



FIG Abuja surpasses expectations - working week has over 2700 delegates

With dancing, bands and colourful traditional local dress **John Brock** reports for *GW* on a memorable conference in Nigeria's capital city

Taking part with over 2700 other guests at Abuja in Nigeria from 49 countries, the FIG Working Week 2013 surpassed the previous record FIG WW crowd set in Rome last year by around 1000. Hearty congratulations to the Nigerian surveyors who so emphatically showed their enthusiastic support for the event on their own turf, just as they have at so many previous FIG events all over the world.

En route to Abuja via Cairo I decided to spend two nights there so I could explore the famous Egyptological Museum, which I was forced to miss during the 2005 FIG WW held in Egypt. What a most splendid showcase of thousands of superb artifacts from the renowned ancient civilisation for people like me to marvel at!

Arriving on the Friday allowed me to settle in early into my surroundings. On the Saturday morning I was permitted to be an observer for the morning session of the Young Surveyors UN Habitat Train the Trainer Workshop under the chairmanship of Young Surveyors chair **Kate Fairlie** (Australia) and facilitator **Danny Antonio** from The Philippines. My good friend Nigerian Surveyor-General Prof. **Peter Nwilo** came over to shake my hand when he paid a quick visit to the room, which was most appreciated. Extended a kind invitation to the Nigerian Institution of Surveyors Dinner at the Nicon that evening, I was most fortunate to be able to join my great Danish friend **Henning Elmstroem** as well as meeting some very important Nigerian delegates one being

Chief (Dr.) **Obazuwa Imasuen** from Abuja.

I was the one!

At the General Assembly on Monday just enough (by one to be exact!) country representatives answered the roll call by vice president Professor **Rudolf Steiger** to constitute a quorum, which meant that decisions could be ratified. In fact, I WAS that one delegate with the balance of power firmly within my grasp. Fulfilling the role as the Australian rep as well as being the only identity from the FIG International Institution for the History of Surveying and Measurement (IIHSM), I was called upon to make a formal presentation about our activities since the last GA in addition to highlighting some of the interesting upcoming events in history.

An excellent presentation was given by the very enthusiastic local organising committee of next year's most exciting four-yearly FIG Congress to be held at Kuala Lumpur in Malaysia. This will be a fantastic event for the world's surveyors and everyone can be guaranteed of an enjoyable and enthralling visit to one of the most exotic locations on earth. I can assure all history lovers of events to thrill and delight; details to be notified in the near future so keep your eyes peeled on the FIG website. Each of the nations hosting the FIG Working Weeks in 2015 and 2016, being Bulgaria and New Zealand respectively, showed the audience why they should go to their countries and join with them to share their hospitality and culture at those great events.

At the Welcome Reception held poolside at the Nicon Hotel, the many Nigerians present extended their warm greetings to the overseas visitors with great music offered by the band to provoke much dancing especially by the Czechs, Germans and Finns who tripped the light fantastic with true panache.

The Opening Ceremony on Tuesday saw a full auditorium at the Convention Centre hear the Minister for Lands **Mike Onolememen**, an architect, extend a warm welcome on behalf of Nigerian President **Goodluck Jonathan**, who was detained on overseas business. Mr Onolememen has a great connection with the surveyors of Nigeria and his speech displayed a true affection and appreciation of the value of the work carried out by our profession in his country.

Below: queuing delegates are entertained by a dancer ahead of taking a partner to learn the delegate two-step. . .



Not getting lost in translation

At the first plenary session vice president **Chrissy Potsiou** chaired the FIG Task Force on Housing and Property, which highlighted Land Reform in Africa and the Global Land Tool Network - an initiative of UN Habitat. At a session called "Surveying Today and Tomorrow" I volunteered to fill in as rapporteur for the local who had been double booked and despite a technical failure the speakers carried on most capably.

Belgian Surveyor-General **Marc Vanderschueren** gave an excellent presentation in English on the Federation of French Speaking Surveyors, which greatly bridged the apparent gap between the two different language groups promoting some future joint activities with translation in various countries. New Zealander **Brian Coutts**, **Leonie Newnham** from Australia and **Volker Schwieger** (Germany) completed the session with propositions to redefine the surveying profession through education and communication via the internet and social media along with an innovative new course named GEOENGINE available in English at the University of Stuttgart.

Step out in style to become a chief

My first act of bravery was my venture outside the hotel compound that afternoon to catch a local taxi to the nearby Sheraton Hotel so that I could change my Aussie currency to Nigeria Nira. The taxi drivers were most helpful and honest providing a very cheap and reliable service to foreigners like me plus they spoke better English than most of the ones we have in Sydney!

Through the help of some of the locals I was able to purchase a Nigerian hat and outfit, which I would don for the Nigerian Cultural Dinner that night. Being the only outsider daring to wear the traditional dress I was made an Elijah (or foreign chief) by the impressed local contingent. Local musicians were a great accoutrement to an evening well provided with food and drink from all over Africa which helped the FIG Foundation under the chairmanship of **John Hohol** from the US raise much needed funds to assist worthy recipients in developing countries realise their ambitions to become surveyors.

History session

The IIHSM did not conduct one of its customary History Workshops but a History Session on the Wednesday afternoon of the conference's Technical Program was able to attract over 40 attendees. As chair I had most able assistance from my fill-in rapporteur **Leonie Newnham** (Australia) chair of Commission 1, who took the place of the local young surveyor, who did not show up. The first presentation was by me titled: *The Boundary Stones of Tutankhamun's Father - Akhenaten's City of the Sun*, which described the fascinating boundary stelae (stone markers) placed just after 1400 BC to precisely

Our reporter adopts local dress and finds plenty of new friends.



delineate the perimeter of the newly created site of the Egyptian capital in the centre of the country called Akhetaten (literally "Horizon of the Orb (or Sun)") by its obsessed creator Akhenaten (born Amenhotep IV).

Our second speaker was **Peter Laarakker** from The Netherlands who presented a compelling then and now recollection of the time he spent in Nigeria during 1978-80 as a teacher at the local university. Many former students offered fond memories of Peter's mentorship. There followed Nigeria's best foreign ambassador and Registrar of the Surveyors Council of Nigeria (SURCON) **Winston Ayeni**, who gave an entertaining History of the Training of Surveyors in Nigeria. As a superb memento of our journey to Abuja we found a specially published new book on the History of Surveying in Nigeria, which will be a special memory of our visit to this country, especially for me and all those with a similar passion for surveying's colourful heritage.

Well done!

Unfortunately on the following day I had to leave Abuja to get home for some urgent business and was forced to bid all of my Nigerian and overseas friends farewell until next year in Kuala Lumpur so I cannot report to you about the Gala Dinner, which I am sure would have been a stunning success. Congratulations to all concerned for staging such a magnificent event with special appreciation to the FIG ladies **Louise, Hanni, Claudia** and **Julie** for their professional and undaunted dedication to make our visit so enjoyable in such a far-off land. Another particular 'well done' must be offered to FIG president **CheeHai Teo** and vice president **Rudolf Steiger**, who filled in so ably for the much missed **Markku Villikka**, who is still recovering from an illness. We all wish you a speedy recovery Markku and send you our warmest wishes. Sincere appreciation to Nigerian Institution of Surveyors President **Olubode Adeaga**, congress director **Barde Jatau** and their wonderful local team for pulling off such a memorable conference.

"... a compelling then and now recollection of the time he spent in Nigeria during 1978-80 as a teacher..."

• Photo credits to Claudia in the FIG Office.

NIGNET, low cost GNSS and joined-up tidal data – it was all at FIG Working Week Abuja

This year's FIG working week took place in Abuja, Nigeria. **Richard Groom** has been browsing the papers relating to Geodesy, Engineering Surveying and Hydrography.



International Federation of Surveyors
 Fédération Internationale des Géomètres
 Internationale Vereinigung der Vermessungsingenieure

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Note: the references refer to the various technical sessions

CORS in Nigeria

Nigeria has recently established a network of eleven GNSS CORS, called NIGNET and sixty passive stations. Collectively these are the realisation of the Nigerian Geocentric Datum (NGD2012), which is ITRF2008 at epoch 1 January 2012. The work started in 2008 and was completed in 2012. NGD2012 replaces a non-geocentric datum dating from the colonial period, which used the Clarke 1880 ellipsoid. The passive stations are existing control stations from the historical national control network and serve to establish the transformation between the two systems. **Nwilo et al** (TS01B) describe the development of NIGNET, which is derived from baselines to nine IGS stations in Africa and southern Europe.

Ayoola, Adebomehin et al (TS02B) have been analysing data to calculate 'precipitable water vapour' from the zenith tropospheric delay at the NIGNET stations. This work took on urgency following the rainy season of 2012, which was one of the worst on record, leading to severe flooding. It is hoped that this data can be used for rainfall forecasting. Tropospheric delay models are an important aspect of GNSS processing. **Dodo et al** (TS06B) compare the results from three models using data from NIGNET.

In TS03C, **Fernandes, Apolinario et al** describe SEGAL (Space and Earth Geodetic Analysis Laboratory), a collaboration between two Portuguese universities which has specialised in establishing CORS in remote locations.

Relating datums

Uzodinma and Ehigiator-Irughe (TS02B) report on the discrepancies between different

transformations used by the oil companies in Nigeria to translate legacy survey control, which was established on the Nigerian (Minna B) Geodetic datum and WGS84. The discrepancies are large – up to 45m. By using Kriging and inverse distance weighted interpolation methods the authors have reduced the inconsistencies to 60mm. However, digging deeper, it is clear that some oil companies used seven-parameter transformations whilst others have used three-parameter transformations – perhaps the latter companies work in small areas. Within these groups there is reasonable consistency.

Ono, Onwuzuligbo et al (TS02B) express outrage that a network of GPS control stations that was established for the development of Awka Capital Territory in Anambra State in 1991 had by 2011 been completely lost. Most stations had been destroyed and not replaced. Their proposal is to re-establish the network. But perhaps it would be better to establish a local CORS instead...

The need for a geoid model to convert ellipsoid heights to orthometric heights in Nigeria was the subject of several papers. A paper by **Idrizzi** (TS02B) considers use of global geoid models EGM84, 94 and 08 for producing a model to convert GNSS heights to orthometric heights in Macedonia. Not surprisingly, EGM08 was found to be most accurate. He sees this as a useful technique in the absence of gravity observations.

Affordable GNSS

'Cost-effective' GNSS was a topic raised in a number of papers. Cost is the most significant factor restricting take-up of GNSS technology in the developing world. **Schwieger and Lilje** (TS03C), suggest a single frequency receiver with external antenna for 2000 euros and provide decision matrices comparing the cost of various techniques, also taking into account the comparative cost of developing and developed world surveyors.

Elujobade (TS05C) describes CadastralUltra, a purpose-built low-cost GPS system for cadastral survey in Nigeria. He says that land surveyors in Nigeria have resorted to using navigation grade devices for cadastral survey because the cost of survey-grade instruments is prohibitive. CadastralUltra consists of a handheld L1 receiver that can record carrier phase data and an external antenna. The equipment is used to observe static baselines, which are post-processed. This may help with relative measurements but it still needs a precisely known point in order to obtain



Remote CORS installation in Nigeria (By kind permission of SEGAL (Space & Earth Geodetic Analysis Laboratory).

With our compliments

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precise coordinates on the national grid. Densification of NIGNET is a suggested solution, with a CORS at every local government headquarters office manned by qualified surveyors.

Zhang and Schwieger (TS05C) tested various L1 antennae with a u-blox L1 receiver for low-cost monitoring applications. They extended the test to include an L1 antenna with choke ring which was able to meet the requirements of geodetic monitoring, although the accuracy in plan is rather better than the accuracy in height.

Kowalewski of navXperience GmbH (TS06B) gave a paper on his company's 3G+C antenna in the Galileo monitoring network. There is a useful description of the factors involved in antenna calibration and compares calibration of the 3G+C antenna with Trimble's Zephyr Geodetic II and the Leica AR10, with surprising results.

Monitoring structures

Ehiorobo et al (TS07E) used a combination of survey, geotechnical and structural monitoring equipment to study deformation of a building in Benin City. Their paper is well worth reading for its interdisciplinary approach. **Henriques and Oliveira** (TS07E) have devised macros in Excel to analyse deformation monitoring observations and develop predictive models. They show how their technique works on three large structures.

Irigue et al (TS08C) have used reflectorless total station observations to points on a cylindrical tank with processing using Kalman filtering techniques to study its deformation.

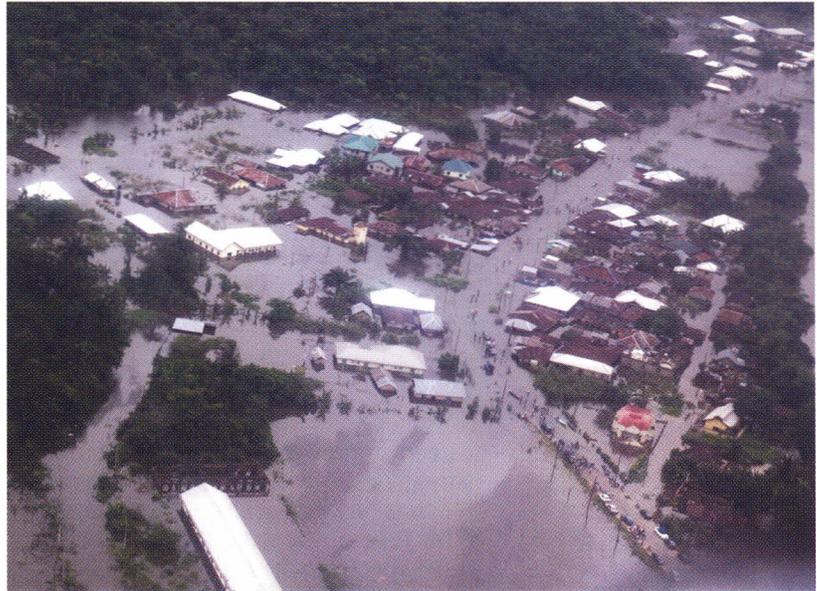
Photogram for Topo

In TS03C, **Jarroush** investigates the use of digital cameras for collecting topographic information and in particular looks into calibration methods. He tests the system on two sites and processes the results using Datamate's DatuGram3D photogrammetric software. The same sites were surveyed using a total station, resulting in differences of 10–25mm in plan and 3–15mm in height. Jarroush says that the photogrammetric technique is three times more productive than using a total station and also results in a 3D image record, which could prove useful.

The intensity of the return from laser scanning surveys can give an indication of the physio-chemical characteristics of the target. **Bordin et al** (TS08C) have studied the effect of distance to target on the intensity values and conclude that it should be taken into account before analysis of the intensity.

Floods

Nigeria was affected by widespread and unprecedented flooding in September and October 2012. Shell Petroleum Development Company (SPDC) is the major oil and gas operator in the Niger Delta and their



Devastating flooding at Ahoada, Rivers State, Nigeria during October 2012.

geomatics team (**Eyers et al** (TS06D)) provided support for the company's response to the emergency by collecting and analysing data collected during the flood event, including Radarsat-2 and COSMO SkyMed satellite data. Flood modelling was covered in a paper by **Olayinka et al** (TS06D) and used Cellular Automation Evolutionary Slope and River Model (CAESAR) to predict flood inundation at three places in Nigeria.

Hydro agencies needed

Etuonovbe (TS05E) puts the case for African nations to have national hydrographic agencies. At present in most countries there are no standards, quality assurance or central archiving of data produced by private companies. On a similar theme, **Ojinnaka** (TS05E) highlights the need for co-ordinated tidal studies along Africa's coastline in order to understand the tidal system and explain different observed rates of sea level rise and coastal flooding issues. The author mentions tidal anomalies off the Nigerian coast, a theme that is taken up by **Badejo et al** (TS06D), who have used an offshore tide recorder to carry out detailed tidal harmonic analysis in the Bonga oil field.

Sutherland and Singh (TS06D) introduce us (well this reviewer, at least) to a new acronym, SIDS – Small Island Developing States. The Caribbean has many of these and they need to develop strategies to deal with the threats posed by climate change. An alliance between Caribbean and Canadian universities is looking at the potential effects of sea level rise but the lack of long-term tide gauge data is affecting the accuracy of modelling efforts.

• All papers presented at the conference can be downloaded from <http://www.fig.net/fig2013/index.htm>

“The intensity of the return from laser scanning surveys can give an indication of the physio-chemical characteristics of the target.”

Hydrographic representation spans fifty countries – FIG Commission helps drive ‘Blue Economy’

Through its commission structure, FIG maintains a strong focus on hydrography and the marine environment.

Dr Michael Sutherland, Chair of FIG Commission 4, outlines the commission’s aims, objectives and activities.

Terms of Reference

Commission 4 is the Hydrography focus of FIG. The Commission has over sixty delegates, correspondents and academic members representing approximately fifty countries. It is probably more precise to say that the business of Commission 4 is hydrography and the marine environment. This is reflected in the Commission’s Terms of Reference that include:

- **Hydrographic surveying;**
- **Offshore surveying in support of energy, environment, submarine telecommunications, ports and harbours;**
- **Hydrographic education, training and Continual Professional Development (CPD);**
- **Marine Environment and Coastal Zone Management (CZM) ;**
- **Data processing and management of hydrographic data; and**
- **Nautical charting and bathymetric mapping – analogue and digital, including ENCs (Electronic Navigational Charts).**

Publications

Commission 4 supports hydrography through its activities, with the support of its national delegates. Information relevant to hydrography is disseminated through publications, and commission members’ participation in international meetings, conferences and committees. As a part of regular business, Commission 4 organizes technical sessions at FIG annual working weeks, biannual regional conferences and congresses that take place every four years. Commission 4’s sole and joint publications include:

- Administering Marine Spaces: International Issues;*
- FIG Guide on the Development of a Vertical Reference Surface for Hydrography;*
- Guidelines for the Planning, Execution and Management of Hydrographic Surveys in Ports and Harbours; and*
- Report on the Economic Benefits of Hydrography*

Additionally, through memoranda of understanding and other formal or informal mechanisms, the Commission works collaboratively and cooperatively with other

organizations sharing overlapping interests. These include the International Hydrographic Organization (IHO), the International Federation of Hydrographic Societies (IFHS), the International Cartographic Association (ICA), the United Nations’ International Maritime Organization (IMO) and the World Bank, among others.

The development of guidelines and standards to assist hydrographers to provide quality services is also a focus of Commission 4. Standards supported by Commission 4 include IHO S-5, S-8, S-6, S-47, S-57, S-100 etc. The Commission represents FIG on the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) jointly with IHO and ICA.

Working Groups

Each four-year term of Commission 4 has a different focus, depending on a number of factors. These foci implicitly relate to Working Groups. While during every term the Commission is concerned with all things hydrographic, the current 2011-2014 term involves activities related to:

- Working Group 4.1** – Ellipsoidally Referenced Hydrographic Surveys (ERS);
- Working Group 4.2** – Standards and Guidelines for Hydrography;
- Working Group 4.3** – Multi-Sensor Systems for Hydrographic Applications;
- Working Group 4.4** – Maritime and Marine Spatial Information Management; and
- Working Group 4.5** – Hydrography in Africa.

Working Group 4.5, Chaired by Commission 4 Chair-Elect Ms **Angela Etuonovbe**, has been particularly active promoting hydrography in Africa through meetings with government officials and workshops. Commission 4 also works with other FIG Commissions and Task Forces. Co-operation and collaboration is currently underway with the FIG Task Force on Africa, and the Climate Change Task Force.

Contributions have also been made to other FIG Commissions’ publications, such as Spatial Planning in Coastal Regions: Facing the Impact of Climate Change from Commission 8. This demonstrates the Commission’s commitment not only to the technical aspects of hydrography but also to its holistic application to socioeconomic, environmental, political and other issues relevant to human societies.

“... not only to the technical aspects of hydrography but also to its holistic application to socioeconomic, environmental, political and other issues relevant to human societies.”

The 'Blue' Economy

In a latest demonstration of the Commission's commitment to hydrography's application to human societies' objectives, a one-day conference titled "The Blue Economy" was organized jointly with the IHO, and supported by RICS. The conference took place at the National Oceanographic Centre (NOC) in Southampton, UK on Tuesday, 9th April, 2013 as part of Ocean Business 2013. Presentations were made by representatives of a number of organizations with interests in hydrography and its contribution to national and international economies. These include FIG, IHO, The Maritime Alliance, International Association of Marine Aids to Navigation and Lighthouse Authorities, IMO, United Kingdom Hydrographic Office, National Oceanography Centre, International Association of Oil & Gas Producers, International Marine Contractors Association, The Hydrographic Academy, and University of Twente. The chief organizer was Mr **Gordon Johnston**, Commission 4 Vice-Chair Administration and Communication.

You can read more about the Blue Economy conference on page 18.

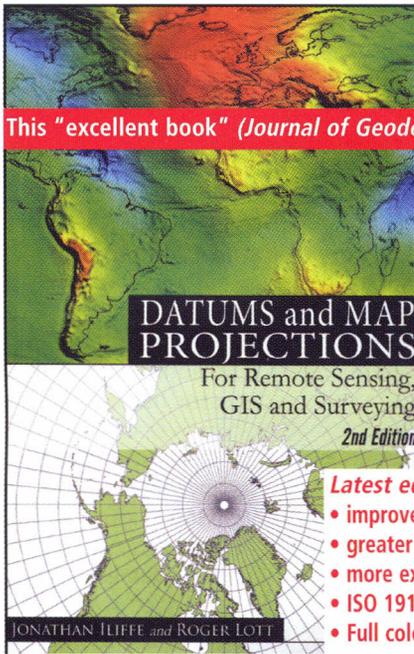
• For more information on Commission 4, visit: <http://www.fig.net/commission4/>



Above: Sharing a light moment at the Blue Economy Conference are (l to r) Robert Ward (president of IHO), Dr Michael Sutherland (chair, FIG Commission 4) and Gordon Johnston (vice-chair Administration & Communication, FIG Commission 4)



The International Federation of Surveyors (FIG), whose membership comprises professional surveying and surveying-related organizations from around the world, was established in Paris, France in 1878. The original members came from Belgium, France, Germany, Italy, Spain, Switzerland and the United Kingdom. Today, FIG member organizations are on every continent. Individuals contribute to FIG objectives through involvement with its ten Commissions, each defined by a different surveying discipline or surveying-related focus. Leading each Commission is a chair, nominated by a professional surveying organization and subject to election/affirmation by FIG General Assembly. Each chair serves a four-year term, with the latest term being 2011-2014.



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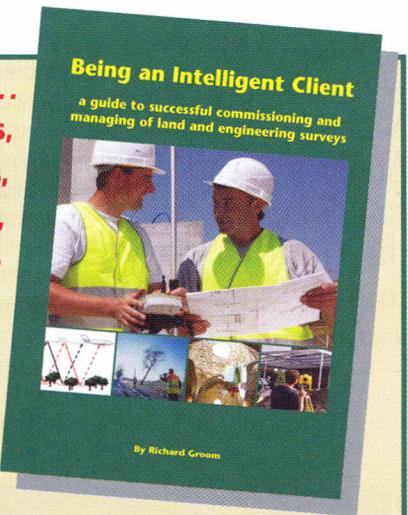
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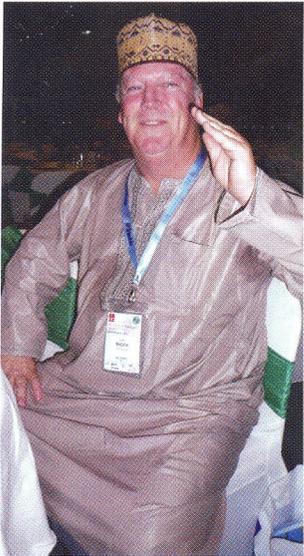
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By Richard Groom

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A major survey conference in Australia's capital and a walking tour in the steps of the country's first governor have kept our columnist busy, in addition to attending the FIG working week in Nigeria's capital Abuja. To read John's report on the FIG event turn to page 14).

• In addition to being an honorary Nigerian chief, John Brock is a Registered Surveyor in Australia and is a stalwart of FIG and its Permanent Institution for the Art and History of Surveying.

In the steps of Australia's founding surveyors (via Nigeria!)

By John Brock

Winter has hit the antipodes like an ice hammer although compared to the UK we are still relatively warm at between 5 and 20 degrees Celsius! A Topp Tour of Luna Park amusement ground brought back childhood memories with a ride on the ferris wheel as well as taking us behind the scenes to see WW II air raid bunkers and the end of the old railway line which used to run right through the fun park.

The Centenary of Canberra

We attended the Surveying and Spatial Sciences Conference held in Australia's capital city Canberra during the third week of April.

In tribute to the original founders of our nation's capital Canberra stalwart **Frank Blanchfield** led a team of young professionals to investigate the original field notes of surveyor **Percy Sheaffe** to relocate the exact spot where Federal Government Minister **King O'Malley** (yes, that was his first name ?) placed the first peg to ceremonially commence the construction of the Federal Capital Territory (later to be renamed the Australian Capital Territory – ACT).

In a fitting tribute to a 100-year anniversary the organising committee also entrusted Frank with the task of conscripting appropriate speakers to take part in the History and Heritage Workshop to be held on Tuesday 16 April. The impressive programme had **Matthew Higgins** (not the Queensland surveyor!) with his "Surveyors at the Snowline" during which the enthralled audience experienced the borderlines of the ACT with photos of some reference trees lost to bushfires as well as all of those surveyors involved in making the survey.

Then we had **Terry Birtles** give a varied dissertation on the Capital's doyen of surveyors **Charles Robert Scrivener** about whom he has recently released a great book biography followed by my presentation on "Surveyors of Canberra", which listed the early surveyors of the ACT area before the Commonwealth survey team did their assignment as well as the more current identities inclusive of developer/surveyor **Henry Ferdinand Halloran**, whose dream of a Port City for Canberra at Jervis Bay was derailed when the government of the period's plans for a southern rail link were dishonoured.

South Australian **Adrian Cummins** told us of the skill and courage of surveyor **John**

McDouall Stuart through Central Australia along with Victorian **Lindsay Perry's** tribute to **Mathew Flinders** for the naming of our nation Australia.

Greg Eccleston showed us the product of the project to make a giant Map of the Explorers of Bass Strait, while **Frank Leahy** related his tale of the sleuth work entailed in relocating the Plant Camp where the ill-fated explorers Burke and Wills buried their survey equipment in the outback.

Finishing off a great array of talks was the great nephew of W.A. Canning, **James** (from Melbourne), giving a descendant's version of the history of the major Stock Route bearing his name which is situated in far north western Australia.

The Welcome Reception that night and the Young Surveyors Cocktail Party on the following evening provided ample opportunities to refresh both palates and old acquaintances. The Annual Scrivener Breakfast held at Surveyors Park in the Parliamentary Circle within view of the New Parliament House came with great weather and spirit as those present were asked to volunteer their fond recollections of their times in the ACT providing some humorous anecdotes, while a hearty repast was consumed.

Governor Phillip walk and Barnett tour

Brian Powyer cut an imposing figure as he strode from Queen's Wharf at Parramatta dressed as his alter ego **Arthur Phillip** to lead his faithful following of 50 colonists along the same route that his predecessor had forged in 1788. This 225th Anniversary river walk was a terrific tribute to Parramatta's founder and NSW first governor. Hot on the heels of this walk we were taken on a Historic Houses Trust bus tour to view some of the works of Australia's most prolific architect **James Barnett** who was Colonial Architect in the second half of the 19th century. By 1881 he had 1490 projects under his direction with the most notable being the remodelling of Customs House (1887), Sydney GPO (1866-91), Colonial Secretary's Office (1873-80), Callan Park Lunatic Asylum (1873-85) and my absolute favourite building, the Old Lands Department (1877-90) in Bridge Street with the many statues of surveyors and explorers adorning its façade. Our most knowledgeable guide was architect historian **Robert Griffin**.