

ICATS NEWS

SPRING 2016



EDITOR'S NOTES

Ali Green

Welcome to the latest edition of ICATS News – the first of 2016. The last six months have been busy, with a good deal of travel for the ICATS team within the UK and beyond. The majority of this publication features the wonderful IFEAT Conference in Sri Lanka, which this year focused on Asian ingredients and medicinal plants and their sustainable production. This was a fabulous event and inside the newsletter you will find reviews of the conference, selected lecture papers and an account of a brilliant field trip to a cinnamon plantation.



Joanna Norman, our new ICATS Field Tutor, was also in Sri Lanka to lead a one-day perfumery workshop, ably assisted by Sharon Heard. She has kindly written a full account for ICATS News about the workshop. You can also find out more about Jo's career in our *Introducing* section along with a feature on one of our students from India.

There is, as usual, a fine selection of review articles of the latest publications in the aroma trades by Tony Curtis as well as a focus on the latest hot topics in the news. You can also read Tony's great report on the recent IFRA Fragrance Forum in London, where the focus was 'Our Fragrant World'. I'm sure you will all agree when you read his report, that it sounded a fascinating series of lectures on a wealth of aromatic subjects!



As you may have seen in the last edition of ICATS News, our friend and colleague John Ayres has decided to retire. Before leaving, however, he very bravely led a perfumery workshop at a local high school with a group of sixteen-year-old chemists and their teachers; you can read all about this in our illustrated feature. John has also written a comprehensive account of the BSP New Ingredients Symposium from 2015 that I am sure you will enjoy.

There should be something for everyone in this edition, but as Editor, I am always on the look-out for material for the next ICATS News. Please let me know if there is anything you would like me to cover in our newsletter or if you would like to contribute to future editions as a guest feature author. I really want our newsletter to reflect the industry today and would really welcome any feedback from any of our readers.

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IFEAT

THE 2015 IFEAT CONFERENCE

IN COLOMBO, SRI LANKA

ALI GREEN

The 2015 IFEAT Conference was a fabulous experience from start to finish. It began in a rather unpromising manner, with a lengthy journey for Sharon Heard and me to Heathrow from Plymouth and then a long-haul flight to Colombo, on which we met our colleague from ICATS, Jo Norman. As soon as we stepped off the plane, the humidity and heat washed over us and the bustling airport, complete with a bizarre selection of outlets, including one that sold washing machines and electric guitars, signaled we were no longer in the UK. We were soon greeted at the IFEAT desk where a taxi to our hotel was really efficiently arranged and our Sri Lankan adventure began.

From the vantage point of our air-conditioned cab we passed Buddhist and Hindu temples and a vibrant array of buses, tuk-tuks, motorbikes, cattle and colourful people. Soon we arrived in Colombo, the commercial centre for Sri Lanka, where the traffic was interesting to say the least and from that time on, our journeys anywhere were serenaded by numerous horns and we were party to some novel rules of the road. Our hotel, the Galle Face, is the oldest in Colombo and offered serene, colonial tranquility with a restaurant overlooking the Indian Ocean - a total contrast to the bustling city outside. Although we had been travelling for a long time, we were all really invigorated



The conference opening ceremony



Ali Green giving the ICATS Annual Report

by our arrival and were looking forward to the evening's welcome reception.

A few hours later a coach arrived to take us the short distance to the Kingsbury Hotel. The opening reception offered a vibrant cultural introduction to the island. We were welcomed by a Sri Lankan elephant and once inside the venue, there was a succession of music and dance performers that reflected the traditional and contemporary culture of this colourful island. Included among the numerous acts were the virtuoso drummers who gave a flavour of the complex rhythms within the local music. The rarely-performed peacock dance was very special too, with beautiful costumes and dancers with poise and elegance, unique to Sri Lanka. It was great to meet up with many old friends at this reception and to see the record number of delegates, who had travelled from all over the world.

Throughout the conference, Sharon Heard manned the ICATS desk by the door to the lecture hall and fielded numerous questions about our courses as well as meeting many of our students past and present. As we had all the course material on display, it was an excellent opportunity for would-be students to see the numerous books and learning materials provided on an ICATS course and to ask questions about the different study pathways on offer.

Monday saw the official opening of the Conference; this involved a memorable traditional Buddhist fire ceremony, undertaken by beautiful dancers. We were warmly welcomed by the head of the 2015 Conference Committee,

Devapriya Nugewela (Link Natural Products (Pvt) Ltd.) and the first lecture session was introduced. This focused on Asia as an innovative supplier of ingredients and included a fascinating insight into local production and issues facing the region. It was followed by a session that looked at medicinal plants in healthcare, food and cosmetics¹. Following the excitement of the previous evening, Monday night was low-key and following dinner an early night was in order.

Tuesday opened with the IFEAT Business Meeting in which several new members were elected to the IFEAT Executive. I gave the Annual ICATS Report, which was well-received by IFEAT members. The report included details of the numbers of new students, the profile of the students, the BSP Workshop Weekend and accounts of visits by the ICATS team to symposia and to industry. The meeting also covered the two-week residential Flavour Course at Reading University, after which medals were awarded to the best students from both ICATS and the Reading Course. There was a review of the fabulous study tour to France, as well as giving details of next year's tour to the US. The IFEAT Gold Medal Lecture was given by the eminent Dr R O B Wijesekera who described his illustrious career in the world of medicinal plants and spices. The afternoon's session was devoted to Social Achievements in the Flavour and Fragrance Industry, with some inspiring accounts of various initiatives across the industry.

Tuesday evening saw the IFEAT Annual Dinner at the Hotel Jetwing Blue, Negombo. Despite the rather damp weather, this was another fabulous evening with copious food and

drink with numerous cuisines represented. The setting was a beach which featured some traditional Sri Lankan fishing boats, a beautiful touch. Once again, we were treated to some fantastic entertainment, with more traditional dancing and some great bands. The dinner gave us a good opportunity to meet more people in the industry and find out more about their business and new trends and ventures in the aroma trades.

Wednesday was a free day on which study visits and workshops were scheduled. Sharon Heard assisted Jo Norman, with the one-day Perfumery Workshop while I attended a one-day field trip to Kosgoda to see cinnamon production and cinnamon leaf oil distillation².

Thursday saw the last morning attended by ICATS; this focused on Market Developments and the Trends of Naturals, another fascinating series of lectures offering a privileged insight into cutting edge initiatives and research that promise to revolutionise the industry from field to laboratory to consumer.

Jo Norman and I were lucky enough to have a private tour of Colombo in the afternoon, the highlight of which was a visit to a Buddhist temple in the heart of the city. It finished our Sri Lankan visit very well and made us all determined to return to this beautiful and vibrant island and see more of what it has to offer.

Thanks must go to the organizing committee for this excellent conference; they thought of everything to ensure that the entire experience was not only stimulating and informative, but also comfortable and stress-free. Thanks must also go to the IFEAT Educational Committee for their continued support of ICATS thereby enabling us to attend crucial events such as this. The conference promotes excellence and the dissemination of research and good practice in our wonderful industry.



Sri Lankan Drummers at the welcome reception

- 1 Selected lectures are reviewed later in the newsletter. The complete proceedings are available for students upon request from ICATS.
- 2 See later in the newsletter for a report on the Perfumery Workshop and an illustrated account of the cinnamon trip.



The ICATS Table with Sharon Heard, Jo Norman and Ali Green



IFEAT MEDAL-WINNING ICATS STUDENT, **LISA LAM**

This year's medal-winning ICATS student had an excellent technical background when she was first employed by CPL Aromas, Hong Kong. However, Lisa felt she needed additional training, *"I found that I didn't have much general understanding in areas such as the financial, regulatory and business aspects of the aromas trades"* and looked to ICATS to fill in the gaps. *"ICATS materials covered most of the...aroma trade industry such as history of scents, regulation, and product development etc. that greatly benefitted my career path as I transitioned from R&D to product development and the business side of aroma trades"*. After four and a half years of employment with CPL Hong Kong, she has now moved on and is based in the US at a perfumery company where she is selecting scents for the growing Asian market. Lisa has been an excellent student during her time with ICATS and we would like to wish her well in her future career.



Lisa Lam



SELECTED LECTURES FROM THE 2015 IFEAT CONFERENCE

This year the focus at the Sri Lanka Conference was on therapeutic plants and their derivatives as well as sustainable production with a focus on local initiatives. The standard of the presentations was superb and it has been a challenge to select five papers that truly represent the rich variety and quality of the lecture series.

THE IFEAT MEDAL LECTURE: SCIENCE AS THE KEY TO NATURE'S BOUNTY

Dr R.O.B. Wijesekera

It was a great honour to hear the story of Dr Wijesekera's illustrious career as a researcher and scientist. His focus has been on the use of plants, including work on essential oils, spices and medicinal compounds as well as pioneering analytical techniques for identifying active ingredients and improving processing methods for plant derivatives. He spoke of his involvement in a World Health Organisation initiative looking at plants used for contraception in rural communities. This involved task teams in six centres across the world, four in developing countries, each with a body of scientists and all collaborating over a two-year period. All this was before email technology; Dr Wijesekera recalled the collaborative aspect was particularly challenging! The results of this initiative left a lasting legacy: two botanical gardens, uniform protocols for extraction, along with bioassays for key species. The team were able to pass on seven leads for drug development, two of which (*montanol* and *zoapatanol*) are now in wide clinical use. It was fascinating to hear about these scientific pioneers and their analysis of plants in the early days of analytical characterisation techniques.

Since this ground-breaking endeavour, Dr Wijesekera has not only been involved with setting up a new research capability at *CISIR Colombo*³ developing and perfecting analytical techniques, quality assurance and defining quality standards, but has also worked on new distillation techniques as well as working with institutions across the world from Nepal to Madagascar in a variety of projects in industry and academia. He was also helped to develop the quality control centre within the *Fragrance and Flavour Development Centre*, Kannauj in India⁴, whilst focussing on sandalwood-based perfumes.

Dr Wijesekera noted the many similarities between the pharmaceutical and aroma trades in their use of plants; he stressed that a key concern needs to be the sustainability of any naturals used in industry. The key to this, he feels lies in partnerships between consortia of producers and users, be these pharmaceutical companies or the aroma trades. He focused on several highly successful initiatives already in place, such as Vanilla production in Madagascar and Benzoin extraction in Laos, which he feels should act as models for the industry going forward.

This lecture from a pioneer in the field of botanicals was inspirational; Dr Wijesekera has worked in the industry for over six decades and has had a massive impact on the industry, not only in his native Sri Lanka, but also globally. His enthusiasm and passion for plants and their sustainable use should act as a stimulus for those at the beginning of their journey in this fascinating field of study, leading them on to aspire to having such a positive effect on the industry.



³ <http://iti.lk/en/our-divisions/research-development/herbal-technology.html>

⁴ <http://www.ffdcindia.org/default.asp>



ECOPHARMACOGNOSY AND THE SUSTAINABILITY OF COMMERCIAL NATURAL PRODUCTS

Prof. Geoffrey A. Cordell,
Natural Products Inc.,
Evanston, Illinois, USA

Ecopharmacognosy is a new term meaning the study of sustainable, biologically active natural resources. This fascinating presentation given by Professor Cordell, looked at a potential framework of strategies for natural medicines and their development ensuring their continued availability, stability and benefit whilst protecting not only the local small-scale producers but also ensure consistent and reliable benefits for the end user.

Clearly the first question needs to be whether a plant chemical actually has the desired effect on the patient or end user. However, in the world of ecopharmacognosy big questions also need to be asked before that plant is exploited, to see whether it meets sustainability goals. For example, in general roots and bark are far less sustainable as source material than leaves and seeds. Once the plant is decided upon, then extraction and processing techniques need to be selected that will ensure consistency whilst also not using excessive energy or water resources.

One of the big problems Professor Cordell outlines is that there is no universal database of medicinal plants and their active ingredients, and that researchers are often reliant upon a motley array of sources including ancient pharmacopeias, village “wise people” and market tradesman. Clearly these will offer varying quality of information and all stake holders will need to work together to identify the potential of new plant materials. One of the big difficulties is that many traditional remedies have numerous component plants (sometimes over 30), which makes isolating the active compound difficult. More confusion arises when different villages might call a medicine by the same name, but the plants used vary from locality to locality.

With this in mind, Professor Cordell briefly talked about the potential use of new technology out in the field to speed up analysis, such as portable GC.HPLC.MS, Raman spectroscopy, FTIR or the employment of drones with hyper-spectral imaging. All these are possible and would definitely facilitate the job of modern-day medicinal plant-hunters, enabling them to locate the plants with the optimum chemical content and then see how the specific local environment has affected these levels.

Like Dr Wijesekera, Professor Cordell stressed the need for collaboration in order to support a sustainable industry; he felt this particularly needed to be encouraged within academia, where individuals often work alone or in small local teams. Integrated technology should also form an

integral part of the way ahead for ecopharmacognosy to support systematic testing of traditional materials in order to characterise them with a view to in vitro and in vivo testing, ultimately culminating in human trials. I found Professor Cordell’s presentation highly informative and felt that it covered the issues affecting the industry comprehensively. Although ecopharmacognosy falls at the periphery of the traditional aroma trades, despite the centrality of naturals in our business, it is important to note that several compounds from spices and essential oils have been identified and are now employed medicinally. Given the extent of the pharmaceuticals industry, this could well be a new venture for some organisations that wish to expand beyond the fragrance and flavour market, and continued leading edge research could well be warranted for nature’s treasure chest.

INDONESIA: CURRENT AND FUTURE MARKET DYNAMICS

Ravi Sanganeria, Ultra International B.V., LA Spijkenisses,
Holland and PT. Van Aroma, Jakarta, Indonesia



This fascinating paper gave a comprehensive overview of the various challenges facing the aroma trades in Indonesia. It is a nation that comprises of 18,000 islands and is thus highly susceptible to environmental changes which can affect the production of its core aroma products of clove, patchouli, nutmeg, citronella and vetiver. Climate change is a big issue, with 1500 islands anticipated to be lost by 2050 along with the main airport at Jakarta by 2030 due to rises in sea levels. Human impact on the environment is also great, with deforestation occurring at an alarming rate due to illegal logging. By 2050, it is projected that at the current rate, 30% of forests in Indonesia will be lost. As Indonesian aromatic oils are so crucial to the business, these issues could have a major impact upon the industry as a whole.

In addition to environmental factors, a number of socio-economic factors also affect production. The currency is particularly volatile, sometimes swinging by as much as 20% in a week; this substantial variable will affect export profits in the aroma trades (these contribute over \$500,000,000 to the Indonesian economy). Corruption

is unfortunately also a significant factor for farmers and processors, many of whom have to self-finance⁵.

The paper then looked at the five main aroma crops to see how all these issues might affect the quality and quantity produced and whether these crops were primarily used for the domestic market or exported for the global market. Here, I will only discuss two. The production of the largest volume crop, clove, is currently stable, however it is highly vulnerable as it is easily affected by climate. For clove cigarette production, undertaken by hundreds of very small producers for a largely domestic market, farmers are able to respond to potential shortfall caused by increased rainfall, by expanding the farming area given over to clove. Patchouli on the other hand, for which Indonesia is responsible for providing 90% of the global market, is far more agriculturally demanding, needing to be grown within a crop rotation system, due to soil depletion. In the last ten years, production has moved from the traditional growing zones in Java and Sumatra to the new area of Sulawesi. A key reason for this has been the increase in global demand for this important perfumery oil. However, the more acidic soil in Sulawesi has led to a less-desirable, more acidic oil. In addition, it is acknowledged that patchouli oil is far better quality if it is naturally aged. Due to high demand, however, this process is not accommodated even though the aged oil would command higher revenue, since it is more cost-effective to ship more of the less mature oil than store it.

In conclusion, it was noted that there were many challenges ahead for producers and brokers in the region: currency fluctuation, deforestation, logistics, climate change, product migration, market growth, new plantations and domestic demand. Only by planning ahead, working together and seeking expert advice, can the stakeholders in the region face the future and keep a secure supply for the global aroma trades that rely upon the key Indonesian oils.

BIOTECHNOLOGY, SUSTAINABLE FARMING AND AROMATIC CROPS

Nisha Shah, Fine Fragrances Pvt Ltd, Mumbai, India

Ms Shah gave a wide-ranging overview of some of the strategies being put in place to ensure a sustainable future for vital flavour and fragrance products, with a focus on biotechnology as a solution for some of the key environmental and farming threats to supplies.

The current market is often highly requesting, with more customers demanding 'Fair Trade', organic or sustainability credentials; a situation which is made more complex by a fall in the supply of certain high-value aromatic oils. Ms Shah outlined a number of factors that have affected output, including bad farming practices, poor trade organisation, climate change and indiscriminate exploitation of small-scale farmers by fertilizer and



Patchouli

pesticide manufacturers, leading to pesticide-resistant insects and infertile land.

There are numerous biotechnologies that could be options for improved production: -

- **Development of higher-yield variants**
- **Development of stress-tolerant crops (e.g. drought-resistance)**
- **Development of specific traits, such as oil-rich parts of the plant**
- **Cloning of endangered species**
- **Fertilizers that have secondary metabolites, which provide essential nutrients through proteins**
- **In vitro production of oil constituents**

A fascinating and important case study is that of patchouli, where the soma-clonal shreshta and samarth variants have been found to have a higher patchoulol content. An experimental micropropagation initiative has led to a variant with an increase in oil of 10-15% and a decrease in harvest time, both of which would confer benefits to growers. Sustainability credentials demand not only the development of better plants with higher yields, but also a reduction in fertigation and pesticide usage in order to lessen environmental pollutants.

Ms Shah gave some really concerning statistics about the eutrophication of the soil through commercial fertilizers; commonly 95% of these are not absorbed by the plants and through excessive irrigation leach nitrates into the wider ecosystem. Pesticides and fertilizers can enter the water system leading to worrying and dangerous medical conditions including cancer, nerve damage, hormonal imbalance and blue-baby syndrome. She cited the incidence of cancer in Bhatinda, Punjab and its links to the over-use of fertilizer and pesticides locally, giving very concerning statistics.

Potential solutions to these issues might be a move to organic production⁶ and the development of bio-



fertilizers, bio-insecticides and the use of fermentation technology, all without a decrease in yield. Hydroponic cultivation is another potential way forward with 70% less water used, a yield increase and a highly-controlled environment meaning only nutrients used by the plants are absorbed. Since it is a closed system, no environmental pollution is caused by excess fertilizers, which are simply cycled around thereby also reducing the quantity required. An interesting organic solution being pioneered is the pairing of fish farms with the growing of patchouli, where the fish excrement provides excellent fertilizer for the plants, and the plants 'clean' the water.

This presentation was truly fascinating, showing many solutions to the problems being faced by producers of key aroma products today. There was food for thought too, as the details about the deterioration of farming land and the effects of fertilizers and pesticides on key growing areas in developing countries and their populations were concerning. What is certain is that change must happen in order to supply the flavour and fragrance industry with traditional staple aromatic products.

THE POSITIVE IMPACT OF COLLECTIVE ACTION IN THE FIELD TO SUSTAIN THE SOURCING OF NATURAL INGREDIENTS FOR THE BEAUTY INDUSTRY

Catherine Peyraud, Natural Resources Stewardship Council (NRSC), Grasse, France

This exciting presentation highlighted an initiative that has brought together world leaders in the beauty and aromatics industries. Although many of these companies usually compete against one another, in this stewardship circle they have joined forces to generate a positive impact on biodiversity as well as supporting the livelihood and interests of local producers of naturals.

The need for a sustainable future was a key theme running through the conference. The NRSC⁷ are actually going out into the field and sharing good practice with local

producers. This was illustrated by looking at the case study of NRSC's work on vetiver production in Haiti in 2012. The focus here was on enabling a fairer system for the growers and distillers by setting up local cooperatives and also educating growers in more sustainable farming methods. NRSC have enabled 600 farmers and three distillers/ exporters to set up six cooperatives in Haiti; this represents 25% of vetiver production in Haiti. The farmers are now using more efficient farming methods, leading to water conservation and less soil erosion. Two local initiatives have now taken over from NRSC and are continuing the good work.

This initiative is not only altruistic, although it is clearly beneficial to those in developing countries who can profit from investment and the sharing of research and good practice, it is also ensuring a sustainable future for the industry. This is surely a goal that we all share; working with the wonderful array of spices and essential oils we enjoy in the aroma trades is not only a privilege, but it also carries with it a responsibility to the producers and the wider environment.



NRSC

NATURAL RESOURCES STEWARDSHIP CIRCLE

IMPLEMENT GOOD PRACTICES AND RESPONSIBLE SOURCING FOR THE BEAUTY INDUSTRY

5 See the review of the presentation by Catherine Peyraud on the NRSC initiative in Indonesia to address some of these issues.

6 As has been pioneered in the Indian State of Sikkim; see <http://indiatoday.intoday.in/story/sikkim-becomes-the-first-fully-organic-state-of-india/1/573654.html>

7 www.nrsc.fr

IFEAT STUDY DAY

**AT THE DASSANAYAKE WALAUWA CINNAMON PLANTATION,
KOSGODA AND THE HDEES EXTRACTS LTD CINNAMON LEAF
DISTILLATION PLANT**



It was with some trepidation and copious waterproof clothing that I made the 5.30am start to get to the Conference Hotel. We were promised an all-access tour of the famous Sri Lankan cinnamon industry from plantation to export-ready product. Cinnamon is one of my favourite spices: it has such an evocative smell that reminds me of comfort and indulgent baked treats that warm you on the coldest days of winter. I would generally say that the Sri Lankan climate could not have been more unlike a British winter with its wet heat and humidity and tropical rains; this winter in Britain has certainly provided the torrential downpours and mild climate, although not the 30°C usual in Sri Lanka!

The tour gave me an opportunity to leave the confines of Colombo, the commercial capital of Sri Lanka and view the wider world of the island in all its beauty, albeit through a curtain of rain. From the bus window, I got a real glimpse of everyday life with cows walking along the road, crazy traffic, with tuk-tuks everywhere and the lush green vegetation to be seen all around, even in urban areas. As we left the city limits, we could see more of the vast tea plantations and forests that cover much of the island along with a large variety of fascinating bird-life that populate the wetlands. Numerous herons and kingfishers with beautiful plumage were little splashes of colour or pure white against a sea of verdancy.

Our first stop was the Dassanayake Walauwa Cinnamon Plantation where we were greeted by a beautiful marquee and a large welcome banner. We were given a brief introductory talk about the plantation before being shown the various stages in the cultivation of top quality organic cinnamon trees.

The trees were grown in tight rows, with drainage ditches repeatedly dug between them in order to ensure water-logging of the trees did not occur. We were shown how the trees were coppiced, rather like hazel trees, to encourage new shoots to come up from the base of the tree thus ensuring that the inner bark needed for the spice is of the





best quality. We were also shown how the shoots were harvested. When they are a certain length they are cut on a slant preventing any flat surfaces succumbing to water-related issues like fungal infection. The plantation does not use any pesticides or herbicides to preserve the quality of the cinnamon bark and associated oil or to sustain the ecosystem. This necessitates constant intensive weeding by the employees – a continual battle in a climate that fosters plant growth at a fast rate. There were numerous insects living on the cinnamon trees that leave small marks on the leaves from their activities but have no effect at all on the spice or the cinnamon leaf oil – a secondary product from these fragrant trees.

Near to the cinnamon trees we were shown a coconut plantation where they were intercropping, using Sri Lankan pepper, which is an initiative that has been going on for the last 12 years. The plants are beginning to fruit now and provide a second stream of income for the plantation, offering distinctive Sri Lankan pepper, which differs from the more common Vietnamese variety and even those grown in nearby southern India due to the unique microclimate enjoyed locally⁸. The introduction of a new commodity is not the only benefit for the plantation. The introduction of pepper to the local ecosystem has been shown to increase the productivity of the coconuts by 20%⁹ and provide a substantial improvement in soil fertility. This is undoubtedly a benefit to both the environment and to the plantation owners, as greater diversification not only fosters a more healthy ecosystem, but also spreads the economic base for the proprietor who no longer needs to rely on only one cash crop.

We then moved on to the Dassanayake Walauwa Residence, the traditional home of the plantation owner. The 19th century residence was very grand, with numerous bedrooms and certainly more luxurious than most of the private residences I had seen. There was a beautiful courtyard and a large traditional kitchen that gave a flavour of past grandeur.



Cinnamon tree showing coppicing



Next to the residence was the cinnamon processing plant, which was constructed in the early 21st Century to better accommodate the workers, ensuring they had a safe and dry place to undertake the painstaking cinnamon bark peeling process. A number of workers demonstrated the meticulous task of first removing the outer bark without damaging the fragrant inner spice-rich bark. A second group of skilled employees then stripped this inner bark creating the characteristic cinnamon quills. The quills would then be dried before being trimmed down to the shorter lengths we are all familiar with. As we left the facility, we were given a gift of premium quality cinnamon by the family before leaving for a distillation plant.

The nearby cinnamon leaf distillation plant is one of a network run by HDDES Extracts (Pvt) Ltd.. Although the company also own a state-of-the-art modern distillation plant, we were taken to a traditional still set up in the middle of the low-lying jungle, which gives work to a number of locals. In this facility, cinnamon leaves are

distilled to extract the essential oil which has a high eugenol content, and is similar in smell to clove rather than cinnamon. The leaves were crammed into a wooden vat and the workers compacted them with their feet and then sealed it with clay. A fire was then set in a large clay-surrounded furnace with nothing wasted as it is fuelled by the leaves that have been used in previous distillations. The oil is then distilled into a sequence of ever-smaller stainless steel receptacles. Whilst there, we were treated to coconut water straight from the fresh coconuts and it was nice to meet some of the employees, who were really friendly and welcoming.

We were then taken to a rather sumptuous beach-side hotel for an excellent meal; this served as quite a contrast to the simple existence led by most of the local employees of the two facilities we had visited. However, it was good to see that in a high-tech industry there is still a place for traditional methods and in fact it is difficult to better them in some instances. Certainly from an environmental and sustainability point of view, both the plantation and the distillation plant had an eco-friendly agenda at the forefront and good practice was being employed. I am very grateful to the local IFEAT organising committee in conjunction with local tour provider Walker Tours for arranging such an informative excursion. Thanks must also go to the Dassanayake Walauwa Plantation and HDdeS Extracts for opening their facilities to us and making us feel so welcome. I learned a great deal about the cinnamon industry and will certainly be mindful of how much effort has gone into the cinnamon I use so frequently in my kitchen.

8 Pepper is one of the four essential oils featured in the ICATS learning material put together for our students by Dr Brian Lawrence, an expert in the field.

9 Senevirathne, Shantha, 2011, *Productivity improvement by pepper as an intercrop in tea and coconut*, Report of 36th Peppertech meeting, Senggigi, Indonesia



Processing the Cinnamon



Leaves showing insect damage



Employee weeding between the trees

MEET AN ICATS TUTOR:

JOANNA NORMAN

Joanna has spent over 30 years working with fragrance and was originally trained by top five flavour and fragrance house IFF, in both London and Paris. Her professional background includes all aspects of fragrance development, marketing, sales and training. Fascinated by the relationship between the two luxury industries of fashion and fragrance, Joanna researched this link at the Royal College of Art completing an M.Phil. in 2000. Joanna is founding Director of fragrance consultancy, Pandora Ltd, a Senior Corporate Trainer and Visiting Lecturer at Kingston, The University of the Arts, London and Southampton Universities. She is currently the chair of judges for the Jasmine Awards and member of the Fragrance Foundation Education Committee, pioneering the use of the sense of smell in primary schools. She is very much looking forward to tutoring on the ICATS diploma course - an enterprise which embodies her passion for both perfume and education.

Married with 2 sons, she spends her time between the UK and France enjoying the proximity of an abundance of rose, jasmine and lavender.



ICATS INTERMEDIATE PERFUMERY WORKSHOP

IFEAT CONFERENCE SRI LANKA, SEPTEMBER 2015

Following in the illustrious footsteps of Tony Curtis and John Ayres, Joanna Norman, founding director of fragrance consultancy Pandora Ltd and previous vice-president of IFF, ran an interactive fine fragrance workshop exploring perfumery trends in terms of raw materials (both natural and synthetic), accord strategy and multi sensory appeal. She was more than ably assisted by the experienced Sharon Heard, who provided invaluable support.

The day was divided into four sessions culminating in a 'create your own fragrance' exercise. The underlying theme of the workshop was communication, the workshop objectives not only included perfumery development but also how to expand one's vocabulary to describe fragrances and ingredients as well as be able to create a memory bank of odours. The outcomes for the participants, who ranged from aroma chemical and natural oil suppliers to trainers and perfumers, would be improved general knowledge of perfumery and better communication skills of their products or creations with their clients, colleagues and consumers.

ODOUR LANGUAGE AND FRAGRANCE INGREDIENTS

In the first session Joanna introduced a hands-on exploration of all the senses using coloured pens, a variety of textured fabrics and sounds, examining how they relate to the sense of smell by the shared emotions they evoke. Following the accepted fragrance ingredients' classification of 16 Odour Groups, an example from each category was evaluated and described using the participants' extended sensory vocabulary.

FRAGRANCE ACCORDS, CREATIVE DRIVERS AND KEY TRENDS

During the second session Joanna described how fragrance ingredients are the building blocks of perfumery creation and are blended to form 'accords', the cornerstones of the perfumery family classifications. The citrus cologne, floral, floral aldehydic, fougère, chypre, oriental and gourmand accords were explained and demonstrated using scent strips. Examples of fine fragrances of each accord launched over the last century were evaluated to convey their olfactive connections. During the afternoon, Joanna's third session guided the group through the key drivers of fine perfumery and how they influence fragrance trends in all categories from niche perfumery to household products.

FRAGRANCE CREATION

Armed with knowledge of the perfumery creation process and the current trend for distinctive woody fragrances

in feminine, masculine and shared fragrances, the participants created their own woody accord. Natural and synthetic oils were provided including natural oud, which is currently found in many fine perfumery ranges, (a plantation-grown agarwood artificially infected with fungus was supplied by Asia Plantation Capital Essentials), and Clearwood, a soft, clean version of patchouli recently launched by Firmenich. The participants could keep their accord as a fragrance in its own right or add it to a fragrance oil which had been created without a woody background to provide a rounded Eau de Toilette on a contemporary theme. Each participant took home a fragrance of their own making and handouts on an ICATS USB stick.

ACKNOWLEDGEMENTS

Very many thanks to Peter Whipps at JC Buck who provided the oils, Marianne Martin at AFF who created the fragrance to 'top up' individual formulae and Link Natural in Sri Lanka who made up the solutions for the creation exercise.



MEET AN ICATS STUDENT

SHRUTI RANGA



Shruti has just completed her ICATS Diploma. She is a graduate of Engineering from Mysore University and currently works as a Perfumer and in Research and Development.

"I have been working at NR Group for eight years as a perfumer. NR Group is India's leading incense manufacturer and has also forayed into related home fragrance products. I am responsible for raw material sourcing, new ingredient identification/ evaluation as well as fragrance creation.

The ICATS diploma programme gave me good insight of both the management as well as the technical aspects of the Aroma Trade industry. The programme was well-structured and the content was easy to understand yet vast in many ways. The knowledge I gained will surely benefit me and I am grateful to have completed the diploma on schedule while working."



ICATS ON THE ROAD

DR CURTIS AND DR GREEN VISIT THE UK INDUSTRY

ALI GREEN



Ali with Matthew Williams

In the summer of 2015, Tony Curtis and I embarked on a short tour of the aroma trades industry in the UK. We wanted to meet a wide cross section of people in their workplace to gain an up-to-date picture of who we are providing the course for and any additional areas where they might need educational support provided by our distance learning programmes. It was also a fabulous opportunity to touch base with many current, former and potential students and to receive feedback from them about the learning materials we provide.

The first leg of the journey took us from Plymouth to Bury St Edmunds. We visited nearby Haverhill to see the aroma chemical site run by IFF where we were hosted by ICATS student and British Society of Perfumers committee member Matthew Williams. He gave us a great introduction to IFF and their numerous sites around the globe. IFF are one of the largest producers of flavour and fragrance materials in the world and their facilities are testament to their expertise in efficient yet green production that conforms to the stringent regulations in the many countries in which they manufacture and with whom they trade.

Following Matthew's presentation, we donned hard hats and high visibility jackets to walk around the state-of-the-art chemical plant. It was very noticeable from the outset that the high-tech nature of the facilities meant that very few staff were needed to run the Haverhill plant. The safety mechanisms in place were incredibly thorough, ensuring minimal if any environmental impact with their own water cleansing reservoirs on site. The plant was impressive in size, with a huge number of chemical storage tanks and distillation towers all controlled by a central computer system to optimise production. The site produces both flavour and fragrance ingredients in bulk and wherever we went, we were immersed in a different aroma, depending what was being produced in that area.

After a busy morning, we drove the short distance to visit Treatt, a firm that can trace its history in the aroma trades back to the nineteenth century. We were very kindly hosted by Vince Skeels, then Technical Support Manager at Treatt, who introduced us to Karen Cocksedge and Luke Mardellis, employees that are current ICATS students. It was rewarding to spend time talking to them over lunch about their learning experiences and educational needs. Vince also gave a really interesting presentation on the diverse range of products produced by Treatt as well as the charitable work that they are involved in supporting a village in Tanzania and promoting sustainable oil production in Kenya.

After lunch, we donned hair nets (with Tony also sporting a beard snood), overalls and steel toe-capped shoes for a tour of the large site comprising of several large industrial buildings and laboratories. Treatt produce a wide range of products for the fragrance and flavour industry, both natural and synthetic, but specialise in naturals, including a wide range of top quality organic oils and their trademark Treattarome® natural products which use a special distillation process to encapsulate maximum flavour. Compared to the production of massive quantities of aroma chemicals, it was interesting to see the far wider range of smaller production levels at Treatt, who cater for many different types of clients from large manufacturers to



Ali with Beverley at CPL

individuals. We were shown a range of distillation facilities, some offering highly specialised technology as well as excellent QC and R & D facilities. I was fascinated to see Karen's work in the lab devising new flavour ingredients for an array of beverages and a micro-brewery set-up and to see the ICATS learning material on the shelf, where she could refer to it whilst working.

After a very enjoyable day, we travelled south down the motorway for the next part of our trip to visit CPL at Barrington Hall, near Bishops Stortford the following day. We were shown around the facilities by Perfumer and

Creative Director Ange Stavrevska, who has established a fine career at CPL and contributed to many successful products, including a fragrance for the Queen! Barrington Hall is the international headquarters for CPL and not only houses the administrative centre, but also the creative and marketing hubs for the business. To describe the Hall as impressive would be an understatement; it is a typical British stately home, complete with gardens and a fabulous entrance hall and reception area with a beautiful decorated ceiling and massive wooden panels everywhere.

It was really interesting to see how this historic building housed state-of-the-art laboratories and testing facilities for personal care and laundry products in what would have originally been bedrooms, servants' quarters and kitchens. Many of the offices were in grand rooms featuring copious original features and it seems a fabulous environment in which to be creative. Despite the historic backdrop, however, it was obvious that analytical techniques form a vital aspect of the perfumer's craft today and that hard science with highly rigorous testing were at the core of all new product development. The marketing team are also well-positioned to work with the creative perfumery team here to look at new trends and markets that are opening up in the aroma trades. It was heartening to hear some great stories about former ICATS students and learn how well their careers have progressed within the industry.

At the end of the morning, we then travelled up to Brixworth in Northamptonshire where we were greeted for lunch by Beverley Bayne, a Senior Perfumer at CPL with a wealth of experience in the industry. Beverley had organised a comprehensive tour around the facilities which enabled us to see what life in a highly technical modern fragrance compounding plant was like. We met many of the Perfumers and QC personnel, some of whom were current or past ICATS students. It was clearly apparent that traceability and quality were of key importance. Speaking to those whose job it was to check prices, availability, quality and alternatives for aroma ingredients really demonstrated what complex products are created. The creators are not only accountable to their clients and subject to a volatile global supply network, but are also subject to ever-more-rigorous regulation; this



Ali with students at Treatt

task is becoming increasingly challenging! There are so many parameters to consider for each chemical that it is a constantly-shifting playing field.

We visited the compounding area and saw the cutting-edge digital technology used to create large orders. Chemicals are mixed from a computerised pick list, accurate to a drop. There was also a version for small orders in its own room, which enabled us to see the process far more easily – hundreds of tubes from numerous containers, some in cold and hot storage fed into the machine to put together any compounding order sent via computer. This machine was often used for the small samples required by the perfumers in product development or to send to clients. Some of the quantities were tiny, yet still absolutely precise: a triumph of engineering. We also met some of the R and D staff and learnt about some of the exciting new products under development, some of them were so clever and look as if they will be truly groundbreaking.

Over the two days that we visited these four sites, we were welcomed with open arms, a real reflection of the big family that is our business. I would like to extend our sincere thanks to IFF, Treatt and CPL for hosting us on this memorable tour. I thoroughly enjoyed myself and learned a massive amount about our industry and where it

is going in the future. It was so worthwhile for us to meet our students and to ask them what they need from us and what they thought about our learning material. We hope to be undertaking more visits in the future and are always interested to hear about what the industry would like from ICATS. Please don't hesitate to get in contact with any suggestions.



Ali with Ange at CPL

**IFRA UK
5TH FRAGRANCE FORUM
ROYAL SOCIETY (LONDON) OCTOBER 2015**

OUR FRAGRANT WORLD

TONY CURTIS

2015 has been another vintage year for conferences and symposia. The spring was marked with the outstandingly successful British Society of Perfumers Workshop Weekend. The feast continued with the BSP New Materials for the Perfumer Symposium and the British Society of Flavourists Symposium. Dr Green reports on the industry's global event the IFEAT Conference in Sri Lanka. As the threat of winter gloom descended the 2015 season closed, as always, with the IFRA- UK Fragrance Forum at the world renowned Royal Society providing a suitable high-note ending. This year's theme was *Our Fragrant World*.

from around the world with studio backdrops such as the New York skyline. The BBC World Service (radio) is not able to do this on air. However, it has turned this disadvantage into an audience participation opportunity for soundscapes. Listeners send in their recordings of typical sounds that typify their locality and time of day. Alex opened his excellent presentation with

"Don't judge cities by the skyline. Forget the Gherkin (a new skyscraper in London), or the Angel of the North [a large steel sculpture in the North of England] and make way for the fried-chicken takeaways and flat white coffee. Welcome to the 'aromascape'."

It is the 'aromascape', not our visual senses, that has helped form our cities is the proposition. In the last Newsletter I referred to a classic perfumery book that covers some of the historical context *The Foul & The Fragrant: Odour and the Social Imagination* by Alain Corbin (Papermac, London, 1996, ISBN 0 333 65658 X). As always the news is mixed, estate agents suggest that a local florist adds 2% to the value of a property and a fried-chicken takeaway can do the reverse, reducing the price by more than 25%. When our Diploma participants come to ICATS Module 8 on Marketing, they are introduced to the service-extended marketing mix. The four classical product mix elements (the so-called the four Ps) are: Product (in benefit-orientated terms), price (in value terms), place (physical distribution, promotion (communication)). However, much of what we consume are services (like a restaurant) and for these, three other 'Ps' are needed to direct the Marketer: people (the welcome from the celebrity chef), process (that discrete personal service - always remembering your name) and physical evidence (a delightful concoction of coffee odour – not stale cabbage – with subdued lighting and appropriate music). Noise as well as stale fried chicken can be an issue with housing. A side-effect of the soundscape perceived nuisance is the drop in numbers of small live music venues in London as local residents oppose licence applications. Alex added to our stock of examples of how odour can impact on the marketing mix: welcome to the 'aromascape'.



Dr Alex Rhys-Taylor

If delegates were feeling a little sleepy after an over indulgent English breakfast, Dr Alex Rhys-Taylor (a sociologist from the Centre for Urban & Community Research at Goldsmiths College, London) woke us up with a riveting account of the effect of food smells on house prices. There is only one thing you can expect from the Fragrance Forum: it will surprise you!

BBC Radio has introduced two new features which are novel. At 5:55 am on Radio 4 (a UK national news and speech radio channel) you can be awoken by *Twitter of the Day*. This is a short 2-3 minute interlude of a specific bird-song (from anywhere in the world) with a few words of explanation. A rather atmospheric alarm call! The BBC World Service has taken this even further. On the BBC World News TV programmes they profile their interviews



Professor Jonathan Reiazar continued an enthralling first session with *Detecting Disease – The Pathological World of Smell*. He also revisited some of the areas covered in *The Foul & The Fragrant*.

He commented, “Religion is one topic where such an approach has dominated with good smells regularly associated with heaven and hagiographies, and bad smells effectively demarcating sin and Satan.” He then continued to discuss modern issues in the association of odours and health.

In the second session, Dr Mar Moss (Head of Department of Psychology at Northumbria University) presented his research on how modest improvements can be made in memory with his lecture *On the way to Scarborough Fair: Memory and Mood Effects of Rosemary Aroma*. If this was of academic interest Tim Nancholas of Kantar WorldPanel considered the practical marketing aspects with his lecture *How Fragrances Influence Shopper Behaviour*.

For me the show-stopper was the ever-effervescent and enthusiastic Lizzie Ostrom with *Forgotten Fragrance Storytelling*. I do not have space to develop her

contribution here, but if you get the chance do go to hear her speak and do read her new book *Perfume a Century of Scents* which is reviewed elsewhere in this ICATS News Letter.

Coming from the West Country of the UK, the home of Plymouth Gin, I was enthralled by Bob Fowkes (Director and Co-founder of Brockmans Gin) with *Message in a Bottle – Telling a unique brand story with an innovative aroma and taste profile*, the last presentation of the day. With any quality gin, the secret is in the use of the best botanicals and for Brockmans, these include Valencian orange peel and juniper berries from Tuscany. This is another textbook marketing example of getting the product right (flavour) and the brand right with meticulous attention to the appropriate packaging and branding.

As always we left the Royal Society having been informed, educated and very well entertained! This report for the News Letter is, of necessity, brief and has to be selective. A more complete report may be found on the IFRA UK website.



Lizzie Ostrom and Bob Fowkes



Bob Fowkes

THE BRITISH SOCIETY OF PERFUMERS ONE-DAY SYMPOSIUM

NEW RAW MATERIALS FOR THE PERFUMER

JOHN AYRES



Caroline Allen



White Jasmine



Sandalwood

The 33rd One-Day Symposium was held on 21st May 2015 at Whittlebury Park, Towcester, with over 130 delegates and presenters registered to attend. Six companies participated in demonstrating their raw materials: PFW Aroma Chemicals, DRT Chemicals, Givaudan, Nactis, IFF and Solvay.

The symposium started with a fascinating talk by **Caroline Allen** on *The Role of Artificial Fragrances in Olfactory Communication*. Caroline is an evolutionary psychologist conducting post-graduate research as a PhD candidate at the University of Stirling.

Some insights from Caroline's presentation:-

Olfaction in animals communicates reproductive potential, competitive potential and compatibility. Recent research data from the past 10 to 15 years indicates that olfactory communication in humans signals ovulatory status, personality traits, state of health, emotional state, kin recognition and immunity profile. Human body scent profile is linked genetically to MHC profile – major histocompatibility complex also referenced as HLA, human leukocyte antigen, which encodes the immune system in humans. Women are generally more odour-sensitive than men because they bear a higher cost in reproduction. In other words, they are choosier!

Using classical deo-panel protocols, Caroline's research studies are investigating the effects on human olfactory

communication of wearing fragranced products. Research studies designed to investigate whether fragrance masks or enhances olfactory discrimination in the choice of a potentially suitable partner indicate a significant correlation between fragrance choice and MHC profile. The directions of the current study are to define MHC profiles and their effect on body odour in order to link these with individual fragrance choice. The overall objective is to map the three elements - MHC profile, body odour and fragrance type - to create a unifying multi-dimensional correlation.

FRAGRANCE INGREDIENT PRESENTATIONS

Today's creative perfumer faces the challenges of increasing and often wildly fluctuating raw material costs, progressively lower fragrance briefing prices and increasingly restrictive regulation of ingredients, as well as short briefing deadlines. The challenge for the fragrance ingredient supplier is to develop new materials with high odour value and to demonstrate well-known materials used in new creative contexts. This year's presentations showed one or two significant new natural raw materials, and re-introduced some established aroma chemicals.

PFW AROMA CHEMICALS

Paul Hodges gave an entertaining presentation, supported by perfumer Achille Riviello, around the theme of their latest film starring Pierre the Perfumer, "Fragrancestein – Building a Better Monster". The "monster" was a powerful creation with an overdose of skatol. Achille demonstrated

a successive animation process by the use of five PFW replacement ingredients with high odour value: **PFW® Cyclofloranol, Iriswood, Isojasmone T, Cyclomyral and Sagecete**. The resulting composition developed a clean freshness, while maintaining the power and complexity of the original.

PFW® Cyclofloranol is a new introduction with a complex floral/aldehydic odour profile.

DRT CHEMICALS

Presenting for the first time at a BSP ODRMS, DRT demonstrated two woody-amber ingredients in various formulations:-

Sylvamber®

A new, rather expensive, amber-woody material based on a variation on the isomer ratio of Iso E Super, with high odour value.

Fixamber

A spicy-woody amber note with dry tobacco, hay-like characteristics, known as Trimofix.

GIVAUDAN

The Givaudan presentation explored and expanded the perception of green notes through three ingredients:

Spirogalbanone® Pure

A powerful, stable and highly substantive green galbanum note with fruity, pineapple facets.

Pharaone® 10%/DPG

A new fruity, green note that adds value and powerful natural aspects to a wide range of fragrance compositions.

Viotril ABQ5770M

A powerful, green speciality base, built around a captive Givaudan ingredient, signalling characteristics of orris, violet leaves and cucumber.

NACTIS FLAVOURS (SYNAROME)

Synarome has been part of the Nactis Group since 2006. Their presentation featured the "Passiflora" collection of nine specialities.

alpha-Amylcinnamaldehyde diethyl acetal

A floral jasmine note with red fruit qualities, adding green, juicy, natural characteristics to a strawberry formula demonstrated in shampoo.

Guaiacwood acetate

With its rosy and spicy accents, this product adds warmth and naturalness to a range of compositions.

Ethyl nonanoate

A tropical fruit note with rosy nuances and a wine-like effect demonstrated well in a pineapple shampoo formulation.

Isobornyl methyl ether

A complex woody, green, camphoraceous note that enhances the fresh fruity (apple) character of a shampoo formulation.

Pop Corn 601800

Roasted cereal-like, with facets of caramel toffee and fruit, this speciality blends well with powdery and musky fragrances.

Tonka Bean 601693

A green, sweet Tonka bean absolute note with a soft woody-vanilla background.

Oudharome 601720 & Agarome 601775

Of these, Agarome was found to be the better approach to an agarwood accord.

Ambrarome Absolu

A gorgeous old favourite from Synarome, introduced in 1926 as an ambergris substitute and still going strong! Huge odour value at 1% dilution.

IFF

A highlight of the whole symposium was IFF's presentation of **Amber Xtreme™** ("Xtreme power, Xtreme performance"), demonstrated very creatively in a whole range of finished products from fine fragrance to household cleaner, with each product category displayed in a different themed room. This new material showed high odour value and versatility across all product categories and across a range of perfume types from amber to green apple.

Created in 2001 from research linking Galbanum molecules with an ether moiety, this must be one of the most significant introductions since Ambrocenide from Symrise. Olfactively, Amber Xtreme is more woody/amber.

SOLVAY

For their début presentation, the Solvay team showed two new materials and highlighted their **Augeo™** range of solvents from renewable sources, which can be used to enhance fragrance effectiveness and performance in modern air fresheners.

Rhodialtal® Original

An alternative to traditional sandalwood raw materials, imparting long-lasting, diffusive, natural-smelling sandalwood characteristics to a range of end-product formulations.

Rhovaniil® Natural

Created from natural raw materials (ferulic acid from rice bran) by a Solvay process, this ingredient is a good vanillin substitute.

This was, once again, a successful and valuable symposium, rounded off by dinner and the annual BSP Fragrance Awards.



ICATS' JOHN AYRES VISITS PLYMOUTH COLLEGE FOR A **FRAGRANCE CREATION EXERCISE**

It was a great pleasure to welcome John Ayres (the ICATS external examiner and one half of Pandora Ltd Perfumery Training) to Plymouth College in November. Very bravely, John had volunteered to supervise a creative session with a group of sixteen year olds at a local school; facing a lab full of teenagers can be unnerving, but John was as calm and enthusiastic as ever. The students had been selected from the top set in Science and were starting to think about subject choices and career options.

John gave a brief presentation about the olfactory system in the body and then outlined a few details about the industry. The main focus of the session was for students (and some enthusiastic chemistry teachers) to get 'hands-on' or rather 'nose-on' with some key perfumery ingredients. By working his way through a number of essential oils and aroma chemicals and giving out smelling strips, John introduced the idea of the aroma language to the students, using key terms like 'sweet', 'fresh' and 'woody'. It was obvious from this stage that the students were greatly enjoying this exercise and were really imaginative with some of the descriptions the scents provoked.

As a further challenge, the students then had to create their own lily of the valley scent, having been given a drop-by-drop basic formula, which they then had to modify with the aroma chemicals they had been given. The students really enjoyed this process and were genuinely surprised that just one or two drops difference of certain materials could completely alter the fragrance. Although there

were a few fragrances of dubious quality, it was clear that several of the group had an excellent nose for a balanced scent and they were all very pleased to be able to take their creations home with them.

This exercise only took an hour, but had the effect of planting a seed in the mind of young people which may lead to some of them considering our wonderful industry as an option. Although most teenagers are great consumers of fragranced and flavoured products, the creative scientists behind these are from a 'hidden industry' that does not feature in most career advice for chemistry. It would be enormously beneficial for the industry if more outreach of this kind could be undertaken globally in order to get the very brightest of the next generation interested in and engaged with the aroma trades.

John gives a talk on Olfaction



Students working on perfumes



The staff get involved

BOOK REVIEW

DR TONY CURTIS

Perfume: A Century of Scents

Author: Lizzie Ostrom

Illustrated: Cynthia Kittler

Published by Hutchinson

£16.99 (ISBN 978 009 195 453 6)

Contents

The Bountiful Belle Époque: 1900 - 1909

The Theatrical Teens: 1910 - 1919

The Roaring Twenties: 1920 - 1929

The Threatening Thirties: 1930 - 1939

The Insubordinate Forties: 1940 - 1949

The Elegant Fifties: 1950 - 1959

The Swinging Sixties: 1960 - 1969

The Spangly Seventies: 1970 - 1979

The Egotistical Eighties: 1980 - 1989

The Naughty Nineties: 1990 - 1999

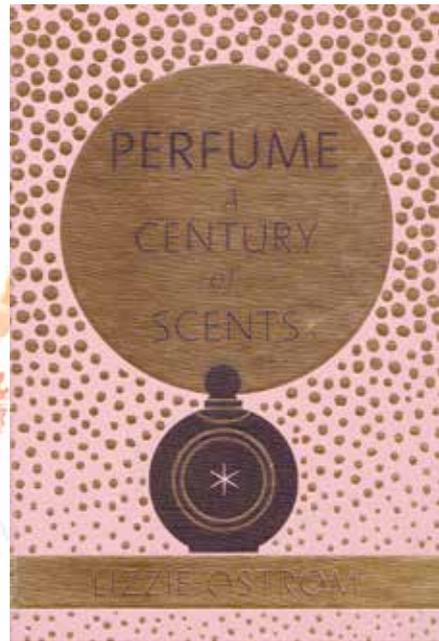


Where do you start to read this book? In my case, after the introduction, at the beginning! Of course for me this was the Swinging Sixties. In 1963 I moved from provincial England to a Bloomsbury college hall of residence. Appropriately for a University College (UCL) hall it was named after the founder Jeremy Bentham and located in an idyllic crescent in central London. This was the height of the swinging sixties with Carnaby Street the apparent centre of the universe. To me patchouli was the odour of the moment. It was a time of flower power, teenage rebellion and an explosion of creative talent. In our second decade of the 21st century with so much professional branding and marketing it is not easy to comprehend an un-branded movement. Lizzie captures this moment:

"It is very difficult to point to any one of this group of 1960s fragrances – which encompasses patchouli, musks and other aromatic oils – as exemplifying the Hippie Stink tradition. The very allure of these perfumes was in their unbrandedness and their presentation in little brown glass bottles with squiffily applied labels, put together in some makeshift premises, even better, imported from Nepal or Kashmir."

For me the charm was not only the odour and literally the scent of rebellion and anarchy but the sense of democratic accessibility. How different to the so-called 'artisan' perfumes of today which appear to be sold on from exclusive and expensive outlets. Lizzie sums it up so well with the *'...importance of real aromas for those reacting against the ideal nuclear family with its suburban house, fitted kitchens and convenience foods'*. Something accessible but not plastic!

For me the lifelong love affair of patchouli continued after leaving university. I joined a BBA research group doing fundamental research into the nature of essential oils. It had been discovered, with some surprise, that several essential oils had heterocyclic nitrogen compounds as significant contributors to their odour profiles (e.g. petitgrain oil). It was also reported that sesquiterpene-derived nitrogen compounds had been identified in patchouli oil. There followed a fun year of almost totally unsuccessful research in attempting to find an economic synthesis. However, at least there was a wonderful aroma of patchouli oil filling the laboratory. Fortunately for me, my work on another sesquiterpene iso-longifolene was more successful.



In the week that I started to write this review, a large folder arrived from my sister. A younger member of the family had spent several years researching the family history. I had a folk memory that my parents had got married after my teenage mother had eloped on the back of a motorcycle in the Roaring Twenties - every teenager thinks they invented love. However, if the 60s were swinging, the 1920s were no slouch! Thus my next dip into the wonderful collection was to that chapter.

With some trepidation Lizzie included Chanel 5 (1921) in her collection for this decade (her concern was what new take could be made). I have picked this fragrance out as it is 180° opposite to Patchouli. Slick elegance with one of the top ten brand names of all time is miles away from the chaotic anarchy of Patchouli! Ageing rock stars of the 60s and 70s re-release collections with titles such as '50 Years at the Top!' Well Chanel 5 is still a leading brand and now in sight of a century at the top.

What makes this book so lively are the little asides and anecdotes. I think we can all relate to this one taken from the Chanel 5 overview:

"At parties, when the subject of one's work comes up, new acquaintances will frequently roll up their sleeves with a daring look in their eyes and challenge: 'Guess what perfume am I wearing, if you can't get this one you're in trouble.' At which point their wrists or worse, their necks – are brought up to my face, a bit too close for comfort."

We have all been there! Lizzie very successfully brings her own take in a lively profile of this timeless fragrance. If you prefer a more academic review, then possibly the definitive account is given in the classic book *Perfume Legends: French Feminine Fragrances* by Michael Edwards. The joy of Lizzie's contribution is not only her writing style, but also the eclectic collection of fragrances she covers. Clearly it is good to study the classic great perfumes but to really get the 'scent of time' it is good to look at the quirky, possibly long-forgotten, contributions as well. Do buy this book, it is an affordable price: it will delight, entertain and inform you.

IN THE NEWS

TONY CURTIS

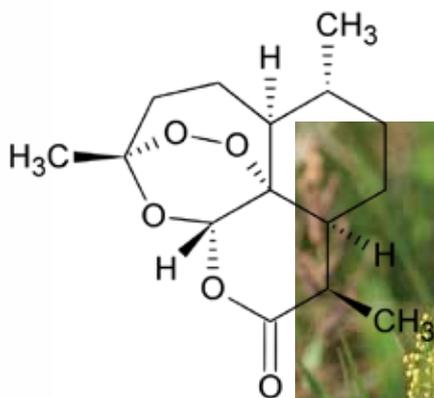
This section was written during the winter vacation. All my scientific and technical journals featured end of year seasonal editions. However, all is not what it appears. *Chemistry* (Royal Society of Chemistry) feature focused on food. More specifically *Well-tempered Chocolate*. When I worked



at BBA there was a whole floor of flavour application workshops. My guilty delight was to visit the confectionary one. Just how can such a lovely subject bring back painful memories! Well the answer is that painful part of chemistry, for many of us, the fiercely mathematical subject of thermodynamics. Do you remember your first experience of phase diagrams? In an earlier ICATS News letter we discussed the problem of Napoleon's army with tin buttons changing their crystal structure in the extreme cold of the Russian winter. This is just two phases. Just into the first paragraphs of this article and we are into 'Cocoa butter is a six-phase polymorphic crystal'. Many years ago I discovered that cocoa butter was a rather complex material but six-phases please!

In our discussions about sensory experiences in earlier News Letters we have mentioned that one sense (e.g. colour) can influence how we experience another sensory input (e.g. flavour). In food, the feel and texture in the mouth are an important part of the total pleasure. Who wants a soggy biscuit or a dry cake? It turns out what is needed for the chocolate experience is crystal form V, not IV or VI! Some crafty exploitation of kinetics and thermodynamics is needed to get your chocolate into this form. I had never realised that just like cheeses and wines chocolate needs some time (three or four weeks, not the years for wine) for a bar to mature, in this case to fully crystallise. Get it wrong and you may get some change to larger form VI crystals and this may result on a greyish bloom and loss of gloss of chocolate.

Translating the skills of a chocolate chef into a fast moving production line needs deep insight into the chemistry and precision engineering. When I next bite into a chocolate bar I will have some new respect!



Artemisia Annua

If the above topic was epically seasonal another major feature hit one of the hottest spots in terpene chemistry with *Molecule-making microbes*. Some recent IFEAT Conference papers have focused on bio-transformations and fermentation reactions. This article featured terpenoid molecules of medicinal importance. A major target was artemisinin which used to be extracted from plants but in a costly low yielding process. The elegant ability of bio-synthetic pathways to produce specific complex polycyclic molecules with precise stereo-specificity is clearly attractive.

One example took me down memory lane. This is the conversion of valencene (a sesquiterpene found in orange oil) to nootkatone (a grapefruit flavour). In the 1960's we had to produce a few hundred grams. We used an old company cook-book method (I suspect dating back to the late 19th century). We used stoichiometric tertiary butyl chromate. It was a rather dangerous process to prepare this reagent. You (very carefully!!!) dissolved chromium trioxide in anhydrous tertiary butanol. This is the challenge of the 21st century to replace dirty, dangerous and polluting processes with better alternatives. Sometimes this is a change of chemistry: the move from chlorine based processes to air oxidation for benzyl alcohol, benzaldehyde and benzoic acid is an example. The ability to engineer bio-process is going to become more and more important, after all our bio-ethanol for cars comes from fermentation. Pharmaceuticals and high end flavour and fragrance molecules are a clear targets, now firmly in the sight of the major innovative companies. Watch future papers from the IFEAT Conference to follow developments. As always do read around our subject.

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