

TW:eed



Tetrapod World: early evolution & diversification

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August was the TW:eed Project's Microfossil Month at the University of Leicester. With the help of eight volunteers, from A Level to graduate level, they examined many samples from our main field site at Burnmouth. The aim was to record the microfossils present in sieved samples, and identify differences in the assemblages present in various rock types and stratigraphic levels throughout the Ballagan Formation.

During the month the volunteers learnt how to process and sieve samples, pick for microfossils, identify specimens and image them on the Scanning Electron Microscope (SEM). They also had time to examine some of the rock samples from our recent excavation at Chirside, discovering many fossils such as ostracods, bivalves, fish material and bones. This is helping to shed further light on the environments in which the tetrapods lived and which animals and plants they lived alongside.



Leicester Volunteers, copyright Carys Bennett, 2015

In September we held our regular team meeting, this time in Southampton, where some of the team were also speaking at the Symposium of Vertebrate Palaeontology and Comparative Anatomy. This was a two-day team meeting, the first day being taken up with individual talks about the work the various members had been doing, and the second, general discussions and workshops, as well as quite a bit of talk about how we'll be taking this project forward after next summer.

The geographical area we've collected these amazing fossils from is quite restricted, so there's lots more fieldwork to be done as well as plenty back at the lab!

We would have to choose a new Principal Investigator for this project, however, as Jenny Clack from Cambridge will have retired by that time, so will not be able to lead the project, though she will likely be involved. I suspect that many of the rest of the team would want to be involved.



Southampton team photo, copyright Team TW:eed

In late September several project members went to Brussels to take part in a symposium on Climate Change and Biodiversity Patterns in the Mid-Palaeozoic. They were contributing to a special session on the TW:eed Project. Individual members have presented papers before at specialist conferences on palaeontology, vertebrate palaeontology and sedimentology, but this was the first time different parts of the project had been invited to share their results at the same international meeting.

They gave presentations on a range of different topics including the environment of the Borders Region during the early Carboniferous, atmospheric oxygen levels at the time, the recovery of plant life following the end-Devonian extinction, the palaeoclimate of the early Carboniferous and the rich diversity of fishes and tetrapods we are now finding in Romer's Gap. Their presentations sparked a lot of discussion, especially in the tea break following the session.



Team members at IGCM, Brussels, copyright Tim Smithson

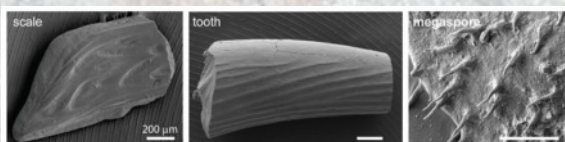
In October we published (online) a paper on lungfish diversity in the scientific journal *Palaeontology*, though the paper edition won't appear until January, 2016. The team named seven species of lungfish new to science, where previously there had only been one species known. You can read a summary of the paper on the project website if you're interested.

<http://www.tetrapods.org/public-outreach/publications/Lungfish-toothplates-paper-2015.html>

In November, Tim Kearsy (BGS) gave a talk about palaeosols at the Geological Society of America in Baltimore. The abstract of his talk can be read on the project website.

<http://www.tetrapods.org/public-outreach/publications/GSA-Palaeosols-talk-abstract.html>

Also in November, Carys Bennett (Leicester) gave a talk at the Micropalaeontological Association's annual meeting in Liverpool. She explained how the microfossil count, now over 9,000 specimens of scale, tooth and bone fragments of ray-finned fish, lobe-finned fish and sharks and rays, are helping us to piece together details of the environments in which these animals lived. This work has been the result of many years of microfossil picking with the help of Easter and Summer placement volunteers. It is gratifying that as a result of this hard work, this study will form the basis of an upcoming publication. Later in the month she spoke about the project to students at Newcastle University.



Microfossils: fish scale, tooth fragment, tree megaspore

In mid-December, several team members attended the AGM of the Palaeontological Association in Cardiff. Carys Bennett spoke about five new species of tetrapod which we have found and gave lots of interesting information about the palaeoenvironment in which they lived.

Kelly Richards (Cambridge) presented a poster about the shark remains she has been studying, amounting to about 10 new species from Whitrope Burn. She has submitted a paper about this.

Also from Cambridge, Tim Smithson's poster discussed the diversity of tetrapods from the Tournaisian, including those from Nova Scotia, and Tom Challands (Edinburgh) showed a poster of the fish remains he's found near Tantallon Castle east of



Team Tweed at the PalAss AGM, copyright Carys Bennett

Edinburgh, including several new species of lungfish. That is, in addition to the seven new species of lungfish we published a paper about earlier this year.

We were also delighted that Jenny Clack (Cambridge), Principal Investigator of the project, was presented with the PalAss's most prestigious award, the Lapworth Medal, for her lifelong contributions to palaeontology.



In the run up to Christmas, Carys Bennett and Janet Sherwin (Leicester) gave talks to the British Sedimentological Research Group at Keele University.

Futures

Nick Fraser (NMS) will talk to the Tweedales Society in Peebles on February 9th.

The NMS will open the exhibition they're preparing about the project on 19th February. This is free to visit and will remain open until mid-August. They've already started publicising it. You can see an online advert here <http://www.nms.ac.uk/national-museum-of-scotland/whats-on/fossil-hunters/>

Team members from the Cambridge, Leicester, Southampton and the BGS are preparing a paper about the new tetrapods which will be submitted shortly.

Several team members have submitted papers which will form a volume to be published by the Royal Society of Edinburgh in honour of the late Stan Wood. Kelly's shark paper will be one, Laura Porro (Royal Veterinary College), Carys Bennett (Leicester) and Jenny Clack have submitted a paper about a tetrapod jaw from Burnmouth, Per Ahlberg (Uppsala) has submitted one about a tetrapod jaw from Tantallon, Maggie Wood has written about work Stan did at Mumbie Quarry and Tim Smithson (Cambridge) and Ian Rolfe (NMS) have submitted an article about what made Stan such a brilliant collector. Other papers for this volume are being prepared.

Members of the team from Leicester, Southampton and the BGS are advertising a new PhD project investigating the evolution of tetrapod floodplain habitats over time. Based in Leicester, more information can be found at <http://www.centa.org.uk/themes/dynamic-earth/111/>