

tions to the problem of incorporating nanoparticle sunscreens into water for silicone liquid make-up. A symposium on 'Tobacco carcinogens' held on 30 August highlighted the latest findings on how tobacco carcinogens cause cancer. A key objective was to learn more about how tobacco-related cancers may be prevented. It was concluded with a panel discussion on ways to decrease the cancer risk for the 1 billion tobacco users across the globe.

The mission of the Women's Chemist Committee is to attract women to careers in chemical sciences; provide resources for career development; and promote the acknowledgement of accomplishments of women chemists and chemical engineers. There had been a series of articles/interviews with women scientists. 'Leadership styles' by Madeline Jacobs, editor-in-chief of *Chemical and Engineering News*, drew the attention of many women delegates towards the positive ways of leader-

ship qualities. The committee hosted a presidential symposium titled 'Women in industrial chemistry: trends and transitions' on 29 August. The symposium highlighted the challenges, positive influences and personal aspirations of successful women in science and engineering.

A Presidential Symposium on 29 August on 'The future of chemical plant security: where will we be in 2015?' featured a presentation by Charles E. McQueary, Under Secretary for Science and Technology, Department of Homeland Security, on what the U.S. Government was doing to combat chemical threats nationally. The programme was one of a series of symposia related to 'Enterprise 2015', a society-wide effort to identify potential changes in the chemical enterprise in the next decade. The successive sessions included a wide-ranging discussion in which audience members gave their predictions of the state of the chemical sciences ten years from now.

Quite a good number of participants from India were found in different divisions of the technical sessions. Most of them were young chemists working either as postdoctoral fellows or doing their graduate courses (Ph D) in different universities of USA. Many of the research papers reported results of newer synthetic methodologies for novel organic and inorganic compounds. The posters displayed ranged from small heterocyclic compounds with profound biological activities to large supramolecules self-assembled with proper angles and definite shapes.

ACKNOWLEDGEMENT. I acknowledge the BOYSCAST Fellowship.

Okram Mukherjee Singh, Department of Chemistry, University of Utah, 315 S 1400E, Salt Lake City, Utah 84112, USA.
e-mail: ok_mukherjee@yahoo.co.in

MEETING REPORT

The great plume debate*

Earth scientists are currently debating the origin of 'hotspots' such as Hawaii and huge volcanic provinces such as the Deccan and Siberian Traps, and rigorously testing the mantle plume hypothesis that has been extremely popular up until now. An increasing number of workers now regard intraplate volcanism a necessary and natural consequence of plate tectonics, and do not consider mantle plumes – hot, buoyant upwellings from the core–mantle boundary 2900 km below the earth's surface – necessary or viable. In 2003, a conference took place in Iceland that was devoted to developing alternative theories¹. A second meeting held recently brought together eighty-five scientists from twenty nations, including young scientists, postdocs and students. The meeting was convened by Ian Campbell (Australian National Univ.), Gillian Foulger (Univ. of Durham), James Natland (Univ. of Miami), Dean Presnall (Carnegie Institution of Washington), and W. J. Morgan (Harvard Univ.).

The conference comprised 15 topical sessions, each 90 min long, including three keynote talks followed by intense spontaneous discussion and debate among all participants. In addition, several shorter (5 min) presentations were made by delegates to summarize their posters. After a welcome by G. Foulger who laid out the scientific agenda, including calling for a clear definition of a mantle plume, two talks were given in the first session, 'Plume theory and predictions'. Campbell described the main features of plumes and predictions of the plume hypothesis, that they should: (i) comprise a large head (2000–2500 km diameter) followed by a small (100–300 km diameter) tail; (ii) have higher temperature than adjacent mantle, and be hottest in their centres; (iii) originate from a hot boundary layer – the core–mantle boundary; (iv) produce picrites (though these may not reach the surface); and (v) produce pre-volcanic, domal uplift of 500–1000 m. Morgan discussed plumes and earth evolution and suggested that plumes replenish the asthenosphere. In the next session, 'Alternative theories and predictions', Foulger discussed the generation of melting anomalies by plate tectonic processes, invoking mantle heterogeneity,

stress fields and the recycling of shallow, fusible materials. L. Elkins-Tanton (Brown Univ.) discussed magmatism caused by lithospheric delamination and D. Sandwell (Scripps Inst. of Oceanography) argued that linear volcanic chains may form as a result of either plumes or also crack mechanisms, and most intraplate features have few plume attributes.

In a pair of sessions entitled 'Lithosphere and mantle physics and dynamics', J. H. Davies (Cardiff Univ.) reviewed mantle convection and argued that cylindrical upwellings were inevitable. U. Hansen (Univ. of Muenster) discussed plume generation in mantle-relevant scenarios. J. Tarduno (Univ. of Rochester) reviewed palaeomagnetic evidence for the motion of the Hawaiian hotspot. C. Kinkaid (Univ. of Rhode Island) described the many forms of mantle upwellings encountered in models. E. Burov (Univ. of Paris) showed that lithospheric uplift patterns over plumes can be complex, not simply domal, if the real rheology of the lithosphere is taken into account. S. King (Purdue Univ.) described the theory of edge-driven convection, but considered it unsuitable for hotspots away from large steps in lithosphere thickness. J. van Wijk (Scripps)

*A report on the American Geophysical Union Chapman Conference 'The Great Plume Debate', held from 28 August to 1 September 2005 at Fort William, Scotland.

presented a model where LIP-sized volumes of magma at volcanic rifted continental margins may be produced simply as a consequence of the rifting process, and plumes with anomalously high temperatures are not required. This model may be highly relevant to the western Indian rifted margin and the associated Deccan flood basalts. W. Stuart (USGS) showed that the stress field in the Pacific plate that results from variable thermal contraction is such as to encourage a thermo-elastically driven crack in the Hawaii region to propagate. A. Tiwary (NCAOR, Goa) suggested that the Deccan flood basalts were produced by re-melting of fossil Precambrian intrusions along the western coast of India.

In a pair of sessions focussing on 'Temperature', N. Arndt (Univ. of Grenoble) proposed high melting temperatures and hot and dry sources for high-MgO magmas in Hawaii, Iceland and Gorgona, and a warm and wet source for the Canary hotspot. S. Goes (Imperial College) discussed seismology and its implications for thermal plumes. C. M. Leshner (Laurentian Univ.) described Precambrian high-MgO magmas and noted a pronounced and irreversible change in the maximum MgO contents of magmas at 2.5 Ga. R. Keays (Monash Univ.) argued that the West Greenland picrites were very hot and the high Platinum Group Element (PGE) contents of komatiites, picrites and allied rocks required a plume origin. R. Harris (Univ. of Utah) discussed heat flow on hotspot swells and ascribed the anomalous low heat flow, which has been used to argue against plumes, to hydrothermal circulation. D. Presnall (Carnegie Institution) argued that Na-Fe relationships in MORB indicate mantle heterogeneity, not temperature. T. Falloon (Univ. of Tasmania) argued that crystallization temperatures for MORB and OIB magmas are no different, and OIBs are a result of mantle heterogeneity at normal temperatures. J. M. Rhodes (Univ. of Massachusetts) countered by arguing for a 150°C temperature difference between Mauna Loa and MORB lavas.

In the 'Geochronology' sessions, R. A. Duncan (Oregon State Univ.) discussed geochronological data for LIPs and hotspot tracks with a focus on the North Atlantic. K. Hoernle (GEOMAR, Kiel) opined that age data for the Madeira and Canary Island groups were most consistent with the plume hypothesis. A. Koppers (Scripps) argued that age progressions along the Hawaiian and Louisville chains were best explained

by a moving plume. However, A. K. Baksi (Louisiana State Univ.) showed that most isotopic ages for hotspot basalts and tracks, routinely used by plume/plate motion modellers, were statistically unacceptable. J. O'Connor (Vrije Univ.) presented ages from the Galapagos area and Carnegie Ridge and considered non-plume mechanisms for hotspots possible.

In the 'Seismology' sessions, R. Allen (Univ. California, Berkeley) presented seismic images of Iceland and Newberry hotspots, arguing that Iceland was an asthenospheric/plume upwelling, but Newberry was a lithospheric phenomenon. D. Zhao (Ehime Univ.) presented tomographic images that he interpreted as showing plumes and slabs. G. Nolet (Princeton Univ.) presented an interpretation of recent seismological images, claimed to represent plumes in terms of the earth's heat budget. A. Deuss (Univ. of Cambridge) suggested that seismology was important in the search for plumes, but a better understanding of mineral physics was first required in order to correctly interpret seismic images. B. Julian (USGS) presented a new suggestion for using guided seismic waves to search for plumes. T. Lay (Univ. of California, Santa Cruz) discussed whether the D'' layer can be a plume source, and noted that plumes from D'' should have significantly greater temperature anomalies than any surface observations show – close to 1000 K.

In the 'Planetary' session, A. Jones (Univ. College, London) presented an asteroid impact model for the North Atlantic province, and C. Reese (Washington Univ.) presented an impact model for the Tharsis Rise on Mars. V. Hansen (Univ. of Minnesota) described circular and semi-circular features of Venus, favouring a plume explanation, whereas W. Hamilton (Colorado School of Mines) argued that these were the marks of ancient impacts, not young plumes.

In two sessions devoted to the 'Field evidence', A. Saunders (Univ. of Leicester) argued that plume-generated pre-volcanic uplift did occur in the Siberian Traps, but to the west of the main area, over the West Siberian Basin. S. Jones (Trinity College, Dublin) talked about uplift associated with the North Atlantic Province. Y. Xu (Guangzhou Inst. of Geochemistry) described the palaeogeographic changes due to domal uplift just before the Emeishan flood basalt volcanism in China. H. Sheth (IIT Bombay) gave an overview of the main features of the Deccan Traps incon-

sistent with the plume model (8–9 Myr duration, palaeolatitudes, rift and fracture zone control, no pre-volcanic uplift, etc.). He pointed out that extensive planation surfaces under the Deccan lavas in central India rule out plume-head-generated pre-volcanic uplift, and the Deccan and Sahyadri regions have experienced major post-volcanic uplift. V. Sallares (UTM, Barcelona) argued for an upper-mantle origin of the Galapagos hotspot. J. Winterer (Scripps) presented evidence that young island-seamount chains on the Pacific were formed over older fracture zones.

In sessions on 'Petrology and geochemistry', C. Hawkesworth (Univ. of Bristol) described the geochemistry of ocean island basalts in terms of sources, components and reservoirs. J. M. Rhodes (Univ. of Massachusetts) presented arguments for a chemically and thermally zoned Hawaiian plume, and E. Takahashi (Tokyo Inst. of Tech.) proposed that the Hawaiian source contains a significant proportion of eclogite derived from mixing blocks of the order of kilometres in size. J. G. Fitton (Univ. of Edinburgh) showed that Ocean Island Basalt is widespread at 'hotspots' and continental rifts where no one would expect a plume and thus hotspots cannot tap a mantle source unavailable to other (shallow?) melt-extraction processes. M. Keskin (Istanbul Univ.) presented a collision-based plate tectonic model for volcanism and uplift in Eastern Anatolia. A. Schersten (Vrije Univ.) described the principles governing the distribution of tungsten in the earth and ruled out contributions from the earth's core in 'hotspot' magmas.

The conference ended with a synthesis by Campbell and Foulger that addressed the main elements of both plume and alternative models, and made recommendations for future research. These include improved geochronology and seismic tomography, mantle physics and field geological evidence, among others. It is important to recognize that there is no single alternative to mantle plumes that fits all localities, but several processes and mechanisms (plate tectonics, asteroid impacts, lithospheric delamination, edge-driven convection, etc.) that could apply to individual localities.

Throughout the conference, there were dozens of poster and oral presentations. Many Powerpoint presentations and posters are available for download from the conference website <http://www.mantleplumes.org/Chapman/Information.html>. The conference was enhanced by two half-day field

trips to classic geological localities near Fort William, including Glen Coe and Ballochulish. Here, the delegates were able to examine Proterozoic (Dalradian and Moine) metasediments and Devonian granites and volcanics. I. Dalziel (Univ. of Texas, Austin) delivered a lecture on Scottish Highland geology in its global (supercontinent) context. Larger (5-day) pre-conference and post-conference field trips to classic areas of Tertiary igneous activity in western Scotland (Rum, Mull and Isle of Skye) were also run and attended by groups of 10–20 people.

Conference abstracts, field photographs, and other information can be freely

downloaded from www.mantleplumes.org. This hugely successful website was launched in March 2003 by Foulger, and its objective is to provide information and generate debate among the scientific community regarding whether plumes exist, what alternatives are possible, and whether they do better at explaining intraplate volcanism and geodynamics than the plume model. At the time of writing, there are over 100 substantial pages authored by almost 200 scientists worldwide in addition to a host of other resources, including current pre-prints and papers, news items and bibliographies. New contributions to the website are welcome, and readers should contact

Foulger (g.r.foulger@durham.ac.uk) or Alexei Ivanov (aivanov@crust.irk.ru) for further information.

1. Sheth, H. C., *Curr. Sci.*, 2003, **85**, 1518–1520.

Hetu C. Sheth*, Department of Earth Sciences, Indian Institute of Technology, Bombay, Powai, Mumbai 400 076, India and **Sarajit Sensarma**, Department of Geology, St. Anthony's College, Shillong 793 001, India.

*e-mail: hesheth@iitb.ac.in

MEETING REPORT

Evidence-based and integrated medicine for lymphatic filariasis, other chronic dermatoses and HIV/AIDS*

In India, millions suffer from lymphoedema. Worldwide management of filariasis with available drugs is effective, but the therapies are expensive. A national seminar was organized by the Institute of Applied Dermatology (IAD), Kasaragod to discuss alternative forms of therapies available in India for management of this disease.

Pradeep Kumar (IAD) discussed the aims and objectives of the seminar. This included overview of work done by IAD in the clinical analysis on patients who received integrated therapies, understanding gaps that prevent bridging different systems of medicine and developing an evidence-based patient treatment protocol for chronic and difficult-to-treat patients with chronic dermatoses and lymphoedema.

Sreekrishnan (Arya Vaidyashala College, Kottakal) spoke on sheelapada, ayurvedic understanding of lymphoedema, filariasis and treatment for lymphatic drainage. He gave an introduction on sheelapada followed by pathophysiology of oedema during the treatment, principles of sheelapada and internal herbal medication in sheelapada.

*A report on the National Seminar on Evidence-based and Integrated Medicine for Lymphatic Filariasis, other Chronic Dermatoses and HIV/AIDS, organized by the Institute of Applied Dermatology, Kasaragod during 8–10 February 2005.

Terence J. Ryan (Oxford University, UK) spoke on 'Global alliance for elimination of lymphatic filariasis'. According to him, skin diseases are common in the developing world, particularly in the rural areas of India, Africa, South America, China, etc. In India, filariasis is the major cause of lymphoedema. The most important activity taken up is to eliminate transmission by the mosquito of this microfilaria. If microfilaria are removed by drugs given to patients, then they cannot be transmitted to other patients. The Global Alliance has taken up the work of distributing drugs freely to patients. Another component of the programme is morbidity control.

Nandini K. Kumar (ICMR, Govt of India) discussed ICMR Guidelines and Regulation of Governing Traditional Medicine Research. Her talk included classification of traditional medicines, ethical and regulatory requirements, reverse pharmacology, requirements of international collaborative research, role of ethics committees and impact on national health economics while conducting research on traditional medicines.

R. K. Shenoy (T.D. Medical College Hospital, Alappuzha) spoke on 'How lymphatic filariasis can be managed'. According to him, lymphatic filariasis is a common vector-borne tropical disease that causes considerable long-term physical

disability in affected subjects. This disease is the commonest cause of lymphoedema and hydrocele in India. WHO has targeted this disease for global elimination by the year 2020. In India, 15 states including Kerala and 5 union territories are endemic for Bancroftian filariasis, while Brugian filariasis is prevalent only in certain regions of Kerala and other states. His lecture covered recent advances in understanding pathogenesis and immunology, development of potent diagnostic tools and chemotherapeutic agents that are safe and effective. Stages of filarial infection, clinical manifestations of the disease, diagnosis management of disability, treatment and prevention of lymphoedema were discussed by the speaker.

Apart from the lead lectures, some sessions were devoted to group discussions on topics like peer review of integrated management of filarial lymphoedema, future direction of clinical application for integrated medicines, therapies, ethical, legal and biodiversity issues, clinical demonstration of all stages of integrated management protocol for filarial lymphoedema of rural communities, chronic dermatoses, etc.

Minakshi De (*S. Ramaseshan Fellow*), 35, Garpar Road, Kolkata 700 009, India e-mail: amitkde@satyam.net.in