alltogether represented 15 countries. The meeting was organized by Coal Research Limited (CRL)-Energy Research & Testing which is situated at Lower Hut, a town closed to Wellington.

The meeting was officially opened by the Vice President, Prof. Kwiecinska, who welcomed all participants and the General Manager of CRL, Dr. Rob S. Whitney. She expressed the sincere thanks of the ICCP to him and his company for the organization and the support of this years annual meeting and mentioned especially Dr. Tim Moore, Senior Geologist of CRL, who had done most of the preparation. Dr. Whitney welcomed the ICCP in Wellington and presented a short introduction into CRL activities. He explained the importance of coal petrology in the field of the control of coal quality within his company.

Directly after the opening ceremony the General Assembly was held under the direction of the President, Prof. Lemos de Sousa. He made known the apology of the General Secretary, Prof Correa da Silva, and further 15 ICCP members for their absence. He asked the audience wether it agrees that the Editor,

Prof. Wolf, acts in place of the General Secretary. This was accepted by the attending members.

The President asked the members present to stand in honour of Dr. John Castano and Prof. Dr.Ryohei Takahashi. Both passed away unexpectedly during the last year.

Following the Statutes §6, the President asked the plenary for confirmation of the minutes of the 48th ICCP meeting held at Heerlen, The Netherlands, September 8-14, 1976. On behalf of Prof. Murchison, Dr. Cook criticized severely one of the passages of last year's minutes depending treasurer's report. After an extended discussion (see also treasurer's report of this year's minutes) the plenary agreed in its closing ceremony to eliminate the phrase that last year's report of the treasurer was "incomplete". The 1996 Minutes be amended to read "The report...sent to the President is considered complete." In this version the plenary confirmed the minutes.

Elections

During the year two elections, for Treasurer and Secretary of Commission 3, took place. For **Treasurer** only two candidates were on the short list because Prof Murchison had drawn back his candidature. 42 valid votes were cast

Schwab 29 votes (69%)
Kutzner 13 votes (31%)

Dr. Schwab was elected for Treasurer of the ICCP.

In the case of the election for Secretary of Commission 3 the President asked the Plenary to accept the results of the voting procedure although there was an error at the voting slip. There, it was asked to vote for Chairman of Commission 3. Because it was clear for all of the participants that in reality it was asked to vote for the secretary the result of the election was declared as valid by the plenary. For **Secretary of Commission 3** 53 votes were cast.

Menendez 44 votes (83%)
Flores 8 votes (15%)
Null 1 vote (2%)

Dr. Menendez was elected for Secretary of Commission 3.

The names of Dr. Schwab and Dr. Menendez were offered to the plenary for confirmation and accepted by applause.

The President took the opportunity to thank the Past Treasurer, Prof. Dr. Murchison, for his long standing activities. Not only he took care for the financial health of the ICCP long time but also he managed the reprint of the 2nd edition of the handbook and the print of some supplements in a profitable way.

Forthcoming Elections

It was announced that the next elections are concerned with the secretary of Commission 1 and the chairman of Commission 2. But later on it was stated that for both officers it is one year too early. Therefore, in the closing ceremony the President has retracted the announcement.

Treasurer's Report

1. Balances in the General Accounts (£)

Account	1997 (13.10)	1996 (30.08)
Curent	36.50	81.04
Premier	15215.52	13317.25
Totals	15252.02	13317.25

In a letter to the President (14.10.97) the Treasurer explained, concerning the balance for 1996 which was thought to be "incomplete", that the missing expenses for the General Secretary in last year's report are included in this year's balance because the "payment to the General Secretary took place on 20 September, 1996 and so therefore belongs to the 1996-1997 Report".

The ICCP apologises completely and unreservedly to Prof. Murchison for the comments printed in relation to the 1995/96 Treasurer's Report.

2. Handbook Accounts
Since the handbooks and supplements have been transfered to The Netherlands into the charge of Dr. Fermont a new account has been set up to deal with sales of the handbook. The old funds rest in the United Kingdom until now. Details will be explained next year because Dr. Fermont was absent.

Membership Fees

In his last report Prof. Murchison has given the state of affairs depending the payment of the membership fees. This list was summarized by the new Treasurer, Dr. Schwab, and shows that only 90 members (37%!) paid in time. All other members have outstandings. **Those who have not paid will get a label together with no. 17 of the ICCP news. They have to contact the treasurer until the next meeting. Otherwise they will be excluded from membership.**
Dr. Schwab explained also that in the future the fee will be calculated in Pound Sterling (£) and that the payment should be made by credit card because this saves money. The amount of the fee will stay steady at 20£ per year or 50£ for three years.

ICCP Statutes

The President explained the content of four proposals for changements of the statutes (see also Minutes of the 48th Meeting). These changes depending on: 1) Membership (§3). Institutional membership has to be introduced because several companies have aked for membership which will increase the income of the ICCP. In the past an institutional membership was undisireable because the ICCP was seen only as a community of experts. 2) Voting procedures (§11), which have to become more clear in view of a secret counting. 3) Number of candidates (§11). In cases where it is not possible to find two candidates for a special office by the council one proposal should be accepted.
Texts for the proposed changes will be prepared by the Council and circulated to all Full and Honorary members by letter for voting.

Membership

Two Associate Members were elected to Full Members of the ICCP: Dr. Costel Nedelcu (Romania) and Mr. Harold W. Read (Australia).
The following colleagues were elected for Associated Members:

Mr. Banadi Bardhan (India)
Mr. Mohmudeen Faiz (Australia)
Dr. Rodney Alan Gayer (United Kingdom)
Dr. Hakan Kahraman (Australia)
Dr. Joachim Koch (Germany)
Mr. Kiyofumi Okada (Japan)
Dr. Per Rosenberg (Danmark)
Dr. Birthe Schmidt (Norway)
Mrs. Maristela Bagatin Silva (Brasil)
Dr. Nobuyori Takeda (Japan)
Mrs. Laurraine Margaret Walsh (Australia)

Handbook of Coal Petrology

The saleable copies of the Handbook and the different supplements are located now at the Nederlands Instituut voor Toegepaste Geowetenschappen TNO in Heerlen (The Netherlands) and have the care of Dr. Fermont. His address:

Geological Survey of the Netherlands
P.O. Box. 126
NL-6400 AC Heerlen
The Netherlands
Fax-Nr. +31-45-561 6461

ICCP Archives

The archives, situated at Aachen until now, should be also located at Heerlen in the future. Dr. Fermont was contacted by Dr. Pickel in this matter and has agreed. As soon as the archive is passed over to Heerlen the old collection of documents shall be combined with new parts of the archives of Dr. A.H.V. Smith and Prof. Spackman.

Future Meetings

The next meeting of the ICCP will take place in Porto (Portugal) on September 20-26, 1998. Enquiries should be adressed to

Prof. Dr. Manuel J. Lemos de Sousa
Universidade do Porto
Faculdade de Ciências
Departamento de Geologia
Mineralogia e Geologia
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The 1999 meeting will be organized by Prof. Dr. Cornelia Panaitescu and will take place in Bucuresti (Romania). For the meeting in 2000 an invitation of the Brazilian Oil Company Petrobras is in the hand of the President. This meeting will be held in Rio de Janeiro. And for 2001 the Geological Survey of Denmark and Greenland has invited the ICCP to held its meeting in Copenhagen.

Thiessen Medal

This year the Reinhard Thiessen Medal was awarded to the Honorary Member of the ICCP, Prof. (em) Dr. Geoffrey H. Taylor for his outstanding work in coal petrology. Geoff Taylor is member of the ICCP since 1954. The laudatio was prepared by Alan Davis and read by Alan Cook and the Medal was presented by the President, Manuel Lemos de Sousa. The laudatio will be printed in no. 17 of the "ICCP news".

Social Programme

An ice-breaker party took part in a familiar atmosphere in Tim Moore's and Jane Shearer's house at Karori, Wellington. The Conference Dinner was prepared at "The Tugboat Restaurant", situated at an old steamer which anchors in the harbour of Wellington.

Poster Session

During the week of the meeting a poster session took place in rooms of the Science House. 16 posters were presented covering topics of all three commissions (see abstracts).

Excursion

From October 25 to October 28 an excursion was organized by Dr. Jane Newman and Dr. Richard Sykes. Main points of interest were outcrops showing Tertiary vitrinite rich coal of different rank of the West Coast Coalfields at the South Island of New Zealand. Also the difficulties of mining within this mountaneous area of heavy precipitation (up to 7m per year!) were explained. The geology of the area visited was explained in an excellent guide.

2. Reports of the Commissions

2.1 Commission 1: General Coal and Organic Petrology

Chairman: Alan Cook
Secretary: Walter Pickel

Tuesday, 21st October

Accreditation Programme: Aivars Depers

Aivars Depers gave a report on the progress of the accreditation programme. 64 analysts of 31 labs in 14 countries have participated up to now, of which 31 had been previously accredited according to the results of the first analysis. From the participants of the second run, the results of 15 participants were still missing at the time of the meeting.

A main problem is still to produce a software for the evaluation of the data, as there are various types of data to be dealt with: data from analysts, who participated in the first accreditation excercise, data from those who just started with the second and as a future problem, data from analysts, who might miss one excercise inbetween. Anyhow, finally the results of the recent excercise will be sent to the participants this year, as Aivars Depers is evaluating the up to date results "by hand".

A version of his report had been recently published by Cook et al. at the occasion of the 7th. New Zealand Coal Conference[1].

Standardization: Walter Pickel

After the Heerlen Meeting, organized by Dave Pearson, Raphael Javier and Walter Pickel, a set of three glass standards had been started to be circulated among those 21 labs, that had indicated their interest. Up to the Wellington meeting, 13 analysts from 9 labs had returned their results and the round robin is expected to be finished before the next meeting.
The purpose of this excercise was a) to give each participant the opportunity to compare his calibration method and standards with others and b) to get an idea, of possible variations of reflectance measurement data due to calibration. No rules were set up relating to how to do the excercise. Analysts were asked to calibrate as they are used to and to report random and maximum reflectance of each standard. As the report was preliminary, there was no detailed discussion of the data, and results will not be printed, before the excercise is finished. Two points were noted. Firstly, various analysts came up with results in between, for example 0.46 % Rr and 0.52 % Rr for the same standard, and this cannot be considered satisfactory. Secondly, 4 analysts returned significantly higher Rmax than Rr values. This latter result can be probably attributed to incorrect levelling of the standards.
It is expected, that the final results will give a measure of possible variations in reflectance measurement due to calibration errors and initiate a possible second excersise.
The round robin is still open for further participants, who should contact Walter Pickel.

Inertinite Editorial Group: Opening remarks, Monika Wolf

Monika Wolf gave a short review of the history of the editorial group and noted that in the working group a clear final agreement could not have been achieved on the questions of the size limit of inertodetrinite, on an alternative name for the newly proposed maceral "secretinite", about the question, if this maceral should be grouped within macrinite and if the inertinite macerals should be subdivided similar to the vitrinite macerals in maceral-sub-groups.

[1] **Cook, A.C., David, P., Davis, A., Depers, A.M., Fermont, W.J.J. & Kutzner, R. (1997):** An International Accreditation Programme for Maceral and Vitrinite Random Reflectance Analysis. - Seventh New Zealand Coal Conference, 15. - 17. Oct. 1997, Proceedings, Vol. **2**: 466 - 477.

Secretinite and Funginite, Paul Lyons

Paul Lyons reported on the proposal, he had made at the Heerlen Meeting in 1996, to introduce two new macerals (secretinite, funginite). Various microphotographs of secretinite, a non-cellular, roundish maceral, commonly displaying a characteristic notch and funginite, a fungal-derived maceral, displaying internal cell structure, were shown and discussed. The following discussion predominantly adressed the problems, how to distinguish vesicules from cell structures, how to distinguish the newly proposed macerals especially from semifusinite and the question of the origin secretinite.

General Discussion, Monika Wolf

Monika Wolf re-started the general discussion about the inertinite sheets, including secretinite and funginite. The size limit for inertodetrinite was discussed, and if 10 µm, as proposed by the group, were a reasonable limit, which was finally accepted, as it is consistant with the size limits set in the vitrinite group. Further discussion dealt with the problem of the distinction between fusinite and semifusinite and whether brightness or cell structure or both criteria should be preferred. It was proposed that a diagram of Alan Cook similar to that published in the Australian standard for maceral analyses showing the variation in reflectance with rank of various macerals was to be included into the sheet "Inertinite".
A vote on the question of size limits revealed 18 in favour of 10 µm and 2 in favour of 15 µm. By the following vote it was decided, not to introduce a subdivision of inertinite with 13 in favour and 5 against. After further discussion of this point it was agreed that in the sheet "Inertinite" headings will, be placed over the list of macerals to distinguish inertinite "with internal plant cell structure" from inertinite "lacking internal plant cell structure" and "fragmental matter".
After further discussion about minor changes in the sheets they were approved by the working group with 15 in favour and no-one against. The sheets are still open for further changes till Dec. 31., applications should be forwarded to Monika Wolf by then. Prior to the next meeting the sheets will be circulated to the members of Commission I for final approval.

Liptinite Editorial Group: Walter Pickel

Walter Pickel reported on the progress, he had up to the meeting made in compiling new sheets for the liptinite macerals. As for most of the liptinite macerals excellent definitions exsist in former handbook editions, the main problem was to make the new definitions applicable for coals of all rank as well as for dispersed organic matter and to add more recent information mainly into the paragraph "Chemical Properties". All macerals formerly defined are newly compiled and re-written according to the format that was set up by the vitrinite editorial group, the maceral colloresinite was re-introduced into the liptinite group.
Bituminite (the former "bituminite" and "bituminite in rocks other than coal") were except from putting the two sheets into one and editorial changes according to the new format, not changed as they are considered to be up to date, the same holds true for mineral bituminous groundmass, colloresinite and the sheets telalginite and lamalginite that are to be proposed as the two only submacerals in the liptinite group.
Mineral bituminous groundmass as well as bituminite were further discussed, especially if the mineral bituminous groundmass, even though no maceral in sensu strictu should be left in the liptinite group or dealt with separately.
For further progress, Alan Cook , Werner Pfisterer and Monika Wolf volunteered to support the edition of the next version to be discussed in detail at Porto Meeting.

Coal Classification: Manuel Lemos de Sousa

Manuel Lemos de Sousa, as president of the ICCP responsible to represent the ICCP at classification matters, reported shortly about his attendance of the UN-Porto Meeting on the Codification of Low Rank Coals and the ISO Meeting on Classification in Capetown.
The International Classification of In-Seam Coals, based on the Alpern system is going to be published this year.

Wednesday, 22nd October

Coal Classification: Manuel Lemos de Sousa

Manuel Lemos de Sousa anounced, that he had invited five members of the ICCP to form an ad hoc working group on classification. These members are: A. Cook, Z. Correa da Silva, A. Davis, H. Pinheiro, W. Pickel.

Microlithotype Editorial Group: Monika Wolf

Monika Wolf presented the set of sheets on microlithotypes, the editorial group had produced. In the starting discussion it was decided, that using only one subdivision of inertite, fusite, was confusing and not necessary and thus not to used in the new classification. The chapter "comments" from the fusite sheet was to be added to the inertite sheet.
Further discussion led to various changes in the sheets. Finally the sheets were accepted by the commission with 15 votes in favour and no-one against.

The sheets are open for further changes until Dec. 31 1997, applications have to been forwarded to Monika Wolf by then. Prior to the next meeting the sheets will be circulated to the members of Commission I for final approval.

ICCP Training Programmes: Alan Cook

Alan Cook presented proposals for possible ICCP activities in training and education, and discussed the option, to have short courses held in combination with future ICCP Meetings. Further discussion points were the possibility of courses independant from meetings and media (e.g. video, cd-rom) to be used as lecture material.

Discussion on the New Handbook Edition: A. Cook. W. Pickel, M. Wolf

The point was brought into discussion, that even though various working groups deal with topics, relevant for a third edition of the handbook no complete concept of possible contents seems to exist. A list of possible contents was proposed and extended during the discussion. The following topics, in addition to those who are worked on at the moment, were considered: lithotypes of medium and high rank coals, combustion residues, bitumens, carbon, coke, analytical methods, as reflectance mesurement and maceral analysis, the huminite maceral group, minerals and microlithotypes of low rank coals.
An ad hoc group (Alan Cook, Walter Pickel) is to send a complete proposal list of contents to the editor by the end of 1997 for further consideration and discussion at the next meeting.

Editorial Group Ulminite

The group was founded at the Wellington Meeting. Geoff Taylor is going to be responsible for the group. Volonteers are asked to contact him.

Prof. Geoffrey H. Taylor
Research School of Earth Sciences
Australian National University
GPO Box 4
Canberra ACT 2601
Australia
Fax: +61-6-2490 738

2.2 Commission 2: Application of Coal and Organic Petrology at Geology

Chairman: Wolfgang Kalkreuth
Secretary: Angeles Gomez (on behalf of Willem Fermont)

Isolation of Organic Matter: A. Hutton, L. Stasiuk

The convener of this working group over the past 4 years, John Castaño, passed away in early 1996. In respect to his outstanding scientific work TSOP is going to have a **Symposium in Memoriam of John Castaño** at its 1998 meeting in Halifax, Canada, July 26-30. ICCP members are asked to consider to submit contributions to that symposium.

Based on J. Castaño's archives and reports J. Burgess presented a summary report on the last three round robins of this working group. From the data it is clear that a common classification for dispersed organic matter (DOM) is needed to overcome the huge spread in results of compositional data reported by the various laboratories. Some of the recommendations were: a) future round robin work or re-examination of previous samples should include micrographs, which would identify the various components; b) the previous samples were all rich in amorphous matter, future work should include a sample with a higher percentage of structured material.

In response to a letter received from C. Thompson-Rizer, who is currently chairperson of the TSOP Research Committee the chairman of Commission II will contact TSOP to explore the possibilities to set up a joint committee with the aim to establish a common classification scheme for (DOM).

The new conveners of the working group are A. Hutton and L. Stasiuk. They are going to work out a new concept for the WG and will contact the members of this WG to inform about future activities.

Environmental Applications: Avairs Depers

The atlas and the white book received only minor additions over the past year. Future activities of the WG will focus on the analysis of 3 round robin samples:

-contaminated harbour sediment
-a roof dust sample
-contaminated soil

The classification will be that presented at the Krakow meeting (Level 1). It was pointed out that in a recent TSOP study in Halifax Harbour, Nova Scotia some other components such as glass, diessel oil, alumina, mesophase were identified and should be added to the

current ICCP classification scheme. It was also recommended to publish some of the preliminary results such as the classification scheme and to intensify the co-operation with TSOP.

B. Kwiecinska presented a proposal by Dr. Jan Pasava, Czech Geological Survey to study within the ICCP organic matter related to environmental concerns. Considered are areas such as weathering of organic matter in fossil fuels, organic matter in aquifers, microbiological processes of leaching, organic matter in nuclear waste. Interested ICCP members may contact Dr. J. Pasava at pasava@cgu.cz or at Czech Geological Survey, Klarov 131, CS-118 20 Praha, Czech Republic.

Pseudovitrinite: Lila Gurba

Based on information received from a questionaire distributed amongst 18 members of the WG a very detailed report was presented on the occurrence and nature of pseudovitrinite. Points discussed include:
- wide geographical distribution, both found in northern and southern hemispheres
- occurs in coal from Carboniferous to Tertiary, so far pseudovitrinite has not been reported from Triassic coals
- most abundant in high volatile to medium volatile bituminous coals, although occurs also in lower and higher rank coals
- pseudovitrinite occurs most frequently in vitrinite-rich coals, with liptinite contents < 5 %

The convener compiled current informations and results of previous ICCP exercises in a number of Appendices and these are available upon request:
Appendix 1: Questionaire-Summary of Comments received, 13 pages;
Appendix 2: Back to the past: Historical survey of the work carried out by ICCP on pseudovitrinite (based on Harold Smith's archives), 9 pages
Appendix 3: Results of exercises (1968-1970) performed according to Prado's method, prepared by J. Prado, 13 pages;
Appendix 4: Bibliography, 4 pages

Suggested activities for 1997/98 include:
- develop a sample bank for researchers to use
- conduct a round robin exercise (rank and composition)
- carry out relevant tests (etching, thin sections, chemistry, coking tests)
- compilation of further contributions by WG members

Internet: Martin Reinhardt

The first draft of the ICCP Homepage arrived in Wellington by e-mail just in time to be presented to the ICCP members during the general assembly on Friday, Oct. 24, 1997 and was greeted with much applause.
The homepage had been prepared by C. Araujo using pertinent text files received from the general secretary, Z. Corrêa da Silva. Technical *know how* and support had been provided by Petrobrás. The current format is that suggested by the members of the working group and will be modified slightly following suggestions received at the meeting and the critical review by members of the WG. The first version will most likely be out by early 1998, hosted by the Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil.

Coal Facies: Maria Hámor-Vidó

The first white paper on Coal Facies and Depositional Environments was presented at the meeting. The contributions contained in this volume (approx. 60 pages) include pertinent data on Germany, Hungary, Ukraine, Australia, Canada and Poland, with each contribution accompanied by tables indicating source of information, geological age, coal rank, analytical methods applied, and inferred depositional environments.
Future activities of the WG will focus on: a) compile in 97/98 additional information from those members who did not respond as yet; b) evaluate the data once the compilation part is finished; c) prepare final report.

Atlas on dispersed OM: Wolfgang Kalkreuth

A report as to the status of the atlas was presented. The text part comprises now approx. 40 pages with completed sections on
- identification and diagnosis of dispersed organic matter (DOM)
- sampling procedures and sample preparation
- optical methods to determine petrographic composition in DOM
- optical methods to evaluate thermal maturity of organic matter
- references

Future work will focus on the assemblage of suitable photographs. At the meeting it was suggested to produce 3 plates for each maceral group, one for low, one for medium and one for high maturity. H. Hagemann offered to digitize the photographs at the RWTH Aachen.

The atlas will also have an extended bibliography on published plates on DOM, where in table format

information is given as to the type of OM, geological age, mode of observation, remarks on quality of reproduction etc.

Alginite Sheets: Alan Cook

The text part of the alginite sheets has been approved at the Krakow meeting in 1995 with minor additions to be made based on submissions made by L. Stasiuk/W. Kalkreuth (compilation of published data on spectral fluorescence measurements and an updated reference list) and A. Gomez (chemical data on Spanish oil shales).

As at last year's meeting in Heerlen the format of plates and the selection of alginite types in relation to geological age and geographical areas was discussed. The convener suggested to circulate a first version of the plates by end of November for review to L. Stasiuk, A. Gomez and W. Kalkreuth. The final versions of the plates will be presented at the 1998 meeting approval.

Thermal Indices: Angelika Vieth-Redemann

The WG conducted in 1996/97 interlaboratory exercises with the aim to improve the reproducibility and comparability of spectral fluorescence measurement. This time the fluorescence properties of tasmanites algae were determined on a series of samples from the Toarcien of the Paris Basin, representing various maturity levels.

The results show that spectral curves and related fluorescence parameters obtained by the various laboratories were in very good agreement for samples having an estimated vitrinite reflectance range from 0.4-0.9% Rr (measured vitrinite reflectances by one laboratory were 0.48-0.6% Rr). Difficulties were encountered at higher maturation levels, where some laboratories reported erratic fluorescence spectra due to the low fluorescence intensity of the sample material.
Future work of the WG will focus on: a) re-examination of sample 4 from last year's round robin. This was the sample having the highest maturity level and some of the laboratories had difficulties to produce a reasonable spectrum, while the remaining labs showed "normal" spectral curves, which were in fact very close to each other with a lambda max in the order of 630nm; b) a new set of round robins (2-3 samples) of Australian torbanite, supplied by A. Hutton.

Much of the future activities and directions of the round robin will depend on the current convener, who indicated that she may not be available to work on ICCP matters, depending on her workload in 1998.

Basin Modelling: Harry Veld

Due to a lenghty period of fieldwork in China, reorganization and moving of his employer the convener apologized in having not been able to submit any material for the WG at the Wellington meeting.

However, the following activities are planned in the future:
- the final report on the Kemperkoul well will be sent out within the next couple of month
- a concept for a qualified organic matter data sheet will be sent out for discussion
- a detailed procedure to model a series of wells from the Western Canada Sedimentary Basin will be presented at next year's meeting in Porto. The stratigraphic interval comprises about 4000 m of Upper Jurassic/Tertiary strata, in which coal-bearing successions alternate with marine strata including potential source rock intervals (Rr= approx. 0.6-2.6%).

2.3 Commission 3: Application of Coal Petrology to Utilization

Chair: Judith Bailey
Secretary: Rosa Menéndez

Coke Petrography: Raphael Javier

On behalf of the convener the secretary presented an overview of the last Round Robin exercise. A set of pictures was prepared and sent to the members of the WG. For all the selected fields, three pictures were taken with the polars crossed at two different angles and using a lambda plate. Participants were asked to identify the texture within a 20 mm field surrounding the indicated points, according to the classification and descriptions given in Krakow. In this occasion, from 17 questionnaires circulated, 11 participated in the exercice. Results were not analysed before the meeting by the convener but he will be asked to do it so that guidelines for the next exercise may be established.

Coal Blends: Alan Davis

In the absence of the convener, Angeles Gómez presented the results of the exercise. 21 responses were received, one of them after the ellaboration of the report and therefore not included in it, but the data fell within the range of the other results. Point-counting was carried out by 20 participants, and reflectance analysis was carried out by 19 participants.

Automated analyses was only performed by one person.

One of the coals analysed was inertinite-rich, and the other was vitrinite-rich. The results were considered encouraging. Where composition was determined by reflectance, the mean composition differed from the actual by 10 %. Where point-counting was used, the difference was nearly 6 %. In both cases the high-inertinite coal was underestimated.

The standard deviations in the estimated blend compositions were about the same for the two methods used. Where reflectance was used to estimate composition, the standard deviation was lower than it was in 1995 even though the blend used was more complex in this exercice. This may be due to counting 400 points as opposed to 200 in 1995.
The presence of a significant amount of non-assignable inerts (11.6 % by reflectance, 7.7 % by point-count) probably accounts for the underestimation of the proportion of high-inertinite coal. On the assumption that the non-assignable inertinite derived from the two coals in the same proportion as in the blend, it is possible to correct the mean calculated blend composition. The obtained values approached to the actual ones. Refinement of petrographic estimates of blend compositions is going to depend on the development of means of prorating particles consisting of only inertinite.

Determination of reflectances of the component coals done both manually and automatically was excellent. Results obtained from the single automatic analysis were reasonably close to those obtained manually.

Alan Davis expressed his wish to resign as Convener of the Working Group, and a replacement will be offered at the next meeting. Alan Davis will be asked to continue one year more to ensure the continuity of the activities of the WG.

Inertinite in Combustion: Angeles Gómez

Twelve participants from 8 institutions took part in the exercice. The classification system used consisted of identifying the point under the crosswire rather than the whole particle. Participants were asked to distinguish between vitrinite-derived chars, fused inertinite material (isotropic/anisotropic; porous/dense), and unfused material (fusinoid and dense).

The wide spread of results obtained made statistical analysis of the results difficult: some of the uncertainties related to the analytical problems, some to the coal itself, and some might be related to the area around the crosswire itself; the amount of uncertainty did not justify the spread of the results, the percentages before and after pro-rating the dubious identifications being equally unsatisfactory; all the participants agreed that unfused material in combustion was reduced to 25 %, which reveals that most inertinite in the sample showed some plastic behavior.

The same classification system will be retained for next year's exercice. Coals of the same rank will be used. Pyrolysis char of one vitrinite-rich coal and one pure inertinite belonging to the same seam will be provided. More precise guidelines about the counting procedure will be provided.

Combustion: Diego Alvarez and Edward Lestter

A set of three blocks were sent to 16 labs, 7 of which responded with 12 sets of data. Chars used in the three blocks were generated from combustion of Middelburg coal in a 1 MW rig. Sample 1 was a near-burner (pyrolysis) sample. Sample 2 was a > 38 micron fraction from the cyclon (back-end), and Sample 3 was a demineralised cyclone sample, using acid digestion.

The exercise was designed to evaluate: 1) the differences between the samples; 2) the agreement using a simple three terms char classification system (thin-walled, thick-walled and massive). The agreement between labs was not particularly good, although agreement between Nothingam University and INCAR was reasonable. Agreement between operators from the same lab was good. Agreement of each operator repeating the analysis of the same block was also good.

General conclusions about the samples were based on the overall results: a) sample 1 contained more thick-walled char than samples 2 or 3; b) difference between sample 2 (sieved) and sample 3 (acid demineralised) was minimal and hence either technique was found acceptable for carbon concentration.

Future work will concentrate on: a) the use of a DTF to generate a pyrolysis sample and a combustion residue; b) a potential modification of the current classification system to include secondary porosity and c) the use of Internet to specify exact points and record each data point separately.

Automation: Petra David

In the absence of the convener, Javier Prado presented the activities of the WG. In February 1997 a questionnaire was distributed to the members of the working group. Six of seven members replied. In the distributed questionnaire it was asked to give a brief description of the applied procedures.

From the 1996 questionnaire it was concluded, that the WG on Automation should try to also standardise their analyses. Therefore it was decided to start the first Round Robin exercise with the analysis of single coal samples which are also used for the accreditation exercice. The advantage of this approach is that the results can be compared to a huge data set. Seven sets of seven coal blocks, which are also used for the accreditation analysis, have been provided by Aivars Depers. From these, three coal blocks have been selected and distributed with further instructions for analysis to 6 members in July 1997. The data set of the 1997 Round Robin exercice is not complete. But since all the members indicated that they will perform the missing analyses in the near future, results are not presented at the Wellington meeting. However, the first results look quite promising. It is planned to distribute the final results and an evaluation to the members of the WG after receiving the missing data and to present the results at the 1998 meeting in Porto. Further activities of the WG in 1998 depend on the final results of this exercice.

Javier Prado also explained the difficulties found in the petrographic analysis of one sample, due to the presence of high reflectance vitrinite particles.

Call for Nominations for the Reinhardt Thiessen Award

Nominations are sought for candidates for the 1998 Reinhardt Thiessen Medal award. The award is made for individuals who have made outstanding contributions in the field of coal or organic petrology. Any person of high standing in the field is eligible for the award; ICCP membership is not a prerequisite. Only full membes of the ICCP may submit a nomination.
The award is made by the ICCP Council acting on the recommendation of the five membes of the Thiessen Award Committee and will be presented at the 1998 ICCP meeting to be held in Porto (Portugal) in September. The committee invides you to send your nominations to: Dr. Alan Davis, Chairman of the Reinhardt Thiesen Award Committee, Coal and Organic Petrology Laboratories, 105 Academic Projects Building, University Park, PA 16802 USA (Fax: +1-814-865 3573). **Letters of nomination** should provide the reasons for and justification of the proposal and must be **received by March 15, 1998** at the latest.

Abstracts

Erosional unconformity — A paradoxical interpretation from vitrinite reflectance

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Erosional unconformities are so far identified from the offsets of the vitrinite reflectance profile and the amount of erosion is calculated as equivalent to the missing sediment section corresponding to the missing VRo of the profile. This method of calculation has got some inherent problems because it cares only for the time-temperature history of the basin but does not consider the modifications of the profiles due to changes in the tectono-stratigraphic conditions of the basin. Moreover, all the profiles with reflectance offsets are considered to be erosional in this method which need not be physically true, some of which may be non-depositonal also.

In this paper an attempt is being made to nullify the effects of modification by reconstruction of the profile to find out if there is any erosion or not. The method of reconstruction has been applied to the available data for a well in Broach Depression of Cambay Basin, India, and the amount of erosion thus calculated is a fairly good match with the results of seismic analysis.

An atlas of coal macerals and dispersed organic matter from hydrocarbon source rocks, Canadian sedimentary basins - Canadian Society for Coal Science and Organic Petrology.

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The Canadian Society for Coal Science and Organic Petrology (CSCOP) was established in 1971 by a group of government, university and industrial coal scientists to provide a vehicle for collaborative research and discussion. The current membership is in the process of producing a reflected light photomicrograph atlas of macerals in coal and hydrocarbon source rocks from Canadian sedimentary basins. The "Atlas" will commemorate the 25th Anniversary of CSCOP and, in the spirit of the founding initiative, the "Atlas" represents a collaborative effort amongst government, university, and industry, coal and petroleum geoscientists. The first part of the "Atlas" will feature coal macerals of the vitrinite/huminite, liptinite and inertinite groups and associated mineral matter; this section is sub-

divided into the following categories: (i) lignite and sub-bituminous coals, (ii) high-volatile bituminous coals, (iii) medium-volatile coals, (iv) low-volatile coals; and (v) semi-anthracites and anthracites. In addition this section will include photomicrographs of carbonization residues produced during coking of Canadian feedstock coals. The second section of the "Atlas" will feature Dispersed organic matter constituents within Phanerozoic hydrocarbon source rocks of Canada. This section of the "Atlas" is sub-divided into the following categories: (i) herbaceous macerals (vitrinite, liptinite and inertinite), (ii) unicellular and coccoidal alginite, (iii) amorphous macerals, (iv) organic chitinous macerals (e.g. chitinozoa, graptolites), (v) acritarchs, dinoflagellate and algal mats and; (vi) oily and solid bitumens.

Combining FAMM and VR to study wells posing difficult thermal maturity problems in Australasia and S.E. Asia

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Thermal maturity studies reported in the literature are often exceptional cases where a particular technique or combination of techniques worked well. In some regions, the reality of normal exploration practice is quite different, and thermal maturity assessment of samples using normal routines may lead to wildly inconsistent and erroneous results. Several important sources of difficulty for thermal maturation studies are:

1. Perhydrous and subhydrous vitrinite compositions which respectively give rise to vitrinite reflectance (VR) suppression and enhancement,
2. Complex stratigraphy (unconformities),
3. Complex tectonics (thrusts),
4. Contamination by cavings, drilling mud additives and reworked organic matter (OM), any of which may sometimes overwhelm the indigenous OM,
5. Lack of supporting data on some samples such as depths, stratigraphy, and drilling history and conditions.

These problems often preclude the effective use of thermal maturity indicators derived from bulk analyses (Rock-Eval T_{max}, several organic geochemical ratios). As a result of extensive study of wells from Australasia and S.E. Asia, we have found that by combining two microscope-based thermal maturity techniques, VR and fluorescence alteration of multiple macerals (FAMM), many difficult thermal maturity problems due to any combination of the above factors can be resolved.

Relationships between thermal maturity indicators are often poorly known and depend upon cross calibrations, the portability of which from region to region or even basin to basin is uncertain. By contrast, the relationship between VR and FAMM equivalent VR (EqVR) is well established for the S. E. Asian and Australasian regions. This is expressed in a fluorescence alteration diagram on which vitrinite reflectance iso-suppression curves are drawn. Calibrations have been carried out for the Indonesian Tertiary (Wilkins et al., 1997) and the diagram appears to work well for OM of this age throughout the S. E. Asian region. Pre-Tertiary organic matter is treated using an Australian Permian calibration which also appears to work satisfactorily for Jurassic and Cretaceous source rocks of the North West Shelf of Australia (Wilkins et al., 1995). Inconsistencies between VR and EqVR are usually found to be due to difficulties in identification of the vitrinite population in either method. In this way VR and EqVR used in combination are much more powerful than either method alone.

Wilkins, R. W. T, Wilmshurst J.R., Hladky G., Ellacott M.V. and Buckingham, C.P. 1995. Should fluorescence alteration replace vitrinite reflectance as a major tool for thermal maturity determination in petroleum exploration? Organic Geochemistry 22, 191-209.

Wilkins, R. W. T., Sherwood, N. R., Faiz, M., Teerman, S. C. and Buckingham, C. P. 1997. The application of fluorescence alteration of multiple macerals (FAMM) for petroleum exploration in S. E. Asia and Australasia. Proceedings of the Petroleum Systems of SE Asia and Australasia Conference, Jakarta, May, 1997, 923-938.

Application of petrography in studies of interactions between coals during coking

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Coals have recently been found to interact when their blends were heated, in a way that affects the extent to which they fuse.These interactions were stronger and more noticeable as the difference in rank between the coals present in the blend increased.

Blends of two pairs of strongly interacting coals were investigated petrographically to detect any changes in coke optical texture resulting from these interactions.

Petrographic observations have shown that in the case of a blend of high volatile and low volatile coals, the interaction was reflected by a much better integration of coke components, with a greater proportion of fused boundaries compared to cokes made from the individual coals. Inertinite grains were much better incorporated into the vitrinite derived matrix in the blend, compared to the low volatile coal on its own.
In another blend of sub-bituminous and medium volatile coals, where a strong interaction was detected, optical microscopy showed that mosaic size of the medium volatile coal had decreased substantially with increasing amount of sub-bituminous coal added.

The mechanism of observed interactions is attributed to physical transfer of volatile material between the coals constituting the blend, during their pyrolysis. This volatile material could be acting as a plasticiser.

Coalification tracks of various vitrinite types in Permian coals of the Gunnedah Basin, New South Wales, Australia.

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Detailed petrographic analysis of high-volatile bituminous coals in the DM Texas DDH 1 borehole from the Gunnedah Basin, New South Wales shows the presence of three distinctly different members of the vitrinite group. Apart from telocollinite (or in the ICCP classification, collotelinite) and desmocollinite, these include a component resembling material described in Northern Hemisphere coals as "pseudovitrinite".

The mean maximum reflectance of each of these components, along with that of semifusinite, was measured separately in a vertical section, including a situation where an igneous intrusion has locally influenced the adjacent coal seams, to determine the response of each different vitrinite type to increasing coal rank. The results show that a separate reflectance histogram can be drawn up for each vitrinite component, and that three populations of vitrinite, based on reflectance distribution, can be distinguished in a single coal sample.

Detailed study of a vertical sequence through the strata shows that the same three populations can be followed down to the end of the borehole, with separate coalification tracks for each vitrinite component.

There is a distinct separation between the regression lines of telocollinite and pseudovitrinite at the low end of the rank range examined (Rv_{max} based on telocollinite = 0.68%). The reflectance values for the different vitrinite components converge towards the high end of the rank range (Rv_{max} of telocollinite = 1.2%), making separate measurement of the different components less significant in delineating rank trends only at relatively high rank levels.

Separate identification and reflectance measurement is required for the different vitrinite types in high-volatile bituminous coals in detailed maturation studies, such as might be required to establish patterns for petroleum generation. Even where measurements are confined to telocollinite, as recommended by ICCP and Australian Standards, special attention should also be paid to the possible presence of pseudovitrinite. This material would usually be counted with telocollinite. If present in significant proportions, however, it may significantly affect overall Rv_{max} values and hence the meaningful interpretation of maturation data.

Components of syn- and post-deformational coalification in the Mountain Park area, Alberta, Canada

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The Lower Cretaceous Jewel seam, which is generally about 10 meters thick, is the major economic coal seam of the Mountain Park area, located in the Rocky Mountain Front Ranges. The strata of the area are complexly folded and cut by several thrust faults. Vitrinite reflectance of the Jewel seam (and other coal horizons) was measured from samples collected at outcrops and drill holes from close to hundred, evenly distributed, locations. The mean maximum vitrinite reflectance of the Jewel seam ranges from 0.94 to 1.28 percent, with the highest values in the lowest thrust sheet. In addition, there is a slight east to west increase in reflectance in each thrust sheet. These relationships indicate that coalification resulted largely from pre-deformational sedimentary burial, with components of syn- and post-deformational coalification during the later stages. The Mountain Park area shows a larger component of post-deformational coalification than the nearby Cadomin area. It also appears that thrusting in the area took place after folding.
In order to examine other relationships between coalification and deformation, vitrinite reflectance

anisotropies were determined from oriented coal blocks. Several blocks have biaxial anisotropies, indicating a relation to tectonic stress fields. These biaxial coals display maximum reflectance axes parallel to nearby fold axes, which suggests a relationship between vitrinite anisotropy and local deformation. The biaxial vitrinite ellipsoids result from superposition of tectonic strains on a primary, sedimentary burial related uniaxial anisotropy.

Composition, depositional environment and rank distribution of Porculla Formation Coals in Yanacancha Basin (Peru).

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The coal series in the Yanacancha Basins located in the Peruvian Andes is the Porculla Formation of Lower-Middle Tertiary age. This series has a variable thickness (150 - 200 m) and it covers the limestone and quartzite basement of Middle-Upper Cretaceous Formations in a discordant fashion.

Coals of the Porculla Formation were sampled and studied with the aim of determining their composition, rank and the depositional environment in which they were generated. Stratigraphically these coals are located in the middle part of the Formation in only one coal level 8 m thick made up of thin coal beds (less than 0.5 m in thickness) alternating with clay, chert and tuff levels. Globally, coals of the Porculla Formation are humic with an autochthonous-to-hypautochthonous character and are composed of clarain and vitrain lithotypes. Optical microscopy shows that vitrinite is the predominant maceral group (70 - 91% vol.) followed by liptinite (6 - 20 % vol.) and inertinite in lesser amounts. The mineral content is moderate to high (11- 35- 48% ash) and it is made up mainly of quartz, clays and syngenetic pyrite. Some trace elements such as Ba. Sr and Cr show relatively high contents (> 501 ppm) and seem to be associated with the inorganic fraction of these coals.

The depositional environment of coals from the Porculla Formation as indicated by its characteristics such as composition, lithotypes, geology and also the paleoenvironment and paleofacies indices suggests the predominance of swamp conditions in a fluvial-lacustrine setting. The vitrinite reflectance values (0,5-0,6%), the fluorescence of the liptinite macerals, the chemical rank parameters and Tmax results indicate a low degree of evolution (diagenesis/catagenesis transit) for these coals which corresponds to the subbituminous / bituminous coal rank. Unlike the Cretaceous Basins of Peru, the evolution of coals from the Yanacancha Basin is related to normal evolution by burial and probably also to the tectonic activity at the final stage of the Andean Orogeny (Terminal Miocene - Lower Pliocene).

The coals in thermic contact with sulphides and gold mineralization from Baia Sprie — Maramures (NW România)

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The Baia Sprie area is a well know place of various mineralogy within Europe. The first written information on the mining from Baia Sprie dates at 1141 but simple exploitation began many thousands of years ago, mostly by the Geto-Dacic people. Baia Sprie is famous because its polymetalic mineralization is natural and has up to 80 metalic minerals. Recently I discovered the natural coke and pyrocarbon in the coals which are in thermic contact with polymetalic mineralization from Baia Sprie.

Baia Sprie area was formed by neozoic geological formations (magmatites and hydrothermally altered products and polymetalic mineralizations postpannonian, pannonian sedimentary deposits and other younger rocks). the Pannonian sedimentary deposits was formed by marls, sandstones, volcanogen-sedimentary rocks and bituminous coals-anthracites. The Pannonian geological formations are crossed by the veins of chalcopyrite + pyrite + galena + sphalerite + bornite + tetrahedrite + haematite + chlorite + albite + adulare + baritina + other interesting minerals and quartz + gold + calcite. Two aspects are very important at the contact of the mineralizations with Pannonian sedimentary deposits:

1. In "Herneanu Valley", at the zone of number 5 shaft, the polymetalic and gold mineralization crossed the Pannoian sedimentary rocks. Often the quartz + gold and calcite has replaced vitrinite. In the same time the vitrinite was replaced by pyrocarbone and natural coke. But, the pyrocarbone hasn't a good cone in cone structure. it is as inflated round zone (10 - 20 μm) in the middle of vitrinite. The natural coke hasn't the mosaic anisotropic structures as in meta - anthracites from anchimetamorphic geological formations of Romania, for example. The reflectance of vitrinite of coals from "Herneanu

Valley" zone is 1 - 3%, so a bituminous coal - anthracite.

2. In quarry "Hill Mine" zone the Pannonian sedimentary deposits with coal is crossed by quartz + gold veins and calcite; rarely it was observed polymetalic mineration. In this place (quarry "Hill Mine"), the reflectance of vitrinite is 0.60 - 0.70% RmVi, the vitrinite has been sustituted by hydrothermal quartz + gold (1 - 5 μm) and 1.34 g/t, in chemical analyses) and calcite, often.

Conclusions: In "Herneanu Valley" zone the temperature of hydrothermal sulphides polymetalic mineralization has transformed the organic matters in pyrocarbone and natural isotropic coke. That temperature was by 250 - 300°C (determined by geothermometrically method, Nedelcu and Pintea, 1993).

In quarry "Hill Mine" zone the coals are in bituminous coal stage only and in there it was not formed the natural carbonic products of temperature. The temperature of hydrothermal solutions of quartz + gold + calcite was by 100 - 150°C only.

Nedelcu, C. and Pintea, I., 1993, New data regarding the significance of the pyrite morphology and the fluid inclusions in quartz crystals at Baia Sprie. Rom J. Mineralogy, v. 76, 79-86.

Technological expression of the relationship: coal characteristics—coke quality, by means of petrographic analyses

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To explain and substantiate the above relationship, it is required to consider the following main aspects, practically verified.

1. The petrogaphic characteristics of charge components and blends – vitrinite reflectance and histograms, maceral and microlithotype composition – offer the theoretical and practical background for coal blend making.

2. Under constant technological coking parameters – including component's grain size distribution - coke microstructure is the result of a pyrogenetic process physico-chemically governed by the rank and petrographic composition of coal blend.

3. Coke structure determines its quality, due to the fact that the main of its practical use properties – strength and reactivity – are influenced by its structure. These properties can be estimated and even quantitatively determined by means of petrographic analyses. So, there have been established relationships between these and coke quality indices, regarding its behaviour in the blast furnace. These dependences, which reveal coking ability of differenct coal charges, are successfully used in coking plants for making and preparing the blends and to predict the coke strength.

The best support to the above considerations has been offered by using Romanian weakly coking coals, in simple, binary and complex coking charges. In these experiments rank and petrographic composition of components have lead to a coke whose quantitative structural composition was technologically expressed by specific values for strength and reactivity.

Naturally-formed char particles: morphology and derivation

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Normally combustion char morphotypes are derived from pulverished fuel (p.f.) combustion of coal. However, particles with typical combustion char morphology have also been found in Carboniferous, Permian and Jurassic coals and carbonaceous mudstones (Petersen, submitted). The particles are whiter (in reflected light, oil immersion) than the associated huminite or vitrinite and should be grouped within the inertinite maceral group, but both in morphology and derivation the particles do not correspond to any of the established inertinite macerals. The particles may, however, easily be classified by means of a char classification scheme. They are generally of the dense char morphotypes, i.e. the crassinetwork/mixed network/mixed and inertoid types. Combustion temperature has a strong influence on char morphology (Rosenberg et al., 1996a; Rosenberg et al., 1996b), and experimental low-temperature combustion of coal, in particular in a muffle furnace with a low heating rate, yields similar morphotypes as observed in the coals and mudstones. This indicates that the naturally-formed chars were derived by low-temperature influence on gelified organic matter during surface or ground fires in peat mires. Such fires generally produce temperatures below 300°C (Scott, 1989). The naturally-formed chars are volumetrically of minor importance, but they may have palaeo-environmental implications in that

they indicate a peat fire (ground fire), in particular if additional evidence is provided by pyroinertinite and/or pyrolitic carbon.

Petersen, H.I., submitted: Naturally-formed char particles in coals: an unrecognized minor coal component with palaeo-environmental implications. - Submitted to Fuel.

Rosenberg, P., Petersen, H.I. and Thomsen, E., 1996a: Combustion char morphology related to combustion temperature and coal petrography. - Fuel 75, 1071-1082.

Rosenberg, P., Petersen, H.I., Sørensen, H.S., Thomsen, E. and Guvad, C., 1996b: Combustion char characterisation. Energy Research Project no. 1323/91-0012 and 1323/93-0018, Final report. - Geological Survey of Denmark and Greenland, Report 1996/51, 64 pp.

Scott, A.C., 1989: Observations on the nature and origin of fusain. - Int. J. Coal. Geol. 12, 443-475.

Fluorescence aspects in meta-bituminous coals from the Moatize coal basin, Tete Province, Republic of Mozambique

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Petrographic analyses were carried out in coal samples from Chipanga III and Chipanga VIII mines from the Moatize coal basin in Mozambique. Initially, the samples were subjected to sieving and grinding processes to obtain several grain sizes.

Maceral and microlithotype analyses were done in these grain sizes as well as the random reflectivity of telocollinite. The maceral analyses show these coals to be mainly vitrinitic with general absence of liptinite. Some of the grain sizes are very rich in mineral matter. The telocollinite random reflectivity presents mean values of 1.376% and 1.370% for the Chipanga III and Chipanga VIII coals respectively.

Fluorescence studies showed the existence of liptinite associated with the mineral matter-rich grain sizes. Bitumen and hydrocarbon manifestations were also detected by fluorescence. The occurrence of fluorescing vitrinite was also detected.

The occurrence of fluorescing liptinite in meta-bituminous coals seems to be incongruent. One possible explanation beeing that clay mineral, as refractory material, preserved liptinite from heat effects from subsidence and/or from dolerite intrusions at the final phase of the Karoo Supergroup.

Organic facies of organic-rich Devonian rocks of the Western Canada Sedimentary Basin

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Organic-rich intervals occur in a variety of lithofacies (shallow-water carbonates, evaporites and shales, and deeper basin-filling carbonates and shales) within Middle and Upper Devonian-aged strata of the Western Canada Sedimentary Basin (WCSB). The petroleum source rock potential for the intervals varies from poor to excellent. As part of a basin-wide organic geochemical- and organic petrographic-based investigation of Devonian-aged petroleum systems in the WCSB, the organic-rich horizons are classified into organic facies using criteria from organic and inorganic petrographic microfacies as defined by reflected, white and fluorescent light microscopy and confocal laser scanning microscopy. The findings point to a surprisingly wide variation in organic facies within and between stratigraphic units. A depth-dependent model is currently being used to interpret organic facies based on maceral assemblages within Devonian potential source rock units: Organic facies A (deep water), B (intermediate water depth) and C (shallow water depth) are defined by the relative volume and types of unicellular Prasinophyte alginite, spiny acanthomorphic acritarchs, coccoidal alginites and sporinites. Organic facies D represents distinct intervals in source rock units which are enriched in siliceous microfossil assemblages. Organic qualifiers are also being used to evaluate regional variations in organic facies: (i) enrichment in terrestrial, land plant-derived vitrinite and inertinite macerals, (ii) graptolite-enriched, (iii) chitinozoan-enriched, (iv) possible sulphur-enriched amorphous kerogen and; (v) stromatolitic, algal mats. The paleoenvironments in which these organic facies accumulated are variable and range from basinal to platformal marine settings, near shore terrestrial-influenced marine settings, as well as brackish estuarine and brackish to hypersaline lagoonal and lacustrine-like settings. The regional distribution of organic facies in these strata provide information about paleogeography and its control on source rock quality, and the influence of organic productivity versus preservation.

Fluorescence micro-spectrometry of hydrocarbon fluid inclusions in Upper Devonian Duvernay Formation source rocks, Alberta, Canada.

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Hydrocarbon fluid inclusions (hcfi) in sedimentary strata have been mainly reported from porous and permeable lithologies. Reports of their occurrence in hydrocarbon source rocks are rare and thus their potential for better understanding petroleum systems has been under utilized. The wavelength of maximum fluorescence energy emission from uv-excited organic matter, including hcfi, is controlled mainly by the type and concentration of aromatic molecules relative to the concentration of aliphatic compounds. Using a suite of synthetic and natural hcfi, Stasiuk and Snowdon (1997) have demonstrated that the fluorescence shifts to shorter wavelengths with increasing saturate/aromatic, oil density, n-C17/pristane and n-C18/phytane. In this poster we report on the relationship between the fluorescence properties of hcfi, and optical and geochemical thermal maturity parameters for Upper Devonian Duvernay Formation, Alberta, Canada. In addition, preliminary results are presented from fluorescence alteration experiments of hcfi conducted with a confocal laser scanning microscope.

Stasiuk, L.D. and Snowdon, L.R. (1997) Fluorescence micro-spectrometry of synthetic and natural hydrocarbon fluid inclusions: crude oil chemistry, density and application to petroleum migration. Applied Geochemistry, v.12, 229-241.

Variation of physico-chemical properties of vitrinite during its artificial thermal evolution

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Vitrinite is one of the most important organic components of humic coals. Its reflectance properties under optical photometry make it possible to evaluate the thermal diagenesis of sedimentary basins. Moreover, vitrinite reflectance is a classification parameter for industrial uses of coal. In this paper, changes in the physico-chemical properties during the artificial thermal evolution of an almost pure low-rank vitrinite (99.9% vol.) with a very low mineral content (1.5% ash) are investigated to understand the transformations which this component undergoes in the catagenesis phase. During the heating processes, different amounts of oil, gas and water are recovered in accordance with the successive processes (primary and secondary cracking) peculiar to this evolution phase. Microscopical observations show that the thermal degradation of the vitrinite as an explanation of chemical transformations starts at the 325°C stage. This degradation affects the massive matrix and the ultrastructure of the cellular fillings rather than the more resistant cell walls which are still discernible in the residue of pyrolysis at 450°C. However, in the final steps of the process, the chemical structure of the vitrinite is completely dislocated. At the same time considerable fracturation and a pore system develops leading to the massive expulsion of effluents. These transformations in the vitrinite structure produce an increase in vitrinite reflectance from 0.53% in the raw material to 1.94% for the residue obtained at 450°C. Variation of the reflectance values are in accordance with those described for the natural evolution series of vitrinite in the catagenesis stage. The results of chemical observations show a good agreement between chemical and petrological parameters and also with the general tendency described for natural vitrinites during the oil and wet gas generation phases. However, a significant loss of hydrogen was obtained for the artificial series of vitrinite mainly due to oil and gas production/expulsion. On the other hand, Tmax values above 350°C stage are slightly higher than expected. This indicates that the thermal stability of vitrinite evolved through open pyrolysis system occurs earlier than in the case of vitrinites evolved in natural conditions or those obtained under the confined medium system.

Geology and peat-forming environments of the Waikato Coal Measures, New Zealand

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The Waikato Coal Measures (Eocene-Oligocene) are the basal formation of the transgressive Te Kuiti Group, unconformably overlying an undulating surface cut into deeply weathered Mesozoic basement rocks, and grading up into shallow marine formations. The coal measures are typically less than 100 m thick but exceed 200 m locally. They were deposited within a N to NNW-trending valley system, about 35 km wide and 200 km long, parallel to the regional structural

grain. Tectonic faulting is inferred during earliest deposition at Rotowaro, but did not persist, the major influences on the pattern of deposition being regional subsidence and basement topography. Coal measure sediments are dominated by fine-grained lithologies, principally mudstone, with lesser proportions of sandstone and coal; conglomerate is rare. The sediments are components of five facies associations, the distribution of which is the basis for recognition of anastomosed and meandering fluvial systems, inferred to have existed on a northern alluvial plain, and fluvial coastal plain and tidal coast systems, inferred to have existed in the south.

Eight coal seams are recognised, with ranks ranging from subbituminous C to A. Coal seams in the north are characterised by low to medium ash contents (<10%) and low sulphur (<1%), whereas seams in the south typically have medium to high ash (5-15%) and medium to high sulphur (>1.0%). Variation in sulphur content between northern and southern seams, and related trends within and between coalfields, are primarily a consequence of the varying depth of seams below overlying marine formations. All seam profiles are rich in vitrinite and poor in liptinite and inertinite, but wide variation in the proportions of individual vitrinite macerals reflect facies variations between seams and vertically and laterally within seams. Three broad seam facies are recognised. The Base & Margin facies (humic) occurs at the base, roof and lateral margins of thick seams (>~1.5 m) and dominates throughout thin seams (< ~1.5 m). It is relatively rich in wood tissue, clastic mineral matter, and pollen of Myrtaceae, *Rhoipites* spp., *Phormium* and some conifers. The Interior facies (humic) dominates the central parts of thick seams and is characterised by relatively abundant cork tissue, little to no clastic mineral matter, and pollen of *Casuarina* and heath-type plants. The Sapropelic facies is relatively minor in occurrence and irregularly distributed, and is rich in liptinite and inertinite. The three facies are inferred to represent topogenous, ombrogenous and aquatic peat facies respectively, and collectively constitute a raised mire complex. Major coal seams thus formed in long-lived raised mires, with the central bog plains elevated above normal flood levels and therefore generally protected from clastic inundations from adjacent fluvial channels.

Coal measure basin history is summarised in a series of paleogeographic maps. These show the early development of anastomosed and meandering fluvial systems, and accumulation of thick peats, on the northern alluvial plain in the late Eocene. Fluvial sedimentation began in the south during earliest Oligocene marine transgression across the northern region. Transgression continued southwards, strongly influencing late coal measure deposition on the southern coastal plain and tidal coast during the early Oligocene. Coal measure deposition was ended by marine transgression across Mangapehi Coalfield and the establishment of marine Te Kuiti Group deposition over the entire Waikato region by middle Oligocene.

Use of the electron microprobe to determine the distribution of organic sulphur and other elements in macerals of Australian coals.

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The estimation of organic sulphur in coal relies upon an indirect procedure involving subtraction of sulphur in pyritic and sulphate forms from the total sulphur content. Any errors in the determination of total, pyritic or sulphate sulphur, however, cumulatively influence the derivation of an accurate value for the organic sulphur content.

A method has been investigated for measuring organic sulphur directly by use of the electron microprobe. This method is based on the recent application of electron microprobe techniques to light elements in coal by Bustin et al. (1993). It avoids the uncertainty of calculating organic sulphur by difference, and also allows direct determination of organic sulphur (and other elements such as carbon) on small particles such as individual macerals.

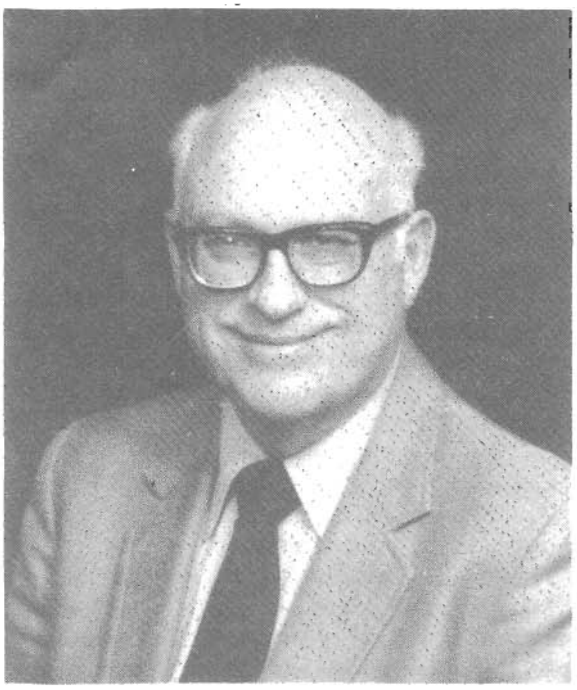
Electron microprobe analysis was carried out on several high-volatile bituminous coals of Permian age from the Sydney-Gunnedah and Bowen Basins. The specimens were prepared as either polished blocks or as grain mounts in the same way as for petrographic examination, and the polished surfaces coated with carbon for examination under the electron microprobe. Along with sulphur, the elements C, O, N, Al, Si, and Fe were monitored. If the intensities of Al, Si or Fe were significantly higher than background, however, the data were discarded as representing mineralised rather than pure maceral components.

Sulphur was found to have a relatively uniform distribution within each individual maceral component. For a given coal the organic sulphur content of vitrinite was also found to be consistently greater than that of the inertinite macerals. Highest organic sulphur was found in the liptinite macerals (mainly sporinite in the coals analysed). These relationships are identical to those reported in the literature for US and other Northern Hemisphere coals; however, in the case of Gondwana coals the contribution of inertinite is usually more significant in determining the total organic sulphur content.

Although the sulphur content of the different macerals varies, within this framework, for each individual seam or coal-measure succession, organic sulphur can be related, for a given sequence, to the relative proportions of macerals in the individual coal samples. Inertinite-rich coals, common in Gondwana sequences, tend to have lower organic sulphur contents than vitrinite-rich coals from the same geologic succession, simply because of their high inertinite content.

Bustin, R. M., Mastalerz, M., and Wilks, K. R., 1993, Direct determination of carbon, oxygen and nitrogen content in coal using the electron microprobe.: Fuel, v. 72, p. 181-185.

John R. Castaño (1926 - 1997)



Last spring the bad news arrived that our long standing member John Castaño passed away on April 20, 1997 unexpectedly in Houston, Texas. We all lost a helpful colleague and a good friend.

When John joined the ICCP he was an international well-known geochemist who had just started to integrate organic petrography in his research. His deep understanding of the geological processes forming and transforming organic matter was remarkable. His knowlege and interest in analytical techniques was very helpful from the beginning of his membership, and it was no accident that he became later the convener of the working group "Isolaton of Organic Matter".

John's outstanding knowledge was the result of his career. A New York native, born June 10, 1926, John received his B.Sc. in geology from City College of New York and his M.Sc. from Northwestern University with a thesis about iron ore deposits. In 1950 John entered in the Shell Oil Company as a stratigrapher and well site geologist. From late 1951 to 1960 he was involved in geochemistry at Bakersfield, California where he integrated petrography, stratigraphy, structure and geochemistry. From 1961 to 1965 he was based in Seattle studying the stratigraphy of different basins in Alaska and conducting source rock/oil correlation studies. Later, 1967, when John was working in Los Angeles he introduced coal petrographic methodes in oil prospecting.

These brief outlines show how systematically John enlarged his activities and knowledge which were admired by all of us. His career within the Shell Company, often attended by changes of residence of the whole family, leaves open.

During his employment and also after his retirement in 1986 John was very active in different scientific societies. He was TSOP Vice-President and President, and TSOP awarded him honorary membership. He was also active in the AAPG and the Society of Economical Paleontologists and Mineralogists. John was a fellow of the Geological Society of America and 1978-1980 member of the U.S. National Committee on Geochemistry, National Academy of Science.

After his retirement John Castaño continued in his research and made available his outstanding knowledge to different projects. He got out of all the activities unexpectedly and left a void behind him. This void feel also all of those who had the chance in their life to meet this warm-hearted person.

Monika Wolf

The author is grateful to Tim Pontolillo, TSOP Editor, who made available the photograph and who allowed to use the information about John Castaño's life printed in TSOP Newsletter 14 (2), 1997.

Ryohei Takahashi (1923 - 1997)

Shortly after an extended tour of some European countries Ryohei Takahashi passed away suddenly and unexpectedly June 15, 1997 in Fukuoka (Kyushu).
Prof. Takahashi was a long standing member of the ICCP introduced yet by Prof. Stach. He has had an outstanding scientific career in Japan showing the high prestige of all branches of coal science in the past there. But also his open-minded, always cheerful character was part of his success.
Ryohei Takahashi was born August 10, 1923 in Fukuoka City. He received his B.Sc. in geology 1946 from Kyushu Imperial University, Fukuoka and took over during the same year an employment as geologist in Aso Mining Company, Iizuka. By suspension of the company he was able to join the Faculty of Engineering, Kyushu Imperial University as a research assistant from 1947 to 1948. 1952 he entered the university finally and became Associate Professor of Geology in 1953. From 1956 to 1958 he prepared a PhD thesis about the relation between coalification and geological structure in the North-Kyushu Basin under the supervision of Prof. Stach in Germany and was graduated at the Kyushu University. Since this time he described in several papers the petrographic character of Japanese coals and used coal petrography for the prediction of the coal's industrial properties. Later on he was also involved in coke petrography.
1972 Ryohei Takahasi became Full Professor of the Kyushu University and Head of the Coal Geology Laboratory. 1980 to 1982 he was Dean of the Faculty of Science and 1986 he was elected President of Kyushu University. He had hold this office until 1991 when he was retired. But this was not the end of his career. In 1992 he became President of the National Center for University Entrance Examinations, Tokyo. He stood in this office until 1996 followed by Director of the Fukuoka City Library, Fukuoka as well as Director of the Kyushu Historical Museum, Dazaifu. These offices he had hold until he passed away.
Prof. Takahashi was a well-known man in Japan. More than 800 people attended the memorial service. It shows that he had fullfilled his duties in all his offices.

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Dead line for the next issue of the ICCP NEWS is April 30, 1998!