



## The Tectonic Studies Group celebrates 50 years

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It is rather appropriate that we set out reminiscences, from Manchester, of how TSG was born. From our combined memories, we think the idea of creating a specialist group for structural geology was first discussed between John Ramsay (Imperial College, London) and Robin Nicholson (University of Manchester, now deceased) in 1968, when John visited Manchester to examine a Ph.D. thesis. This was an exciting time in Britain, when *Folding and Fracturing of Rocks* (1967) had recently been published, and an M.Sc. in structural geology and rock mechanics had been initiated at Imperial College, London, where Susan Beech had secured a place for 1968-9. From our combined recollections, in 1969 Robin Nicholson wrote from Manchester to all geology departments in Britain where there was a structural geologist, to gauge interest; and John Ramsay took the idea to the Geological Society, and then volunteered to host a meeting at Imperial College, London. This meeting on 29-30 December 1970, approaching fifty years ago, became known as the inaugural TSG meeting.

This first meeting fell between Christmas and New Year, and was thematic: *The Study of Folds*. Speakers were allotted 45 minutes each! Among them was Sue Treagus, formerly Beech, who recently discovered 11 pages of handwritten notes to accompany her talk on asymmetric folds, based on M.Sc. work at I.C. and ongoing Ph.D. research at Manchester; this, we think being her first conference talk. As with the TSG conferences that were to follow, this inaugural meeting comprised talks from research students as well as university lecturers /professors. The afternoon session of the second day (30 December) was programmed: "Open discussion on the possibility of holding regular meetings on structural geology, tectonics and rock mechanics". We cannot remember why the name *Tectonic Studies Group* was chosen, and neither can John Ramsay, but he suggests (pers comm, 2020): "Regarding the title of the 'Tectonic Studies Group', that was a long time ago, and I am not completely sure how the choice came about. I seem to remember that some of the audience wanted to widen the name because they felt that 'structure geology group' was too restrictive and might put off those plate pushers". John Ramsay was appointed the first TSG chairman, and Derek Powell (Bedford College, London) the secretary. It was decided that meetings would be annually, and that the next one would be in Manchester. The meeting ended with John Ramsay giving an open invitation to those present, to attend a party at his house in Notting Hill. It was quite a party: one of us remembers dancing.

The 1971 TSG meeting in Manchester, organised by Robin Nicholson and Jack Treagus, should probably be considered the first 'real' TSG, having a two-day open programme, accommodation in a hall of residence (Dalton Hall, Manchester), and a conference dinner with bar. We can find no programme for this Manchester TSG meeting, and would love to retrieve one. It set the precedence for two-day annual meetings being convened in

December, after the end of the autumn academic term in UK universities, but before Christmas. From subsequent TSG programme books, the lengths of talks were 30 mins at Bristol (1972), 25 mins at Newcastle (1973), and had contracted to 15 mins at Liverpool (1978). Even so, two days was becoming insufficient time at annual meetings to accommodate talks for the growing TSG membership, by the end of its first decade. By 1983 (Glasgow), many would-be speakers could not be accommodated in the programme, which led to a speedily arranged one-day Research in Progress (overflow) meeting at Burlington House, London, in February 1984. At the 1984 AGM at Swansea, TSG Annual Meetings became three days of talks, with added workshops and field trips on days before or after, a style that has continued since. The three-day TSG AGMs continued to be held in mid-December, until in 1999 the conference date moved forward to January 2000, a decision taken by Ernie Rutter (Manchester); and has remained as a January AGM thereafter. The reasons for changing to January include the availability of university halls of residence, and to avoid clashes with other specialist groups that by this time were also convened in December.

During the 1970s, TSG held December annual meetings at Manchester, Bristol, Newcastle, Exeter, Birmingham, Dundee, Leeds, Liverpool and Nottingham (1979). The Manchester 1971 meeting had about 50 attendees, but numbers had increased to 160 at Liverpool in 1978. By the end of the decade, TSG AGMs were seeing a significant attendance from mainland Europe, as well as from the core structural geology community in Britain. John Ramsay had moved from I.C. to Leeds (1973) and then to Zurich (1978), taking some of his former M.Sc. and Ph.D. students with him, to continue their research in strain, folds and Alpine structure; other British nationals moved to post-doctorate or staff positions at Leiden, Rennes, Grenoble, and North America. Robert Shackleton, an important early figurehead for TSG, had attracted Mike Coward to join his African research group at Leeds. Mike then became a lecturer/reader, and inspired a new generation of Leeds students to field studies in NW Scotland and the Himalayas. He brought Leeds undergraduates to the 1979 Nottingham TSG meeting, where Rob Butler first made his mark. During this first decade, TSG facilitated many exchanges of ideas, spawning collaborations and friendships that have persisted to this day. In particular, the collaborations between Liverpool and Leeds has played an important part in maintaining the energy of TSG, in its early to middle years particularly. Sadly, many of the formative TSG players, Robin Nicholson, Robert Shackleton, Mike Coward, Juan Watterson, Martin Casey and many others, are no longer with us, but will be warmly remembered for their important contributions.

Numbers grew and subject matters broadened, as TSG AGMs met at Keele in 1980, then Oxford, Cardiff, Glasgow, Swansea, Southampton and Hull (1986). By the time TSG was back in Manchester in 1987, the attendance had expanded to 350, with 200 enrolled for the conference dinner. In this 3-day programme there was space for only 70 speakers in 15min slots, and many people had to accept poster space in lieu of a talk; 65 posters in total. We recall giving precedence to research students, and allowing only one talk per person, regardless of status. It would appear that 1987 marked a peak in TSG attendance, with many research presentations from the expanding petroleum industry as well as universities. And yet, by the end of the 1980s, perhaps reflecting freezing of academic appointments in the UK universities, as well as rationalisation of UK geology departments in the 1989 Oxburgh review, and some reining back of oil-industry-funded research, numbers at TSG

AGMs began to decrease. By 1990 there was vigorous debate about how TSGs might attract more numbers, including inviting leading people to be keynote speakers. This move was vigorously opposed by those who wished to maintain the tradition that TSG AGMs provided a level playing field, with the same opportunities for research students as for more senior academics. Quoting John Ramsay: "TSG has always tried to encourage and to give the floor to young researchers to put forward their views and findings, and not to give preference to more experienced 'oldies'". In the end, the question of whether to use keynote /invited speakers to boost attendance at AGMs has been left to conference organisers, being used at some of the subsequent meetings in the years to follow.

Before continuing with an account of the annual meetings through TSG's middle years, it is important to take stock of all that the UK Tectonic Studies Group achieved in its first two decades. In parallel with the growth of its annual meetings, it soon started to convene or support thematic conferences, ranging from one-day meetings on a particular topic at the Geological Society, to one or two day meetings at UK university venues or overseas venues. The British community of structural and tectonic geologists that had grown during the 1960s, and was nourished by John Ramsay's book *Folding and Fracturing of Rocks* (1967) and the M.Sc. course at Imperial College, grew rapidly through the 1970s. So when Paul Hancock (Bristol) sought approval and support in 1977-8 for starting a specialist journal, there was a ready audience for the new *Journal of Structural Geology (JSG)* in the TSG community. Paul Hancock was founding editor-in-chief, and Tony Barber (Chelsea College London, another TSG stalwart) associate editor. The first issue, published in early 1979, ended with a report and abstracts of a thematic TSG conference at Nottingham on spatial periodicity of structures, convened by Colin Ferguson (Nottingham) and Peter Cobbold (Rennes). The *JSG* would go on to publish many special issues from TSG-sponsored national and international conferences, including two notable 1982 conferences at Rennes (*Strain Patterns in Rocks*, 1983) and in Zurich (*Planar and Linear Fabrics*, 1984).

TSG spread news of its meetings through the Geological Society Newsletter, and direct notices from organisers to geology departments and individuals. The relationship between TSG and *JSG* remained close, within the British community, continuing when one of us (SHT) took over the reins as *JSG*'s chief editor, during 1985. One initiative that began in 1986, was to publish once a year in *JSG* a Diary of international events, listing thematic and annual conferences of TSG, and the many other structure/tectonics groups that had subsequently formed around the world on similar lines to the UK's TSG. The first diary in 1986 listed TSG meetings on *Inversion Tectonics* organised by Graham Williams (Cardiff), in London, (December 1986), *Palaeostress and Fault Systems* (Richard Lisle, Swansea, February 1987), as well as publicising the two annual meetings for 1986 and 1987. The Diary in 1987 (*JSG*, Vol 9, No 4) lists a May 1987 *Alpine Tectonics* Meeting (Mike Coward, London), a summer Field Meeting in the Alps led by Rob Butler, and thematic meetings in October-November in Leeds, Cardiff, Bristol and Southampton. This gives a two-year glimpse of the variety of themes that were engaging members of the Tectonic Studies Group in its second decade.

As it is not feasible to list all of TSG's thematic meetings throughout the 1970s and 1980s, nor the evolution of themes in every annual meeting, without turning this account into a catalogue, we can only attempt a broad-brush. So for another viewpoint, we asked Ernie Rutter, who tells us he attended every meeting until the 1990s, and has only missed about 7

annual meetings to date: this is likely to be the record for anyone still standing. He writes from memory (pers. comm. 2020): "there certainly has been a succession of fashions, sometimes more than one in parallel. Apart from strain and folding, the 1970s was the decade of SEM and TEM, although EBSD fabrics were yet to appear. In the 80s we had extensional tectonic, inversion, foreland fold and thrust belts, and the emergence of greater participation from oil company people. From the 90s onwards there was much more attention given to faulting and fault rocks. I think numerical modelling had always been there, but with the techniques evolving."

While these themes were waxing and waning, and new ones appearing towards the end of the 20th century, we should also note that these fashions involved regional geology and tectonics, not just theory and modelling. At the 1979 annual meeting (Nottingham), of the 34 talks 20 were regional structure/tectonics, the majority on areas in Europe, especially GB and Ireland and the Alps, and 14 on theory/modelling, with folds, stress and strain, and faulting the predominant subjects. Ten years later, at the 1989 meeting at I.C. London, now expanded to three days, the programme was arranged as roughly topical sessions, with session 1 on the Himalayas, and session 2 covering USSR, Malaysia, Tunisia and Italy. Other sessions were by themes, with tectonic wedges, thrust zones, rifts and basins, lithosphere extension and shear zones emerging as popular topics, some representing directions in industry-related research. The Caledonides and Variscides in NW Europe still remained active topics, as TSG included leading participants from the British Geological Survey as well as universities and industry at home and abroad.

As the 1990s began, TSG had reached the point where most of the largest and most central UK universities were hosting AGMs for the second time, starting with Liverpool, Edinburgh and Southampton (1990-1992). In 1993 the AGM left UK shores for the first time, and was convened by Dave Johnston at Trinity College, Dublin, marking the important fact that the TSG had always included contributors from Ireland. The rest of the 1990s saw AGMs at Leeds (1994), Cardiff, Birmingham, Durham and St Andrews (1998). As noted earlier, there was no December AGM in 1999, at this point switching to January, where Manchester was the venue again (2000). This is a good point to note other developments during the 1990s.

During 1990, as a result of support from the *Journal of Structural Geology* board and TSG members, SHT initiated an International Association of Structural/Tectonic Geologists (IASTG) to encourage international communication among structural/tectonic geologists. This would take the form of a twice yearly International Newsletter to be published in *JSG*, replacing the annual Diary and providing far more information, including regular reports from TSG and other specialist groups around the world. *International Newsletter 1* (Spring 1991, in *JSG* 13/3) reported on the 21st TSG annual meeting that had been at Liverpool, and detailed forthcoming meetings for 1991 that included magmatism and the causes of continental break-up, at Burlington House London. This newsletter also provides information about the new *Ramsay Medal*, an award that was introduced in 1989 by chairman Ken McClay (Royal Holloway & Bedford College, London), to mark the 20th TSG. It was - and still is - awarded to an outstanding publication based on Ph.D. research, authored by the student. Rereading this account of TSG, thirty years on, reveals that it had ended stating that the retiring TSG chairman had agreed to write an article on 20 years of TSG in Britain, for the next international newsletter. This did not happen, and the only record we

have (apart from that notice) is a copy of a letter written by SHT (to the chairman) on her recollections of how TSG began. Which has proved very useful when writing the first sections of this article!

We will not repeat everything from the reports of TSG's activities from the twice yearly International Newsletters printed in *JSG* from 1991 to 2001, but simply draw attention to this printed record for future historians of TSG, as well as records from GSL's monthly *Geoscientist* magazines. The 1990s was probably the decade which saw the greatest increase in topical meetings, held at Burlington House, London or UK university venues: an average of three rising to four in 1994-1997. Too numerous to list, one by one, and many involving collaboration with many other specialist groups of GSL, there are some key players in TSG that led the way in energising these very varied topical meetings, in particular Rob Knipe (Leeds), Rob Butler (Leeds), Bob Holdsworth (Durham) and the Liverpool Fault Analysis Group of Juan Watterson and John Walsh. Topics include the role of structure and tectonics in magmatism, volcanism and planetary processes, reservoirs, passive margins, basement reactivation, melt segregation, fluid flow, salt tectonics, rates of processes, neotectonics, fault zones, and tectonics of the British Isles and Scandinavia.

The number of thematic TSG meetings listed in the International Newsletters (in *JSG*) appears to decline towards the end of the 1990s, but this can partly be explained by the *Geoscience* conferences initiative of the Geological Society and partner societies, a biennial international earth science meeting in the style of GSA, AGU, AAPG, and EUG. *Geoscience 98* (Keele, April) brought together in one time and place, a number of varied thematic sessions on deformation processes, fracture, fluid flow and tectonic of the British Isles, arranged by Butler, Kuszniir, Young, Casey, Holdsworth and Whalley. *Geoscience 2000* (Manchester, April) hosted sessions on fluid in fault zones, geodynamics, rifting, collision, modelling and the mantle (Knipe, Wilson, Cunningham, S Treagus, Turner and Lloyd). To our knowledge, this was the last *Geoscience* conference and the Geological Society's last attempt to convene a meeting for all the specialist and regional groups in one place, in this manner.

The Tectonic Studies Group saw another important change during the 1990s, with the development of the World Wide Web and the growth of email as the most useful method to communicate information rapidly. In February 1995, John Whalley (Portsmouth) created the *Geo-Tectonics* mailbase list: in his own words (pers. Comm. 2020) "a result of late-night bar conversations at the Tectonic Studies Group AGM" (Leeds, December 1994). This was to become the most important method of communicating information in the structure and tectonics community, on conferences, as well as dialogue among individuals, world-wide: as it is to this day. John Whalley announced his retirement as list owner, in April 2020, after 25 years of service, and we would like to thank him on behalf of TSG and the world-wide structure and tectonic community, for playing such an important part in the success of TSG for the second half of its 50-year life. The *Geo-Tectonics* email list is far more than a TSG enterprise, of course: but TSG was its birthplace. Once this list had become established as a user-based method of communicating news of TSG activities, meetings, abstract deadlines etc, as well as international conferences, it became clear that this was the most effective and rapid method of communication internationally, for TSG. At the same time, it became no longer feasible to continue maintaining the IASTG in the form of the International

Newsletters published in the Journal of Structural Geology (especially when SHT was no longer the chief editor), and so the international newsletters sections in JSG ceased in 2001.

As noted earlier, the year 2000 marked the change from December to January annual meetings: now back in Manchester again. We could summarise meetings and changing fashions, from 2000 to 2004, but neither Treagus was very actively involved in TSG by this time, so it would be better for TSG's story to be picked up by one of the younger generation of geologists maintaining the continued success of this group. The AGMs in Manchester, Leeds, Leicester, Liverpool, and Durham (2004) are testament to the energy of the structural/tectonic geologists at these universities, and their collaborations, noted earlier: Ernie Rutter, Dan Faulkner, John Wheeler, Dave Prior, Martin Casey, Geoff Lloyd, Rob Butler, Bob Holdsworth, Ken McCaffrey, John Dewey and Paul Ryan - to name a few, with many more rising in the ranks during this fourth decade. Most of these annual meetings remained 3-days covering a wide range of topics as ever, from collisional orogenic processes, transpression and transtension, to fractures and faults and microstructures and textures; and covering almost every continent. Keynote speakers were a signature of the Leicester meeting in 2002 (a controversial topic back in 1990); and the middle day of the Durham 2004 meeting was a morning field trip to the 90-fathom fault, and an afternoon programmed as the Shell Seminar (also controversial for some). The Tectonic Studies Group was always a broad church, a meeting place for different ideas, interpretations and opinions, and we hope this will remain in decades to come.

In 1989, the Ramsay Medal was introduced to mark 20 years of TSG; a set of 25 medals was cast (and another set, later), and each would be engraved with the recipient's name, for their prize publication based on Ph.D. work. Recipients are listed on TSG's web site. After the untimely death of Dave Johnston in 1995, a Dave Johnson Mapping Prize was introduced for the best undergraduate mapping project (nominated by departments). To honour the memory of Mike Coward (d. 2003), who played such an important part in TSG, the Mike Coward Prize is awarded for best student talk at a TSG annual meeting. The "best student poster" award was renamed the Sue Treagus Prize, at the Edinburgh TSG AGM in 2015. Thank you, TSG: I never expected to be a poster girl at my age!

Find out more about the Tectonics Studies Group here: <http://tectonicstudiesgroup.org/>



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