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Groups St Andrews 2009 in Bath

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INTRODUCTION

Groups St Andrews 2009 was held in the University of Bath from 1 August to 15 August 2009. This was the eighth in the series of Groups St Andrews group theory conferences organised by Colin Campbell and Edmund Robertson of the University of St Andrews. The first three were held in St Andrews, and subsequent conferences held in Galway, Bath and Oxford, before returning to St Andrews in 2005 and to Bath in 2009. There were about 200 mathematicians from 30 countries involved in the meeting as well as some family members and partners. The Scientific Organising Committee of Groups St Andrews 2009 was: Colin Campbell (St Andrews), Martyn Quick (St Andrews), Edmund Robertson (St Andrews), Colva Roney-Dougal (St Andrews), Geoff Smith (Bath), Gunnar Traustason (Bath).

The shape of the conference was similar to the previous conferences (with the exception of Groups St Andrews 1981 and 2005) in that the first week was dominated by five series of talks, each surveying an area of rapid contemporary development in group theory and related areas. The main speakers were Gerhard Hiss (RWTH Aachen), Volodymyr Nekrashevych (Texas A&M), Eamonn O'Brien (Auckland), Mark Sapir (Vanderbilt) and Dan Segal (Oxford). The second week featured three special days, a Cannon/Holt Day, a B H Neumann Day and an Engel Day. The invited speakers at the Cannon/Holt Day included George Havas (Queensland), Claas Roever (Galway) and Marston Conder (Auckland). For the B H Neumann Day, two of his sons, Peter Neumann (Oxford) and Walter Neumann (Columbia, New York), were invited speakers as were Michael Vaughan-Lee (Oxford), Cheryl Praeger (Western Australia) and Gilbert Baumslag (CUNY). For the Engel Day invited speakers included Gunnar Traustason (Bath), Olga Macedońska (Katowice) and Patrizia Longobardi (Salerno). Our thanks are due to Charles Leedham-Green (QMWC, London), Roger Bryant (Manchester) and Gunnar Traustason (Bath) for helping organise the programmes for the special days, and to the speakers on these special days.

Each week contained an extensive programme of research seminars and one-hour invited talks. In the evenings throughout the conference, and during the rest periods, there was an extensive social programme. There were two conference outings. The first was to Stonehenge and Salisbury, and the second was to Stourhead Gardens and Wells. In the first week there was a conference banquet at Cumberwell Golf Club. In the second week there was a wine reception at the American Museum in Britain for the B H Neumann Day and a conference banquet at Bath Racecourse on the Cannon/Holt Day. We wish to thank Charles Leedham-Green for allowing us to publish the after-dinner address that he gave at the banquet. Once again the *Daily Group Theorist* was a nice feature of the conference. We thank the various editors of this, by now traditional, publication.

Once again, we believe that the support of the two main British mathematics societies, the Edinburgh Mathematical Society and the London Mathematical Society

has been an important factor in the success of these conferences. As well as supporting some of the expenses of the main speakers, the grants from these societies were used to support postgraduate students and also participants from Scheme 5 and fSU countries.

As has become the tradition, all the main speakers have written substantial articles for these Proceedings. These articles along with the majority of the other papers are of a survey nature. All papers have been subjected to a formal refereeing process comparable to that of a major international journal. Publishing constraints have forced the editors to exclude some very worthwhile papers, and this is of course a matter of regret. Volume 1 begins with the papers by the main speakers Gerhard Hiss and Volodymyr Nekrashevych. These are followed by those papers whose first-named author begins with a letter in the range A to E. Volume 2 begins with the papers by the main speakers Eamonn O'Brien, Mark Sapir and Dan Segal. These are followed by those papers whose first-named author begins with a letter in the range F to Z.

The next conference in this series will be held in St Andrews in 2013. We are confident that this will be, as usual, a chance to meet many old friends and to make many new friends.

We would like to thank Martyn Quick, Colva Roney-Dougal, Geoff Smith and Gunnar Traustason both for their editorial assistance with these Proceedings and for all their hard work in organising the conference. Our final thanks go not only to the authors of the articles but also to Roger Astley and the rest of the Cambridge University Press team for their assistance and friendly advice throughout the production of these Proceedings.

CMC, EFR

A SPEECH IN HONOUR OF JOHN CANNON AND DEREK HOLT

CHARLES LEEDHAM-GREEN

Ladies and Gentlemen, Mathematicians and friends. I find myself the ass on whose back has been laid the burden of expressing our feelings on the birthday celebrations of Derek and John. It is a matter of regret that John cannot be with us, but I shall follow the famous and ill-written paper by Ella Wheeler Wilcox¹, and turn my mind to the happier aspects of this occasion. As we walk around the Cayley diagram of life, we are constantly at cross-roads; but a birthday is an Irish roundabout² where there are but two exits: we can look forward, or we can look back.

Looking back, my first introduction to programming was re-writing the STACK-HANDLER for John's CAYLEY program to work on the Queen Mary College mainframe machine. This, of course, was written in FORTRAN; and the success of the translation owed much to expert supervision. The first time I proved a theorem as the result of computer-generated information this information was obtained using CAYLEY, on a mainframe at the ETH in Zurich, using punched cards.

At about the same time (plus or minus 10 years) Derek and I overlapped in a certain Lehrstuhl in Aachen, and I was told, in hushed tones, that this Englishman was writing a program in C to calculate cohomology groups. The combination of the two C words, namely C and cohomology, induced a feeling of awe that was akin to the feelings of builders of propeller-drive fighter aircraft towards the end of the late war towards colleagues at the other end of the shed who were building the first jets.

Life, by which I mean mathematics, might be divided into two activities; dreaming dreams and digging holes.

The dreamer of dreams tells us what holes to dig, how to dig them, why to dig them, and how deep we may need to dig.

The digger of holes digs holes.

Sometimes the dreamer decides that some hole can be dug; and sometimes, in a moment of inspirations, thinks of a new kind of hole that can be dug, perhaps quite easily. The fact that it is possible in theory to write a cohomological package in C was clear enough; the fact that it was a *practical* project, and that the code would be widely used, was a profound insight; but an insight that would have been

¹ Laugh, and the world laughs with you:

Weep, and you weep alone;

For the sad old earth

Must borrow its mirth,

It has sorrows enough of its own.

The opening lines of 'Solitude', by Ella Wheeler Wilcox; The New York Sun, Feb 25, 1883.

² *The design of roundabouts, a minimalist approach* Maguire and O'Donovan, in Road Maintenance Monthly, March 1987; Cork.

useless if Derek, having dreamed the dream, had then not been prepared to dig the hole.

It is not to be thought that life is so simple. It is not the case that the dreamer dreams, and then the digger digs. The dreamer's dream will come from the close inspection of holes that have been dug, and of the means by which they were dug; and the digging of holes will always be inspired by the dreaming of further dreams.

This interplay between dreaming and digging has consequences. The poet informs us that 'Humanum est errare', an adage completed by poets and parodists in various ways. It is an essential feature of the human soul that to err is human, but to produce a real disaster requires two people. That is why we have Laurel and Hardy. I am not suggesting any similarity between Derek and John on one hand, and between Laurel and Hardy on the other: quite the opposite. The tragedy of Laurel and Hardy is that the dreamer cannot dig and the digger cannot dream.

Derek and John have collaborated with many people, and I confess a tendency to work socially myself, but they do not collaborate on the assumption that they will just dream dreams, or just dig holes, and I think it is perhaps the case that all great mathematicians can both dig and dream.

It is harder than we think to distinguish great mathematics, but one expects and requires great mathematics and great mathematicians to attract equally good mathematics and equally good mathematicians from subsequent generations. You are all of you young, some ridiculously so; but it is the number of brilliant and ridiculous young mathematicians at this conference that has so heartened those of us of riper years. It cannot be claimed that this conference is dominated by the work of any two people, but the previous Edinburgh conference on the Matrix Group Recognition Project was concerned with a project that would not have been without the work of Derek and John, and it too was heavily populated by the ridiculously young, and disturbingly brilliant.

We have come round the roundabout, and are looking to the future.

The most famous advice to the mature mathematician was, of course, given by Tennyson, and his advice is contained in a paper called Ulysses³, NOT in the hope of preventing Joyce⁴ and others from writing on the same subject, but because the hero is the mathematician, and the mathematician is the hero, and Ulysses is the hero, and Ulysses is the mathematician. One might express this more briefly, but 'is' is not as symmetric or transitive as some have supposed.

Here is the advice; or some of it:

It little profits that an idle king,
By this still hearth, among these barren crags,
Match'd with an aged wife, I mete and dole
Unequal laws unto a savage race,
That hoard, and sleep, and feed, and know not me.

³ Alfred, Lord Tennyson. Ulysses. In *Poems 1842*, MacMillan, London.

⁴ James Joyce. Ulysses, Published in serial form in *The Little Review*, March 1918– December 1920.

I cannot rest from travel; I will drink
 Life to the lees. All times I have enjoy'd
 Greatly, have suffered greatly, both with those
 That loved me and alone; on shore, and when
 Thro' scudding drifts the rainy Hyades
 Vext the dim sea. I am become a name;
 For allways roaming with a hungry heart
 Much have I seen and known,— cities of men
 And manners, climates, councils, governments,
 Myself not least, but honour'd of them all,
 And drunk delight of battle with my peers,
 Far on the ringing pains of windy Troy.

I am a part of all that I have met;
 Yet all experience is an arch wherethro'
 Gleams that untravell'd world, whose margin fades
 For ever and for ever when I move.

I hear you ask what is all this about aged wives. Poetry is metaphor (though metaphor is not poetry). The still hearth and barren crags are the office and lecture theatre. The aged wife is the university. To mete and dole unequal laws unto a savage race that hoard, and sleep and feed is to teach Calculus II to the second years. I am much moved when through scudding drifts the rainy Hyades vexed the dim sea: a beautifully understated description of a theorem that wouldn't come out.

So to conclude, do what you can do; both in mathematics, and in accepting our heartfelt thanks: for your work, that has changed our lives, and for your friendship that has enriched them.