

IUSSI, BRITISH SECTION

(International Union for the Study of Social
Insects)

SPRING NEWSLETTER, MARCH 2002

Editor/Secretary's Note

Dear Fellow Members of the British Section.

Since the last newsletter, we have had the opportunity to attend two very strong meetings: the **European IUSSI Meeting (25 – 28 September 2001, Berlin)** and our **Winter Meeting** organised in a new format by David Sumpter, **From Worker to Colony: Understanding the Organisation of Insect Societies (7 – 8 December 2001, Cambridge)**. I think that many of us enjoyed both meetings very much indeed. Here you could read the letters of thanks written to the organisers on behalf of all of us by the Section President, Francis Ratnieks. For our next Winter Meeting in December we are going back to the traditional venue, the Meeting Rooms of the Royal Entomological Society in London.

The next newsletter is due on 15th September 2002. I would be very grateful, if you could send me e-mail messages with items of interest to include in it: news of people, people moving, new people, travel adventures, new projects, new books, meetings, events, advertisements, suggestions, proposals, etc.

With best wishes for the spring and looking forward to seeing you in Sapporo,

Ana Sendova-Franks, 15th March 2002. WUE

Officers of the British Section of the IUSSI

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Meetings site <http://www.angus.co.uk/iussi/meetings.html>
Who's who site <http://www.angus.co.uk/iussi/whoswho.html>

Annual Winter Meeting Friday, 6 December 2002

Venue	Royal Entomological Society, 41 Queen's Gate, London, SW7 5HR
Organiser	Dr. Francis Ratnieks, Department of Animal and Plant Sciences, Sheffield University, Western Bank, Sheffield, S10 2TN, U.K. Tel: ++ (0)114 2220070; Fax: ++ (0)114 222 0002; E-mail: f.ratnieks@sheffield.ac.uk
Talks	Anyone who would like to give a talk, please send a title and short abstract to Francis Ratnieks by 1 August 2002.
Flyer	A flyer with the provisional programme and further details of the meeting is enclosed with this newsletter.

British Section Web Site

Remember to visit our web site and to send Angus Stokes your contact details. A copy of this newsletter will be made available on line at our web site.

Membership for 2002

Welcome to new members! We are always pleased to hear from people who would like to join. Please sign students, postdocs, colleagues, etc. I would like to remind those valued members who have missed to **renew their membership for 2002** to get in touch with our Treasurer. Even if you do not wish to renew your membership, please let Andrew Bourke know about it.

Sapporo 2002

Please note that the registration deadline for the **XIV International Congress of the IUSSI (28 July – 3 August 2002, Sapporo, Japan)** has been extended to 31st March 2002 for oral presentations and 20th May 2002 for poster presentations. The registration form and other information are available at the following web site: <http://iussi.coop.hokudai.ac.jp/>.

Dr. Stephen Martin (Sheffield University, e-mail: s.j.martin@sheffield.ac.uk), who has lived in Japan for seven years, kindly offered to supply more information on request.

Letters of Thanks on Behalf of the Section

Prof. Dr. Randolf Menzel
Neurobiology Unit, Biology/Chemistry/Pharmacy
Department
Free University of Berlin, Koenigin-Luise-Strasse 28-
30
14195 Berlin, Germany

3 October 2001

Dear Prof. Dr. Menzel

The British Section was well represented at the 2001 Berlin Meeting of the European Sections of IUSSI. At our business meeting it was unanimously agreed that we should thank you and your fellow organizers for arranging the Berlin meeting, which was a resounding success. As President of the British Section, that happy duty has fallen upon me. I would be most grateful if you would accept our sincere thanks on behalf of everyone, especially the Berlin team, but not forgetting the Scientific Committee, the German

Section of IUSSI, and all the others who contributed in many ways.

In particular, we would like to acknowledge the tireless efforts that you and Eva Rademacher and your team, especially Mary Wurm, put in. We would also like to acknowledge your initiative in proposing the meeting. Following the lead of Johan Billen 10 years ago in Leuven, and now the Berlin meeting, I firmly believe that European-wide meetings have an important role to play in IUSSI and that we will see many more such meetings. There is no doubt that within Europe we have enough people and high quality science to fully justify such meetings, as the Berlin conference has so convincingly demonstrated.

yours sincerely

Francis Ratnieks
President of the British Section of IUSSI
(International Union for the Study of Social Insects)

Dr. David Sumpter
The Isaac Newton Institute, University of Cambridge

11 December 2001

Dear David

From Worker to Colony: Understanding the Organisation of Insect Societies, 7th and 8th of December 2001, IUSSI British Section Annual Winter Meeting, Isaac Newton Institute, Cambridge, UK

This is just to express the thanks of all who attended, and in particular the officers of the British Section of IUSSI, for your efforts in conceiving, funding and organizing such an excellent meeting. I was impressed with so many aspects of your efforts

Professor Sir John Kingman, FRS
Isaac Newton Institute for Mathematical Sciences
20 Clarkson Road, Cambridge, CB3 0EH, U.K.

11 December 2001

Dear Sir John

From Worker to Colony: Understanding the Organisation of Insect Societies 7th and 8th of December 2001, IUSSI British Section Annual Winter Meeting, Isaac Newton Institute, Cambridge, UK

This letter is to express the thanks of all who attended, and in particular the officers of the British Section of IUSSI, for the support of the Newton Institute in hosting and funding what was truly an excellent meeting. I was most impressed with all aspects of the assistance that the Newton Institute provided. Clearly, the building itself and the

that it is hard to know where to start. But these include your care and attention to detail, your ability to provide a program of excellent speakers, and your success in attracting a broad audience from many countries and from a wide range of disciplines, including the all important mix of biologists and mathematicians. With postdocs such as yourself, who are willing to "make things happen", I feel that the future of interdisciplinary research in the UK involving social insects is a bright one. I also look forward to the spinoffs of the interdisciplinary contacts that will undoubtedly have been generated.

yours sincerely

Francis Ratnieks
President of the British Section of IUSSI
(International Union for the Study of Social Insects)

philosophy of the Institute are ideally suited for hosting such meetings. But there are many other things that help turn a good building into a great institute. In this respect, it is a pleasure to report on how friendly and helpful all the staff were (for example, the reception desk and the lady who makes the tea), with care taken in both the small things as well as the big things. It is also a pleasure to report that the meeting was a great success in scientific terms, as were the pre-meeting sessions organized by Dr. David Sumpter. The meeting attracted participants from many countries and from a wide range of disciplines, including the all important mix of biologists and mathematicians. I am certain that many existing interdisciplinary contacts have been strengthened and new ones generated.

yours sincerely

Francis Ratnieks
President of the British Section of IUSSI
(International Union for the Study of Social Insects)

News from Social Insect Labs in the British Section

Team:: Antzz, University of Helsinki The Helsinki group has moved and is getting used to new surroundings and the steel and glass architecture of our new facilities (find new address below). The group composition is slightly changing also: Marianne Elias, who has spent a post doc year with us is moving to Oulu to work with Pekka Pamilo. Her project continues to deal with polydomy and polygyny in *Formica* ants and she will still be closely associated to us and doing her fieldwork in Southern Finland. Christine Johnson left Finland and is now working as a post doc in Leuven. We are also waiting for Cathy Liautard from Lausanne to join us in Helsinki as our new post doc, working on population genetics of *Formica exsecta*. As for our native finns, Perttu Seppä returned from Uppsala and is currently sharing his time as a lecturer at the department, and as a lab coordinator in the Molecular Ecology and Systematics laboratory. Besides, he is pursuing his population genetic studies on various ant species. Kalle Trontti, who finished his MSc in the autumn, is headed for Southern France to collect *Plagiolepis* ants for his PhD work on social parasitism and population structures, Minttu Hannonen is busy writing her thesis (to be defended in the autum). Katja Bargum is finishing her MSc and planning a PhD

starting in the autumn. The rest of us are eagerly waiting for a new field season with projects on colony founding in *Lasius niger* and *L. flavus* (Vienna Setälä), worker fertility and egg laying in various *Formica* species (Heikki Helanterä) and reproductive strategies in *F. truncorum* and *F. exsecta* (Lotta Sundström). **New address for the team: Department of Ecology and Systematics, P.O. Box 65, FIN-00014, University of Helsinki, Finland. Team::Antzz on-line: <http://www.helsinki.fi/science/ants/>. And the fax number: +358-9-19157694**

Heikki Helanterä

Institute of Zoology.... Rob Hammond has now left IOZ and since January has been working in his new post with the European Union Improving Human Potential 'INSECTS' network based in Laurent Keller's group at the University of Lausanne. Andrew Bourke and Rob plan to continue their work together on social evolution in the polygynous ant *Leptothorax acervorum*. Before leaving IOZ, Rob conducted a pilot study funded by RSPB on the population genetics of the scarce Scottish bumble bee, *Bombus distinguendus*. This was in collaboration with Andrew and Rhys Green from the University of Cambridge and RSPB. *B. distinguendus*, the Great Yellow Bumble Bee, is a Biodiversity Action Plan Priority Species. Once widespread throughout Britain, it is now almost entirely confined to the islands of the Inner and Outer Hebrides. In future, funding permitting, we aim to conduct an ecological and genetic study of this important species with a view to understanding and reversing the causes of its decline. In the same study, Rob also researched methods of non-lethal sampling of DNA from worker bumble bees. In October last year, Carlos Lopez Vaamonde and Will Koning joined Andrew and Bill Jordan as a NERC-funded postdoc and technician respectively. Carlos and Will are conducting behavioural and genetic work on queen-worker conflict over male parentage in captive bumble bee (*B. terrestris*) colonies. Meanwhile, Zjef Pereboom and Roselle Chapman are continuing with their projects on gene expression in bumble bee caste determination and the conservation ecology of London's bumble bees respectively.

Andrew Bourke

Copenhagen It's been a while since we updated the comings and goings in the Copenhagen group, but that's mostly because the social insect crew has been relatively stable during 2001.

Our major new addition has been **Michael Poulsen**, who joined us as a PhD student in September to continue his studies of caste differences in the defence of *Acromyrmex octospinosus* workers against parasites and pathogens. Michael is that rarest of all creatures in the Copenhagen group – a real Dane.

The other major change in the group was the departure of **Seirian Sumner** at the end of 2001. Sez has got a fellowship with the Smithsonian Tropical Research Institute in Panama, and is already over there, rearing *Polistes* wasps in her living-room for planned research on the genomics of caste differentiation. We're already missing her terribly.

In the next few months, our group will be expanding further, with the arrival at the end of March of **Kellie Palmer**, who will be the Copenhagen post-doc in the **BABE** network (see further details enclosed with this newsletter), and who'll be looking at honeybee genetic diversity, exploiting, amongst other populations, the native bees still found on the Island of Læsø (one of the nicest bits of Denmark, if you ever get a chance to visit...). We should also be gaining two new recruits for the *Maculinea/Myrmica* research group as part of the **MacMan** network (details enclosed), but who these will be remains to be seen, as the positions are still open for application – but not for much longer, so if you're interested, see the advertisement under **Job Vacancies**.

David Nash

Conference Attendance

The British Section of IUSSI supports student members by awarding small grants for conference attendance (for more details please visit <http://www.angus.co.uk/iussi/studentgrants.html> or see Autumn Newsletter from 15th September 2001). One of the guidelines for awarding these grants is that successful applicants must write a brief article about the conference for the Section newsletter.

David Hughes (Oxford)... The IUSSI (British Section) funds students to the value of £100 to attend conferences, and this scheme, if not generally known, should be, as it is a great help. I used this grant to partially fund my trip to the IUSSI European meeting in Berlin (September 25-29, 2001) where I presented a paper at the W.D. Hamilton symposium. The conference was a great success and consisted of 20 symposia and a well stocked poster display. Groups were well represented and came from places as diverse as Ireland and the Ukraine whilst non-European delegates came from USA, Australia and Japan. The huge benefit of such meetings for PhD students like myself is the ability to meet so many varied researchers. Being within an institution where I am the only one flying the flag for social insects (I study *Polistes* and their parasites) it was particularly useful to me. The talks were extremely interesting overall and particular mention must be made of the highly eminent plenary speakers which covered a very broad range from honeybee brains to social vertebrates.

Of course the conference had its downsides, which served to destroy my stereotypes of German efficiency. The problems, though light in retrospect, did provide much to talk about. Overall though, it was a great success which is attributable, I believe, to the small informal nature of such gatherings and the very warm response that social insect students receive. Such trips are to be highly recommended and the IUSSI's support to be commended.

Adam Hart (Sheffield)... Once winter tightens its grip, those of us who live in Sheffield start day-dreaming of sunshine, Caribbean coasts, tropical forests and rum coolers. Never ones to resist temptation for long, Francis Ratnieks, Tom Wenseleers and I left the grey and damp of a November in Sheffield to spend four weeks in Merida, Mexico. This beautiful and historical city on the Yucatan Peninsula is fast becoming a winter field site for the Sheffield lab – we spend last January there as well. The purpose of the trip was three-fold. First, we attended the second Mexican Stingless Bee Conference, where Francis and I gave talks covering our stingless bee research. The conference was excellent and although conducted mainly in Spanish we had the benefit of simultaneous translation – a bonus for those of us with only rudimentary Spanish. Second, we continued our research into stingless bees. I had intended to further my work on nectar transfer behaviour (see Nectar transfer in stingless bees, Hart and Ratnieks, *Ecological Entomology*, in press). In particular I was hoping to look at those bees within the nest that receive nectar from foragers. Some preliminary work at the beginning of last year had showed that there might be a functional equivalent of the honey bee's tremble dance in *Melipona beecheii*. However, local conditions were against me. The nectar flow was very late last year and there were no colonies foraging. Attempts to train bees to a feeder, as one might do with honey bees proved unsuccessful. Luckily, Tom's project, looking at queen-killing in *Melipona beecheii*, did not rely on local conditions and I was able to assist him in his research. About 20% of all emerging brood in this species are queens, and these queens are usually killed soon after emergence by workers. Together, we got some good data on the occurrence, timing and method of queen killing in this species. Our work will be supplemented with data gathered by researchers at the University of Yucatan, Merida and a paper written up over the summer. A final goal of the trip was to make a film in collaboration with Serian Sumner, then of the University of Copenhagen and now enjoying the forests of Panama courtesy of a fellowship from the Smithsonian Tropical Research Institute. Those of you who attended the TMR-Network meeting in Florence, 2000 may remember Serian's triumph with her "Short Film About Ants". We aimed to make a similarly entertaining scientific film about stingless bees. An important but often overlooked aspect of these bees is their importance as honey producers and in some parts of Yucatan local people still keep a number of species as "honey" bees. Not only is the honey valuable as a sweetener, but it has many putative health benefits. The techniques of apiculture and its importance in this area is something that we have been interested in since our last visit here and we were keen to record these things on film. With "Melipona-culture" dying out throughout this area the film we obtained could be an important record. Those of you going to Japan later this year may have the opportunity to see Serian's film if she has managed to find time to edit it by then. If not then perhaps it will be aired at the Winter meeting.

Overall our trip was very successful. We were the only Europe-based researchers to attend the Second Mexican Stingless Bee Conference and the talks we gave were warmly received. Our research will result in at least one publication, with an international collaboration between Sheffield and Merida. Through our friends and colleagues in Merida, we were able to visit and talk with a number of local people keen to share their beekeeping experiences and knowledge on film. This trip was partly funded by a travel grant from the IUSSI and I would like to take this opportunity to thank them for their financial support. I would also like to thank Francis Ratnieks, Tom Wenseleers and Serian Sumner for making the trip fun as well as worthwhile. Finally, I would like to thank those people who helped us in Mexico, in particular, Luis Medina-Medina, Javier Quezada-Euan, Carlos Echazarreta and everyone at the Facultad de Medicina Veterinaria y Zootecnia, Merida, Mexico.

Who is Doing What and Where

Adam Hart... After a successful viva with Tom Seeley in December, Adam Hart of Sheffield has now gained his PhD. He is continuing at Sheffield, with a post-doc focusing on reproductive conflict in *Dinoponera quadricaps*, a species of queenless ponerine ant from Brazil.

Getting Started

Dr. Dave Stevens... has just begun a three-year NERC postdoc working at UCL with Jeremy Field on 'Future fitness and helping in social queues'. This will entail long periods of fieldwork conducting experiments in Malaysia, with the aim of quantifying the direct fitness benefits for subordinate helpers when they inherit the dominant (egg-laying) position in small social groups. Prior to arriving at UCL, Dave completed a PhD and a postdoc at the University of Glasgow, where he worked on developmental trade-offs and resource allocation strategies in holometabolous insects (mainly caddis flies and butterflies). He says that his hobbies include roller-darts and collecting pencil sharpeners.

Sam Scholes... is starting a PhD under the supervision of Ana Sendova-Franks and Chris Melhuish at UWE, Bristol. The title is "Brood sorting in *Leptothorax albipennis*: from individual to collective behaviour". Sam graduated from the University of Sussex in Brighton with a neuroscience BSc. His degree has led to an interest in emergent phenomena, of which brood sorting is an example. In the future he would like to study the chemical aspects of stigmergy, with an emphasis on carbon dioxide as a cue.

Some thoughts on a recent trip to Brazil by Francis Ratnieks, January 2002

I have just returned from a two-week trip to the University of São Paulo, Brazil, where I was invited to give some lectures in return for a ticket and living expenses. My host was Prof. Vera Imperatriz-Fonseca, who is head of the bee laboratory (Laboratorio de Abelhas). My talks were well received and the audience seemed all to understand English. Most people spoke English well, and I had little need to exercise my rather limited Portuguese, although I tried to do so occasionally just to show that communication and learning other people's languages goes both ways. However, I am now inspired to work hard at learning Portuguese so that I can benefit more from future trips to Brazil. (I was fortunate to be invited on another expenses paid trip to give a plenary talk later this year.)

There are more than 100 colonies of 19 species of bees at the lab. But all are Meliponinae, or stingless bees. Unfortunately, stingless bees are only found in the tropics. Even though I am the veteran of 10,000 honey bee stings, and am practically immune by now, it was a pleasant change to study bees that cannot sting. Some of the species kept at the lab have other methods of defence, but these were mild in comparison. Some bite, and others just annoy you by trying to enter nose, mouth and other convenient openings.

The University of São Paulo is impressive, being in a campus of 9 square kilometers. There are large woods on campus that to the untrained eye look like tropical rain forest but are in fact second growth forest. For bird lovers there is even a field guide to the birds of the campus, which include parrots, hummingbirds (flower kissers to the Brazilians), and other exotica. From a practical point of view, I was pleasantly surprised to find the biology cafeteria offering sushi and barbecue (churascaria), and at a price similar to a couple of sausage sandwiches here.

I also visited the Museum of Zoology, which has the largest collection of pinned insects in Latin America, and is a centre for studies of biodiversity and systematics, and the Ribeirão Preto campus of USP. USP at Ribeirão Preto is notable for having sixteen faculty studying bees. (Yes, that is sixteen. Possibly a bit excessive, even to my thinking.) In my talk I mentioned the late William Hamilton, and was pleased to note that he was warmly remembered by Lionel

Gonçalves, one of the faculty. Bill visited Brazil many times and Warwick Kerr, the founder of the Riberão Preto bee group, was one of the first established people to take an interest in his ideas.

An additional purpose of my trip were to check out the lie of the land for my postdocs Tom Wenseleers and Adam Hart, who both have projects on Brazilian insects. Adam will collect colonies of dinosaur ants for our NERC grant on conflicts in societies of totipotent females, and Tom will study female caste fate conflict in *Melipona* bees for his EC-funded Marie Curie postdoc. Now that I have visited the places and met the collaborators I can send Adam and Tom without undue worry. There is a certain formality about Latin America and it is helpful that the lab leader can meet the museum directors, lab leaders and so on before sending in the troops.

In addition, I was able to initiate research of an unplanned nature, studying things that took my interest and which I had not known existed beforehand. The first concerned the stingless bee *Partamona helleri* that builds a special entrance tube of resin and mud in the shape of a gaping "toad mouth". In the base is a much smaller (x 20) entrance hole. Foragers fly in at high speed into the toad mouth (6kph) and literally crash into the back wall. They then bounce down towards the hole. Because the back wall is concave and sloping down, the bees are deflected in the correct direction. Almost all bees, >95%, "crash" in. Their small size makes the impact insignificant. A crash with your head or mine onto a brick wall at 6kph would at best hurt a lot and might even be lethal. (Please don't try it.) In terms of scaling, the impact scales as mass/area so a bee weighing 1million times less than a human would have an impact 100 times less given the same velocity. In any event, it was fun filming the bees to measure their speed and documenting over 1000 arrivals to see what percentage crashed, and other things. By means of their clever entrance, these bees resolve the conflicting demands on a nest entrance to be both easily defendable (i.e., small) and capable of handling forager traffic (i.e., large). *Partamona helleri* nests have up to c. 200 bees per minute coming and going so a large entrance is necessary.

The other new thing to me were giant communal webs of the orb-weaving spider *Eriophora bistrata*, with up to 1000 large spiders (same as the large garden spider found here) with webs 5-20m across and 2-5m high. The spiders build communal "cross lines" between the trees but each builds its own orb web. They leave their huddle (a truly awesome sight as there are 1000 large spiders in a large blob about 25cm across) an hour or two before night. When a spider starts building a web it repels other wandering spiders, who have not yet started building, with a "bounce" behaviour. This results in the intruder leaving without a fight, showing a "bourgeois" strategy. But when two spiders have side by side webs they sometimes interfere, resulting in more prolonged bouncing. But neither leaves. Both play "resident stays" and soon they habituate to each others bouncing and stop. But there can be even more escalated behaviour where one spider takes over another's web. When this happens its not game theory but brute force. In a crowded web some spiders don't build but monitor an existing web. These also do not depart when "bounced". If a large prey item falls into a web up to 6 spiders eat it, but if small only the resident. So non-builders get a chance of some food. The whole thing is self-organized pattern formation (spiders and webs well distributed over the whole web area) with simple rules. Basically, spiders without webs are repelled by spiders with webs. Spiders with webs stay put.

The field site where I studied the spiders, and also did some of the bee research, was a beautiful farm owned by the retired professor of bees, Paulo Nogueira-Neto, 3 hours north of São Paulo (on a modern motorway that was, by British standards, uncrowded and with highly edible roadside food). He is rarely there, as he has many farms and a house in Sao Paulo, but there is a cook and people to look after things. Plus 200 colonies of stingless bees, pet toucans, rheas and a flock of geese. Dr. Nogueira likes people to study the bees and other animals on his farm and its all set up for this. He is an exceptional person, and meeting him was one of the highlights of my trip. He is a lifelong conservationist and bee biologist, with a special interest in promoting beekeeping with stingless bees. He wrote the first ever book in Portuguese on animal behaviour, and was the first Secretary of the Environment for Brazil (25 years ago). In this latter role he initiated much conservation activity, including the setting up of nature reserves (known as "Ecological Stations"). He was known for being politically neutral and disinterested financially. A few years ago he received the Duke of Edinburgh award from the World Wildlife Fund from the Duke himself in London. He has also received several high honours from the Brazilian government, and at 79 is still going strong and with no thought of stopping his many activities. I am sure that other researchers from Sheffield or elsewhere would be welcome at his farms, including one that I hope to visit next time which is in the state of Acre in the upper Amazon. This area has the world's highest diversity of stingless bees because it is on the border of three biogeographic regions of South America.

Also on the farm was a colony of *Camponotus* ants. Instead of living in the ground or in a log, this one builds a nest of silk, about 50cm by 25 cm in a tree. I made a small hole in the nest and a few hours later the workers at the damaged site were holding larvae in their mandibles to produce the silk to repair the hole. I had seen a similar thing in weaver ants, *Oecophylla*, in Thailand, who stitch together leaves with larval silk. But in this *Camponotus* the whole nest is of silk. When the nest is mildly disturbed there is a sudden rushing noise, like leaves rustling in the breeze, as thousands of tiny feet spread the alarm and head out to defend the city. The nest exterior is soon covered with thousands of ants. *Polybia* wasps and *Partamona* bees also showed spectacular, rapid, defence. One second after their nest was tapped they were piling out of the entrance by the hundred. But only the *Polybia* could sting, so it was fun to watch the *Partamona* and *Camponotus* without worry, and to videotape the action. But for the *Polybia* I stood well back. The nest was black with the bodies of hundreds of wasps, ready to pounce on the enemy.

Another outstanding Brazilian biologist who I met was João Camargo, who is a bee systematist at Riberão Preto. Someone told me that I should meet him to talk about my sudden interest in *Partamona* bee entrances, as he knew about them. What I did not know was that he has spent more than 20 years studying these bees. He showed me his incredible collection of nest entrances, and his equally impressive collection of pinned bees which filled a large room

and included about 20 type specimens of various Brazilian *Partamona*. Camargo is one of the greatest biological illustrators and he also showed me many of his originals, mostly in black and white using black ink. They are models of clarity, accuracy and beauty. The illustrations of his forthcoming systematic and biogeographical synthesis of *Partamona* had taken 1000 hours. (Some of his illustrations can be seen in Edward Wilson's "The Insect Societies" and Charles Michener's "The Social Behaviour of the Bees" .) He also showed me specimens and drawings of a remarkable stingless bee that he has discovered in the Amazon. It is the world's first farming bee, and it farms scale insects. The bee builds its nest in a cavity in a living tree. The cavity is made by larvae of moths (Cossidae). (One British species of cossid, the goat moth, is known for having a spectacularly large and smelly caterpillar that bores giant holes in trees.) The bees build their comb with wax from the scale insects and store the honey dew (but they also visit flowers for pollen and nectar). The scale insect is not known outside bee nests. The bee, the caterpillar and the scale insect are all species new to science. Only the tree is not new. A paper on it all is in press in *Biotropica*. We all know that ants and termites farm. Now we know that bees do it too!

Brazil is certainly a place where the biologist can be inspired. And I was thousands of kilometers from the Amazon, which must be worth a visit but might be almost overwhelming in new things to see. But Brazil is also a place where much good science is carried out, and it was inspiring, also, to meet some venerable representatives of this tradition.

My colleague Vera tells me that the University of São Paulo is linked to the University of Sheffield. (The nature of this alleged link is a mystery to me.) She had been inviting me for several years so that I could give some new ideas and theory insights to her group. I hope I was able to do this. Britain is a leading country in generating ideas, and this is something that UK biologists can offer, both as visitors to Brazil and as hosts to Brazilians. In terms of technology, there is perhaps less we can offer. For example, on visiting Riberão Preto I was shown the new gene sequencer and other extensive genetic equipment they had. After spending time in Brazil, I can see that coming to Britain could well be a large culture shock in the wrong direction. In comparison, Britain is cold, expensive, gastronomically challenged and with practically zero biodiversity. If we are to attract PhD students from Brazil we need to remember that they have good universities of their own, and to consider carefully what it is that we can offer them, both in terms of value for money and things that they cannot obtain in their own country. There is a lot of respect for British science, but we need to offer them more than just a chance to see the land of Darwin and Hamilton, and the chance to improve their English.

Job Vacancies

Ph.D Studentship, University College London

A Ph.D studentship is available to join a research group at UCL working on the behavioural and evolutionary ecology of social systems. The topic will be "coevolution and conflict between social parasites and their hosts", focussing on *Polistes dominulus* and its social parasite *P. semenowi*. The research will initially utilize laboratory nests, but will involve trips to southern Spain to collect the animals, and field experiments might also be conducted. Molecular work, to identify host versus parasite immatures, may form a small part of the research.

For further details, see <http://www.ucl.ac.uk/~ucbt266/pages/studentship.html>.

Applicants should send a covering letter and a CV, including their nationality and contact details (including e-mail addresses) for the applicant and two referees to: Dr Jeremy Field, Dept. Biology, University College London, Wolfson House, 4 Stephenson Way, London NW1 2HE, U.K.

Postdoc / PhD Student vacancies in *Maculinea* research, Copenhagen University

The Zoological Institute, University of Copenhagen, Denmark is seeking two researchers to work on the population genetics and ecology of *Maculinea* butterflies. The appointments will be made as part of the EU-funded MacMan network. The project will involve development and application of DNA markers to examine the population genetic structure of European *Maculinea* species, and examination of the ecology of Danish populations of *Maculinea alcon*. One appointment will be at the postdoctoral level, and the other will be at the PhD or postdoctoral level depending on the strengths of applicants.

The two positions do not have a formal application deadline at the moment (although we may have to introduce one when/if we place a formal advertisement), but we hope to produce a shortlist of candidates during March 2002, and make a final decision by early April 2002, so if you want to apply it would be best to do so before mid March. It would also be ideal if the successful candidate could start in Copenhagen by mid-June 2002, so that data can be collected in the 2002 field season.

For further details, please contact David Nash by e-mail at DRNash@zi.ku.dk, or see the vacancies page on the MacMan web site at: <http://www.zi.ku.dk/eunet/macman/>

NERC Ph.D. Studentship 2002: Conservation, ecology and genetics of the scarce bumble bee, *Bombus distinguendus*

Supervisors: Dr Andrew Bourke (Institute of Zoology, Zoological Society of London), Dr Rhys Green (Department of Zoology, University of Cambridge & RSPB)

Project: The Great Yellow Bumble Bee (*Bombus distinguendus*) is a Nationally Scarce species and is on the Biodiversity Action Plan Priority List. It is now almost entirely confined to Scottish islands. Its Hebridean strongholds include coastal grassland managed by the RSPB for waders and corncrakes. Since 1980, the species has seriously declined in Britain and parallel declines are reported from the rest of Europe. This is most likely due to loss of suitable grassland. However, available information on the foraging preferences of *B. distinguendus* is largely observational. Population sizes are unknown because nests are rarely found. Very little is known about its population genetics, but preliminary work at the Institute of Zoology has identified eight variable microsatellite loci for use as molecular markers. Since *B. distinguendus* occurs on widely scattered islands, it is probable that some populations are small and genetically isolated and so liable to adverse effects of inbreeding and loss of genetic variation. The overall aim of the studentship is a set of integrated ecological, genetical and experimental studies of *B. distinguendus* in the field to (a) identify appropriate management measures and so help reverse the species' decline, and (b) test basic hypotheses in conservation biology. Specifically, the student will:

- Using mark-recapture and genetic methods, census the number of colonies and measure their foraging ranges across several sites; with field-work, measure the ecological characteristics of the same sites; and so quantify the habitat factors most favourable to *B. distinguendus*.
- Experimentally test the resulting findings by conducting habitat manipulations (alterations of sowing, grazing and mowing regimes) on RSPB reserves.
- Using microsatellite markers, assess levels of gene flow and inbreeding and so test the hypothesis that the genetic isolation of sites is potentially harmful to the long-term future of the *B. distinguendus* metapopulation.

The student will be registered at the University of Cambridge and be based at the Institute of Zoology in London and the Department of Zoology in Cambridge. The field-work will be in the Inner and Outer Hebrides. He or she will be trained in field ecology, population and molecular genetics, experimental design and conservation biology. Prior experience with any of these will be valuable. He or she will also help develop management plans for *B. distinguendus* and be enabled to conduct research yielding original data and high-quality scientific publications. This will be a CASE studentship with RSPB.

Reference: Prys-Jones, O.E. and Corbet, S.A. (1991) Bumblebees. Revised edition. Naturalists' Handbook 6. Richmond Publishing Co. Ltd., Slough.

Applications: Send a CV, the contact details of two referees (including e-mail addresses) plus a short covering letter saying why you wish to apply for the project to: Christina Herterich, Institute Administrator, Institute of Zoology, Zoological Society of London, Regent's Park, London, NW1 4RY, UK. The deadline for applications is **Friday 5 April 2002**. Informal enquiries to Andrew Bourke (Tel 020 7449 6676, E-mail andrew.bourke@ioz.ac.uk). ZSL is Registered Charity No. 208728. See <http://www.zoo.cam.ac.uk/ioz/> for further information about the Institute of Zoology and other Ph.D. projects available.

Postdoctoral Researcher and Graduate Research Assistantship, University of Houston, U.S.A.

We are seeking a **Postdoctoral Researcher** to study the relationship between genetic variability and disease incidence in the western harvester ant, *Pogonomyrmex occidentalis*. We seek a person with expertise in insect pathology, particularly pathogenic fungi or microsporidia. The work will involve characterization of infections (pathogen incidence, diversity and load) from samples of brood and workers, and experimental infections with fungi. Applicants must have a Ph.D. degree and must be able to work independently. Experience with social insects not required, although it would be advantageous.

The position is funded for two years starting in Spring 2002 (no later than May 2002). The salary will be \$28,000/yr with medical insurance, retirement and other benefits.

We seek a **graduate student** for a project to study the relationship between genetic variability and disease incidence in the western harvester ant, *Pogonomyrmex occidentalis*. The research assistantship is funded for two years and could begin as early as Summer 2002. We seek someone with some experience in rearing or managing ant colonies. Students can expect to become involved with studies of arthropod diseases, use of microsatellites and a long-term field project in ant population biology.

Contact for both positions: Diane C. Wiernasz, or Blaine J. Cole, Department of Biology and Biochemistry, University of Houston, Houston, Texas 77204-5001, U.S.A.; dwiernasz@uh.edu; bcole@uh.edu; Phone: 713-743-2677 (DCW); 713-743-2679 (BJC)

Postdoctoral Position in Behavioural Ecology, University of Bern, Switzerland

Applications are invited for a postdoctoral research position in the Department of Behavioural Ecology at the Institute of Zoology, University of Bern. The Position is part of an SNF-funded research project on mechanisms of conflict and cooperation in the reproduction of vertebrates, led by Michael Taborsky. Applicants should have experience in modelling and a keen interest in theoretical issues in evolutionary biology. The position is initially for two or three years and can be prolonged.

The successful candidate will join a research group focussing on evolutionary mechanisms of advanced sociality and alternative reproductive behaviours. Other research fields in the ecologically oriented Institute of Zoology include Conservation Biology (Raphael Arlettaz), Evolutionary Ecology (Heinz Richner), Population Genetics (Laurent Excoffier) and Synecology (Wolfgang Nentwig).

To apply, please send your CV stating past and present interests and two letters of recommendation until 1 April 2002 to: Prof. Michael Taborsky, University of Bern, Dept. Behavioural Ecology, Institute of Zoology, Wohlenstr. 50a, CH-3032 Hinterkappelen/Bern, Switzerland; Phone: +41-(0)31 631 9156; Secret: +41-(0)31 631 9111; Fax: +41-(0)31 631 9141; e-mail: Michael.Taborsky@esh.unibe.ch; <http://zoology.unibe.ch/behav/>

BBSRC Postdoctoral Position and BBSRC Studentship, University College London: Evolution of an exaggerated sexual trait

Principal Investigators: Dr Kevin Fowler, Prof Andrew Pomiankowski & Dr Hazel Smith

A BBSRC **postdoctoral position** is available, to start as soon as possible. It will use evolutionary and molecular genetic techniques to determine the identity and mode of action of the genes that underlie male exaggerated eyespan in stalk-eyed flies. A panel of species will be used to explain a) the evolution of species differences in the degree of eyespan exaggeration, b) how and when in development the eye stalk is produced, and c) the basis of sex differences in eyespan exaggeration. We will investigate stalk-eyed fly homologues of genes known to act as regulators in *Drosophila* head development, and novel regulators identified using enhancer-trap and gene-trap lines. The successful applicant will receive full training in the relevant techniques involved.

The postdoctoral research fellow will be assisted by a research technician (full-time) and will join the expanding research group working with stalk-eyed flies. Projects are profiled at <http://www.stalkies.com>. Requests for further information and applications to Prof Andrew Pomiankowski, Dept. of Biology, Wolfson House, 4 Stephenson Way, London, NW1 2HE (+44 20 7679 7413) or e-mail ucbhpom@ucl.ac.uk.

Applicants must have, or soon expect to have, a PhD. Applications should be made as soon as possible and include a CV, address, telephone number, fax & details of 3 referees. Salary will be within the RA1A scale plus London Allowance.

Applications are invited for a BBSRC funded **studentship** with Dr Kevin Fowler from 1/10/02. The project combines evolutionary and developmental genetic approaches to examine the basis of a sexually exaggerated trait, male eyespan, in stalk-eyed flies. In part, it will identify and exploit stalk-eyed fly homologues of genes known to regulate head development in fruitflies. The student will form strong links with a postdoctoral fellow and research technician in a new collaboration by Kevin Fowler, Andrew Pomiankowski & Hazel Smith on the mechanisms underlying sexual traits.

The expanding research group working with stalk-eyed flies has a set of diverse programmes that focus on 1) the signalling function of exaggerated male eyespan, 2) the developmental genetics of eyespan, 3) the consequences of multiple mating, 4) the role of sexual conflict and involve collaborative links between Tracey Chapman, K. Fowler, A. Pomiankowski and H. Smith. More information about the activities of the group can be found at www.stalkies.com.

Applications should be made as soon as possible, including CV & covering letter, contact address, telephone number, fax & details of 2 referees to Dr K. Fowler, Dept. of Biology, Wolfson House, 4 Stephenson Way, London, NW1 2HE (tel 020 7679 7424) or e-mail to ucbhkof@ucl.ac.uk.