

OCIAM NEWSLETTER

May 2007

EDITORIAL

Of convection and mulled wine

The OCIAM Christmas party, with its mulled wine and mince pies, has been a Dartington House tradition for many years. An interesting development in recent years has been the propensity for the mulled wine heater to blow the trip switch in the kitchen ring main. And yet, once the wine is brewing, this no longer happens. Why is that? One theory is that initially, before efficient convection is initiated, the wine is effectively insulated, causing a build-up of heat in the heater, and hence the blow out. The simplest way to fix it would be to put a decent rating fuse in the circuit breaker, but there is little chance of that in these health and safety plagued times.

Coppicing OCIAM

By the time of the next newsletter, a radical change in OCIAM will have occurred. The two Ockendons, still in place, will have their pre-replacements in post. And your editor will be on five years' leave at the University of Limerick. Only in Oxford do you have to go somewhere else to be promoted. And it seems that in these RAE days, there will be three 'replacement' positions. So suddenly, there will be a lot of new wood replacing the old growth which is being cut back.

Sometimes you can recognize the age of a long-vanished tree by the diameter of the ring of younger trees which have replaced it as the central core is cut back. The core values of OCIAM have been exported round the world, in the international study groups in particular. Will the core values of OCIAM survive at its centre, or will its coppiced remains be re-invented in outlying subjects such as finance and medicine?

A pint of DD

In a bloodless coup last January, while the then Deputy Director was slumbering on sabbatical, he was replaced by the newly svelte and dynamic Chris Beward. Chris will bring a much-needed dynamism to the job.

Thought for the day

Bernard Beuzamy is a French mathematician (a functional analyst) who taught at the University of

Lyon for sixteen years, before leaving to found a mathematical consultancy company in 1995. He wrote an article for the Irish Mathematical Society Bulletin (Irish Math. Soc. Bull. **48**, 43-46 (2001), based on an address to the Dublin Mathematical Society, from which the following beautiful quotation comes:

“...what academic mathematicians do, or try to do, is to prove theorems, and they train their students in the same direction.

These theorems usually concern some deep and narrow question, left unanswered by the previous generations, or some arbitrary generalizations of earlier work. The impact of such theories upon real life mathematics is usually extremely small, not to say zero, especially since the solution is put, by means of the publication system, in terms which are understandable only to the specialists of the domain. Those who might need it, by some chance, will never notice.

Most current mathematical research, since the 60's, is devoted to fancy situations: it brings solutions which nobody understands to questions nobody asked. Nevertheless, those who bring these solutions are called “distinguished” by the academic community. This word by itself gives a measure of the social distance: real life mathematics do not require distinguished mathematicians. On the contrary, it requires barbarians: people willing to fight, to conquer, to build, to understand, with no predetermined idea about which tool should be used.”

The full article can be found at <http://www.maths.tcd.ie/pub/ims/bulletin>. Lest we, as applied mathematicians, feel smug about this, let us remember that we also are academic mathematicians. We may not prove theorems, but are we barbaric enough?

FUTURE EVENTS

17 May 2007

The First Brooke Benjamin Lecture on Fluid Dynamics

Mathematical Institute, Oxford University, L1, 5pm
“Water Wave Theory”

Jerry Bona (University of Illinois, Chicago)

11-15 June 2007

The Twenty-Second Annual Mathematical Problems in Industry Workshop (MPI 07) at Stevens Institute of Technology in Hoboken, New Jersey. Register at <http://personal.stevens.edu/~pdubovsk/mipi2007/index.cfm.htm>

14 June 2007

Oxford/Cambridge Jamboree
11am, Mathematical Institute, Oxford, lecture room 2.
To register contact Laura Auger at auger@maths.ox.ac.uk

2-5 July 2007

Applications of mathematics in the geosciences. Lodore Falls Hotel, Borrowdale, Lake District. A few places may still be available. See <http://www.maths.ox.ac.uk/mgg/workshops>. For further information, email fowler@maths.ox.ac.uk.

16-20 July 2007

6th International Congress on Industrial and Applied Mathematics (ICIAM) in Zurich, Switzerland
Register at <http://www.iciam07.ch/index>

13-17 August 2007

ESGI 61 – Danish Study Group
Sonderborg, University of Southern Denmark
Register at <http://www.mci.sdu.dk/ESGI61/>

2-5 September 2007

OXMOS workshop - a joint meeting with MULTIMAT on "Microstructure" will be held at St Anne's College. More information can be found at <http://webh01.ua.ac.be/multimat/meetings.htm>

10-14 September 2007

Mathematics in Medicine study group, University of Southampton. The web page <http://www.maths.soton.ac.uk/MMSG07> is still under construction. Further details from Colin Please.

NOMURA LECTURE
Monday 15 October 2007

Professor Peter Carter
Further details to be announced

30 June-4 July 2008

ECMI 2008, University College London
15th European Conference on Mathematics for Industry <http://www.ecmi2008.org/>
Deadline for mini-symposia proposals: 13 November 2007.

FAMILY NEWS

Baby Winstanley

After a very long labour, Narissa Laura Winstanley arrived at 11.36 a.m. on 23 November 2006, weighing 3.2 kg and in vigorous good health. She and her parents stayed in Bumrungrad hospital (Bangkok) for a couple of days after the birth to learn some tricks from the nursery staff and then went back home feeling extremely happy and a bit tired.

**Nursery Corner**

Tiina Roose's son Max turned one on March 18th. He has become an accomplished underwater swimmer (see picture below) after having successfully completed the Waterbabies beginners' course just before Christmas. He is now taking advanced swimming classes. Like a true Englishman, Max has also been learning social graces. In addition to saying Emme (Mummy in Estonian) and Daddy (in English), he can also say "thank you" - "aitah", but so far only in Estonian. Max has 5 teeth (3 in the top and 2 in the bottom) and can feed himself porridge with his own spoon and drink from an open cup. He also really likes cheese, but not the fancy stuff, cheddar is his favourite.



COMINGS AND GOINGS

Our Marie Curie Fellow **Igor Loutsenko** has returned to Trieste to continue his work on dynamical systems. We will miss his idiosyncratic and relaxed Ukranian style. Not to mention his skill at sniffing out integrable systems.

After two a half years stay in OCIAM **Roman Voskoboynikov** has taken refuge from John Ockendon and Jon Chapman at the University of Cambridge where he has been hired by the Rolls-Royce University Technology Centre in the Department of Materials Science and Metallurgy. Roman has been appointed within the 'Alloys by Design' EPSRC funded project that involves Imperial College London, the University of Oxford and the University of Cambridge.

Carina Edwards has now moved to Heidelberg. She writes: 'As I am living in Stuttgart I am commuting to work but am not finding this a problem due to the German trains. I am working in BIOMS in the University of Heidelberg with the group of Ulrich Schwarz, looking at mechanical interactions and feedback mechanisms between cells and their environment in cysts.

'Having spent six and a half years in OCIAM I could fill a book with anecdotes and messages of gratitude to all those who have helped, guided and supported me. So I would just like to thank EVERYONE at OCIAM for making the last few years so enjoyable and rewarding. If any of you are passing my way please do let me know. N.B. one benefit of being in Germany is the excellent beer!'

VISITORS

Gunter Meyer visited for a month from Georgia Tech, to work on numerical methods in option pricing. Gunter is a regular visitor to Oxford, and this time he unearthed the problem of discrete dividend payments for American Put options.

Tony Ware is in Oxford for six months as a Nomura Senior Research Fellow, working on energy derivatives and the numerical solution of problems arising from them.

Erhan Coskun visited us from Karadeniz Technical University in Trabzon, Turkey for 6 weeks in Hilary Term. He is trying to set up an initiative in Mathematics in Industry and while he was here he took part in all our industrial workshops as well as the Study Group in Nottingham. He also led a case study

for a group of our MSc students. This collaboration started last year when an OCIAM deputation visited Trabzon for an Industrial Mathematics Workshop and will continue when Peter Howell goes back there in June to take part in a Summer School.

Pedro Jordan from the US Navy Centre at Stennis, visited for 2 weeks, 26 Feb-16 March. One of his main interests concerns weakly nonlinear wave propagation and acceleration waves, but we spent most of the time discussing delta-shocks.

Joseph Fehribach, from Worcester Polytechnic Institute, Massachusetts, who is one of the 4 key East Coast Study Group organisers, paid us a brief visit March 5-9. As usual the vexed topic of getting NSF support for Study Groups dominated the discussions (even in the absence of such support, OCIAM researchers usually manage to participate!).

Bill Ziemba from the University of British Columbia visited us from 5-10 March. He was teaching capital growth theory and pensions fund management on the Mathematical Finance programme.

Lorenzo Fusi, who has a scholarship from Dipartimento di Matematica "Ulisse Dini", Firenze in Italy, paid OCIAM the first of 5 week-long visits April 23-28. Happily, one of his main interests concerns the gelification of waxy oils which is a subject of interest to UK mathematicians since the 2006 Study Group in Bath.

OBITUARY

With great sadness, we announce the death of Les Woods at the age of 84. Les was a great supporter of OCIAM, and in twenty years of retirement was never far away. His funeral service was held in Balliol College chapel, where in a memorable address, Denis Noble finished his eulogy with a sung Maori chant. Below we reprint John Ockendon's obituary for the Independent, with their kind permission.

The Independent, Obituaries, 12 May 2007

Professor L.C. Woods

L.C. Woods had an extraordinary career that took him from fighter pilot in the Pacific to Professor of Mathematics at Oxford University. His military service was as colourful as his academic life and, even when his scientific eminence had been recognised, he always relished his role as enfant terrible. Woods's fearlessly questioning and even impish approach made him a prophet and maverick of his times. Alas, at a time when such scepticism is most needed, modern scientific management in

government laboratories and universities has all but exterminated it.

Born Leslie Woodhead in 1922, he was the son of a fearsome fisherman who lived near Auckland and his teenage years involved working in an abattoir, an abrupt conversion to atheism and the beginnings of a degree in Mathematics at Auckland University College. Financial pressures and a role model led him to join the Royal New Zealand Air Force in late 1941, which is when his bravery and irreverence were given free rein.

His delight in unauthorised aerobatics led to confrontations with authority ensuring that, initially, he stayed firmly in New Zealand as an instructor. Even that was dangerous enough; once, when he was demoted to drogue-towing, a steep turn wrapped the tow-rope around the tailplane and only a last-minute wire-cutting saved the day. He married Betty Bayley early in 1944 and, with offspring in mind, he changed his name to Woods, a decision he later regretted.

Volunteering for active service, he flew nearly a hundred missions in the Pacific in Kittyhawks and Corsairs, many of them over the heavily defended port of Rabaul; his favourite escapade involved the realisation that a supposed Japanese submarine was a whale. Amazingly, all the while he worked without instruction on mathematics, to the level of a second-class MSc in 1944; Auckland University awarded him an honorary doctorate in 1983.

With his colourful background, Les Woods was astounded to be awarded, in 1947, a Rhodes Scholarship, for which married candidates were only eligible after military service. This enabled him to research computational aerodynamics with Alexander Thom in an engineering department then held in low regard in Oxford. Despite colossal culture shock, Woods completed his DPhil on control reversal in two years, annoyingly having to pay Merton College for the tuition he would have received had he been an ordinary undergraduate student. He almost missed his opportunity to indulge in low flying over Oxford when he firmly informed the Air Squadron's interview panel that his father's job was "minding his own business".

For Woods the natural next step was a first class degree in mathematics in 1951, by which time he was father of five daughters, much to the astonishment of his more theoretical contemporaries. Then, after a brief but intellectually thrilling spell at the National Physical Laboratory, he took a Senior Lectureship at the University of Sydney, working under a colleague who, in Woods's words "found it hard to rise above his international status".

This led to a further move to the University of New South Wales, where Woods became a professor at

the age of 33. This was Woods's induction into high-level university politics and the battle between intellectual freedom and chains of command was one in which he passionately engaged forever after. More importantly, having published his brilliant text *The Theory of Subsonic Planar Flow* in 1961, he realised well ahead of his time that the future of applied mathematics lay in its new frontiers. The modelling of ionised gases, or plasmas, was the perfect vehicle for his attentions.

The pivot of Woods' career came during his sabbatical in Oxford in 1960 when he became embroiled with the plasma physics community at the UK Atomic Energy Authority at Harwell, shortly to move to Culham. This was a key factor in his decision to "demote" himself to the engineering fellowship at Balliol College, where he stayed for the rest of his academic career and which eventually became his home from home. This post provided a wonderful opportunity for Woods's warmth and sense of fun to enthuse his students, graduate and undergraduate, many of whom followed glittering academic careers.

However, more skirmishes with authority followed which, with the involvement of the equally bonhomous George Temple, led Woods to move to a Readership in the university's Mathematical Institute, of which he later became chairman. A final golden opportunity arose when the chair of Plasma Physics was willingly bequeathed to the Mathematics Faculty. Woods' appointment as Professor of Mathematics (Theory of Plasma) in 1970 left him free as a bird, his world travels including a legendary depletion of Cornell's whisky supply and handsome reward from a so-called Institute for Advanced Salaries in Texas.

Most importantly he could throw all his modelling skills into the science behind the Tokamak machine with its promise of limitless clean energy through nuclear fusion. The key question was how to confine the plasma for long enough for the fusion reaction to take place at a significant rate, when all the current experiments showed an unforeseen tendency for the ions and electrons to spread out from their initially toroidal paths.

The traditional explanation blamed some kind of turbulence, a word often used to describe phenomena that are poorly understood. Woods rightly believed that the confinement problem was nearly insuperable and, true to style, came up with a simple speculation which brought him head to head with an immensely powerful and wealthy scientific community.

His ideas never survived peer review, and so they can only be found in his rather idiosyncratic textbooks. However, a layman's version appears in his wonderfully informative and entertaining autobiography *Against the Tide*, an expurgated

version of which was published in 2000 by the Institute of Physics only after two other well-known publishing houses found it too cuttingly forthright. The book received a better review in *The Aeroplane* than in the physics literature, and it seems to have been ignored by the axiomatic applied mathematics community, with whom Woods had also become embattled; he did not like “rigor mortis”.

He remained intensely active throughout his last decade, working especially on solar phenomena such as prominences and coronal heating.

John Ockendon

Leslie Colin Woodhead (Leslie Colin Woods), applied mathematician: born Reporoa, New Zealand 6 December 1922; fighter pilot, RNZAF 1942-45; Rhodes Scholar, Merton College, Oxford 1948-51; scientist, Aerodynamics Division, NPL Middlesex 1951-54; Senior Lecturer in Applied Maths, Sydney University 1954-56; Nuffield Research Professor of Engineering, University of New South Wales 1956-60; Tutor in Engineering Science, Balliol College, Oxford 1960-70, Fellow 1960-90 (Emeritus Fellow since 1991); Reader in Applied Mathematics, Oxford University 1964-70, Professor of Mathematics (Theory of Plasma) 1970-90 (Emeritus); three times married (three daughters and two daughters deceased); died Oxford 15 April 2007.

NEWS

Study Groups and Strategy

Study Groups continue to thrive around the globe. Stimulated by our visiting Professor L Mahadevan (Maha), the Harvard applied mathematicians held their first one in January, supported by the Fell fund¹. Those who were happily available included Philip Bond (now world-famous for his unscented transforms) and Colin Please from Southampton (who scored a big hit with his washing machine analogy for drill strings in oil well boreholes). It was an eye-opening experience for many of the participants, including those from Schlumberger in Boston, who are proposing a follow-up early next year. But before then we hope that some of the Harvard group will be able to come to OCIAM for further informal collaborations.

The contrast with the recent Nottingham Study Group, which had the same number of problems but about 80 participants, was not as dramatic as it might

¹All recent Study Groups scientific reports can be found on the MIIS website (<http://miis.maths.ox.ac.uk/>). However the Harvard workshop was so informal that the presentation transparencies comprised the reports.

have been. In both cases graduates and postdocs played key roles (when they were not clubbing); indeed at Nottingham, John Billingham rightly insisted that all the preliminary presentations were made by graduate students.

An atmosphere with far more gravitas was created at a strategy meeting for maths-in-industry in Heidelberg in March organised by Willi Jaeger under the auspices of the powerful Organisation for Economic Cooperation and Development (OECD). Here very few of the high-level participants had practical experience of the coal-face of maths-in-industry with the result that much of the discussion addressed the user of mathematics in basic science. Hopefully, the OECD will put in a good word for genuine maths-in-industry with the UK government, but, even if it does not, it has adopted the very helpful Brussels definition of “industry” as “any action which is of social or economic value”.

The interface between pure and applied maths more generally was analysed by Steve Davis of Northwestern in an interesting letter to *SIAM News* (Jan/Feb 2007). There he identifies symptoms of dysfunctionality and emphasises the importance of a unified mathematical sciences community.

Without the mutual respect that Steve so correctly identifies, there can be no intellectual unification within the community and hence, no genuine symbiosis between pure and applied mathematics. This is a fact of which OCIAM has been especially aware since its inception because we have had additionally to deal with the perceived division between applied mathematics and industrial mathematics. In 1989, we in Dartington House were scarcely thought worthy of being called applied mathematicians, and it was only Alan Tayler’s diplomacy and persistence that prevented us being called OCIM.

John Ockendon

Minisymposia at ECMI 2008

Plans for the biennial ECMI conference which will be held at UCL in July 2008 are developing quickly. The plenary speakers have been decided and the website is set up at www.ecmi2008.org

The organising committee is keen to promote minisymposia which use exciting mathematics to address the needs of industry or other end users. Proposals for minisymposia will need to be submitted by November 30, 2007, so start planning now. If you have any questions or suggestions about this meeting please contact us on ociam@maths.ox.ac.uk using the heading ECMI 2008.

John Norbury (Chairman, Organising Committee)
Hilary Ockendon (Secretary, Organising Committee)

MSc in Mathematical Modelling and Scientific Computing

This MSc, started in 1978 and run jointly with the Numerical Analysis Group, has gone through a number of guises but throughout it has retained the same basic constituents, viz:

- Core courses on both mathematical and numerical methods
- Classes in modelling and practical computing
- Special topics on a wide variety of applications/techniques
- A substantial dissertation

The course was originally called MSc in Mathematical Modelling and Numerical Analysis, but changed to its present title in 1999. It then divided into two in 2000, when the MSc in Applied and Computational Mathematics was created as a Masters in Research; this retained all the above elements, but put more emphasis on the dissertation. The two courses have now merged under the same title, but we have preserved the flexibility which allows more or less time to be spent on the dissertation. Support from SERC and EPSRC (as masters training packages and now from a CTA award) as well as numerous industries has helped to keep up the high standard of students on this course.

Over the last 30 years the areas in which mathematical modelling is applied have broadened dramatically and this has been reflected in this MSc – last year out of 26 students, 9 did their dissertations in financial applications and 5 in medicine/biology. As a result of the current interest in financial applications we are launching an MSc in Mathematical and Computational Finance this year for those students who want to specialise in this area.

We are holding an Open Day for the MSc on June 1.

The day will start with presentations aimed at those working in industry, who may be interested in getting involved with this course and will end with a social event including current students and staff. Details are on <http://www.maths.ox.ac.uk/ociam/msc-afternoon/>.

If you would like to come to this event please contact us on auger@maths.ox.ac.uk.

Hilary Ockendon
Course Director

Cross country

On 7th March four brave OCIAM graduate students, Dave Hewett, Ian Hewitt, Michi Taroni and James Schofield, donned their running kit for the 2007 Teddy Hall Relays. This gruelling 4 x 3.6mile cross-country relay race starts and finishes at the famous Iffley Road track, home of Sir Roger Bannister's historic first-ever sub-4 minute mile. Although none of the OCIAM athletes broke any world records, the

team did achieve a good time of 98 minutes 8 seconds and a very respectable 2nd place in the Departmental rankings. The team are already training hard ahead of next year's race and hope to go one further and claim the coveted prize for OCIAM.

Dave Hewett

Lisbon Study Group 15-19 April 2007



This is called a Stewart platform. I was given the opportunity to have a ride on it so that we could have a closer look at how it works, before making a model of its control system. It is being developed as a virtual reality ride to give disabled individuals the chance to experience high-thrill sports that they may otherwise not have the chance to experience.

Ashley Pitcher

EGU, Vienna, April 2007

EGU stands for European Geoscience Union, and its annual meeting in Vienna is a vast gathering of some 10,000 conferees. This year there was a strong OCIAM presence, with Rachel Zammett, Andrew Fowler, Ian Hewitt and Heike Gramberg all in attendance. We stayed in two rented apartments, caroused all night, had lunch by the Danube, and so on. There were plenty of former OCIAM visitors and graduates there too: Marta Perez, Bruce Malamud (wearing a *tie*), Liam Clarke, Marguerite Robinson, Felix Ng, Christian Schoof, Sophie Nowicki. Apart from the fact that Austrians smoke a lot, it is a

pleasant place to be, and (perhaps surprisingly for such a large gathering) the science was good. The down side was that we missed the OCIAM Easter party.

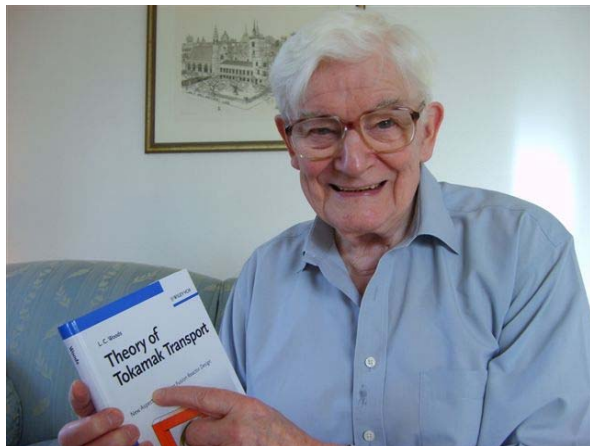
Andrew Fowler

Against the Tide

The Fusion Establishment and a Heretic's Challenge

Les Woods delivered the Nerenberg lecture at the University of Western Ontario on 12 March, 2007.

“Normal” science conforms with the prevailing body of relevant scientific knowledge, but sometimes there are persisting anomalies that can be resolved only by a “revolutionary” break from generally accepted ideas. The most famous example of this paradigm shift is the replacement of Newtonian mechanics by quantum mechanics. My ‘revolution’ concerns the behaviour of heat and magnetic fields. It is a famous result of normal science that in the absence of a heat pump, heat travels from hot to cold, so a heretic claiming that in some circumstances heat flows naturally in the opposite direction, rather like water flowing uphill, would expect stiff resistance from the scientific establishment, especially from those involved in “Big science” i.e. in large, publicly funded, research establishments like NASA or fusion energy laboratories.



The Sun's corona is at a temperature of $\sim 2,000,000$ K, and the only source apparent for this energy is the photosphere at $\sim 6,000$ K, a puzzle for which solar physicists have not been able to find a convincing explanation. Also, magnetic fields looping up from beneath the photosphere into the corona tend to be spiked rather than flattened out by diffusion as predicted by normal science, but in the latter case sunspots would persist for millions of years rather than the few days or weeks that are observed. Both of these long standing problems can be solved by a

heretical theory in which normal transport directions are reversed, a process known as “backward diffusion”.

There is a connection between coronal heating and the disappointing failure of tokamak fusion machines to confine their energy long enough to become viable energy sources, at least within our lifetimes. Sometimes the energy is observed to flow up the tokamak temperature gradient, resulting in what is known as a ‘heat flux barrier’, a clear example of ‘backward heat’. However, on average the mechanism operates in the normal direction and unfortunately increases the radial heat losses thousands of times larger than the values originally expected. Fusion physicists do not understand why this happens, ignoring my theory, which was published 22 years ago. They have put their money (really our money), on turbulence, which in fact is so unimportant that it has no observable effect on the voltage drop around the tokamak torus. To design the international fusion experiment ITER, in place of established theory, they have adopted wild extrapolation from measurements on existing relatively small tokamaks --- this is “Big Science” behaving badly.

No one has written a paper explaining faults in my theory. I e-mailed copies of the preface of my recent book on Tokamak Theory to several dozen plasma physicists likely to be involved with the vastly expensive ITER tokamak to be built at Cadarache, but not a single show of interest! Science advances only via debate and today's heresy is very often tomorrow's received wisdom. Unfortunately the exaggerated claims for fusion have shut the door on scientific debate; maintaining funding is the prime objective and it appears that any work that challenges the conventional wisdom is seen as a threat to this.

Les Woods

Glaciers galore – and sunshine!

Following her thesis defence last year, Helen Haworth went cycling in South America, and even managed to get to Antarctica. Below is a brief extract from her account at

<http://www.boliviabybike.blogspot.com>, well worth a look.

...Continuing my journey (by bus) north, I headed back into Argentina to see the Perito Moreno glacier. A massive, advancing glacier, I saw a photo of it a few years ago and have wanted to see it ever since. And it was huge! 5 kms wide, and 40-60 metres high, it was impressive. I'd have loved to get right underneath it to appreciate its real size, but as chunks keep breaking off, it'd have been rather dangerous, to say the least, and we were kept well away. The noise it made was fantastic - a constant cracking and crashing emanated from within it, and every now and

again, a huge piece would fall off into the water. At one point, a piece the whole height broke free and crashed into the lake. It was hard to appreciate watching from a distance that it was the size of a building!



From one huge glacier, to many smaller ones - my next stop was the gorgeous little climbing village of El Chalten, a little further north still. I knew I'd like the place as soon as I saw it, nestling in the valley with mountains towering all around. The clouds parted as I arrived, showing the two main mountains, Cerro Torre and Mt FitzRoy, in all their glory, and the sun shone the entire time I was there. I was incredibly lucky, and made the most of it, hiking my heart out. How to describe the scenery - the photos hopefully will do it some justice! The first couple of days, I explored everywhere I could with Sue-Ann, a Canadian girl I met on the bus. And she killed me. An avowed knitter, smoker and avoider of all exercise at home, I practically had to run to keep up with her on the hills... and I had thought I was fit!



Helen Haworth