

## FORTESCUE WILLIAM MILLETT (1833 – 1915): THE MAN AND HIS LEGACY IN SOUTH-WEST ENGLAND

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Fortescue William Millett (1833-1915) was one of the leading micropalaeontologists of the late 19th Century. His work concentrated on modern and living foraminifera, some of which were collected from the marine sediments around Cornwall and Devon. He also studied the marine clays of the St Erth Formation, which contain a distinctive and diverse assemblage of foraminifera and Ostracoda together with some enigmatic bolboformid-like microfossils. The presence of these Plio-Pleistocene sands and clays perched on the Palaeozoic basement provides evidence of sea levels significantly higher than the present day.

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### INTRODUCTION

Fortescue William Millett was born on the 6th (or 20th) August 1833 in Marazion (near Penzance), Cornwall. The confusion of his birth date arises from the two dates available to us: the 6th August is recorded in the *International Genealogical Index* while the 20th August is given by Richard Hodgkinson (2006) in his review of the life and work of Millett. His father, Fortescue Millett (1811–1852), and his mother Joanna Teague (1812–1871) were married on the 20th August 1832 and this may be where the confusion of dates has arisen. Their marriage is recorded in the Parish Register as having taken place in Redruth, Cornwall. We also know that Millett had a younger sister, Josepha H. Millett who was born in 1835 (also in Marazion).

Fortescue Millett (senior) had been christened on the 29th October 1812 at Saint Hilary in Cornwall, the son of William and Josepha Millett. We know little of Millett's background or upbringing in Cornwall and, at this early stage in his life, there is no record of any interest in geology or palaeontology. It is thought that his father was a Registrar of Births, Marriages and Deaths in the St Michael's Mount area of Penzance. On his father's death (in 1852) the young Fortescue Millett went to live with his mother and uncle (John Fortescue Millett) in North Street, Marazion. John Millett also died in 1852, leaving the young Fortescue Millett a substantial legacy which he would inherit "on reaching his majority".

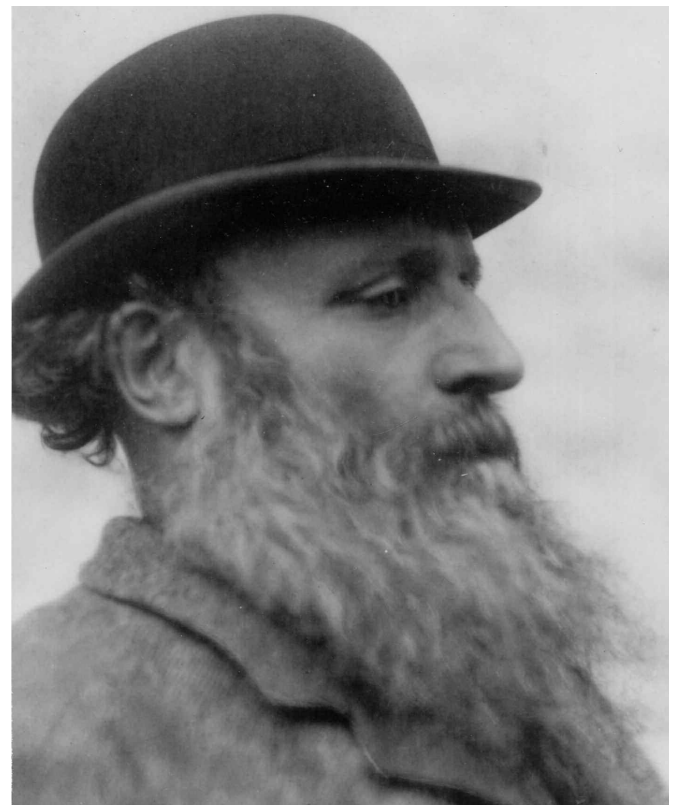
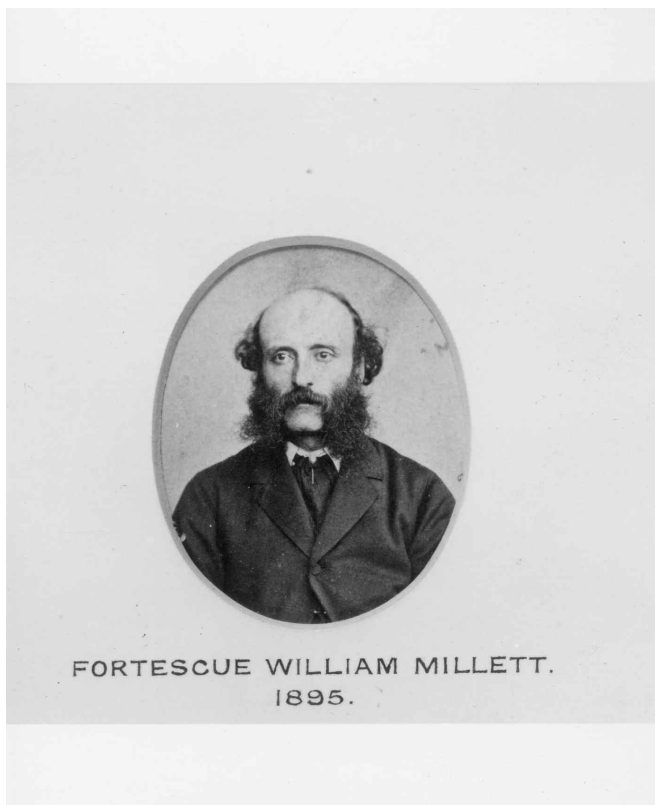
In 1853, at the age of 20 years (and before receiving his inheritance), he moved to London and began work as an "engineer". We know very little of what happened to him in London and there appear to be no records of the work he undertook in the 30 years before his "retirement". The entry reads

Fortescue W. Millett, age 48, born Marazion,  
Manager to hydraulic engineer, Civil Engineer.  
sister Josepha H. Millett, age 46, born Marazion  
cousin Matilda J. Millett, age 38, born Newlyn  
+ visitor and servant

The same 1881 Census data for Marazion shows that some of the Millett family (Robert E. M. Millett, wife Sarah O. Millett and two servants) were living in Gazebo House, Fore Street, Marazion. In North Street, Marazion, lived the Curnow Family (Henry Curnow, mother Elizabeth Curnow, a housekeeper and a "boarder"). The boarder (listed as having independent means) was another member of the Millett family (Elizabeth Millett), although we have not been able to trace her relationship to the rest of the family. There is a web site [<http://tonymillett.tripod.com/biographies.html>] dedicated to the history of the Millett family which is managed by Tom Millett in New Zealand. These data certainly show that the Millett family were still residing in Marazion and it is unsurprising, therefore, that on retirement Fortescue Millett might return to that location two years later. It was, however, during this thirty year residence in London that Fortescue Millett became recognised as a naturalist and a member of societies devoted to the study of foraminifera (Figure 1).

### MILLETT THE MICROPALAEONTOLOGIST

As indicated earlier, Millett was working in London as an "engineer" but, at the age of 32 years in 1865, he is recorded as being a founder member of the Quekett Microscopical Club. This club declined to use the name "Society" when it was founded in order to recognise the amateur status of the majority of its members. Despite that name it remains a registered charity and a learned society. The club publishes a Bulletin (for news, articles and reports of meetings) and a well-respected Journal. This Journal is a highly regarded scientific publication which is regularly cited in other publications. The club is named after a famous Victorian surgeon and microscopist, John Quekett. The Quekett Microscopical Club has a vibrant website hosted by The Natural History Museum in London. Membership of the club is now on the basis of personal



**Figure 1.** Pictures of Fortescue William Millett in middle and old age, reproduced with the permission of the Natural History Museum (London).

recommendation, but how the founding members were appointed or elected is not documented. If Millett's membership was the result of a personal recommendation there is no record of his sponsor.

In 1880 he was elected a Fellow of the Royal Microscopical Society but, again, there is no record of his sponsor(s). He seems to have held no office in the society and, as he returned to Cornwall three years later, he had little chance to take an active role in the society's business aside from publishing a number of research papers in their prestigious Journal. The society was founded as "The Microscopical Society of London" in 1839 and was awarded its Royal Charter in 1866. The origin of the society can be traced back to a meeting of seventeen "gentlemen" on the 3rd September 1839. Two of those listed in this founding group are given as Edwin Quekett and Joseph Jackson Lister. They met "to take into consideration the propriety of forming a society for the promotion of microscopical investigation, and for the introduction and improvement of the microscope as a scientific instrument" ([www.rms.org.uk/About/AboutUs/History.htm](http://www.rms.org.uk/About/AboutUs/History.htm)). The society was founded at a time when Lister's research on lens systems was changing a philosophical or recreational instrument into one that would change scientific investigation. Since the mid-19th Century the society's membership has developed to embrace many in mainstream science and the award of honorary fellowship is much prized (as there are only 65 in total at any time): a notable Honorary Fellow being HRH Prince Philip, the Duke of Edinburgh. It may have been contact with the society and its members that prompted Fortescue Millett to buy a Stephenson Microscope in 1881, or it may have been that even at that time he was contemplating a return to Cornwall and needed a good microscope in order to continue his interest in the natural world.

The details of the Stephenson Microscope he purchased are not known but Hogg (1898), in an article about microscopes, figures (*op. cit.*, figure 45) a Swift-Stephenson's Erecting Binocular Microscope very similar to one that features in a famous portrait of Edward Heron-Allen in his library at "Large Acres" (Selsey) painted by his good friend Winifred E. B. Hardman in 1922.

## RESEARCH IN RETIREMENT

On his return to Marazion in 1883, Millett began (or continued) work on a number of significant projects. He set up his "laboratory" in a large barn attached to "The Parsonage" and it is from this location that much of the research described by Hodgkinson (2006) was undertaken. How he became involved in these various activities is unknown as, while two were of local interest in South and West Cornwall, the other research projects required the provision of material from overseas or important national collections. Becoming knowledgeable of micropalaeontology (especially the foraminifera) was not a simple task as there were few texts available (other than research papers) and few libraries that could cater for such an interest. Those studying foraminifera at the time had to create their own, hand-drawn, catalogue of the species they encountered in their samples. An example of Millett's catalogue is shown by Hodgkinson (2006, figure 2). This figure shows the beautifully drawn foraminifera, some of which were copied from other publications. It is interesting to note that some of these taxa, including the highlighted *Bolivina draco* (of latest Cretaceous age), show forms that Millett did not really study, or encounter in the mostly modern samples that he studied and which are documented in his publications.

We know that by 1884 Millett was a well-regarded expert on foraminifera as his contribution to the study of the material collected by HMS *Challenger* is acknowledged by Henry Bowman Brady. It is known that Brady began writing up this work in 1879, aided by T.R. Jones, W.K. Parker and F.W. Millett while living in London. Letters between Brady and Millett are in the collections of the Natural History Museum and were researched by Robert Wynn Jones while compiling his book on "The *Challenger* Foraminifera" (Jones, 1994).

Between 1885 and 1902 Millett published a series of papers (Millett, 1885, 1886a, b, 1895, 1897, 1898, 1902) on the foraminifera of the "Pliocene beds of St Erth, Cornwall". The material from St Erth is now housed in the collections of the Natural History Museum in London. The clays of the St Erth Formation contain a remarkable microfossil assemblage of 100+ species of foraminifera and a diverse fauna of ostracods: see

Wood *et al.* (2011) for a recent review of the ostracod fauna. At this time he must have been one of the leading micropalaeontologists of his day and he was awarded the William Bolitho Gold Medal by the Royal Cornwall Geological Society, which was based in nearby Penzance.

## MILLETT IN BRIXHAM

In 1901 Millett moved from Marazion to Brixham, taking up residence in a large house (*Eniscoe*) on Berry Head Road. There is no record of why, this distinctive Cornishman should move suddenly to Devon. There are no records of him having family in the area and he seems to have lived a rather reclusive life in the big house, with only his housekeeper for regular contact. Heron-Allen visited him in Brixham and described the conditions as being in a state of confusion. From this time it is clear that Millett's health was failing and his research productivity waned. After his death at *Eniscoe* on the 8th February 1915, an Obituary (Anon., 1915a) appeared in the *Brixham Western Guardian* on the 11th February 1915.

*"The Late Mr. F. W. Millett of Brixham*

*A Notable Scientist*

*At the ripe old age of 82 years, Mr. Fortescue W. Millett passed away at his residence, Eniscoe, on the Berry Head Road, during Sunday night last. His illness was of very short duration. On Sunday morning, while presumably getting ready for breakfast he had a seizure and was found in a precarious state by Miss F. Curtis about 11 o'clock. Dr. G. C. Searle and Dr. R. B. Thompson were summoned but medical skill proved unavailing. For some time past the late gentleman had shown appearances of failing health. He came to Brixham some 14 years ago from Marazion. He was a fellow of Royal Geological Society (Cornwall) and a gold medallist.*

*Deceased collaborated with Mr. F. P. Balkwill, who in 1879 and 1880 collected on the sea-shore at Galway and its vicinity a quantity of scrapings from the surface sand. On examination this proved to be very rich in foraminifera, the forms being both numerous and interesting, and some of them new to the British fauna. Mr. Millett subjected the whole of the floating from these scrapings to microscopic investigation and illustrated the species on four "plate" pages issued in a privately printed book in 1908.*

*Deceased was engaged in microscopic work from the exploration voyages of H.M.S. Challenger. All the minute and rarest species were highly magnified and the world of marine science is all the richer through his life's work.*

*Deceased was an excellent linguist. He could speak 11 different languages and famous scientists of foreign countries were in his scope of correspondence. No one will ever know the services he has rendered science, as he was most unostentatious in his habits, and rarely confided with anyone outside his very limited circle of friends.*

*The funeral will take place today (Thursday)".*

This obituary has no name attached and, by its references to his work, would appear to have been written by someone who knew him personally (rather than scientifically). In the following week the following announcement was published on the 18th February 1915, also in the *Brixham Western Guardian*. *"The Rev. R.W. Perry Circuit officiated at the funeral of the late Fortescue W Millett who was interred at the parish churchyard on Thursday last. The mourners were: Mr. Vivian Millett of London – the nephew, Mr. Ratcliffe – solicitor and Misses F. Curtis and R. Curtis. W.M. Boxer was also at the funeral. The floral tributes were in loving memory from Flo and Ruby, with deepest respect from Mr. & Mrs. E. Crowte, and from Mrs. Wills and Dorothy (Sheffield). Mr. A.G. Hooper was the undertaker".*

While this cannot be guaranteed as a complete inventory of those attending, it is quite noticeable that there was only one identifiable relative (nephew) and none of the scientists with whom he had connections (e.g. Edward Heron-Allen). Hodgkinson (2006) reports that Heron-Allen paid Millett's estate £100 for all of his slides, notes, material and literature which

were then safely removed to London and are now housed in the Natural History Museum. Another obituary appeared (Anon., 1915b) in the *Journal of the Quekett Microscopical Club* in April 1915 and it is possible that this was written by Heron-Allen. Another obituary, written by C. D. Sherborn (1915) appeared in the *Geological Magazine*.

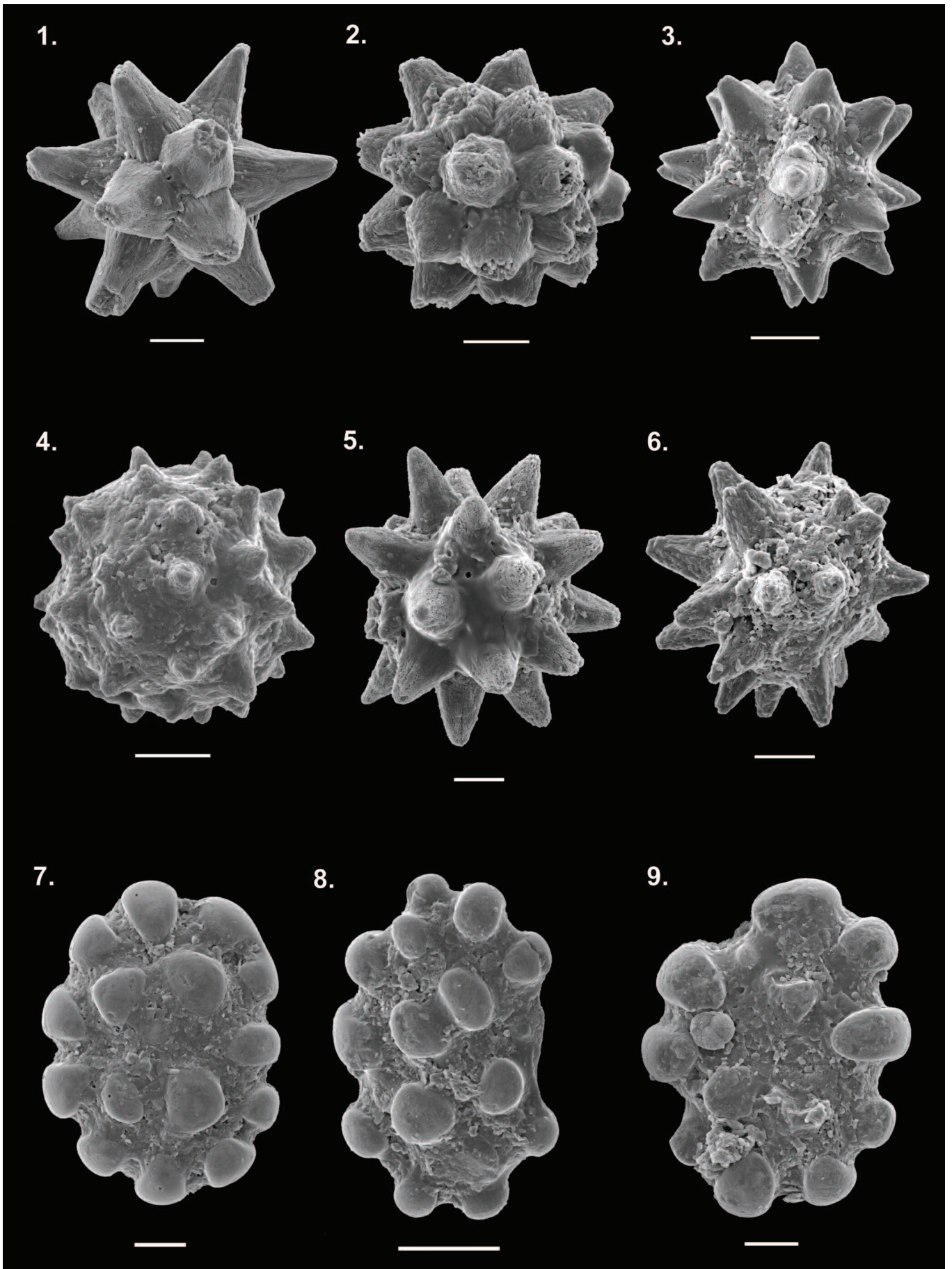
## MILLETT'S SCIENTIFIC LEGACY

Richard Hodgkinson (2006), in a full account of Millett's research, shows how this may have influenced the later work by Heron-Allen, especially in South West England. On his return from living in London, Millett worked on the Pliocene clays of St. Erth (Cornwall) and the foraminifera of the Cornish and Devon coasts before moving to live in Brixham. This collection of valuable material, including samples (residues and slides) from the St Erth Formation is now in the Natural History Museum. Millett's (1885) work on the foraminifera of Cornwall (which was only part-completed) probably inspired Edward Heron-Allen to work on sediments from South Devon and Cornwall. This work resulted in a paper on the foraminifera that was published by the Royal Microscopical Society (Heron-Allen and Earland, 1916). That work continued and, in 1930, the same authors published a series of monographs on the *Foraminifera of the Plymouth District* (Heron-Allen and Earland, 1930).

Millett's work on the St Erth Formation is particularly important as he was able to collect fresh samples of the marine clays while the pits were in operation: see Roe *et al.* (1999) for a history of the clay workings. It is interesting that when the pits re-opened in 1881, in order to provide clay for lining the new dry dock in Penzance, they were described by Nicolas Whitely as "blue clay" with "heaps of broken shells" in a lecture to the Royal Cornwall Geological Society in November 1881. In the subsequent paper, Whitely (1882) was convinced that these were glacial deposits although Wood (1885) clearly disagreed with this conclusion. Subsequent publications (Kendall and Bell, 1886; Bell, 1887a, b, 1887-1888, 1898; Reid, 1890; Johnson, 1903; Milner, 1922; Mitchell, 1960, 1966; Cullingford, 1982) continued the debate about the age of the formation. Mitchell was convinced that they were Pleistocene and, in 1973, published a significant collaborative work on the succession following a major re-excavation exercise (Mitchell *et al.*, 1973). This provided a great deal of material which confirmed the abundance and diversity of the foraminifera that had been previously described by Millett (1886a, b, 1895, 1897, 1898, 1902). The subsequent works of Milner (1922), Jenkins (1982), Jenkins *et al.* (1986, 1989) and Head (1993) were all in favour of a late Pliocene age for the St Erth Formation. This has, of course, now been changed to earliest Pleistocene by the movement of the Pliocene/Pleistocene boundary (Aubry *et al.*, 2005; Head *et al.*, 2008; Gibbard *et al.*, 2009). There are three important outcomes of recent work on the St Erth Formation: the nature of the planktonic assemblage, the diversity and abundance of foraminifera and Ostracoda, and the implications for sea level change represented by the location of the marine clays above the village of St Erth.

## PLANKTON FROM THE ST ERTH FORMATION

As well as the relatively rare planktonic foraminifera described by Jenkins (1982) and the dinoflagellates monographed by Head (1993), Messenger *et al.* (2005) describe the presence of some unusual "bolboformid-like" microfossils. These were found in samples collected in 2003 by MBH but have also been found in samples in the Millett Collection in the Natural History Museum (Figure 2). These do not appear to have been described by Millett in any of his papers and were not illustrated by Mitchell *et al.* (1973). Though having many features comparable to *Bolboforma*, an enigmatic group of microfossils known from marine sediments of mid-Eocene to mid-Pliocene age (Deflandre, 1948; Murray, 1984, 1986; King, 1983; Spiegler and Von Daniels, 1991; Mackensen and Spiegler,



**Figure 2.** Enigmatic microfossils from the St Erth Formation some of which may be related to the bolboformids. Images 1–6 are similar to those illustrated by Messenger et al. (2005, figure 6(b, c, e, f)). The pitbonellid illustrated by Messenger et al. (2005, figure 6(a)) has not been found in the samples collected by Millett and provided by the Natural History Museum. The microfossils covered in calcareous “nodules” (7–9) are probably holotburian sclerites. All scale bars are 20  $\mu\text{m}$  except (8) which is 50  $\mu\text{m}$ .

1992; Spezzaferri and Rögl, 2004; Crundwell *et al.*, 2005; Spiegler and Spezzaferri, 2005), their presence in Pleistocene strata would be problematic.

Similar forms have been found by Leighton *et al.* (2011, figure 9[E,F]) in the Fiskeler Member immediately above the Cretaceous/Paleogene boundary at Stevns Klint (Denmark). In the Danish samples they are associated with a range of “disaster” taxa, including a number of pithonellids and calcareous dinoflagellates (Keupp, 1979a, b; Kohring *et al.*, 2005). A comparable ecological catastrophe is not known for the Plio-Pleistocene succession and the occurrence of these ‘spiny’ microfossils is the result of their being a part of the normal plankton.

## FORAMINIFERA AND OSTRACODA FROM THE ST ERTH FORMATION

The marine clays of the St Erth Formation contain an abundant and diverse assemblage of foraminifera and Ostracoda. Millett (1886a, b, 1895, 1897, 1898, 1902) describes over 100 species of foraminifera and this assemblage was confirmed by J. P. Margerel using material from excavations in the 1970s that were reported by Mitchell *et al.* (1973). In the same paper (Mitchell *et al.*, 1973) R.C. Whatley noted the exceptional abundance and diversity of ostracods. Neither Millett or any of the earlier workers on the St Erth Formation had commented on the ostracod fauna, while Whatley’s observations generated considerable interest in the assemblage.

The ostracod fauna has been described and discussed quite extensively (Whatley and Maybury, 1983; Maybury and Whatley, 1986, 1988; Wood and Whatley, 1994; Harrison *et al.*, 2000) and was recently reviewed by Wood *et al.* (2011). It is difficult to understand how a limited environmental setting in a relatively restricted strait between the “Lands End island” and the “mainland” (Figure 3) could sustain such a diverse assemblage. While the sea water temperatures were <6°C warmer than today, it does not appear to have been excessively warm. The Redonian Stage (Marine isotope Stage 77) is reportedly a warm water event (Scourse and Furze, 1999; Lisiecki and Raymo, 2005) that deposited the clays of the St Erth Formation and coeval sediments in Brittany and North West France (Morzadec-Kerfourn, 1997). It would be very interesting to obtain a more complete, cored section of the St Erth Formation (as attempted by Messenger *et al.*, 2005) and recover more of the microfossil assemblages in fresh material.

## SEA LEVEL CHANGE

The clays of the St Erth Formation are known from the quarries that surround the old vicarage that is located east of the village (Messenger *et al.*, 2005, figure 1). As a result of the geophysical work undertaken at that time the contact between the overlying sediments and the Devonian basement was mapped and the height above sea level located. In “Line 2 – 1999” this would place the base of the Pleistocene (2.0 Ma) sediments at 16–28 m above Ordnance Datum, although Bristow (1996) gives an elevation of 30–37 m. Bristow (*op. cit.*, p. 127) also suggests that the depth of water during the deposition of the clays of the St Erth Formation was 10 m although this appears to be rather shallow. There are several lines of evidence as to the depth of deposition of the succession. (1) The relatively rare planktonic foraminifera appear to be shallow-water morphotypes that would normally be associated with waters <50 m depth. Their rareness would also indicate the lack of a really open marine environment of any greater depth. Stable isotope analysis (Jenkins, 1982, p. 103) of the planktonic foraminifera suggests palaeotemperatures in the range 10–18°C. (2) The succession contains fine sands as well as the clays. The clays contain very little silt and nowhere are there records of sandy inter-beds. This would imply an environment with relatively little, if any, sediment input above clay-grade. (3) The palynological analysis of Head (1993, 1999) indicates a warm,

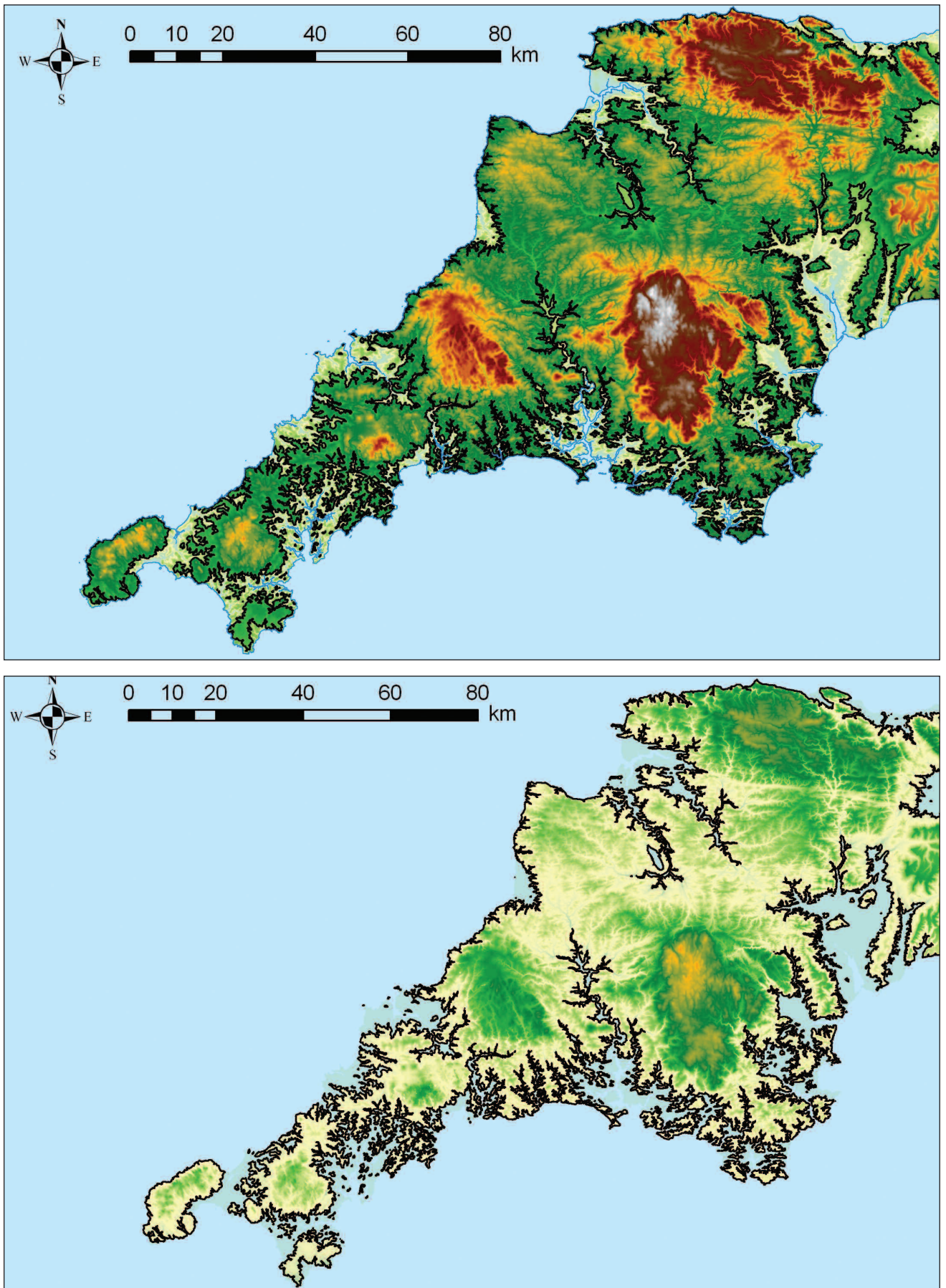
inner-neritic environment with adjacent vegetation that is indicative of cool- or mild-temperate with mild winters. Head (1999) also notes that the succession contains little variation in the palynology and this is suggestive of only one cycle of deposition. Head (1999) records that the spore-pollen analyses of the samples collected by Mitchell *et al.* (1973) contain evidence of a range of environments (estuary, salt marsh, freshwater, soils, woodland, heath and bog). The marine dinoflagellates are diagnostic of relatively near-shore, warm, conditions.

With the bedrock below the St Erth Formation at 16–28 m above O.D. and water depth estimated by the planktic foraminifera to be a maximum of ~50 m, the sea level could have been 66–78 m above present day. The spore-pollen evidence is suggestive of the lower end of this range and so a figure of ~70 m has been selected for plotting the palaeogeography and for making comparisons with other locations.

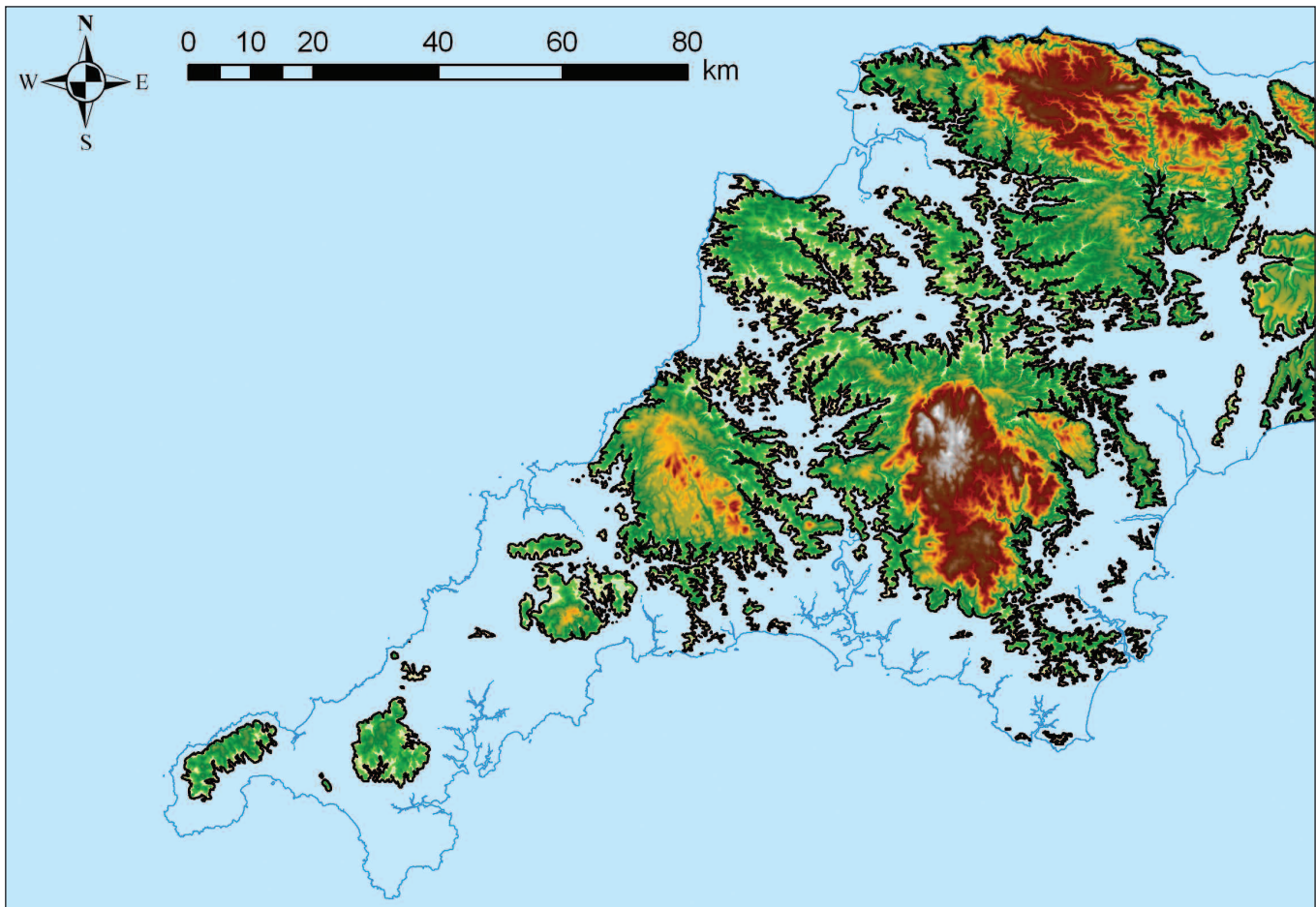
Using a Digital Elevation Model (DEM) the coastline can be predicted for a sea level 70 m above present O.D. (Figure 3). This leaves South West England (mainly Devon and Cornwall) with a number of un-connected islands adjacent to the main land area and the probability that early Pleistocene marine sedimentation was, initially, quite widespread. The palaeogeography created by raising sea level by ~ 70 m certainly explains the outliers of the St Erth Formation around, and to the west of, St Erth village. The present outcrops are located in an area between the “mainland” and the “Lands End island”. Land, however, remains relatively close by and capable of providing the mixed palynological assemblage described by Head (1993). The other feature of elevated sea levels would be erosion and South West England has many well-documented features that are the result of marine(?) erosion during times of elevated sea level. Everard (1977, figures 13, 14) was able to identify a number of “benches” at 82, 92, 106, 130, 150 and 160 m above sea level, considering them to be high-level marine strandlines of late Neogene or early Pleistocene age (cut during transgression/regression of “Coralline Crag” age). Walsh *et al.* (1987, figure 4) identified one such level at 75 m above sea level (near Navax Point) and another at 131 m above sea level (near St Agnes Beacon). They used the term Reskajeage Surface for this feature, but limited the use of the term to west Cornwall only. The higher, St Agnes Beacon level, is possibly related to a Miocene surface as the St Agnes outlier (Walsh, 1999) is tentatively dated as Miocene in age. This might leave the 75 m level as the one related to the St Erth Formation as our palaeodepth estimation could not resolve between 70 and 75 m within our overall estimated range of 66–78 m above O.D. In many areas, e.g. the South Hams around Totnes, Kingsbridge and Salcombe, there is a prominent plateau level that probably has “elements” of this 70–75 m surface, although it would be too simplistic to ascribe it to just that event.

Climate models (e.g. Zachos *et al.*, 2001) predict a “Mid-Miocene Climatic Optimum” around 14–17 Ma. This would appear to be the possible cause of the elevated sea levels required to generate the Miocene sediments on St Agnes Beacon that are 131 m above O.D. The predicted palaeogeography by raising sea level by this figure provides an interesting pattern (Figure 4). The plateaux surfaces of the Lizard Peninsula, Staddon Heights and Mt Edgecombe near Plymouth and most of the South Hams are inundated and they indicate that the landscape features of South West England may well be attributed to a number of erosional events, including the mid-Miocene and the earliest Pleistocene highstands.

The 70–75 m and 130–131 m surfaces (and their associated sea levels) have been influenced by possible uplift of South West England in the last 2.0 million years. In a recent review, Westaway (2010) has given figures for the uplift that may have influenced sea level calculations for both the St Erth Formation and the St Agnes surface. Westaway (2010) regarded the base of the St Erth Formation as 28 m above O.D. and the top of the formation as ~45 m above O.D. If one takes the mid-point as representative of the clay during deposition this gives 36.5 m



**Figure 3.** Earliest Pleistocene palaeogeography of South West England, based on a sea level estimated as being ~ 70 m above O.D. Two versions of the Digital Elevation Model (DEM; OS Landform Panorama DTM 1:50000; ©Crown Copyright/database right 2011. An ordinance survey/EDINA supplied service) are presented. The upper map shows the predicted coastline for the earliest Pleistocene while the lower map gives the same information but brings out the position of the proposed shoreline with greater clarity. As the changes in the mid-Miocene (Figure 4) are more obvious, only one map is presented.



**Figure 4.** Mid-Miocene palaeogeography of South West England, based on a sea level estimated as being ~ 130 m above O.D. (black line). The DEM (OS Landform Panorama DTM 1:50000; ©Crown Copyright/database right 2011. An ordinance survey/EDINA supplied service) also shows present sea level (blue line) for reference. Note that the changes in geography caused by the NW–SE “Tertiary” faulting in South West England (Dearman, 1963; Sanderson and Dearman, 1973) have not been indicated in this map, although the areas in which the faults are located – in many cases – are submerged by the predicted sea level rise.

onto which a water depth of ~50 m would imply a sea level of ~86 m above O.D., which seems potentially high. With the evidence of Walsh *et al.* (1987) pointing to a figure of 75 m above O.D. then this would appear to be more acceptable. Westaway (2010 and *pers. comm.*, 2011) claims that uplift during his Mid-Pleistocene Revolution was ~ 55 m and this would indicate a sea level for the earliest Pleistocene of 20–31 m above present levels (using the range 75–86 m as the two extremes). Recent modelling of Plio–Pleistocene sea levels (Haywood and Valdes, 2004; Raymo *et al.*, 2006, 2009, 2011) suggest that they were 25–30 m above present day levels with Maureen Raymo (*pers. comm.*, 2011) favouring ~25 m for the time of deposition of the St Erth Formation. The range of 25–30 m falls within the, admittedly approximate, range of 20–31 m that we have calculated for the St Erth Formation (using the height of the formation, an estimate for the depth of deposition and the predicted uplift post-deposition).

If the 130 m above O.D. level is the Mid-Miocene Climatic Optimum, Westaway (2010) would suggest uplift of ~90 m since that time. This would give a figure of ~40 m above present levels for the mid-Miocene. As there are no Miocene sediments in South West England to study, then all we have is the erosional feature and small outcrop near St Agnes and so this figure must be taken as little more than an estimate (at best). While this would need testing elsewhere, the figure does not seem to be far from what could be reasonable. As reported by Messenger *et al.* (2005) the drilling campaign failed to recover a full succession of the St Erth Formation. Further drilling should be contemplated, though site location could be problematic: the area has been extensively quarried and many of the former pits back-filled with spoil.

## SUMMARY

William Fortescue Millett was one of the foremost micropalaeontologists working in the U.K. towards the end of the 19th Century. It is clear that his work influenced many of his peers and, almost certainly, had a great influence on Edward Heron-Allen and others that continued working on foraminifera in the 20th Century. It is surprising that, despite the move to Brixham, he does not appear to have worked on the foraminifera of Tor Bay. As can be seen in the paper by Sadri *et al.* (2011) the sea grass meadows, located within only metres of his house, contain quite striking assemblages of modern foraminifera. It is, however, his work on the St Erth Formation that is important to our understanding of South West England and the sea level changes that it represents. If we allow for mid-Pleistocene uplift across South West England we predict a sea level for the earliest Pleistocene of 20–31 m above present levels, with the range 25–30 m being more likely. The sea level in the mid-Miocene is predicted to have been ~40 m above present levels (again allowing for regional uplift since that time).

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