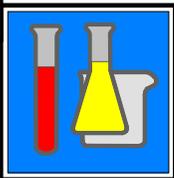




**THE SOCIETY FOR ORGANIC PETROLOGY**



# NEWSLETTER

Vol. 32, No. 2

June, 2015

ISSN 0743-3816

**32<sup>nd</sup> TSOP Annual Meeting**

**Yogyakarta, Indonesia**

**20<sup>th</sup> to 27<sup>th</sup> September, 2015**



Grounds of the Hyatt Regency Hotel in Yogyakarta. Photo courtesy of Tim A. Moore.

## TSOP 32<sup>ND</sup> Annual Meeting 20<sup>th</sup> – 27<sup>th</sup> September 2015

### *On the Edge: Hydrocarbons in the Tropics*

The Organising Committee is pleased to announce that plans are well advanced for your arrival at the TSOP 32<sup>nd</sup> Annual Meeting in Yogyakarta, Indonesia. The Workshop and Technical Programs will span from the 20<sup>th</sup> to the 23<sup>rd</sup> of September. A post conference field trip is planned for the Mahakam Delta area of east Borneo from the 24<sup>th</sup> to the 27<sup>th</sup> of September 2015.

This meeting will provide an opportunity to discuss different aspects of organic petrology in a special atmosphere in the heart of the cultural center of Java. Indonesia is the largest exporter of thermal coal in the world and has a huge and historic petroleum industry, dating back to the early 1900s. Come and join your Indonesian colleagues and exchange ideas, methods, hypotheses and results on all aspects of geology, geochemistry and petrology.

Our hosts for this year's meeting will be Gadjah Mada University, located in Yogyakarta. They are one of the premier universities in Indonesia, officially founded in 1949 and are renowned for their geoscience program in SE Asia.

Details of the meeting can be found on the meeting website <http://tsop2015.ugm.ac.id>. **Abstract submission is open until June 22<sup>nd</sup> 2015 and early registration prices are available until July 31<sup>st</sup> 2015.** Feel free to advertise this event widely and please do not hesitate to contact the Organizing Committee if you have any questions.

Don't miss this once in a lifetime event - see you in Yogyakarta!

Best Regards,

TSOP 2015 Organizing Committee

Please see pages 8-19  
for more meeting details

*Volcano near Yogyakarta  
(© Tim A. Moore, 2007)*



### The Society for Organic Petrology

TSOP is a society for scientists and engineers involved with coal petrology, kerogen petrology, organic geochemistry and related disciplines. The Society organizes an annual technical meeting and field trips; sponsors research projects; provides funding for graduate students; and publishes a web site, a quarterly Newsletter, membership directory, annual meeting program and abstracts, and special publications. Members may elect not to receive the printed Newsletter by marking their dues forms or by contacting the Editor.

Members are eligible for discounted subscriptions to the Elsevier journals *International Journal of Coal Geology* and *Review of Palaeobotany and Palynology*. Subscribe by checking the box on your dues form, or using the form at [www.tsop.org](http://www.tsop.org). Contact Paul Hackley [phackley@usgs.gov](mailto:phackley@usgs.gov) if you do not receive a bill or have any other problems with a subscription. For the best prices on

subscriptions to AGI's *Geotimes*, see their web site at [www.geotimes.org/current](http://www.geotimes.org/current).

TSOP is a Member Society of AGI and an AAPG Associated Society.

### The Society for Organic Petrology Newsletter

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#### GUIDELINES:

The TSOP Newsletter welcomes contributions from members and non-members alike. Readers are invited to submit items pertinent to TSOP members' fields of study. These might include meeting reports and reviews, book reviews, short technical contributions including those on geologic localities or laboratory methods, as well as creative works such as poems, cartoons and works of fiction. Photos, graphs and other illustrations are welcomed. Low-resolution images are discouraged, as they cannot be reproduced well in print. Articles are preferred in Microsoft Word, RTF or plain text formats.

#### Contact the Editor:

Rachel Walker  
e-mail: [rrachelwalker@gmail.com](mailto:rrachelwalker@gmail.com)

#### Address Changes

Please report any changes in address or contact information to: Paul Hackley, TSOP Membership Chair,  
[phackley@usgs.gov](mailto:phackley@usgs.gov)

Members can update their own information by logging into the secure TSOP website:  
[www.tsop.org/mbrsonly/](http://www.tsop.org/mbrsonly/)

The TSOP Newsletter is published quarterly by The Society for Organic Petrology and is distributed to all Society members as a benefit of membership.

Membership in the Society is open to all individuals involved in the fields of organic petrology and organic geochemistry. For more information on membership and Society activities, please see:

[www.tsop.org](http://www.tsop.org)

For purposes of registration of the TSOP Newsletter, a permanent address is:

The Society for Organic Petrology,  
c/o American Geological Institute,  
4220 King St., Alexandria,  
VA 22302-1520 USA

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member society of



### Newsletter Submission Deadlines

September Issue: September 5<sup>th</sup>, 2015  
December Issue: December 5<sup>th</sup>, 2015  
March Issue: March 5<sup>th</sup>, 2016  
June Issue: June 5<sup>th</sup>, 2016

## Presidents' Letter

Dear Members and Friends,

Another year is quickly passing by and so it won't be long until we all meet up again for our annual meeting. This year, Dr. Tim Moore of Cipher Consulting Ltd. and Prof. Hendra Amijaya of the Gadjah Mada University of Indonesia will be hosting our meeting in Yogyakarta, culturally and historically one of the most interesting venues in Indonesia. From a geological standpoint, it is known for seismic activity and spectacular volcanoes located right on its doorstep with easy access to the unique modern analogues of coal, oil and gas source rocks that occur throughout Indonesia. Tim and his organizing committee will be showcasing all of these during the pre- and post-meeting field trips. If you are planning to attend the meeting, I encourage you to go to the TSOP website and register early as this makes life much easier for the Local Organizing Committee.

Postgraduate students planning to present their work are encouraged to apply for student travel grant awards which TSOP will be making available again this year to help with travel and registration expenses (see page 5, the TSOP Facebook page and website for details).

TSOP Officers and Committee Chairs continue to be active on your behalf. With Muki as Chair of the Liaison Committee, we continue to work with the American Geosciences Institute to finalize the Code of Ethics Guidelines that we will be able to reference as a member Society. Chair of the Incorporation Committee, Sharon Swanson, continues to make progress on implementing liability insurance for Officers of the Society. Past-president, Isabel Suarez-Ruiz and Chair of the Elections Committee, Bill Huggett, have steered the 2015 election of new Council members and therefore you will be introduced to the new faces on the Council at the Annual Meeting in September when Vice-President, Dr. Shifeng Dai will be taking over at the helm of the ship.

Finally, I am very pleased to announce that Dr. Agneiszka Drobniak will be joining TSOP Council as Treasurer and this will take place immediately.

I will look forward to seeing many of you at the Annual Meeting in Indonesia.

Sincere good wishes,

Judith Potter  
TSOP President, 2013-2015.

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## Institutional/Corporate Memberships



We'd like to make members aware that membership in TSOP is also open to any organization having an active scientific interest in organic petrology or related fields. TSOP especially encourages institutions to join at the special **institutional rate of \$75/yr** and help support the goals of the Society. See the website for details: [www.tsop.org/join.htm](http://www.tsop.org/join.htm)

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## TSOP is on Facebook!

Visit us at:

[www.facebook.com/OrganicPetrology](http://www.facebook.com/OrganicPetrology)





**THE SOCIETY FOR ORGANIC PETROLOGY**



## 2015 Student Travel Award

**Purpose:** The Student Travel Award is designed to support student attendance at the 2015 annual TSOP meeting in Yogyakarta, Indonesia.

**Eligibility:** The Student Travel Award is open to students who have submitted an abstract for presentation (either an oral or poster) at the annual TSOP meeting and who are travelling to the meeting from OUTSIDE Indonesia.

**Awards:** Four awards of \$750 (US) each will be granted. **Awards will be sent as checks in US dollars – you need to make sure you can cash a check in US dollars in your country before applying.**

**Conditions:** Monetary awards are to be applied to expenses directly related to travel to attend a TSOP Annual Meeting. Funds should not be used to fund research, purchase capital equipment, to pay salaries, tuition, room, or board during the school year. **Students receiving the award will be required to provide receipts detailing travel spending to TSOP after the meeting has concluded.** Copies of travel receipts to Rachel Walker at: [drrachelwalker@gmail.com](mailto:drrachelwalker@gmail.com)

**Visas:** You must have your visa requirements for travel to Indonesia arranged before you book your flights.

**Application Deadline:**

Completed applications must be e-mailed by **July 8<sup>th</sup>, 2015**.

Applications should include:

1. Cover letter requesting travel funds and stating how attending the TSOP Annual meeting will help their research,
2. Filled out Application Form (see [www.tsop.org](http://www.tsop.org) for application form),
3. Copy of the abstract submitted to the TSOP Annual meeting,

Applications will be reviewed and ranked by a committee of three TSOP members; selection of award winners will be based on a combination of quality of research/presentation and potential impact in the field of organic petrology.

Application materials should be sent electronically to Rachel Walker at: [drrachelwalker@gmail.com](mailto:drrachelwalker@gmail.com)

## VRO Machine Survey

TSOP Members – do you have working vitrinite reflectance (VRO) microscopes? TSOP is running an informal survey of how many VRO scopes are out there among the membership in order to build a picture of the kind of equipment members are working with. Those who teach organic petrology courses would find it similarly useful to know which equipment and software are in use, in order to better customize courses to meet the needs of the organic petrology community. Results will be anonymized with respect to individuals and laboratories – the purpose of this survey is to gain an idea of the models of equipment/software being used and their general geographic distribution (ie: how many working VRO scopes are in North America, the EU etc.).

If you would like to participate in this survey, please send answers to the following questions to the TSOP Editor at [drrachelwalker@gmail.com](mailto:drrachelwalker@gmail.com).

Q.1: How many VRO scopes do you have?

Q.2: Who is the manufacturer of the photometer system? (ie: Leitz, Zeiss etc.)

Q.3: What software program do you use with the system?

For an in-depth article about building an analogue Leitz VRO scope, see page 20.



## Potential Postdoc Position

Dr Carolina Mallol is looking for an organic petrologist for a 3 year postdoc position with an ERC-Consolidator project that pursues multi-technique exploration of charred organic matter from Neanderthal fireplace sedimentary deposits.

Dr Mallol's expertise is in soil micromorphology applied to archaeological sediment and has recently embarked in biomarker research in the hope of contributing to the study of the largely ignored organic fraction of prehistoric archaeological deposits. The new project will focus on hearth deposits, and will incorporate organic chemistry techniques (mainly pyrolysis-GC-MS, Raman and CP-MAS C13NMR). Dr Mallol is interested in incorporating organic petrology as well, and in trying to build a reference corpus of charred materials useful for archeological research.

The research group is based at the Bio-organic Research Institute of the University of La Laguna, in Tenerife, Canary Islands. Please contact Dr Carolina Mallol for further information:

### **Carolina Mallol**

Universidad de La Laguna

Departamento de Geografía e Historia

Campus de Guajara, Office A1-03

38071, La Laguna, Tenerife, Spain

& Instituto Universitario de Bio-Orgánica Antonio González (IUBO)

Archaeological Micromorphology and Biomarker Research Lab

Avenida Astrofísico Francisco Sánchez, 38206

La Laguna, Tenerife, Spain

[cmallol@ull.edu.es](mailto:cmallol@ull.edu.es)

## News from ASTM

ASTM D05.28 subcommittee for petrography of coal and coke met Monday, May 11, at the Sheraton Downtown, Columbus, Ohio. Sixteen subcommittee members and guests attended, representing coal and coke producers, users and those with general interest. Primary discussion, led by Rich Pearson of Pearson Coal Petrography, centered on a recent subcommittee ballot for a new draft standard: *Test method for reflectance of coke*. The subcommittee ballot received several negative votes and Pearson outlined proposed changes to the draft standard to address the negatives. The draft standard will be withdrawn, updated, and circulated to subcommittee members prior to re-balloting.

Negative votes to coke preparation practice D3997 also were addressed. D3997 ballots will be withdrawn, updated and recirculated to the subcommittee prior to re-ballot. The subcommittee also discussed updates prepared by Nikola Van de Wetering for coal etching practice D5671 and decided to ballot her updates less a series of photographs that cannot be reproduced in the printed ASTM book of Standards.

Coke textures test method D5061 will be balloted for re-approval following addition of a repeatability statement prepared by Dave Spong and Kevin DeVanne. A recent subcommittee survey considering removal of the more complex maceral classification from D2799 received several comments warranting formation of a task group to consider how to update the standard. New business from Dave Pearson included remarks about vitrinite reflectance test method D2798 and calibration using CCD cameras.

Persons interested in ASTM standards for coal and coke petrography are encouraged to contact Paul Hackley at [phackley@usgs.gov](mailto:phackley@usgs.gov). The next meeting of the subcommittee will be held this October in Tampa, Florida.

## ICCP Training Course Organic Petrology for Industrial Applications

1-4<sup>th</sup> September 2015, Potsdam, Germany

The International Committee for Coal and Organic Petrology (ICCP), in conjunction with Geolab, DGGV, Teichmüller Foundation and GFZ (the German Research Centre for Geosciences), is pleased to announce a training course in organic petrology to be held in Potsdam in September 2015. The course is centered on the petrology of a wide variety of coals. Practical applications and technological importance will be stressed. While a basic geological understanding will be assumed, the course is designed for those with little or no knowledge of coal. It is therefore suitable for undergraduate or postgraduate students as well as established professionals who require a more thorough understanding of petrological aspects of coals.

More information is at [www.iccop.org](http://www.iccop.org).



**TSOP 32<sup>ND</sup> Annual Meeting**  
 20<sup>th</sup> – 27<sup>th</sup> September 2015  
 Yogyakarta, Indonesia

*On the Edge: Hydrocarbons in the Tropics*



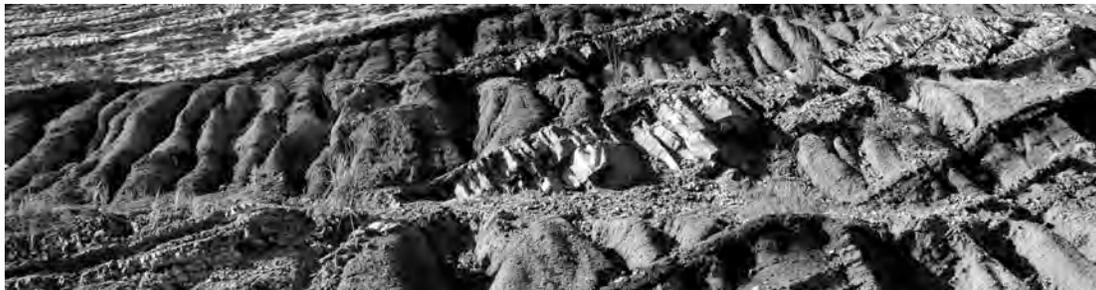
Details of the meeting can be found on the meeting website <http://tsop2015.ugm.ac.id>.

Abstract submission is open until June 22<sup>nd</sup> 2015.

Early registration prices are available until July 31<sup>st</sup> 2015.

Meeting Schedule (please check website for any revisions):

TIME	19 September SATURDAY	20 September SUNDAY	21 September MONDAY	22 September TUESDAY	23 September WEDNESDAY	24 September THURSDAY	25 September FRIDAY	26 September SATURDAY	27 September SUNDAY
8:00 - 9:00				REGISTRATION & OPENING CEREMONY					
9:00 - 10:00				TECHNICAL SESSION #1	TECHNICAL SESSION #3				
10:00 - 11:00		Pre-conference field trip: Borobudur & Family Batik shop	Workshop #1: Fundamentals of Organic Petrology	LUNCH	TSOP BUSINESS LUNCH	FIELD TRIP MAHAKAM DELTA AREA DAY 1: ANCIENT HYDROCARBONS	FIELD TRIP MAHAKAM DELTA AREA DAY 2: BACK TO THE FUTURE - MODERN PEAT DELTA PROCESSES	FIELD TRIP MAHAKAM DELTA AREA DAY 3: BACK TO THE FUTURE - MODERN PEAT FORMING ENVIRONMENTS	FIELD TRIP MAHAKAM DELTA AREA DAY 4: RETURN TO ANCIENT HYDROCARBONS
11:00 - 12:00			Workshop #2: Assessment of Unconventional Hydrocarbon Plays	TECHNICAL SESSION #2	TECHNICAL SESSION #4				
12:00 - 13:00	REGISTRATION								
13:00 - 14:00									
14:00 - 15:00									
15:00 - 16:00									
16:00 - 17:00		REGISTRATION	ICE BREAKER & REGISTRATION						
17:00 - 18:00			Student Function	CONFERENCE DINNER & ENTERTAINMENT	IN-COMING COUNCIL MEETING				
18:00 - 19:00			OUT-GOING COUNCIL MEETING		AWARDS & CONFERENCE CLOSING				
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									



## Field Trip to Ancient & Modern Organic-Rich Environments in Kalimantan Timur (Borneo), Indonesia

### *Hydrocarbons in the Tropics – On the Edge Field Trip*

The field trip will take place from the Thursday, 24<sup>th</sup> of September and end when we fly back into Yogyakarta Monday, 28<sup>th</sup> of September. Below are approximate times and dates for where we'll be and what we'll be doing.

**24<sup>th</sup> of September:** At mid-morning we fly out from Yogyakarta to Balikpapan. We then head north to Samarinda making between 2 – 3 stops, depending on time and weather. We'll be examining Miocene organic-rich sediments.



*Pulaubalang Formation Outcrop, with Dr Ferian Anggara and Prof Chairul Nas as scales (bedding is near vertical).*

From the 24<sup>th</sup> to the 26<sup>th</sup> of September we'll be staying at the Aston Hotel Samarinda (<http://www.aston-international.com/eng/hotel-detail/35/aston-samarinda?gclid=CPWBrLm4-MUCFVcPjgod3oUAeA>).

**25<sup>th</sup> of September:** An early wake up and we head down the Mahakam River to make between 3 – 5 stops at various delta points, again dependent on weather conditions. It will be a long day on the water in boats, so bring your hat, waterproof bag for camera or other important documents, clothes that dry quickly after being wet and lots of sunscreen.



*Landsat of the Mahakam Delta.*

**26<sup>th</sup> of September:** Another early day; we'll be up and make a drive westward towards the upper Mahakam River. We'll then transfer into a number of 'long boats' and head out onto the Mahakam River and then up a tributary into Lake Semayang. This is a large, freshwater lake, ringed with floating vegetation that is subsiding and capturing significant volumes of sediments. If we are lucky, we may see the rare and elusive Irrawaddy dolphins. After arriving at the small floating village, Semayang, we'll discuss the formation and significance of the lake and Kutai basin. There will be an opportunity to walk around the village before re-embarking on the long boats.



*Prof Hendra Amijaya (back) and Dr Ferian Anggara in long boat.*

**27<sup>th</sup> of September:** After having two long days, we'll have a short day driving back to Balikpapan. We'll visit a mine a short drive west of Samarinda and then drive south. If weather permits we'll visit the Borneo Orangutan Survivor (BOS) centre (<http://orangutan.or.id>; the road isn't passable by bus if there is rain). If this option isn't available (or even if it is and time permits) then we'll visit a market in Balikpapan where we'll be able to find local crafts. That night we'll have a nice dinner at a local restaurant. We'll be staying at the Aston Hotel Balikpapan ([www.aston-international.com/eng/hotel-detail/2/aston-balikpapan](http://www.aston-international.com/eng/hotel-detail/2/aston-balikpapan)).



*Paleoslump of sandstone in fine grained material, Bukit Baiduri Energy mine. Trucks for scale at the bottom right.*

**28<sup>th</sup> of September:** In the morning we'll fly out of Balikpapan to Yogyakarta. We'll arrive no later than mid-afternoon.

Remember to bring with you:

- Sun hat
- Sunscreen
- Quick drying clothes
- Small backpack
- Camera
- Waterproof or plastic bag

Also note cost of field trip includes:

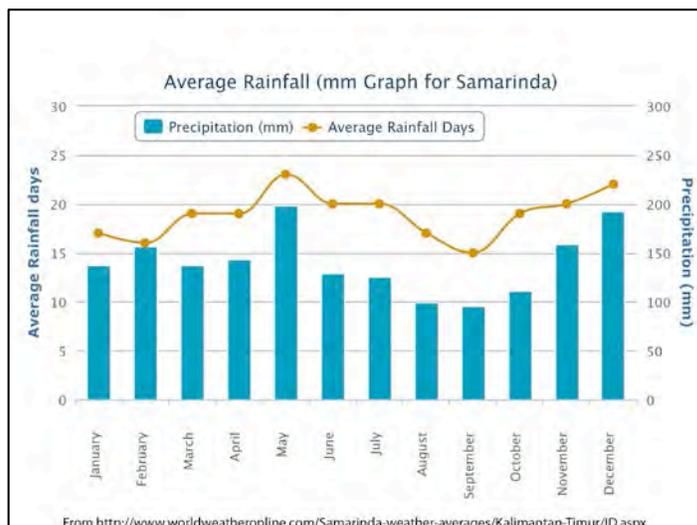
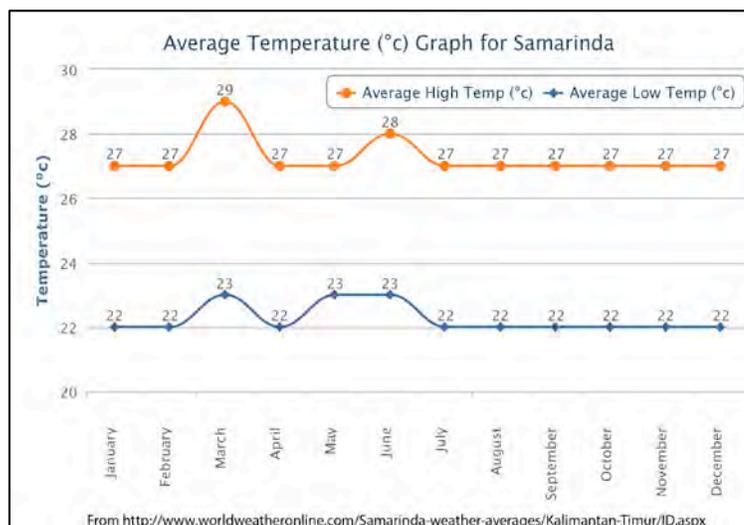
- Round trip air ticket from Yogyakarta to Balikpapan
- Hotel room
- Breakfast
- Lunch
- Guidebook

Dinners will be at participants' costs.

Please see conference website for more information ([http://tsop2015.ugm.ac.id/geo/?page\\_id=20](http://tsop2015.ugm.ac.id/geo/?page_id=20))

**CLIMATE:**

It will be hot and there will be sweat. The humidity is usually above 70% and often approaching 100%. The average rainfall for September is 100 mm; but expect some rain everyday – mostly likely thunderstorms.



**Average temperature and rainfall variation in the Samarinda area, Kalimantan.**

**CLOTHING AND GEAR**

As noted in the previous section on climate, it will be hot, humid and most likely at some point each day water will fall from the sky in abundance. When the sun is out it will be stifling. Thus, bring lightweight, fast-drying clothes. Bring a hat with a brim that goes all the way around. See the conference website (<http://tsop2015.ugm.ac.id/>) for a list of suggested clothes.

**HEALTH HAZARDS DURING THE FIELD TRIP**

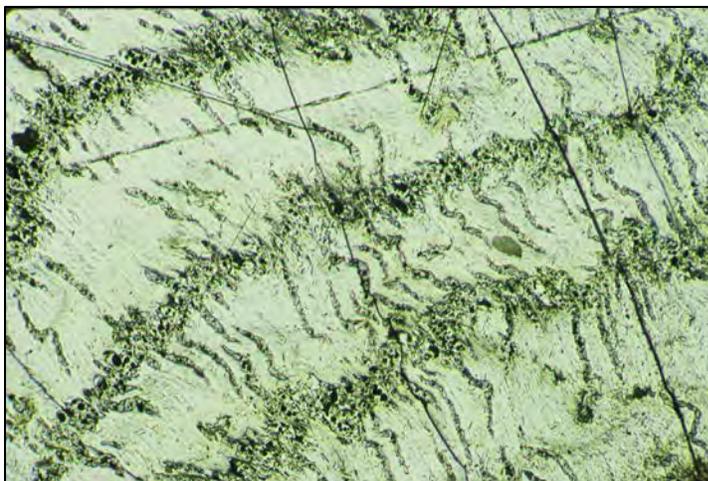
There are a number of tropical diseases that can be found in Indonesia but the risk of getting them is minimal. We will be staying in 4 star hotels in both Samarinda and Balikpapan. All participants are encouraged to seek out their own information but for starters see the conference website (<http://tsop2015.ugm.ac.id/>) for more detailed information and the following link: <http://wwwnc.cdc.gov/travel/destinations/indonesia.htm>. Note that heat stroke is probably the biggest health hazard.

## Meeting Workshops

### Introduction to Organic Petrology – One Day Workshop

#### About the course:

This course is designed as an introduction to organic petrology and is aimed at students, but will also be informative to technical and non-technical persons who work with coal. It will cover basic terminology (coal rank, grade and type), but focus on megascopic to microscopic organic components of coal. The components, or macerals, have distinctive features that record the starting plant material in the peat mires and the geochemical changes that occur during burial and coalification. Maceral composition will influence the utilization properties of the coal as a fuel or metallurgical feedstock, as well as a hydrocarbon source rock.



Course will include power point lectures and virtual petrography exercises, designed to check for understanding throughout the day.

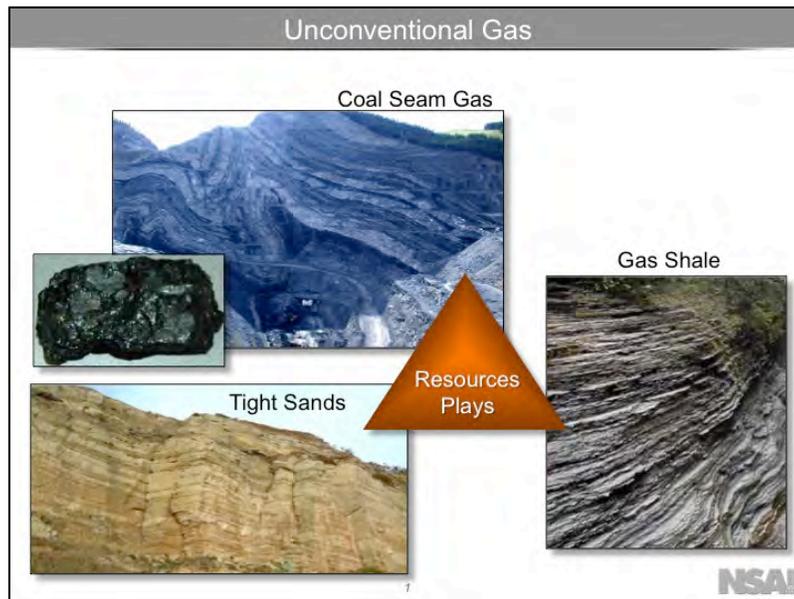
The presenters will be **Dr Walter Pickel** (Coal & Organic Petrology Services P/L, Sydney, Australia) and **Professor Joan Esterle** (University of Queensland, Brisbane Australia). See more about them on the conference website ([http://tsop2015.ugm.ac.id/geo/?page\\_id=77](http://tsop2015.ugm.ac.id/geo/?page_id=77))

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### Introduction to Unconventional Reserve and Resource Assignments - One-Day Workshop

#### About the course:

This course is designed as an introduction to unconventional reserve determinations and is aimed at reservoir and reserve engineers and geologists. The course will also be informative for technical and non-technical persons who work with coal and shale or unconventional reserves. It will cover basic categorization (Reserves, Contingent Resources and Prospective Resources), but focus on differentiation by classification systems (SPE-PRMS and others) and how data quantity and quality affect the categorization. The value of obtaining adequate field and laboratory data and the impact on leveraging that information for increasing reserve and resource booking will be discussed.



A session will be held on uncertainty and variability in laboratory measurements and impacts on reserve booking.

Course will include power point lectures and participant question and answer sections throughout the day. The presenters will be John Hattner and Paul Dan Smith (both from Netherland Sewell & Associates Inc., Dallas, Texas, USA) See more about them on the conference website ([http://tsop2015.ugm.ac.id/geo/?page\\_id=85](http://tsop2015.ugm.ac.id/geo/?page_id=85))

## VISA REQUIREMENTS FOR INDONESIA – TSOP 2015

The good news is that the Republic of Indonesia is very VISA friendly to almost all countries in the world. Check out the following link, which is summarized below.

<http://www.indonesia-osaka.org/wp-content/uploads/2015/02/1.-VISA-PROCEDURE.pdf>

There are only eleven countries that are required to obtain visas before entry (see part C below); There are 64 countries that can obtain visa on arrival (for a small fee) at the airports (see part A below). Finally there are 20 countries who may enter free without a visa (see part B below).

### A. Visa on Arrival

Entry Requirements for Visa on Arrival:

1. Passport must be valid for a at least 6 months as of the date of entry into Indonesia
2. Round Trip Airline tickets/Confirmation slip
3. Visa Fee US\$35 (up to 30 days)

**The list of countries below is permitted to enter Indonesia using Visa on Arrival:**

1. Algeria	23. Iceland	45. Portugal
2. Argentina	24. India	46. Qatar
3. Australia	25. Ireland	47. Romania
4. Austria	26. Italy	48. Russia
5. Bahrain	27. Japan	49. Saudi Arabia
6. Belgium	28. Kuwait	50. Slovakia
7. Brazil	29. Laos	51. Slovenia
8. Bulgaria	30. Latvia	52. South Africa
9. Cambodia	31. Libya	53. South Korea
10. Canada	32. Liechtenstein	54. Spain
11. China	33. Lithuania	55. Suriname
12. Cyprus	34. Luxembourg	56. Sweden
13. Czech	35. Maldives	57. Switzerland
14. Denmark	36. Malta	58. Taiwan
15. Egypt	37. Mexico	59. Tunisia
16. Estonia	38. Monaco	60. Turkey
17. Fiji	39. Netherlands	61. United Arab Emirates
18. Finland	40. New Zealand	62. United Kingdom
19. France	41. Norway	63. United States of America
20. Germany	42. Oman	64. Timor Leste
21. Greece	43. Panama	
22. Hungary	44. Poland	

There are 14 Airports (listed below) where on arrival visa is issued to visitors from above mentioned 64 countries.

1. <b>ADISUTJIPTO IN YOGJAKARTA (YOGJAKARTA)</b>	9. JUANDA IN SURABAYA (EAST JAVA)
2. Ahmad Yani in Semarang (Central Java)	10. Minang Kabau in Padang (West Sumatera)
3. Adi Sumarmo in Solo (Central Java)	11. <b>Ngurah Rai in Denpasar (Bali)</b>
4. El Tari in Kupang (Timor, East Nusa Tenggara)	12. Polonia in Medan (North Sumatera)
5. <b>Halim Perdana Kusuma (Jakarta)</b>	13. Sam Ratulangi in Manado (North Sulawesi)
6. Hassanudin in Makasar (South Sulawesi)	14. Selaparang in Mataram (Lombok, West Nusa Tenggara)
7. Hang Nadim in Batam (Riau Islans)	15. Sepinggan in Balikpapan (East Kalimantan)
8. Husein Sastranegara in Bandung (West Java)	16. Soekarno Hatta in Jakarta

**B. List of Countries entitled to Free Short Visit Visa to Indonesia. The maximum length of stay is 30 (thirty) days.**

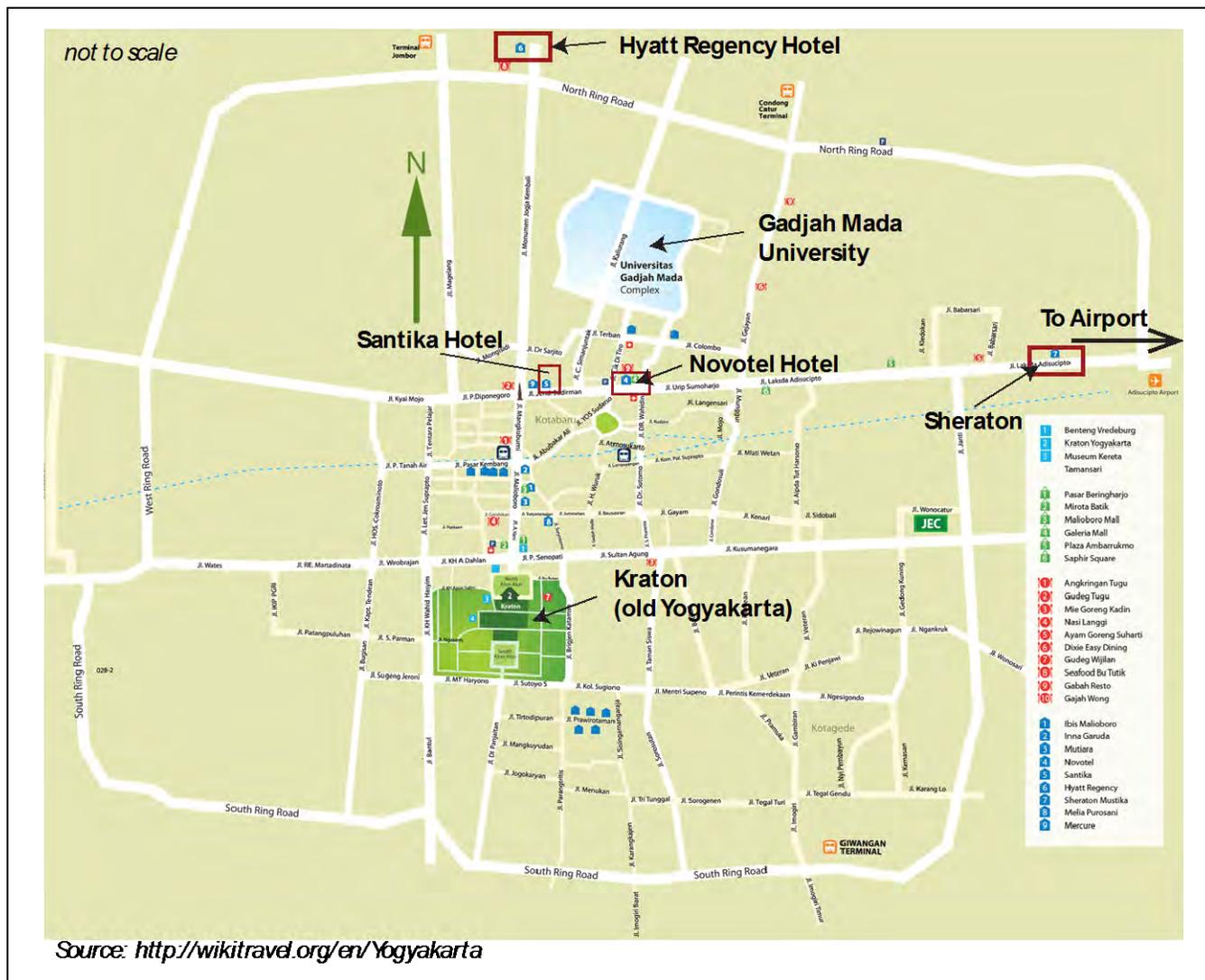
1. Brunei Darussalam	9. Singapore
2. Chile	10. Thailand
3. Hong Kong	11. Vietnam
4. Macau	12. Ecuador
5. Malaysia	13. Cambodia
6. Morocco	14. Laos
7. Peru	15. Myanmar
8. Philippines	

**C. List of countries required to obtain approval prior to entry into Indonesia.**

1. Afghanistan	7. Niger
2. Cameroon	8. Nigeria
3. Guinea	9. North Korea
4. Iraq	10. Pakistan
5. Israel	11. Somalia
6. Liberia	

## Yogyakarta TSOP Venue & Points of Interest

As a way of orienting participants, see the map below. The TSOP Annual Meeting will be held at the Hyatt Regency Hotel in Yogyakarta. We encourage participants to register early and book into the Hyatt where a number of rooms have been reserved. Check out the link given below the map for other attractions around Yogyakarta.



## Out and About Around Yogyakarta: TSOP 2015

*Aretha Christie, Organizing Committee, Partner's Program*

The partner's committee will be available to partners and all delegates to help find their way around Yogyakarta – or Java or Indonesia! – while you are our guests. Our role is to provide you with ideas and logical support throughout the conference. We can make arrangements for groups as small as 2 or even just individuals to see points of interests we suggest or you bring to our attention. Indonesia is extremely child friendly and if you do bring your children, you'll find you'll get extra special warmth bestowed upon you. We'll have a table so come by and ask us anything. We'll give you our contact numbers so if you get stuck somewhere, all you have to do is call!

Below are just some randomly selected activities that might interest delegates and partners.

- **Batik Plentong Yogyakarta**

For those who want to learn the art of Batik, this is for you. Come spend a few hours learning how real Indonesian batik is made by doing it yourself. There is a minimal charge and for this you'll have to book ahead. But let us know what day suits and we'll make the arrangements, including getting you there and back. The shop/'factory' is in Yogyakarta, so it is not far from the hotel.



- **Indrayanti Beach**

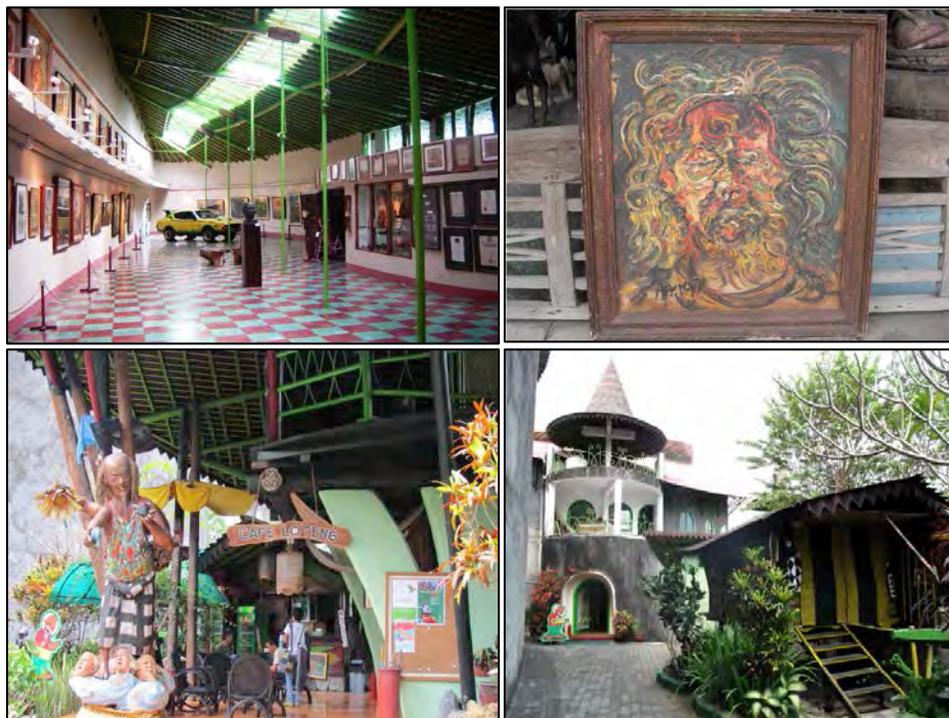
Indrayanti is not really the name of the beach but that is the name of the Café and Restaurant owner, the proper name of this beach is Syawal Beach, and its a little bit different than other beaches. It has a reputation for being clear and tidy, though is a small charge to access it. It is worth we think if you want to feel what the south Javanese coast is like. Walk, swim or lounge away in a gazebo. Bring your sunblock and buy some lovely food at the café and relax!



- **Affandi Museum**

Affandi is one of three nationally known Maestro Painters. A small ticket price of Rp 50,000/ person (about US\$ 5), is required (and a little bit more if you want to bring in your camera) and entrance fee to the museum but for anyone who wants to experience Indonesian art, this is it. It is open daily from Monday to Saturday from 09.00 until 16.00. Bapak Affandi, is considered an amazing painter with an interesting history. He started out painting posters for local cinemas. Bored, he released his imagination in Kelompok Lima Bandung (Five Group Bandung), a group of artists consisting of five painters. From that moment he took off. He traveled around the world, to India, Europe, US and even South America, in order to paint and exhibit his work. He was prodigious and it is estimated he has over 2,000 paintings, spread across the southern hemisphere. One of them is Fisherman and

Pelabuhan Rotterdam (Rotterdam Port) which was recorded selling for 4 billion rupiah (US\$ 300,000) at a Christie's auction.



○ **Kalisuci Cave Tubing**

For the adventurous there is tubing in the Kalisuci cave system. Gunungkidul Regency consists of ranges of hills that are underlain by limestone creating a karst topography. During the dry season, the green outlook will dramatically change into brown. However, Gunungkidul possesses a cave system that will interest some tourists. You really need to go into them to feel and experience their full beauty though. Bring your togs!!



There is a small fee of about \$US5 and perhaps some other incidental costs, but nothing we know of that is outrageously priced.

- **Around Yogyakarta City**

Yogyakarta (pronounced Jog-ja-karta and nicknamed Jogja) city itself has a lot to offer – from the old central Kraton which dates back thousands of years to the shopping which sells almost every kind of batik you'd ever want to look for. There are street markets most days or specialty shops for almost every need. This isn't Bali, though. You won't see many other western faces here; this is where Indonesians come on vacation!

- **Exploring the Historic Temples of Yogyakarta, Indonesia**

The two largest and most significant temple complexes located near Jogja are Borobudur and Prambanan, but around Yogyakarta area, you can easily find other temples that you can explore, like Plaosan Temple, Pawon Temple, Ijo Temple, Sambisari temple, Mendut temple, Barong temple, King Boko Palace. See photos below of some of the more famous temples. These date back some 1200 years; evidence that culture runs deep and broad and long in Indonesia. Come soak up this history and feel the ebb and flow of time.



Photographs: Above is Prambanan and below is Borobudur.

## Meeting Report

### 6th Ohio Valley Organic Petrographers' Meeting

On Friday April 17th, 2015, the 6<sup>th</sup> Ohio Valley Organic Petrographers' Meeting was held in Bloomington, Indiana, USA. The purpose of this informal meeting is to exchange ideas and encourage collaboration between petrographers, both professionals and students. Eight presentations were given as follows:

“Micro-FTIR mapping of organic matter connectivity in Upper Devonian & Lower Mississippian New Albany Shale” – Carley Gasaway, MSc student.

“The effects of the US Clean Air Act on fly ash petrology from four separate Kentucky power plants” – Madison Hood, high school senior.

“Stratigraphic distribution of Pennsylvanian coals and their associated lithologies in Sullivan County, Indiana: Effects on coalbed methane production” – Shane Smallwood, MSc student, Indiana University.

“Petrographic, palynologic, and geochemical characteristics of early Pennsylvanian coals and shales in the Central Appalachian Basin” – Cortland Eble, Kentucky Geological Survey.

“Generation of gas at low temperature at different pressures from kerogen type I, II and III” – Lin Wei, PhD student, Indiana University.

“The Late Cretaceous Belle Fourche and Second White Specks formations in west-central Alberta, Canada as an emerging hybrid source rock/reservoir shale play” – Agnieszka Furmann, PhD student, Indiana University.

“Evidence for fungally-mediated carbon cycling in the fossil record” – Jen O’Keefe, Morehead State University, Kentucky.

“Studies of coprolitic macrinite in coals of various ages” – Jim Hower, Center for Applied Energy Research, Kentucky.



## Searching for the impossible

### Our two-year quest to build a vitrinite reflectance microscope on a micro-budget

Robert Cluff

The Discovery Group Inc., Denver, CO

In early 2011 The Discovery Group embarked on a mission to build a quantitative vitrinite reflectance microscope in support of our internal project work on organic rich mudstone reservoirs around the world. The combination of a heavy backlog at the major service companies offering vitrinite reflectance (“VR”) petrography; inconsistencies between the reports and results we obtained from different laboratories and individual petrographers; and our visceral need to be able to independently assess what was called out as “vitrinite” in those same reports (trust, but verify) led us to the quest to build an in-house scope and at least minimal petrographic capability.

Our initial inquiries for quotations for a modern, research-grade microscope system with a vertical illuminator and the specific components required for quantitative VR work, including a digital photometry system, came back at a minimum of \$50,000 to as much as \$100,000 in certain configurations (e.g. including quantitative fluorescence capabilities) for a new build. To say I was in sticker shock is putting it mildly. It was equivalent to shopping for a Toyota – solid, dependable, cheap – and finding the only options out there were fully loaded Mercedes sedans. Accordingly, we embarked on a mission to purchase a used microscope and parts on the secondary market and live within a budget of \$25,000 for the total effort. It took almost two years, but ultimately we were successful and the capabilities of the system exceeded our original goal.

We built two fully working microscopes with analog photometers, all meeting the published ASTM<sup>1</sup> and ISO<sup>2</sup> standards for quantitative VR work (Table 1), within budget. In the interest of assisting other small research groups like ours, and our academic colleagues looking to add this capability to their laboratories but unable to spend huge amounts of money, we offer this description of the process as a hopefully useful primer.

The basic components required are listed in Table 2, and an annotated photograph of the full working set-up is shown in Figure 1. Our target system was based on the typical research grade VR microscope with analog photometer system in widespread use in the coal petrography and oil company laboratories of the late 1970s and early 1980s. The preferred base microscope in use at that time was either a Leitz Orthoplan or a Zeiss Universal research microscope. Although other base systems can be used, the availability of Leitz and Zeiss parts is substantially greater than any other systems. I used a similar Leitz MPV-2 setup at the Illinois State Geological Survey in the 1976-1980 timeframe to study vitrinite reflectance of the New Albany Shale in the Illinois basin<sup>3</sup>, and relied upon my memory of this microscope and the setups I saw at several oil and gas company research laboratories of the time to work through the specific list of mandatory vs. “nice to have” components. We selected the Leitz Orthoplan base (Figures 1-A, 2) because my early online research suggested Leitz parts are somewhat more available on the secondary market than the Zeiss Universal system. I believe this is still true.

#### *eBay – all the world’s one great flea market*

The base microscope is readily purchased online through eBay or from any of several used microscope dealerships scattered around the world. Orthoplan microscopes were very popular in the 1980s in both biological laboratories and in the semiconductor industry for silicon wafer inspection, making a very large number of used reflected light microscopes available together with the basic scope parts we required (trinocular viewing head, eyepieces, camera adapters, etc.). Their condition obviously varies widely, and nearly all microscopes that have sat unused for a few years require cleaning,

<sup>1</sup> ASTM International, 2009, Standard test method for microscopical determination of the vitrinite reflectance of coal: D2798-09a, 5 p.

<sup>2</sup> ISO, 2009, Methods for the petrographic analysis of coals – Part 5: Method of determining microscopically the reflectance of vitrinite: International Standard ISO 7404-5, 14 p.

<sup>3</sup> Barrows, M.H., and R.M. Cluff, 1984, New Albany Shale Group (Devonian-Mississippian) source rocks and hydrocarbon generation in the Illinois Basin, *in* Petroleum Geochemistry and Basin Evaluation: AAPG Memoir 35, Chapter 1, p. 111-138.

adjustment, and re-lubrication, particularly because microscope grease and oils tend to harden with lack of use and age. Used technical and laboratory equipment dealers around the world offer microscopes and parts for sale by auction or “buy it now”; and in some cases the scopes have already been cleaned and serviced for resale. It is important to research the reputation of the seller, their return policy, if the scope is sold “as-is” or has been recently inspected and serviced, and shipping costs. Packing of a microscope for shipment is something of an art and some technical liquidators are not familiar with disassembling and packing research grade optical equipment for shipment.

Over a two year period we purchased three bare-bones Leitz Orthoplan bases in good condition for \$600 to \$1200 each, on top of which we invested an average servicing cost of \$500 per scope. All of these were the “Metalloplan” or industrial version of the Orthoplan base sold with an oversized X-Y wafer inspection stage, a standard 5-position vertical illuminator, and several infinity corrected (non-POL) incident light objectives. Used biological microscopes normally come with a smaller X-Y stage and a simple 5-position nosepiece for transmitted light observation only. The standard biological X-Y stage is perfectly acceptable for mean random vitrinite reflectance work, while a circular rotating POL stage of the type used for standard thin section petrography will be required if reflectance anisotropy ( $R_{\max}$ ) measurements are critical. The ASTM and ISO standards differ slightly in their specific requirements for stages, with the ISO standard the broader of the two (Table 1). We were able to purchase a refurbished Leitz POL stage for ~\$650. A substage condenser for transmitted light is not required.

*Total base microscope cost including XY stage and servicing: \$1,500 to \$3,000.*

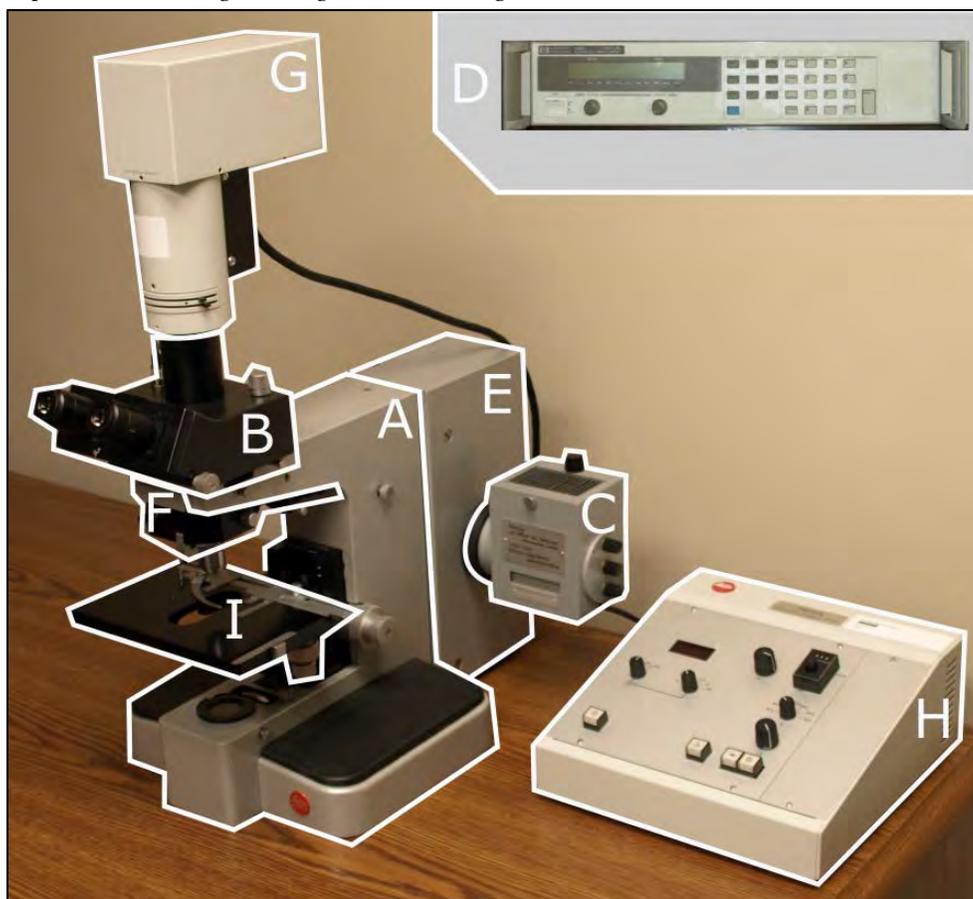


Figure 1. The full working vitrinite reflectance microscopy set-up. A) Leitz Orthoplan base. The model shown is from the “silver grey” production era. B) Trinocular head. C) Lamp housing. D) Hewlett Packard DC power supply (inset). E) Leitz mirrorhouse 500. F) Leitz polarized light vertical illuminator, with clutch style single objective mount. G) Leitz MPV-C photometer head. H) Leitz photometer controller. I) X-Y stage.

### *Trinocular head*

The most common Leitz trinocular head (FSA-GW) includes wide field (30mm) GW eyepiece tubes and a 38mm photo port, with a beam splitter on a slider to divert either 80% of the light to the photo tube and 20% to the eyepieces, or 100% is directed to the eyepieces. The photo port is used for attaching the photometer system. Because light will enter the eyepieces during the measurement cycle and can reflect off the sample, the standard head requires the microscopist to work in a darkened room with no back lighting of any kind to prevent stray reflected light from entering the photometer. The polarized light (FSA-50) trinocular head with an analyzer,  $\frac{1}{4} \lambda$  slot, and Berek prism is unnecessary for VR work, which is good because these are extremely rare and expensive. An alternative version of the trinocular head, the FSA-GW-R (Figures 1-B, 2), includes an automatic shutter that blocks off the eyepieces during either a measurement cycle or when taking a photograph with a Leitz automatic camera system.

*Total cost for trinocular head \$0 (if included with base scope) to \$600*

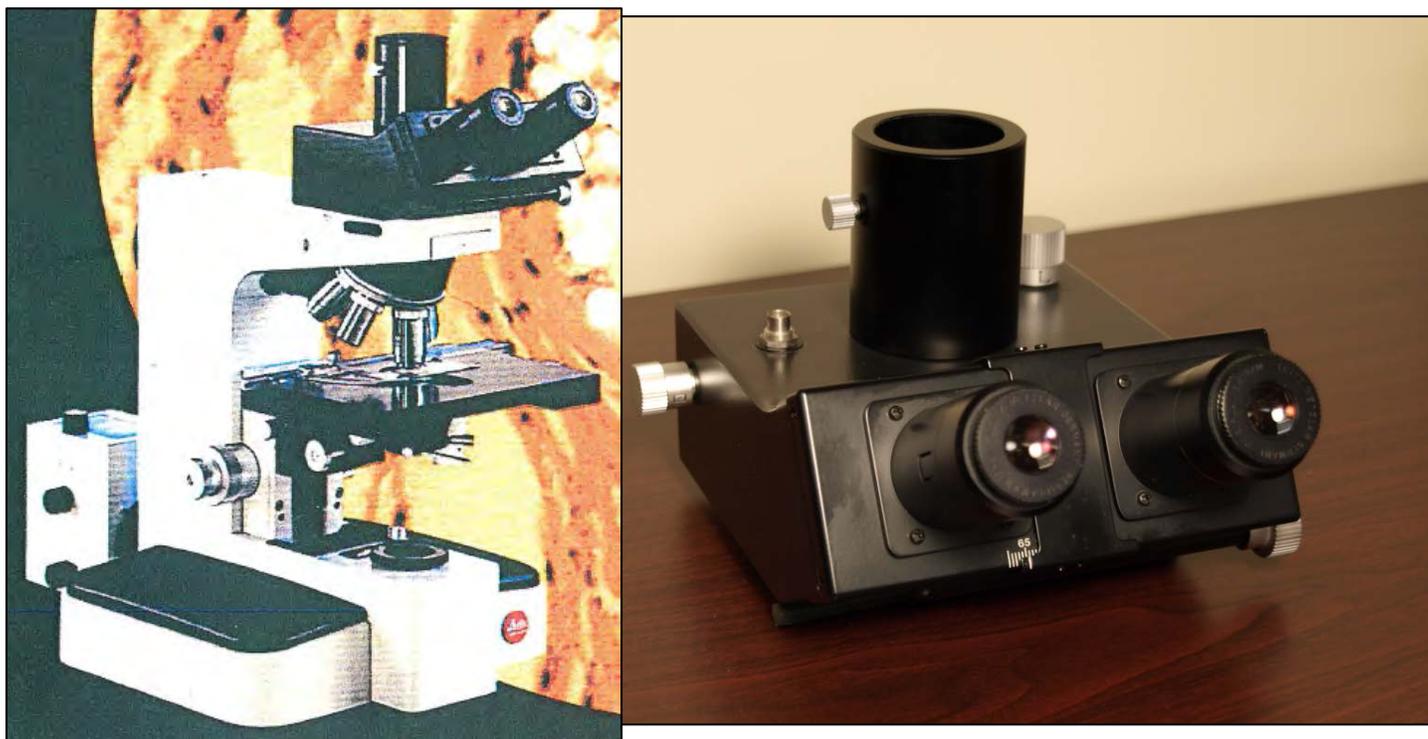


Figure 2 (left). Basic Leitz Orthoplan microscope, from the cover of a Leitz sales brochure c. 1978.

Figure 3 (right). Leitz FSA-GW-R trinocular tube with automatic shutter blocking eyepieces during measurement or exposure cycle. This is also sometimes found in a 4-port version that has an additional photo port on the rear of the head.

### *Illumination – some things are easy*

The standard Leitz illumination system consists of a 12v/100w tungsten halogen lamp housing “100z” (Figure 1-C) paired with a small DC power supply (Figure 4). These are available online for under \$200 without the DC power supply. Nearly all used scopes come with at least one lamp house. To meet the requirement of a high stability DC power supply required for quantitative reflectance work, we used an HP 6642A digital power supply with a standard computer or audio grade 120v automatic voltage regulator (Figures 1-D, 5) to provide a steady light source. Both of these components are available new or used for \$200 to \$500.

The other useful but non-essential accessory for the Leitz Orthoplan system is a Mirror house 500 (Figures 1-E, 6) to allow switching between different permanently attached light sources by simply moving levers. If a Xenon (XBO) or Mercury

(HBO) light source is required to check the fluorescence color, separate high gray liptinite macerals from vitrinite, etc., then this accessory becomes mandatory as there is no other way to connect two light sources to the rear incident light port. These typically sell for \$300 to \$600. Newer LED or “cool light” illuminators are also an option, but adapters to the older Leitz light ports are not made.

*Total cost for illuminator, DC power supply, and mirror house ~\$800 to \$1,200*



Figure 4. Leitz LH100z 12v/100w tungsten halogen light source, with 12v DC controller and spare bulb.



Figure 5. High stability Hewlett Packard DC power supply and standard 120v filtered and stabilized power source.



Figure 6. Leitz mirrorhouse 500 with 3 light ports, switching beam splitter and deflecting mirrors for transmitted and reflected light.

### *Vertical illuminators – when the going gets tough, the tough get goin’*

There are several low availability parts that require perseverance and perhaps aggressive bidding when a key item comes up for auction. The Leitz POL vertical illuminators with a clutch style, single objective mount (Figure 1-F, 7) preferred for coal petrography is one such item that appears very infrequently on the used market. Their prices ranged widely and unpredictably.

We see no reason a standard Leitz brightfield vertical illuminator (Figure 8) cannot be used for VR work. These are both common and relatively inexpensive; in fact the majority of the wafer inspection scopes on the market will come with one. However, this vertical illuminator lacks the rotating filter holder to insert a polarizer. A polarizing filter can be inserted in either the lamp house filter slot or in the diaphragm tube immediately behind the illuminator.

*Total cost for vertical illuminator ~\$100 to \$1,200. \$0 if you find a base scope with a standard vertical illuminator included.*

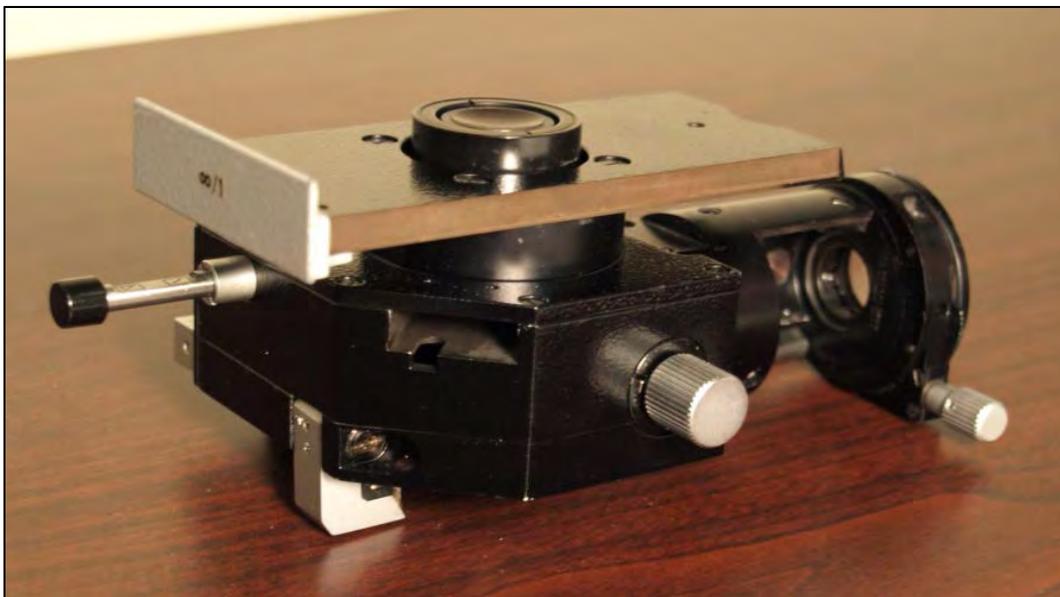


Figure 7. (top left) Leitz polarized light vertical illuminator, 1x infinity optics, with clutch style single objective mount. This is the preferred vertical illuminator for organic petrography.

Figure 8. (bottom right) Leitz standard brightfield vertical illuminator with 5-position rotating objective nosepiece. These were normally included on the industrial or Metalloplan version of these microscopes and were intended for metallurgy, ore microscopy, and wafer inspection scopes. Similar vertical illuminators were sold for brightfield/darkfield and for phase contrast microscopy. Diaphragm tube at right inserts into the light aperture behind the illuminator and could be used to hold a polarizing filter in the light path.

### *Oil immersion objectives – seeking unobtainium*

Wikipedia defines unobtainium as any fictional, extremely rare, costly, or impossible material, or a device needed to fulfill a given design for a given application<sup>4</sup>.

The Leitz 32x and 50x, infinity corrected strain-free oil immersion objectives preferred for VR work in the 1980s (Figure 9) fit the above definition for “unobtainium” almost perfectly. Very few of these were originally sold, and as far as we

<sup>4</sup> <http://en.wikipedia.org/wiki/Unobtainium>

know they were almost exclusively used by the organic petrography community (and we were never a big market). We estimate an average of one of these objectives appears on eBay in any given year, and they appear to be highly sought after<sup>5</sup>.

Fortunately, to quote master Yoda, “there is another”. The current in-production Leica 50x NPlan POL XLR oil immersion objective (Figure 9) is fully compatible with the older scopes requiring only a simple M25 to RMS thread adapter and, as a benefit, offers a superior, brighter image than does the older Leitz objective. Leica also sells 10x and 20x oil immersion POL objectives that while not suitable for VR measurements (they are outside the magnification range set by ASTM standards), are useful for photography and sample scanning. We think it is highly likely that infinity corrected Zeiss oil immersion objectives can also be adapted to the Leitz vertical illuminator with only a thread adapter.

*Total cost for a strain free 50X oil immersion objective \$600 (used) to \$1,200 (new)*



Figure 9. Left to right: a) Leitz 32x/0.65 oel P (for polarizing or strain-free) objective; b) and 50x/0.85 oel P objective. Equivalent dry objectives are NPL Fluotar line and are easily purchased; the oil immersion objectives are almost impossible to obtain. There is also a 20x/0.40 oel P objective that is useful for photography but not suitable for reflectance work. C) Leica 10x/0.25 N Plan EPI OIL POL XLR; and d) 50x/0.85 N Plan EPI OIL POL XLR objective. These have a M25 tread and require an adapter to the RMS threads on the older Orthoplan microscopes. The objectives are otherwise fully compatible and offer a superior, very bright and high contrast image. Leica also sells a 20x/0.40 POL objective (not pictured) as well as non-POL version of the 50x objective.

### *Patience is a virtue*

The final, and ultimately the most difficult and time consuming item for us to obtain was a working photometer-PMT-controller system. Leitz originally sold several versions of their “MPV” system, broadly classed as the MPV-1 in the 1960s, the MPV-2 in the 1970s, and MPV-3 in the 1980s. The MPV-2 and MPV-3 systems are extremely rare and we still have not seen a complete system appear for sale, only scattered parts. The electronics for all three of these systems are obsolete and will be very difficult if not impossible to service.

<sup>5</sup> If you know of any of these sitting in a laboratory drawer somewhere, tell the owners to list them through TSOP!

Fortunately two other systems were sold in the 1980s: the MPV-SP, which was popular for film thickness measurements; and the MPV-C (or “Compact”) photometer with controller (Figures 1-G, 1-H, 10, 11) used for general photometry. Several parts, including the photometer head unit, are interchangeable between these two systems. Both the MPV-C and MPV-SP systems, while not common, are still available; however, more often than not we found they are in poor condition. The MPV-C controller is integrated with the FSA-GW-R trinocular tube to operate the eyepiece shutter during the measurement cycle, which is a strong positive feature, as is the projection of an image of the measuring aperture in the field of view by means of a small backlight. The only required accessories are a 546nm green interference filter and a round or rectangular measurement aperture (Figure 12), both of which fit in slots in the tube beneath the photomultiplier head.

Our persistence in reconstructing the Leitz analog photometer system did pay off in the end, with our ultimately acquiring two working systems for a total cost of \$6,000, but we cannot recommend this solution to others. The system is totally analog and requires us to manually record the measurements with each particle found and centered under the measuring spot. The system is stable and reliable, but very old school in its operation, and when they fail will likely not be repairable.

*Total cost for a working, analog MPV-C photometer and controller ~\$3,000.*



Figure 10. Leitz MPV-C photometer head, with cable connection to the FSA-GW-R trinocular head.



Figure 11. Leitz MPV-C controller, with digital voltmeter display.



Figure 12. Limiting aperture and 546nm green interference filter, both of which are inserted in slots in the photometer tube below the PMT.

### *Miscellanea*

A set of reflectance standards is essential. We purchased five new standards ranging from 0.4 to 1.7% Ro at an average cost of \$850 each. At least three standards are needed to assure linearity of the photometer response.

We purchased assorted heat absorbing filters, color filters, spare lamps, and other incidental accessories online at very reasonable costs. Most non-POL objectives in the 5x to 100x range, both dry and oil immersion, can be purchased for under \$200 and several of these are useful for photography and other non-quantitative work.

Two Nalgene dessicator sample cabinets with drawers were bought at \$200-300 each. Essential sample preparation needs, such as a grinding/polishing wheel, can also be acquired used for reasonable costs.

A large, foam-lined Pelican shipping case has proved useful for shipping the microscope to be serviced with minimal disassembly required.



Figure 13. Primary or “white” scope, complete with photometer and photometer controller. Also shown in this photo is a short-arc Mercury lamp power supply, which is used for fluorescence microscopy.

### *OK, going all in.....*

At the end of the day, our primary “white scope” (Figure 13) cost under \$9,000 to build and test, plus about \$4,000 for the first photometer system. Our secondary “gray scope” (Figure 14) came in under \$6,500, mostly because we acquired many of the basic parts as extras along the way while building the first scope, plus another \$1,500 for the second photometer. In

the latter case we were lucky with the acquisition of a working controller that did not require any effort to revive. There is no question it is possible to reconstruct a 1980s reflectance microscope for under \$10,000, and with patience and perseverance it can probably be done for considerably less. For example, at the time of this writing (March 2015) there were two virtually complete systems up for auction on eBay, one Zeiss and one Leitz, either of which would be suitable for vitrinite reflectance work if paired with a working photometer, and both units sold for under \$3000. There is no doubt with the current downturn in oil and gas activity several systems will appear on the market in coming months as laboratories are shut down and work curtailed. The problem is, and certainly was for us, the photometry system. In retrospect the choice of a photometer should have been made first instead of last. The total project economics and the specific photometry requirements drive many minor decisions concerning the optical system, and in our case it entirely drove the project timeline.

Modern photometer systems are available from multiple vendors with prices ranging from \$11,000 (for an analog PMT system functionally similar to the MPV-C) to over \$45,000 (for a fully digital microphotometer system). Reviewing these is outside the scope of this article, perhaps another member will be inspired to write a review for the benefit of all of us.

Our quest resulted in purchasing components from California, Wisconsin, Massachusetts, Virginia, Canada, the Netherlands, Germany, Romania, and even Colorado. I've learned more about reflectance microscope systems than I ever wanted to know. In the end we achieved all the technical goals we set out to accomplish within our budget. I will be glad to answer questions for anyone who wants to "have a go at this" as they say down under.



Figure 14. Secondary or "gray" scope, complete with photometer.

### *Acknowledgements*

I would like to acknowledge David Paschke, Paschke MicroOptics of somewhere in Massachusetts for his assistance and counsel on all things Leitz during the course of this project. David is without a doubt the most knowledgeable and forthcoming Leitz expert I have met.

Table 1.

	<i>ASTM D2798-096a</i>	<i>ISO-7404-5-2009</i>
<b>Microscope</b>	Any microscope equipped for reflected light microscopy... can be used	Reflected light microscope with photometer or similar device
<b>Magnification</b>	400 to 750x	
<b>Objectives</b>	oil immersion strain free (POL) objectives required, magnification not specified	strain-free, designed for use with polarized light (for maximum reflectance analysis). Magnifications higher than 32x to 50x require numerical apertures that decrease depth of focus and should be avoided.
<b>Stage</b>	Centerable circular stage capable of 360° rotation	For maximum reflectance, a 360° rotating stage is required, otherwise an X-Y mechanical stage is acceptable
<b>Mechanical stage</b>	0.1mm X-Y movement	
<b>Eyepieces</b>	reference cross-hair to locate measurement point precisely, otherwise not specified	one or two viewing eyepieces, one fitted with cross-hairs that can be scaled
<b>Eyepiece</b>	"During measurement, no light shall be permitted to enter the observers end of the viewing eyepiece."	Means of optically isolating the viewing eyepieces from the light path to the PM if the eyepieces permit the entry of extraneous light during measurement
<b>Polarizer</b>	Incident light shall be plane polarized	Sheet or prism polarizer
<b>Vertical illuminator</b>	with Berek prism, orient polarizer at 45°	Berek prism, simple coated glass plate, or Smith illuminator
	with glass plate or Smith illuminator, orient polarizer at 0°	
<b>Photomultiplier (PM) tube</b>	Photometer capable of detecting the minimum light reflected from the limited portion of the coal sample, with a HV power supply within the range required to obtain linearity of the response.	Photomultiplier tube shall be of a type recommended for low-light level applications, and have adequate sensitivity at 546 nm with a low dark field current, and linear response over the range of the measurement and stable output over the duration of the measurement.
<b>Photomultiplier amplifier</b>	Amplified signal must be capable of reliably distinguishing differences in signal equivalent to 0.01% reflectance and remain linear in the range of reflectances measured.	Stabilized DC power supply to the PMT required (specific requirements apply)
<b>Photomultiplier substitutes</b>	Photomultiplier tubes, photodiode arrays, channeltrons, or "other light-measuring devices" are acceptable if they meet the precision, stability and linearity requirements specified for photometers (see below)	Semiconductor photodiodes and digital cameras of high sensitivity have the same requirements for precision, linearity and stability as photomultiplier tubes.
<b>Recorder or meter</b>	Amplifier and meter shall have a response time at full scale of no more than 1 sec to detect the maximum reflectance level during rotation of the microscope stage.	High resistance galvanometer, chart recorder, or digital voltmeter capable of resolution of 0.01% Ro
<b>Light source</b>	Regulated power supply to provide for stable output, with supplemental voltage stabilizing transformers if line voltage fluctuates.	Stable output light source, 100w quartz halogen lamp recommended, with stabilized DC power supply
<b>Light controlling apertures</b>	no specification	two variable diaphragms, one focused on the back focal plane of the objective (illuminator aperture) and the other on the surface of the specimen (field stop)

<b>Filters</b>	Monochromatic green interference filter with peak transmittance of 546 nm $\pm$ 5 nm and half-peak bandwidth of <20 nm, located "at any convenient position in the optical system"	Filter with peak transmittance in the range of 546 nm $\pm$ 5 nm and half-peak bandwidth of <30 nm. The filter should be inserted into the light path immediately before the PM.
<b>Limiting aperture</b>	Non-reflecting, opaque limiting aperture in the focal plane to restrict light to the PM window so only a small area of the sample is measured. Diameter of the aperture to provide an effective measurement spot of 5 $\mu$ m diameter or 20- $\mu$ m <sup>2</sup> area	Measuring aperture which restricts light to the PM to that reflected from an area of the specimen <80- $\mu$ m <sup>2</sup> area and aligned with the cross-hairs in the viewing eyepiece.
<b>Calibration standards</b>	Prisms constructed of high-index glasses or synthetic materials shall be used as standards to calibrate the photometer for reflectance measurement. Desirable to have several standards with reflectances near those of the vitrinite studied, also serves as a check of the linear response of the photometer.	Reflectance standards consisting of isotropic, durable, stable reflectance, flaw free, and have negligibly low absorptance. At least two standards of an order similar to the sample being measured are required.
<b>Immersion oil</b>	Non-drying non-corrosive immersion oil with refractive indices of 1.515 to 1.519 at 546 nm and 25° C	Non-drying non-corrosive immersion oil with refractive index of 1.518 $\pm$ 0.0004 at 546 nm and 23° C. Bottles open more than one year should not be used.
<b>Sample leveling press</b>	Manual levelling device required to level samples when mounted on slides with modeling clay.	Slides, modelling clay and a levelling device.

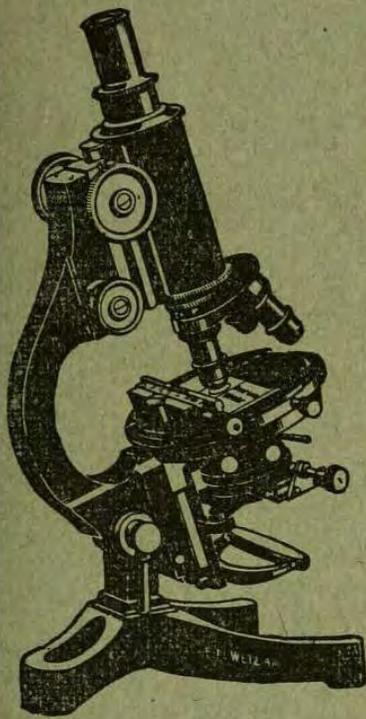
Table 2.

VITRINITE REFLECTANCE MICROSCOPE ELEMENTS						
Category	Part	OEM part number	Available from	Availability	Approx. cost	Remarks
Basic scope	Leitz Orthoplan research microscope	512-180	eBay & used microscope dealers	high	\$500-4000	In widespread use as a general research scope in the 70's and 80's, with one variation widely used for silicon wafer inspection in the semiconductor industry. Both transmitted light and reflected light versions are available used, but condition varies widely.
	FSA 50 trinocular head with 10x eyepieces	552-166	eBay & used microscope dealers	high	\$250	Standard trinocular head almost always comes with the base scope. POL version for transmitted light work is not required.
	POL circular stage, 150 mm, 360 deg rotation	552-167	eBay & used microscope dealers	low	\$650	Not 100% necessary. The standard X-Y stage outfitted on most scopes works fine for mean random reflectance measurements. Rotating stage is only required for Rmax-Rmin work. After market stages are not good quality.

<i>Category</i>	<i>Part</i>	<i>OEM part number</i>	<i>Available from</i>	<i>Availability</i>	<i>Approx. cost</i>	<i>Remarks</i>
<i>Illumination</i>	LH 100 12v/100w tungsten halogen illuminator	514-234	eBay & used microscope dealers	high	\$200	
	LH 100z 100w HBO mercury vapor illuminator	514-237	eBay & used microscope dealers	moderate	\$200	
	Leitz 100w HBO/75w xenon power supply	1149, 1230	eBay & used microscope dealers	moderate	\$200	
	HP 6642A stabilized power supply		eBay & used microscope dealers	high	\$450	
	Mirror house 500	620-556	eBay & used microscope dealers	moderate	\$650	Required to switch between white light and UV illumination
<i>Category</i>	<i>Part</i>	<i>OEM part number</i>	<i>Available from</i>	<i>Availability</i>	<i>Approx. cost</i>	<i>Remarks</i>
<i>Organic petrography application specific</i>	MPV-C photometer head and controller	various	eBay & used microscope dealers	rare	\$2,500	There are several commercially available, modern alternatives to the Leitz MPV photometer system
	FSA-GW/R trinocular head, with MPV shutter	512-734	eBay & used microscope dealers	very low	\$550	Not 100% necessary. Using the standard trinocular head, you will need to work in a well darkened room with <u>no lighting of any kind</u> behind the microscopist because light will travel through the eyepieces and reflect off the sample, introducing non-systematic measurement errors. This special Leitz head has a shutter linked to the MPV controller that blocks light from the eyepieces during the measurement cycle, which reduces the need to work in the dark.
	POL Vertical illuminator, centerable clutch style	553- 214,215	eBay & used microscope dealers	very rare!	\$1,000	This is the preferred polarizing microscopy vertical illuminator for organic petrography
	Brightfield vertical illuminator, 5 position rotating nosepiece	563-281	eBay & used microscope dealers	high	\$500	This is the standard vertical illuminator used in metallurgy and other incident light work. Lacks a filter holder for a polarizer, but a polarizer can be placed directly in the light path behind the vertical illuminator.

	Leitz 20x/0.40P oel objective	559-083	eBay & used microscope dealers	extremely rare!	\$250	Not as bright as the newer, larger Leica objective
	Leitz 32x/0.65P oel objective	559-084	eBay & used microscope dealers	extremely rare!	\$250	Not as bright as the newer, larger Leica objective
	Leitz 50x/0.85P oel objective	559-086	eBay & used microscope dealers	extremely rare!	\$500	Generally referred to as "unobtainium" because so few were made and sold, almost exclusively to the coal petrography community. Not as bright an image as the modern, larger Leica objective.
	Leica N Plan Epi 10x/0.25 oil POL XLR objective	556-513	Leica Microsystems Inc.	high	\$980	Modern scope objective in production, outstanding quality, requires adapter to RMS thread
	Leica N Plan Epi 20x/0.40 oil POL XLR objective	556-076	Leica Microsystems Inc.	high	\$1,000	Modern scope objective in production, outstanding quality, requires adapter to RMS thread
	Leica N Plan 50x/0.85 oil POL XLR objective	556-023	Leica Microsystems Inc.	high	\$1,170	Modern scope objective in production, outstanding quality, requires adapter to RMS thread
<b>Category</b>	<b>Part</b>	<b>OEM part number</b>	<b>Available from</b>	<b>Availability</b>	<b>Approx. cost</b>	<b>Remarks</b>
<i>Accessories</i>	Hard foam lined shipping case, 18"x21"x30 "	iM3075	Pelican Cases	high	\$400	Essential accessory if you ever need to ship the scope to a third party for service
	Mechanical X-Y stage holder	553-082	eBay & used microscope dealers	low	\$500	Very useful for systematic scanning of samples, 20x35mm range
	Handpress/s ample leveler		Mark V Laboratory	high	\$250	Essential
	Leica 50x/0.90 N- Plan objective	506-321	Leica Microsystems Inc.	high	\$200	Used for photography
	Leica 100x/1.25 oil HI Plan objective	506-238	Leica Microsystems Inc.	high	\$100	Used for photography
	Reflectance standard, spinel ~0.4 Ro		Klein & Becker GmbH	high	\$825	Need at least three standards over the range of expected reflectances

<i>Part</i>	<i>OEM Part Number</i>	<i>Available from</i>	<i>Availability</i>	<i>Approx. cost</i>	<i>Remarks</i>
Reflectance standard, sapphire ~0.6 Ro		Klein & Becker GmbH	high	\$825	Need at least three standards over the range of expected reflectances
Reflectance standard, YAG ~0.9 Ro		Klein & Becker GmbH	high	\$825	Need at least three standards over the range of expected reflectances
Reflectance standard, N-LASF46A ~1.3 Ro		Klein & Becker GmbH	high	\$825	Need at least three standards over the range of expected reflectances
Reflectance standard, GGG ~1.7 Ro		Klein & Becker GmbH	high	\$825	Need at least three standards over the range of expected reflectances



**LEITZ-**  
*Mikroskope,  
Mikrotome,  
Mikrophotograph. u.  
Projektionsapparate*

**LEITZ-PRISMENFERNROHRE**

**Ernst Leitz, Wetzlar**  
**Optische Werke**

— Katalog Nr. 46 S auf Verlangen kostenfrei —

## CALENDAR OF EVENTS

[www.tsop.org/cal.htm](http://www.tsop.org/cal.htm)



### 2015

**August 16-21:** 25<sup>th</sup> Anniversary Goldschmidt Geochemistry Conference, Prague, Czech Republic.  
<http://goldschmidt.info/2015/index>

**September 5-11:** 67<sup>th</sup> Annual ICCP Meeting. Potsdam, Germany.  
[www.iccop.org/meetings/2015-iccp-meeting-in-potsdam/](http://www.iccop.org/meetings/2015-iccp-meeting-in-potsdam/)

**September 20 – 27: 32<sup>nd</sup> Annual TSOP Meeting, Yogyakarta, Indonesia.** See website for details! <http://tsop2015.ugm.ac.id/>

**October 5-8:** 32<sup>nd</sup> Annual International Pittsburgh Coal Conference, Pittsburgh, PA, USA.  
[www.engineering.pitt.edu/pcc/](http://www.engineering.pitt.edu/pcc/)

**November 1-4:** Geological Society of America Annual Meeting, Baltimore, Maryland, USA.  
[www.geosociety.org/meetings/2015/](http://www.geosociety.org/meetings/2015/)

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### 2016

**March 7-10:** 12<sup>th</sup> Middle East Geosciences Conference & Exhibition. Bahrain. <http://geo2016.com/>

**September 18-23:** Joint Meeting of TSOP-AASP-ICCP in Houston, Texas, USA. This will be the 33<sup>rd</sup> Annual Meeting of TSOP. Stay tuned for further details after the 2015 TSOP Meeting.



**Please send in meeting, short course and special event announcements to the Editor!**

**For more geology event information, see:**

[calendar.agiweb.org/index.htm](http://calendar.agiweb.org/index.htm)



## **JOINT MEETING TSOP - AASP - ICCP**

The Society for Organic Petrology, AASP-The Palynological Society  
and the International Committee for Coal and Organic Petrology

**September 18 – 23, 2016  
Houston, Texas USA  
FIRST CIRCULAR**

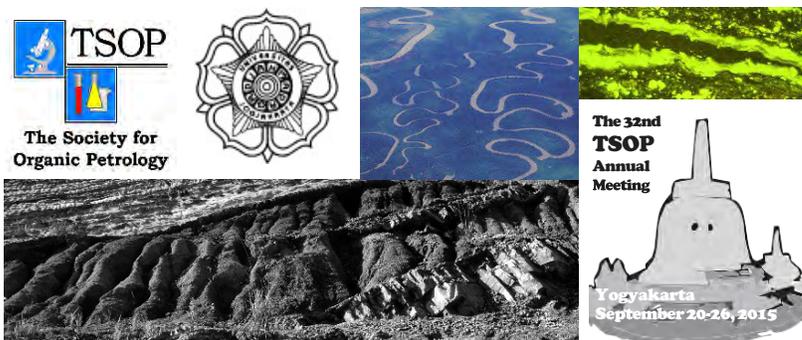
We are pleased to present the initial announcement regarding this first historic joint meeting of these three related geological, geochemical and biological scientific societies. The purpose of this joint meeting is to bring together a diverse group of scientists to discuss the close relationships between organic petrology and palynology, to foster thoughtful discussion and address issues that may be of benefit to furthering the respective sciences. Key themes to be addressed during joint activities include palynofacies and source rock assessment.

The venue for this meeting will be the historic Magnolia Hotel in downtown Houston. The Magnolia was built in 1926 as the former Post-Dispatch Building. It was re-purposed in 2003 as The Magnolia Hotel, and further underwent a significant upgrade in 2009. The hotel is centrally located in downtown within walking distance of excellent restaurants and pubs. Over the past several years downtown Houston has undergone a major revitalization with many new office buildings, exciting arts and entertainment venues, and several world-class restaurants. We believe the downtown will provide exciting possibilities for every need and want.

The meeting will begin with TSOP and ICCP technical sessions and commission meetings on Monday and Tuesday, sessions for all three societies on Wednesday, and sessions and commission meetings for ICCP and AASP on Thursday and Friday. Each of the societies will have ample opportunity to conduct their needed business meetings. Social activities are also being planned accordingly, although a couple of evenings will be open to allow members to enjoy the nightlife of downtown Houston. The Conference Dinner for all attendees is being planned for Wednesday evening and will showcase views of the area skyline.

Houston is a significant transportation hub and the international airport (IAH) is serviced by all major airlines from Europe and Asia. Both airports (IAH and HOU) are serviced by the major US-based airlines. Transportation to and from the hotel area from both airports is available via taxi, shuttle, and MetroBus. Further information on fares and routes will be distributed in later circulars. Our current negotiated room rate at The Magnolia hotel is US\$179/night (single occupancy). Double- and triple- occupancy will be priced accordingly. This room-rate includes a complimentary hot breakfast, a late afternoon happy hour (complimentary beer/wine), a complimentary bedtime cookie buffet, and free internet.

The local Organizing Committee consists of Thomas Demchuk (ConocoPhillips), Jen O'Keefe (Morehead State U.), Thomas Gentzis (Core Laboratories) and Joe Curiale (Chevron). Over the next several months we will do our best to keep the societies and membership informed of new events and deadlines. In the very near future we will be soliciting ideas and potential speakers for our joint technical sessions. We look forward to a great joint meeting in September of 2016.



**Call  
For  
Papers**  
3rd Circular

*On the Edge: Hydrocarbons in the Tropics*

**ABSTRACT SUBMISSION DEADLINE EXTENDED TO:**

**22<sup>nd</sup> June, 2015**

We are extending the date for submission of abstracts until the 22<sup>nd</sup> of June to give a little bit more time to everyone. All other formatting and page limits still apply.

Remember that early registration discounts will end on the 31<sup>st</sup> of July. This date won't be extended. So remember to register early, some events like workshops and field trips may fill up quickly.

The June TSOP Newsletter will detail what other activities participants – or their partners – can get up to if they have some extra time.

- Indrayanti Beach  
Enjoy walking along the beach, swimming, and lazing away time in a shady gazebo.



- Affandi Museum  
Affandi is one of three people considered to be Indonesian Maestro Painters; there is a small entrance fee and if you want to take the pictures inside the museum there is another small fee as well – but well worth it!. Open daily from Monday to Saturday from 09.00 until 16.00.

... And there is more – see page 8-19 of the June TSOP Newsletter!

Remember to check out the meeting updates on: <http://tsop2015.ugm.ac.id/>

**The Organizing Committee says:  
'See you in Yogyakarta!'**