



The Ussher Society

Abstract Volume

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The Ussher Society



PURPOSE

1. To promote research into the geology, geomorphology and other aspects of geoscience in South-West England and geologically related areas.
2. To hold an Annual Conference at various places within south-West England where those engaged or interested in this research can meet both formally, to hear original contributions and progress reports, and informally to effect personal contacts.
3. To publish the proceedings of the Annual Conference and other papers relating to geoscience in South-West England.
4. To organise field excursions.
5. To encourage other geoscience-related activities which the Management Committee may from time to time deem appropriate.

CONSTITUTION

Membership is open to anyone with an interest in geoscience in South-West England on written application to the Secretary and payment of the relevant subscription.

An *Annual Business Meeting* shall be held during each Annual Conference and shall elect a Management Committee and two auditors for the succeeding year.

Subscription shall be set by the Annual Business Meeting and shall be due on 1st January each year.

The affairs of the Society will be managed by a *Management Committee* consisting of a Chairman who shall hold office for not more than two consecutive years and who shall not be eligible for re-election to the office for a further two years; a Vice-Chairman who shall serve for the first year as Chairman-elect and, after two years as Chairman, for one further year as retiring Chairman; a Secretary, a Treasurer, an Editor and a Website Manager, any of whom may be eligible for re-election and who on leaving office shall normally retain Committee membership for one additional year and four others, any of whom might be eligible for re-election up to a maximum term of three years. The Committee shall have powers to co-opt.

Amendment of the Constitution may be effected by simple majority vote at the Annual Business Meeting.

Revised Constitution approved at the Annual Business Meeting St Ives January 2008.

The Ussher Society

ABSTRACTS



THE SCOTT SIMPSON LECTURE

THE CAVES OF EASTERN SOUTH DEVON – QUATERNARY FAUNAS, ARCHAEOLOGY AND LANDSCAPE EVOLUTION

Chris Proctor

Torquay, Devon, TQ2 6DS

The importance of the South Devon caves has been recognised since the early nineteenth century. Recent investigations have shown that Quaternary deposits spanning at least the last 500,000 years exist in the region's caves. Long sediment records extending well back into the Middle Pleistocene preserve evidence of regional climate change at Kent's Cavern and sea level change at Berry Head. Fauna and archaeology dating from the late Cromerian are preserved at Kent's Cavern, and from the Aveley Interglacial at Tornewton



Cave and Cow Cave. The latter site also helps date the incision of the Kate Brook near its outlet into the River Teign. A rich Ipswichian Interglacial fauna is present at Joint Mitnor Cave, and Tornewton Cave has faunas dating from the late last interglacial complex. Kent's Cavern preserves an outstanding record of Middle Devensian to Holocene fauna and archaeology. Important Late Glacial to Holocene archaeology also occurs in the Torbryan and Chudleigh caves.

THE PEATS OF PENZANCE: INTERPRETATIONS OF A NEW EXPOSURE AT EASTERN GREEN

Laura Basell¹, B. Morris, Ralph Fyfe, D. Challinor,
J. Bampton and S. Walls

¹*Queen's University Belfast, Belfast*

This paper reports on archaeological and palaeo-environmental investigations undertaken in 2016 by South West Archaeology Ltd on land off Eastern Green, Ludgvan, Penzance prior to development. The site is primarily of palaeoenvironmental significance, since the only archaeology recorded during fieldwork was a sherd of unstratified eighteenth century stoneware. New dates on peat deposits and palaeoenvironmental results will be presented, and their significance considered in their local and regional context. Although minimal artefactual evidence of human activity was found during excavation, sampling and analysis, the peats and the palaeoenvironmental data they contain are of value in regional interpretations of Holocene landscape change, sea-level change, and understanding human-landscape interaction. The dating and analysis of this sequence supports a pattern seen elsewhere in the UK; namely that the 'submerged forests' and coastal peats are part of complex sedimentary sequences and further research is required to elucidate their chronostratigraphic relationships. The site demonstrates the importance of contract archaeologists in recording and sampling such time-limited exposures, and the potential for geoarchaeological research on deposits of this type in the South West peninsula.

DISPUTES AMONGST GENTLEMEN GEOLOGISTS: OLD NOLL'S STONES AND THE PROVENANCE OF THE SOUTH DEVON SCHISTS

Jenny A. Bennett and John D. Mather

Crockernwell, Exeter, Devon

Early workers recognised that schists cropping out in South Devon were metamorphic rocks. It was suggested that these schists and the slates to the north formed one formation part of which had been metamorphosed by a boss of granite approaching the surface in adjacent parts of the English Channel. A local amateur geologist, Arthur Roope Hunt, discovered that local fishermen often picked up blocks of granite in their trawls. He acquired a block landed by a Brixham trawler and investigated others, known as Old Noll's Stones, incorporated into local buildings. In his view these blocks confirmed there was a submarine granite formation offshore which accounted for the metamorphism of Devonian sediments. Concurrently the South Devon rocks were examined by Thomas George Bonney, Professor of Geology at University College, London, who concluded that the schists and slates were quite distinct, with the schists older and of Precambrian age. There followed an extraordinarily acrimonious dispute, over the provenance



of the schists, between Hunt and his colleagues in Torquay and Bonney in London. Carried out in the pages of the *Geological Magazine* and the *Transactions of the Devonshire Association*, the exchanges show the friction existing between those who regarded themselves as trained geologists and amateurs, whose opinions they ignored.

MINERALOGICAL CHARACTERISATION OF THE REDMOOR (W-Sn-Cu) SHEETED VEIN SYSTEM

Alice Bird¹, Robin Shail, Gavyn Rollinson, James Blight and Jens Andersen

¹*Camborne School of Mines, College of Engineering, Mathematics and Physical Science, University of Exeter, Perryn Campus, Penryn, TR10 9FE (student)*

Selected diamond drill core samples from the Redmoor Sheeted Vein System (SVS), currently being appraised by Cornwall Resources Limited, have been investigated using a combination of transmitted/reflected optical microscopy, scanning electron microscopy and QEMSCAN analysis.

The Redmoor Sheeted Vein System is entirely hosted by variably contact-metamorphosed slates of the Tavy Formation. The earliest episode of magmatic-hydrothermal mineralisation is marked by tourmaline veins. These are extensively overprinted by the development of a greisen-bordered sheeted vein system characterised by a quartz-wolframite-cassiterite-arsenopyrite-löllingite-bismuth-fluorite assemblage. Later sulphide-dominated mineralisation comprises chalcopyrite-sphalerite with minor cassiterite/stannite. The last significant episode of mineralisation is represented by pyrite and siderite, probably related to the regional cross-course system.

These findings largely support work undertaken on South West Minerals' core samples during exploration and appraisal in the 1980s. However, advanced analytical techniques allow more effective mapping of mineralogical and textural characteristics. Wolframite is largely unaltered although, ferberite is developed at grain margins. Sphalerite is a minor mineral but generally exhibits 'chalcopyrite disease'. An unidentified, possibly new, Mo-W-S mineral was identified in two samples. An investigation into the role of cross-course fault systems in controlling the distribution of W-Sn-Cu demonstrated no strong correlation between mineralisation (grade, mineral association, intermetallic correlation) and proximity to the cross-course faults.

DEPOSITS OF THE RIVER AVON IN CENTRAL BRISTOL

Alan Cattell

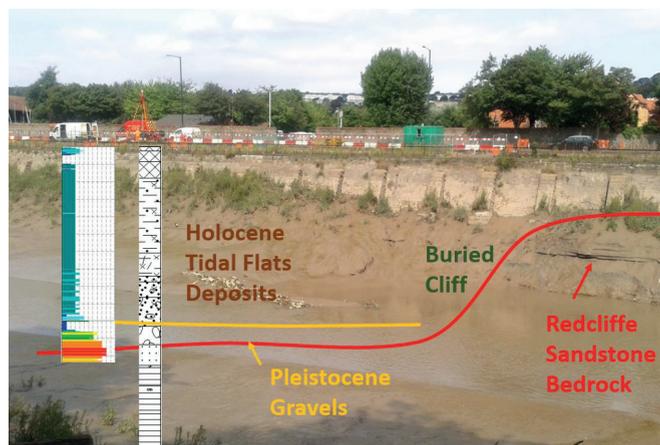
Structural Soils Ltd, Bristol, BS3 4EB

New data are presented on the Pleistocene and Holocene deposits of the River Avon in central Bristol, based on numerous recent site investigations. Bedrock beneath this stretch of the river is Mercia Mudstone, and the shape and form of the flood plain are controlled by the contrast between resistant Redcliffe Sandstone and weaker mudstones. For example, a Pleistocene cliff in sandstone buried beneath Holocene sediments can be traced for over 1.5 km.

The oldest strata are gravels, of presumed Pleistocene age, mainly hidden beneath the Holocene flood plain. They occur as two distinct gravel terraces, with a 5 m difference in level, and presumably a significant time gap, between them.

Sea level rise in the Holocene led to the river becoming tidal, and deposition of finer sediments, which infilled and overflowed the channel. Sands are locally developed at the base, but generally sediments are laminated silts and clays with some peats, the latter being more widespread in embayments and tributaries, all overlain by less well laminated clays.

Laboratory and *in-situ* test data will be presented for these strata, which will be compared with true alluvial strata upstream at Bath and true Tidal Flats Deposits downstream at the coast.



THE CHARACTERISATION OF CORNISH CROSSCOURSES

Craig, F.D.A.^{1,2}, Claridge, H.², Shail, R.K.¹, Yeomans, C.M.^{1,3}, Rollinson, G.K.¹ and Colgan, B.²

¹*Camborne School of Mines, College of Engineering, Mathematics and Physical Science, University of Exeter, Perryn Campus, Penryn, TR10 9FE*

²*Cornish Lithium Limited, Tremough Innovation Centre, Penryn, TR10 9TA*

³*British Geological Survey, Environmental Science Centre, Keyworth, Nottinghamshire, NG12 5GG*

This study combines historic geological and mining date, GIS mapping, fieldwork and sample analysis to produce a model for Cornish crosscourse faulting. Several crosscourse faulting. Several crosscourse fault zones on the north Cornwall coast have been investigated. Key data include fault orientation, kinematics, fault rock types, damage zone width and relative chronology. Faults typically strike NW-SE and their development may be influenced by earlier late-Variscan shear zones. Many faults indicate extensional kinematics and precipitation of vein quartz that is presumed to reflect Triassic ENE-WSW regional extension and the wider occurrence of crosscourse mineralisation [1,2,3]. These are variably overprinted by oblique to strike-slip reactivation episode(s) of late Jurassic

Neogene age. GIS analysis was carried out on a range of data sets to map prospective faults of significant strike trace length SE from the coast towards the Carnmenellis Granite. Offshore bathymetric data was also used to extend fault traces to the NW. The integration of mapped lineaments allowed key structures to be identified and correlated with those observed during fieldwork and in historical mining records [4,5,6]. A preliminary crosscourse classification has been produced and the potential factors influencing prospectivity for the extraction of lithium-enriched geothermal fluids evaluated. The post-Triassic reactivation episodes play a significant role in enhancing intrinsic fault zone permeability and the contemporary in-situ stress regime may enhance dilatancy along these fault zones; allowing significant permeability to be maintained at depth.

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EVOLUTION OF THE HELFORD RIVER, FALMOUTH BAY, SOUTH CORNWALL

Peter Ealey

Manaccan, Helston, Cornwall, TR12 6JG

The E-W aligned Helford River is developed in SE dipping Variscan thrust mid-Late Devonian metasediments, bordered to the north by the Early Permian intruded Carmenellis Granite and to the south by the Lizard Ophiolite nappe, on which there is a small outlier of 'Tertiary' Crousa Gravels. These gravels, resting on a supposed Pliocene planation surface, have dominated previous discussions of the river's development. Re-examination of their depositional setting indicates that the local bedrock topography is characterised by linear ridges and depressions in one of which the present channelised Crousa Gravels lie. It is postulated that they are an exhumed older Permo-Triassic or Mesozoic deposit, pre-dating the Helford River and related to the uplift and denudation of the Carmenellis Granite. The Helford River itself with its trellis drainage, following pre-existing post-Variscan faults, initially formed in a broad Paleogene depression, which was subsequently deeply incised in its centre. By the Middle to Late Pleistocene, if not earlier, estuarine conditions had been established in both the Helford and Fal. The Fal and Helford originally formed part of a



larger Cenozoic fluvial system that continued offshore and was truncated by subsequent coastal erosion of Falmouth Bay.

THE LATE DEVONIAN MASS EXTINCTIONS OF BRACHIOPODS: EXPRESSION IN SW ENGLAND, AND POTENTIAL IMPLICATIONS

Thomas Gibson¹ and Kevin N. Page²

¹*Camborne School of Mines, College of Engineering, Mathematics and Physical Science, University of Exeter, Perryn Campus, Penryn, TR10 9FE*

²*University of Plymouth, United Kingdom, Drake Circus, Plymouth, PL4 8AA, UK*

The Late Devonian Mass Extinctions have long been recognised in SW England and played an important role in the establishment of the Devonian system, though recent studies have neglected this home region in favour of more coherent sections abroad. This study visited a series of historic outcrops, recording the brachiopod occurrences and facies associations, with the aim of reconstructing brachiopod extinction patterns, and attempting to discern causes. North and South Devon show two discreet, divergent facies and faunal successions, with the South showing a collapse of brachiopod diversity, likely related to regional deepening and anoxia, in contrast to northern diversification associated to persistent favourable conditions. The extinction of the orders Atrypida and Pentamerida were recognised, alongside the superfamilies Anoplothecoidea, Unioidea, and Ucinuloidea, in agreement with the broader literature. Several more local extinctions are recognised, which may be due to incomplete records, or local conditions in the Devonian basins of SW England. These diverging facies and faunal successions may be related to the newly redrawn terrane boundary.

MICROFAUNAL ANALYSIS OF THE WATTONENSIS BEDS (UPPER BATHONIAN) OF SOUTH DORSET

Malcolm B. Hart, Kevin N. Page, and Gregory D. Price

School of Geography, Earth & Environmental Sciences, University of Plymouth, Drake Circus, Plymouth PL4 8AA

The Wattonensis Beds (Upper Bathonian) are exposed in the low cliffs to the east of Rodden Hive Point (Dorset) and are approximately 1 m thick. The grey mudstones are overlain by the Elongata Beds at the base of the overlying Frome Clay Formation (= 'Upper Fullers' Earth Clay' aucct.), which are c. 2.5 m thick. The boundary (left image) between the two units



appears to be sharp, but there are no signs of bioturbation or erosional features. The location is a Geological Conservation Review (GCR) site and access is controlled, as is the collecting of material which requires permission. The exposure is badly degraded, and appears to be in worse condition than in 2008, when last visited. This GCR site is famous for the abundance and diversity of the otolith (fish ear bones) fauna, first described by Stinton and Torrens (1968). The presence of this otolith assemblage is confirmed. With the otoliths are a number of statoliths, the aragonitic bones found in the heads of squid-like cephalopods and currently un-described. Many of the otoliths and statoliths are encrusted with adherent foraminifera, as are the numerous shell fragments found in these clays. Associated with the statoliths are a number of arm hooks from ‘fossil squid’ none of which have previously been described.

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**MICROFAUNAL ANALYSIS OF CAVE SEDIMENTS:
CORBRIDGE CAVE, BERRY HEAD, DEVON**

Malcolm B. Hart¹ and Christopher J. Proctor²

¹*School of Geography, Earth & Environmental Sciences,
University of Plymouth, Drake Circus, Plymouth PL4 8AA*
²*37 Grenville Avenue, Torquay TQ2 6DS*

In the Berry Head Limestone Member of Berry Head (Torbay), there are a number of solution caves, of which Corbridge Cave is the largest known. Nearly twenty years’ ago, Corbridge Cave and its cave sediments were described by Proctor and Smart (1991), and this included a series of comments on the foraminifera provided by the late Professor Brian Funnell (University of East Anglia). Many of our current suite of samples (collected in 2018) contain foraminifera, thin-valved ostracods and macrofaunal debris (e.g., echinoderm spines). Almost all of the diverse assemblages of foraminifera are of small size (maximum 150–250 µm) and this suggests that they may have been transported into the cave system by storm or wave action. All of the recorded species are well-known in Tor Bay, including the sea grass meadows, a large area of which is known from near the Brixham Breakwater. With few evolutionary changes during the late Pleistocene, the foraminifera can only provide limited

stratigraphical information, except by using stable isotopes derived from a suite of closely-spaced samples. The present suite of samples may not be able to provide this degree of resolution.

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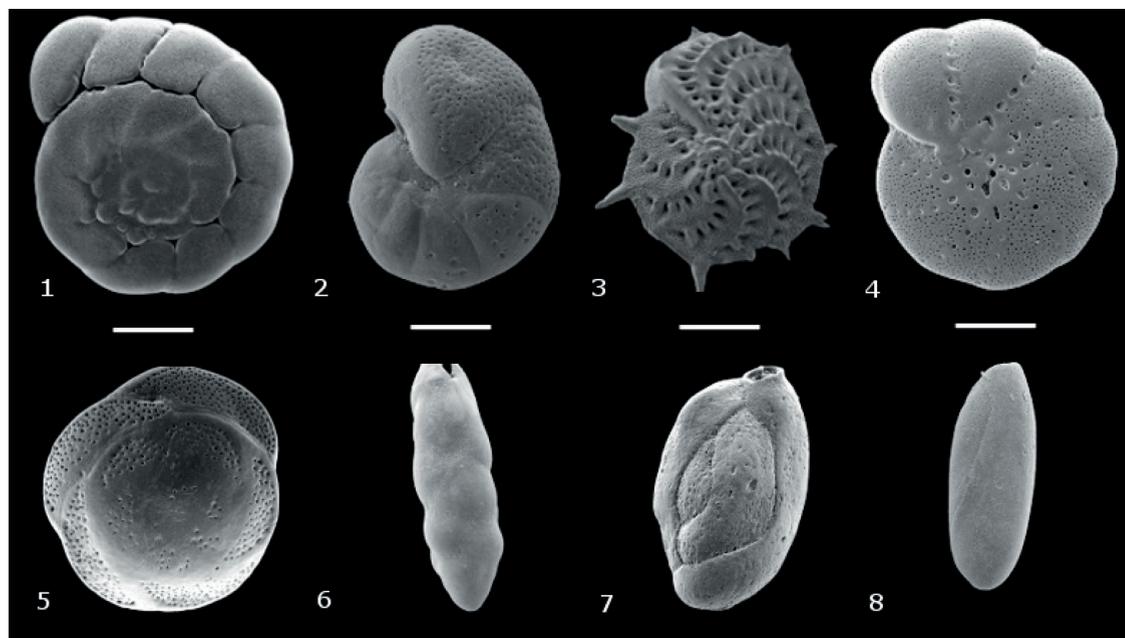
Proctor, C.J. and Smart, P.L. 1991. *Journal of Quaternary Science*, 6(3), 233–244.

**LANDSCAPE AND BEYOND – EXPLORING THE
INTERFACE BETWEEN GEOLOGY AND ART**

Frank Howie

St. Austell, Cornwall, PL26 7EP

From the earliest ceramics and cave paintings to Roman murals, Chinese landscape paintings and Leonardo’s art, from medieval divine retribution, comets and enlightenment literature to the rise of volcanology and the 19th C ‘geological sublime’ to the ‘creation’ of the anthropocene, geology and art are intimately entwined. These connections are reviewed with particular examples drawn from recent exhibitions in the UK and elsewhere and from the visual art movement in South-west England.



GEOLOGY AND MINERALISATION OF POLDARK MINE (WHEEL ROOTS) AND THE WENDRON MINING DISTRICT

Jane Lenton¹, Robin Shail¹, Hannah Hughes
and Gavyn Rollinson

¹*Camborne School of Mines, College of Engineering,
Mathematics and Physical Science, University of Exeter,
Penryn Campus, Penryn, TR10 9FE (student)*

Poldark Mine, near Helston, is a major Cornish Mining World Heritage Site attraction. It is based around the poorly known eighteenth century Wheel Roots workings and provides an insight into mineralisation within the Wendron Mining District of the Carnmenellis Granite. Our study is based on new underground mapping and sample analysis by transmitted/reflected optical microscopy, XRD, SEM and QEMSCAN.

Five principal episodes of structurally-controlled fluid flow, vein development and associated wall rock alteration have been recognised: (1) greisen (quartz-white mica \pm fluorite) associated with the development of a cassiterite- and specular hematite-bearing Horse Whim Shaft 'carbona'; (2) quartz-tourmaline (black then blue) \pm cassiterite; (3) polymetallic quartz-chlorite-chalcocopyrite-bornitearsenopyrite \pm fluorite (rare); (4) quartz \pm hematite; (5) late chalcedony. Rare hydrated Fe (Al) phosphates vivianite and childrenite also found.

Episodes (1-3) correspond to granite-related magmatic-hydrothermal mineralisation, although only (1) and (2) were historically worked. (4) represents the regional 'cross-course' episode and (5) post-Triassic (Cenozoic?) intraplate shortening. The quartz-tourmaline \pm cassiterite mineralisation is controlled by steeply-dipping ENE-WSW striking extensional fault systems. In contrast, the earlier development of the greisen carbona, and subsequent post-cross-course deformation is strongly influenced by sinistral strikeslip on the NNE-SSW fault system, exploited by Jewson's Crosscut.

DEVELOPING A MODEL FOR THE STRUCTURAL AND MINERALOGICAL CONTROLS ON HIGHER-GRADE W MINERALISATION IN THE HEMERDON W-Sn DEPOSIT

Alex Marshall¹, Laurie Hassall, Robin Shail, James McFarlane,
Gavyn Rollinson, Andrew Moore and Luke Palmer

¹*Camborne School of Mines, College of Engineering,
Mathematics and Physical Science, University of Exeter,
Penryn Campus, Penryn, TR10 9FE (student)*

The Hemerdon W-Sn Deposit is centred on a >100 m wide, NNE-striking and steeply dipping, Early Permian granitic dyke. Wolframite and cassiterite is primarily hosted by a variety of sheeted veins. The aim of this study was to investigate and better understand the structural and mineralogical controls on higher-grade W mineralisation.

Historical diamond drill core log records were scrutinised and compared with observations made during core logging of historical and new diamond drill core from different high-grade zones within the deposit. Core samples were analysed with transmitted/reflected light microscopy, SEM and QEMSCAN to understand mineral associations within, and adjacent to veins.

Our revised paragenetic sequence introduces a wolframite precipitation episode prior to quartz-greisen vein development;

early K-feldspar veins are re-fractured, and quartz-wolframite precipitated. Later, presumed, lower-temperature and lower salinity fluids were associated with greisenisation and further wolframite precipitation. QEMSCAN analysis indicates small cassiterites enclosed by larger wolframite crystals and suggests not all cassiterite post-dates wolframite precipitation. Moderately NNW-dipping quartz-greisen veins are dominant in the G10 S compartment of the deposit, while quartz-feldspar vein sets occur further N and dip moderately NW, and steeply SE. The juxtaposition of these different domains may reflect faulting and erosion.

CORNISH LITHIUM: A NEW METAL FROM AN OLD MINING AREA – LITHIUM EXPLORATION IN SW ENGLAND

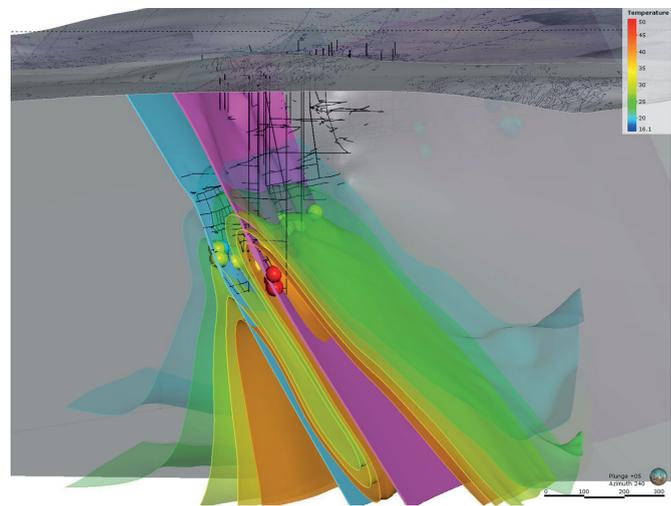
Adam Matthews¹, George Fry¹, Terry Cotton

¹*Cornish Lithium, Tremough Innovation Centre, Penryn,
Cornwall, TR10 9TA*

Cornwall was a major European producer of tin and copper from the Bronze age, but the remaining mines closed shortly after 1985 due to the international tin market crash – rather than a lack of ore. By using modern exploration techniques, Cornish Lithium are recognising new opportunities within the county.

The progress of some deep mines in Cornwall, such as United Mines (500m below the surface), was impeded as deep levels were inundated by hot water (up to 50°C) flowing from permeable faults and dykes. Geochemical analysis of these fluids has identified lithium present in elevated concentrations (50–220mg/l Li) in many hot springs throughout Cornwall. The fluid compositions are also similar over a large geographic area, indicating that fluid production is likely a regional phenomenon. Cornish Lithium believes that this source of lithium can contribute to both global supply and European resource security.

To understand the distribution of lithium enriched geothermal fluids, Cornish Lithium is building a 3D fracture network from historical data. Hydrological parameters can be assigned to each structure to build an understanding of reservoir connectivity and flow pathways. Understanding how the fluids move and interact with the host rock will greatly inform Cornish Lithium's exploration programme.



A NEW LOOK AT THE MIDDLE DEVONIAN STRATIGRAPHY AND ENVIRONMENTS AT HOPE'S NOSE, TORQUAY (DEVON).

Kevin N. Page

School of Geography, Earth and Environmental Sciences, Plymouth University, Drake Circus, Plymouth, PL4 8AA, UK

Hope's Nose is one of the best-known Devonian localities within the historical type area of the System in Devon. It is visited annually by hundreds of students and its rich reef-phase faunas have been sketched in countless field notebooks. But what do we really know about the bedrock geology of the headland, and how accurate are the interpretations presented to students? Surprisingly little has been published on the detailed geology of the site, most studies being in unpublished PhD theses, and that which has been published often does little more than review reviews. Faced with an increasing awareness of the deficiencies in published studies after many years of use for field teaching, in mid-2018 it was felt that a detailed re-assessment of the geology of the site was essential. This project required a comprehensive stratigraphical study to attempt to unravel a sedimentological and environmental story from the disruptive overprint of Variscan and (probably) post-Variscan tectonics. The results facilitate a new interpretation of the succession of Devonian facies and faunas, and hence new insights into the structure of the headland, which is spectacularly well exposed. This new information can now be used to properly underpin future educational use of the area.

A NAUTILOID WITH VENTRAL BITE MARKS FROM THE CHARMOUTH MUDSTONE FORMATION (LOWER JURASSIC) NEAR LYME REGIS, DORSET, UK.

Andrew, C., Howe, P. and Paul, C.R.C.¹

¹*Faculty of Science, Earth Science, University of Bristol*

Locally within the Charmouth Mudstone Formation (Sinemurian, Lower Jurassic) of the Dorset coast fatally bitten ammonites with ventral bite marks are common. We report the first ventrally bitten fossil nautilus. Ventral bite marks occur ventrally at the rear of the body chamber. The predator probably severed attachment muscles, thus removing its prey more easily. The bitten nautilus is unusual in that the large bite mark is entirely within the phragmocone. The nautilus is juvenile with a very short body chamber extending 46° back from the



undamaged aperture. The whorl cross-section is nearly circular, giving the predator little to grip when biting. Nautiloid shells are also thicker than ammonite shells. Despite these difficulties, the predator bit repeatedly and damaged both the shell and septa. Five rounded bites occur on the exposed left side, separated by sharp points. The last whorl includes twelve phragmocone chambers. The last two calcite filled chambers are undamaged. Then follow six sediment filled chambers. The bite mark spans the rear four. The front two sediment filled chambers suggest the bite extended further forward on the unseen right side. The centre of the bite is 160.5° back from the aperture, close to the mean value for ammonites (184.5°).

THE PARAGENETIC EVOLUTION OF POLYMETALLIC (W-SN-CU-ZN-U-BI) MINERALISATION IN THE DOLCOATH SECTION OF SOUTH CROFTY MINE

Jordan Roberts¹, Robin Shail, Gavyn Rollinson, Jens Andersen, Aaron Wilkins and Samantha Rae

¹*Camborne School of Mines, College of Engineering, Mathematics and Physical Science, University of Exeter, Perryn Campus, Penryn, TR10 9FE (student)*

A combination of transmitted/reflected optical microscopy, electron microprobe and QEMSCAN (automated scanning electron microscopy) analysis has been undertaken on diamond drill core acquired in 2008–2013, during exploration of the Dolcoath section of South Crofty Mine (west of the Great Cross-course). It has confirmed a similar paragenetic evolution to that described in previous studies across the wider Camborne-Redruth Mining District. Six, largely fracture-controlled, mineralisation stages have been recognised within the Mylor Slate Formation and underlying Carnmenellis Granite. An early skarn assemblage hosting pyrrhotite-pyrite (sphalerite ± chalcopyrite) is succeeded by a quartz-black tourmaline ± cassiterite. It is followed by a quartz-blue tourmaline-cassiterite assemblage that was the dominant mineralisation at greater depths within the mine. The dominant style within the upper c. 500 m of the Dolcoath section occurs as a quartz-chlorite-sulphide ± cassiterite and is characterised by a strong chlorite wall-rock alteration that variably overprints earlier parageneses. The final episode of magmatic-hydrothermal mineralisation is associated with the development of caunter lodes and comprises quartz-chalcopyrite-cassiterite (stannite) ± arsenopyrite. The chalcopyrite is extensively oxidised to form secondary coppers of bornite and chalcocite. Cross-course and later mineralisation is represented by quartz-hematite-sphalerite-chalcopyrite ± uranium ± bismuth and minor copper secondaries.

A SPECTRAL GAMMA-RAY LOG FOR THE MERCIA MUDSTONE GROUP (DEVON COAST): CORRELATION AND PALAEOENVIRONMENTAL INTERPRETATIONS

Alastair Ruffell

Queen's University Belfast, Belfast

Total count gamma-ray logs are acquired downhole and at outcrop to facilitate rock evaluation and assist correlation. Spectral gamma-ray logs identify the three main radiogenic isotopes of rocks (K, U and Th), and can be used to suggest heavy mineral/diagenetic horizons and most contentiously, have been used as a proxy for penecontemporaneous hinterland weathering. The latter supposition is based on soluble K and U being leached from the hinterland, and this relative Th-enrichment being retained in clay minerals during transport and deposition. With the above uses in mind, 556 spectral

gamma-ray measurements were taken from the entire (bar some inaccessible/unexposed horizons) Mercia Mudstone Group, between Sidmouth and Seaton on the Devon Coast. The first aim was to see whether the gamma-ray log breaks identified in Lott *et al.*, (1982) could be compared to those exposed and named by Gallois (2003; 2018): *some are and some are not*. The second aim was to assess what effect the Carnian Pluvial Episode (Dal Corso *et al.* 2018) had on Th/K and Th/U ratios, which should increase during this episode of humid weathering: *they do not*. The reasons for these correlations and issues in using Th/K and Th/U in palaeoclimate studies will be discussed.

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BRITISH TRIASSIC PALYNOLOGY – IT BEGAN WITH A SPORE FROM BRISTOL

Geoff Warrington

*School of Geography, Geology and the Environment,
University of Leicester, Leicester LE1 7RH*

A description and photographs of spores of the bryophyte *Naiadita* from the Cotham Member of the Penarth Group (Rhaetian, late Late Triassic) at Pylle Hill, Bristol, published in 1901, constitute the earliest record of palynomorphs from the Trias in Britain. Mid-Triassic spores and pollen from Worcestershire were illustrated in 1910 but the subject was essentially dormant until a comprehensive study of *Naiadita*

and its spores appeared in 1938. *Naiadita* was then known from the Cotham Member around Bristol and other sites in Somerset, Gloucestershire, Warwickshire and Worcestershire; it has since been reported from boreholes in Dorset and Oxfordshire. The spore has greater geographical and stratigraphical ranges than the parent plant and has been recorded from Austria, Poland, Switzerland, the Middle East and N. Africa, and from deposits ranging from Early to Late Triassic, but principally Carnian to Rhaetian (Late Triassic), in age. In the British Isles it is known from the Arden Sandstone Formation (early Late Triassic) in central and southern England and from younger deposits, principally the Cotham Member, at sites from Yorkshire to Devon, and in Northern Ireland, Wales and offshore. Originally referred to as 'spores of *Naiadita*' the spore is now known as *Porcellispora longdonensis*.

HYDROGEOLOGY OF THE ISLES OF SCILLY

Nik Whalley

South West Water, Exeter

From spring 2020 South West Water's licence is due to be extended to include the Isles of Scilly, subject to an amendment to the Water Act and the company's licence. The predominant water source on each of the five permanently inhabited islands is groundwater. We have therefore been working to develop our understanding of the geology and hydrogeology of the islands.

The Isles of Scilly comprise over 140 islands and rocky islets, located approximately 30 miles south west of Land's End. The underlying bedrock of Permian granite, an extension of the Cornubian Batholith, is overlain by weathered deposits. There are two main forms of superficial sediments: angular Head (or Ram) and Blown Sand. The differing hydrogeological properties of the granite and its weathered products have a significant impact on the availability and spatial distribution of the islands' water resources.

This hydrogeological review summarises historical studies and recent hydrological and water quality investigations. The extended dry weather period in summer 2018 demonstrated the risk of low rainfall to water supply, providing an ideal opportunity to assess the impact of low groundwater levels on source yield and water quality, including improved understanding of saline intrusion risk on the islands.