Manchester Geological Association

President: Jane Michael

March 2018

WWW.mangeolassoc.org.uk

Founded 1925

Newsletter and information

If you wish to **continue to receive** the MGA newsletter and other information please fill in and return the form on page 11 by the **24th of May.** This form is also available on the MGA website. Note that unless the MGA Secretary receive a signed copy of the form the MGA is **NOT ALLOWED TO CONTACT YOU** in any way.

Quick Diary

Outdoor Events 2018 Calendar

Tuesday 8 May 2018: Carnforth 'igneous' intrusion and Trowbarrow Quarry led by Peter del Strother and Barbara Gordon. **This is a joint MGA/Lancs GA trip**

Saturday 2 June 2018: Yorkshire Geological Society Trevor Ford Memorial Lecture Day at Buxton Dome

Sunday 3 June 2018: Yorkshire Geological Society Field meeting(s) to tie in with previous day's lectures

Friday 13 – Monday 16 July 2018: Fife Coast led by Dr John Nudds

Sunday 19 August 2018: Crompton Moor, Besom Hill and Oldham Building Stones led by Stephen Darlington. **This is a joint MGA/ OUGS NW trip.**

Saturday 29 September 2018: Fred Broadhurst Memorial Field Trip: Deep Dale and Magpie Mine led by Jane Michael.

2018/19 Indoor Meetings calendar

Wednesday 17 October 2018 7.00pm: Holiday Geology: members talks
Saturday 10 November 2018 Broadhurst Memorial Lectures 1.30p Earth's Distant Past: speakers to be confirmed
Saturday 8 December 2018 1.30pm: Some Aspects of the Quaternary: speakers to be confirmed
Saturday 19 January 2019 1.30pm: Hydrogeology: speakers to be confirmed
Wednesday xx February 2019 7.00pm: Annual General Meeting: Presidential Lecture by Cathy Hollis
Wednesday xx March 2019 6.30pm: Joint Lecture with Manchester Geographical Association: Speaker to be confirmed.

Who's Who in the MGA

Officers

President: Dr Cathy Hollis PhD

Vice-President: Niall Clarke MSc

General Secretary: Sue Plumb BSc

Membership Secretary: Jennifer Rhodes

Treasurer: Jennifer Rhodes

Indoor Meetings Secretary: Jane Michael BSc (Hons)

Field Excursions Secretary: Vacant

Newsletter Editor: Lyn Relph BSc (Hons)

Webmaster: Peter Giles MSc

Other elected members of Council

Professor Ray Burgess PhD

Nicola Fowler BSc (Hons)

Peter Gavagan BSc (Hons)

Penny Heyworth MPhil

Ex officio members of Council

The Immediate Past President, Manchester Geological Association: Jane Michael BSc (Hons)

RIGS Representative: Chris Arkwright PhD

The Association's representative on the North West Geologist's editorial team: Peter del Strother MBE BSc CEng MIMechE MBA MPhil

President of the Student Geological Societies of the University of Manchester

MGA Archivist

Derek Brumhead MBE

MGA email addresses

To contact our President: president@mangeolassoc.org.uk

To contact our Vice-President: vicepresident@mangeolassoc.org.uk

To contact our General Secretary: secretary@mangeolassoc.org.uk

For membership enquiries: membership@mangeolassoc.org.uk

For field visit enquiries: outdoors@mangeolassoc.org.uk

For indoor meeting enquiries: lectures@mangeolassoc.org.uk

For newsletter correspondence: newsletter@mangeolassoc.org.uk

For other enquiries: info@mangeolassoc.org.uk

Limestone and The Derbyshire Platform: Castleton

September 2017

by Jane Michael

On Sunday 3rd September 2017, a grey and drizzly day, 10 MGA members were joined by five members of the Leeds Geological Society for a field trip led jointly by the MGA Vice President Cathy Hollis and her PhD student Lucy Manifold. We were to explore the northern margin of the Derbyshire Platform via Cave Dale and Pin Dale.

We met in the main car park at Castleton where Lucy gave us a briefing on the trip. She then outlined the regional geology. We were going to 'visit' the Visean (Lower Carboniferous). Sedimentation occurred over the whole of Northern England that was under an extensional regime at the time. The underlying basement (granite or low grade metamorphic rocks) was stable. Tectonic subsidence resulted in half-graben formation and this affected the depositional pattern as areas of crust underlain by basement remained buoyant. Sediment was received from the Caledonides to the north and St Georges Land (Wales Brabant Massif) to the south. Figure 1 below demonstrates this:

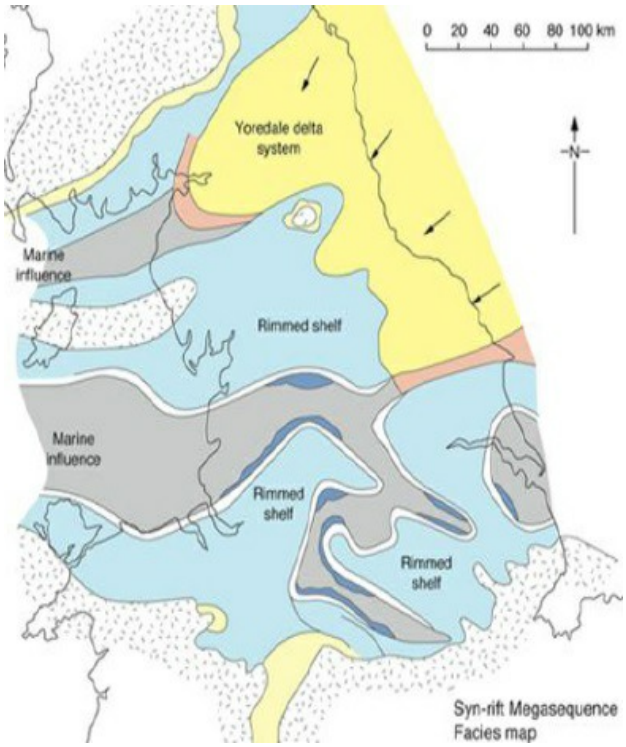

Fig. 1 Regional Palaeogeography (Dinantian)

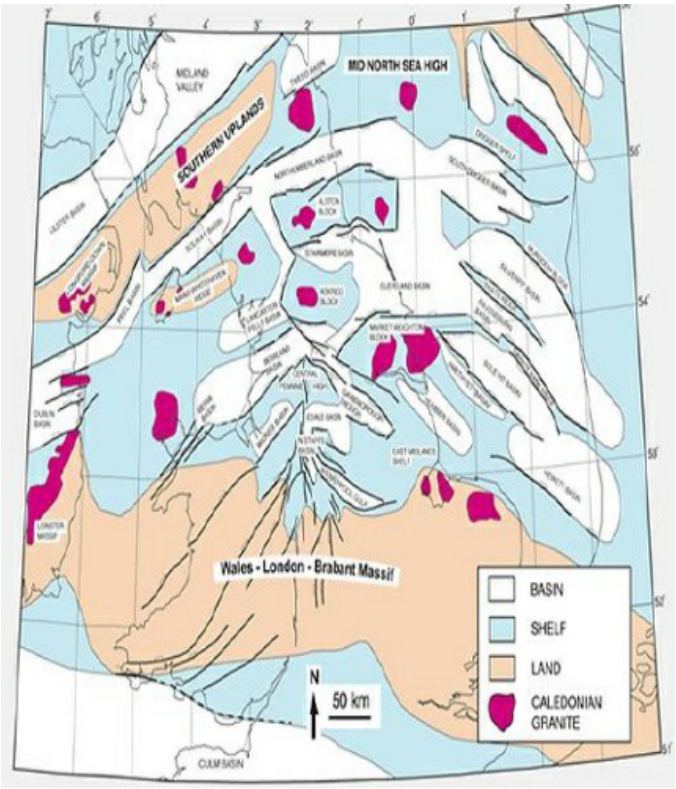

Fig. 2 Regional tectonic setting. Location of Derbyshire platform highlighted in red.

During the Visean, the hanging walls subsided by around half a kilometre and carbonate platforms were formed on the more slowly subsiding blocks. The whole period was punctuated by relative sea level rises and falls. In highstand/transgressive periods, carbonate sedimentation on the platforms recurred, locally providing limestone turbidites and other gravity flow deposits along faulted basin margins. During periods of sea level lowstand, the platform top was often exposed above sea level.

Eventually as time progressed, the fluvio-deltaic sedimentation pro-graded south with carbonate production ceasing except in the south of the area in the East Midlands. By the end of the Visean, as the Namurian commenced, the Yoredale sequences had started and the whole area was subsequently covered by thick layers of feldspathic sandstones.

Cathy explained that almost no work had been published on the sedimentology of the Derbyshire Platform since the 1960s and 1970s, but Lucy was undertaking her PhD revisiting (and improving) the information available.
We would be walking up slope onto the platform and be able to see how the structure changes.

Figure 2 shows the Regional Tectonic setting with the Derbyshire Platform outlined in red – we were looking at just a small part of a much larger system.

Locality 1

After winding our way through a very busy Castleton, our first stop was at the bottom of Cave Dale, the start of our transect through the Derbyshire Platform. We walked onto the carbonate platform, the Bee Low Limestone formation, via the foreslope of the Apron Reef. The beds were dipping towards Castleton and represented the shedding of material off the platform top into deeper water. The water depth was estimated at 15-20m. Lucy explained that the dips are very variable on each platform. The platform margin had cemented easily allowing the steep slope to form. In the past various features, such as cross-bedding and geopetal structures had apparently been seen. However because of increased rainfall, particularly since 2000, there is now so much vegetation that these features can't be seen. We did however spend a little while searching the outcrops and found examples of fragmented bioclasts (Fig. 3).

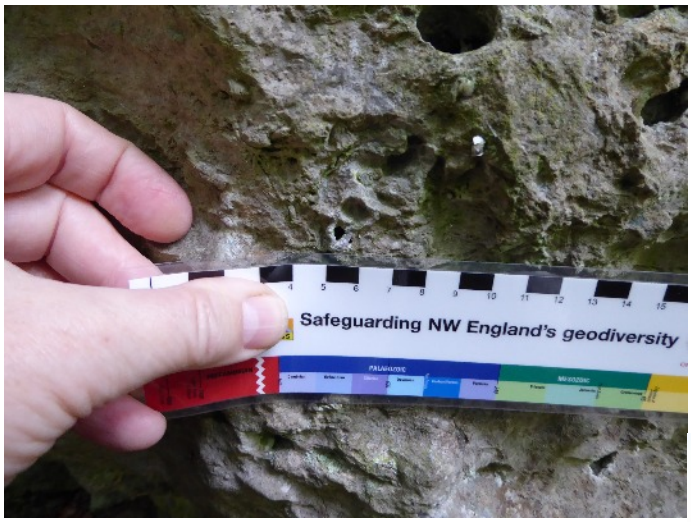

Fig. 3 Fragmented bioclasts

Locality 2

Our next stop was about half way through Cave Dale itself. The beds were flattening. We had reached the Margin of the platform where the reefs were growing. There were small mounds representing the reefs (see Figure 4). Others in Winnats Pass are up to 20m in height. There were no large corals, but we did see bioclasts, which under the microscope show to be formed of bryozoa, brachiopods, small corals and crinoids set in a micrite cement. We did not see any evidence of the algal reef.

Fig. 4 Carbonate Mound/Reef in Cave Dale

Cathy and Lucy explained that it was difficult to tell how the limestone had formed. Carbonate mud had spread across the area and was trapped by whatever was growing there at the time. Whether this mud was a precipitate or ground up material is not known. The composition of the seawater at the time was different from today. There were no icecaps in the Lower Carboniferous although the South Pole Ice cap was starting to form by the end of the Visean; thus the seawater chemistry was changing. This is one instance where we cannot use the modern carbonate forming environments when assessing palaeo-carbonate systems. As an example, the calcite then was low in magnesium which made it very stable and less reactive.

Formation of the Dale itself may well be the result of a cave collapse that had been exploited by ice sheets during the last glaciation..

Locality 3

We proceeded up the Dale to just below the Castle ruins. On the opposite side of the valley we could identify a fault. We were still on the platform margin though there was more evidence of bedding rather than reef mounds although the beds were disturbed by fracturing near the fault. Compaction and cementation of the beds had made them brittle. The fault trended E-W and is thought to be part of a larger strike slip fault system, although it may have been in extension during deposition.

In the fault zone, we found calcite veins (Figure 5) that were formed when hot fluid migrated along the fault. The basin temperatures were high – the area being buried to 3km – so that when faults were reactivated it was like squeezing a sponge. Water trapped by fast burial became heated and mineralised, emerging with fault movement. The temperatures for the calcite formation match those of the basin, up to ~200ºC.

Fig. 5 Calcite veining in fault zone

Fig. 6 Fault Zone

Locality 4

Our final stop in Cave Dale was very near the top. During the Carboniferous there were volcanic centres in Buxton, Matlock and Bakewell as a result of rifting, and the exposure we found was of a very degraded basalt. It was almost columnar!. Whilst some of the volcanism may well have been shallow submarine, sub-aerial volcanism also occurred because there were a great many changes in relative sea levels over the period. Some were due to changes in the icecaps, but others were due to basin subsidence and subsequent fill. When the land was first exposed there was ash in the air that became trapped in the soils as they formed. This is a topic which is poorly understood as no research has been undertaken. Cores from boreholes within the Derbyshire Platform have shown amygloidal basalts.

The limestones we saw above and below the basalt were more horizontal and much thinner, indicating that we had moved from the margin onto the platform top. We had risen 220m since we entered Cave Dale and were now above Castleton with views over the Peak District had it not started to rain.

Fig. 7 Cathy standing in front of the basalt.

Locality 5

After walking towards Castleton, along the road that runs along the top of Dirtlow Rake, we sat in increasingly wet conditions to eat our lunch. Then we walked down into Dirtlow Rake itself. This 'rake' or mineral vein system trends south west to north east to Pindale Quarry, which we would be visiting towards the end of the day. It is part of the strike-slip system where the faults generally follow a E-W or NW-SE trend. This is in alignment with the regional tectonic trend. Some of the strike-slip movement may have occurred during the growth of the fault system during the Lower Carboniferous. Then during the Variscan Orogeny there was large-scale fault reactivation.

This reactivation resulted, as mentioned earlier, in heated water from the sedimentary basin being squeezed out. As a result, coarse calcite crystals which can now be seen in the walls of the fault are intergrown with barytes, galena and fluorite. The mineralised rake that resulted has been exploited by man particularly over the 50 years or so. Since


Fig. 8 Dirtlow Rake

the fluorite mining has ceased the rake has been open for geologists such as us to explore.

The fault system has many planes and movement resulted in slickensides which we were able to find on the sides of the rake in several places. The water passing through also brecciated the rock which is then relinked by calcite crystals.

Locality 6

We walked further down the road through some woods into Pindale Quarry which is in the Brigantian. The beds are thinner as sea level was shallowing and there are more clastics. We were able to identify shoals by the coarse grainstone texture of the rock (often more than 50% bioclasts and with very little mud). It was explained that the current grassy erosion surfaces represent exposed surfaces during relative sea-level fall Clints and grykes formed together with palaeosols and now these erode more easily than the hard limestone. There are *Gigantoproductus* fossils within some of the beds.

We were now about to go over the edge of the platform (up which we 'climbed' earlier). The rocks were fairly horizontally bedded but then we saw mounds and dips, the beds became a bit sandier and there were more slickensides. Corals were also seen.


Fig.9 Pindale Quarry the grassy areas representing palaeo-exposed surfaces.

Towards the end of the quarry, the exposure dipped down over a large mound. Unfortunately we were unable to see much due to growth of vegetation. Cathy suggested returning in February or March when everything had died back then the structure together with bryazoa, crinoids and brachiopods can be seen.
Work is currently being done on the palaeoshoreline: it is thought there may have been embayments in the platform edge with resulting minicurrents affecting the geomorphology.


Fig. 10 Coral in Pindale Quarry.


Fig. 11 Exposure with brachiopod layer.

Leaving Pindale Quarry completed the 'official' part of the trip. However on our walk back to Castleton we came across an exposure of bioclastic limestone filled with brachiopods.

Back in the car park, Cathy and Lucy were thanked warmly by everyone for such an interesting trip.

OTHER SOCIETY EVENTS

BCGS http://bcgs.info/pub/the-society/programme-of-events/

7 April, 10.30. Field meeting, Forest of Dean or River Severn, led by John Moseley

16 April, 7.30. My favourite science: James Parkinson's Organic Remains of a Former World. Speaker: Cherry Lewis.

12 May, 11.00. Field meeting, Calton Hill, Miller's Dale and Tideswell Dale, Derbyshire

OUGS Northwest http://ougs.org/northwest/events/

June 6–10. Geology of Anglesey. Leader: Dr Chris Arkwright

June 16. Quarry Bank, Styal, Cheshire. Leader: Fred Owen

September 7–11. The north Antrim Coast including the Giant's Causeway. Leader: Phyllis Turkington

October 14. Goyt Valley and Marple. Leader: Jane Michael

NWGA http://www.ampyx.org.uk/cdgc/rhaglen.html

Wednesday March 28. Epic seafloor off North Wales. Speaker: Katrien Van Landeghem, Bangor University

Manchester Geographicals

http://www.mangeogsoc.org.uk/manchestergeographies.htm

No program currently available.

NSGGA http://www.esci.keele.ac.uk/nsgga/

No program currently available.

Geolancashire http://geolancashire.org.uk/lectures-and-excursions/

April 27 Dr. Chris Duffin: Late Jurassic Lagoonal Limestones of Solnhofen, Bavaria

October 25th. A Lancaster Building Stone walk is planned and the group should meet at the “Park and Ride” bus station (parking fee is £1 all day) in time to catch the 09:50 bus, bring a packed lunch or use one of the many cafés for the lunch break.

28th April. The coal measures of Todmorden Moor; Peter del Strother.

8th May. Trowbarrow and Keer; Barbara Gordon & Peter del Strother.

19th June. Llangollen; Peter del Strother.

Manchester Geological Association
Outdoor Events 2018 Calendar

Tuesday 8 May 2018: Carnforth 'igneous' intrusion and Trowbarrow Quarry led by Peter del Strother and Barbara Gordon. Trowbarrow quarry exposes vertical Carboniferous (Asbian, Urswick Limestone) strata with spectacular trace fossils. There will be a visit to the Carnforth location in the morning and Trowbarrow in the afternoon. All walking is easy, no hills and less than a kilometre at each site. **This is a joint MGA/Lancs GA trip**

Saturday 2 June 2018: Yorkshire Geological Society Trevor Ford Memorial Lecture Day at Buxton Dome

Sunday 3 June 2018: Yorkshire Geological Society Field meeting(s) to tie in with previous day's lectures

Friday 13 – Monday 16 July 2018: Fife Coast led by Dr John Nudds. The trip will involve walking from Kinghorn to Kirkcaldy on Day 1 and visiting Elie and St Monans on Day 2. 13th and 16th are travelling days. Fife is a beautiful part of the world and well worth staying on for a few days to visit other attractions. Hotel details not yet firmed up.

Sunday 19 August 2018: Crompton Moor, Besom Hill and Oldham Building Stones led by Stephen Darlington**. This is a joint MGA/ OUGS NW trip.**

Saturday 29 September 2018: Fred Broadhurst Memorial Field Trip: Deep Dale and Magpie Mine led by Jane Michael. The trip will be based round Walk 14 Ashford-in-the-Water and Magpie Mine in 'Rocky Rambles in the Peak District' by Fred Broadhurst.

To book on any trips please contact Jane Michael on outdoors@mangeolassoc.org.uk as soon as you can.

Manchester Geological Association
2018/19 Indoor Meetings calendar

Wednesday 17 October 2018 7.00pm: Holiday Geology: members talks

Saturday 10 November 2018 Broadhurst Memorial Lectures 1.30pm:
Earth's Distant Past: speakers to be confirmed

Saturday 8 December 2018 1.30pm:
Some Aspects of the Quaternary: speakers to be confirmed

Saturday 19 January 2019 1.30pm:
Hydrogeology: speakers to be confirmed

Wednesday xx February 2019 7.00pm: Annual General Meeting:
Presidential Lecture by Cathy Hollis

Wednesday xx March 2019 6.30pm: Joint Lecture with Manchester Geographical Association:
Speaker to be confirmed.

All lectures with the exception of the Joint Meeting will take place in the Lecture Theatre in the Williamson Building, Manchester University, Oxford Road, Manchester. The venue of the Joint Meeting will be confirmed in due course.

Manchester Geological Association

An Affiliated Society of the Geologists' Association
Founded 1925
Charity No. 500532

Privacy Policy 2018

Personal Data and Manchester Geological Association

An individual's confidentiality is protected by the Data Protection Act and, from 25 May 2018, the General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679) and the Privacy and Electronic Communications Regulations 2016 (PECR). Personal information supplied by members to Manchester Geological Association (MGA) will be kept on file, encrypted and stored securely on devices protected with recognised internet security software where appropriate; these data will be deleted once they are no longer relevant. Paper copies of Membership Application forms and copies of past Rules and Lists of Members (which includes addresses) will be kept securely, for historical purposes.

Members

Membership Application (or Membership Renewal) and Gift Aid forms request some Personal Data and the applicant's preferred means of communication.

Personal Data

These data include title, name, address, postcode, telephone number (optional) and email address (optional). This information is required to provide the service that is expected by an MGA member. These data will be stored securely.

Accessibility

The MGA will allow members' information to be used only by others working on their behalf and also as required by law (e.g. HMRC for Gift Aid). The MGA will not share members' information with other companies or charities for marketing purposes.

Members have the right to access a copy of the information the MGA holds about them (a subject access request) obtainable, subject to proof of identity, from the secretary: secretary@mangeolassoc.org.uk

Members have a right to object to the ICO (Information Commissioners Office) if they feel that the MGA is not handling their data in a satisfactory manner.

Communication

The MGA will ask members to provide their formal consent to receive their communications either electronically or by hard copy through the post.

We will use a member's personal data as follows:

1. To send MGA newsletters by email or by post, which may include:
   i. notices of MGA lectures and field trips
   ii. Down to Earth Extra magazine – email only
   iii. geological news and geological events held by other organisations

   These will be circulated electronically to members who wish to receive communications by email. These emails will not show recipients' email addresses (note: at present 'Bcc' is used).
2. To post out North West Geologist issues where they cannot be collected in person at meetings.
3. AGM (and SGM) information will be sent electronically or by post, as members choose (note: the address labels, for paper copies, are created by the Treasurer).
4. Subscription information will be available electronically or by post. Members will be informed (by

email or post) when there is a change in subscription rates. Also, these changes will be on the MGA website.

5. Gift Aid - personal details of members are sent to HMRC (title, name, address and postcode) to enable the MGA to reclaim UK tax on subscriptions and donations made under Gift Aid. HMRC requires the MGA to retain information about this declaration for seven years.

Note: With the exception of notices for General Meetings (AGM, SGM) members can opt out of any/all of MGA communications at any time by contacting the secretary.

The MGA does not hold or store any financial data on the website.

Data transmission over the internet is inherently insecure, and the MGA cannot guarantee the security of data. The website contains links to other websites. The MGA is not responsible for the privacy policies or practices of third party websites. When members visit the MGA website, certain information is collected that does not identify them personally, but provides the MGA with "usage data" such as the number of visitors or what pages are visited most often. These data help to analyse and improve the usefulness of the information provided on the website.

Abbreviations:
AGM: Annual General Meeting
SGM: Special General Meeting
HMRC: Her Majesty's Revenue & Customs
GA: Geologists' Association

Approved by Manchester Geological Association Council via email: March 2018

To be reviewed as required and certainly in 2021

Trevor Ford Commemoration Event

The Dome Buxton 02 June 2018

2nd June (am) Overview of Trevor Ford's life and interests

Sat 2nd June (pm) Geological research, including talks by;

Dr Noel Worley,

Dr Cathy Hollis (Mineralization and Dolomitization in the Peak District)

Prof John Gunn (Hydrogeology of the Peak District), Dr Richard Shaw and Dr Jim Rieuwerts Caving and mining history).

Sun 3rd June: Fieldtrips : Mineralisation and sedimentology of the Matlock-Wirksworth area of Derbyshire (Cathy Hollis), Ecton Copper Mines (Tim Coleman) and Magpie Mine Mining Heritage Site (PDHMS)

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Confirmation of Details Form 2018

A new General Data Protection Regulation (GDPR) becomes law on 25 May 2018.
This law is aimed at protecting your personal data. Therefore, the Manchester Geological Association (MGA) will need your written consent to communicate with you by post, email, telephone, or text.

Please complete and return this form as soon as possible but before 25 May 2018 to the secretary, marking the envelope GDPR.
Or download the form from our website www.mangeolassoc.org.uk, complete it, and forward it electronically.
A copy of the MGA's Privacy Policy document is on the same website page. Please read the Privacy Policy document before providing your consent.

N.B. Full and Associate members at the same address: please fill in **both** sets of consent boxes.

NAME(S): . . . . . .

TITLE(S): (Mr/Ms/Dr/Prof. etc) . . . . . .

ADDRESS: . . . . . .

. . . . . .

. . . . . .

TELEPHONE(S): (Home) . . . . . (Mobile/Other) . . . . . .

EMAIL(S): . . . . . .

Date. . . . . .

I consent to you contacting me by (please write Yes or No in appropriate boxes):

Name	Email	Post	Phone	Text

Please see the MGA's Privacy Policy at www.mangeolassoc.org.uk

I give the MGA permission to use my contact details, for MGA use only, as detailed in the MGA's Privacy Policy.

Deadline for completion 24 May 2018

Completed forms can be returned by email to: secretary@mangeolassoc.org.uk or posted to:
GDPR, Sue Plumb, 20 Ridge Crescent, Marple, Stockport, Cheshire SK6 7JA.

Thank you for completing the form