

GEOLOGI

Coprolite is compiled and produced by Helen Kerbey, Department of Natural Sciences, National Museum of Wales, Cardiff CF10 3NP (e-mail Helen.Kerbey@museumwales.ac.uk, tel +44 (0)29 20 573250). It is published three times a year in March, June and November. Any material for inclusion should be sent to Helen Kerbey by the first of the previous month, i.e. by 1 February, 1

No. 76

June 2015

Chairman: Giles Miller, Senior Curator, Micropalaeontology, Department of Earth Science Natural History Museum, Cromwell Road, London SW7 5BD, Email: g.miller@nhm.ac.uk

May or 1 October.

Secretary: Sarah King, York Museums Trust, Yorkshire Museum, Museum Gardens, York, YO1 7FR, Email: Sarah, King@vmt.org.uk

Treasurer: John Nudds, School of Earth, Atmospheric and Environmental Sciences, The University of Manchester, Oxford Road, Manchester, M13 9PL Tel 0161 275 7861 Email: john.nudds@manchester.ac.uk

## GCG Chairman's Report

#### **Arts Council England Bid**

As some of you will know, we were unsuccessful in our bid to ACE for funding. Paolo Viscardi and I met with representatives from ACE on 5th May to get feedback. We have also received support from Nick Poole at Collections Trust to give us some pointers as to how we can improve our application for the next round of funding later this year.

#### **Geologists' Association Curry Fund bid**

Better news is that we werefunded 1K to develop an interactive "Be a Curator!" exhibit for the Lyme Regis Fossil Festival and other geological festivals. A big thank you to Isla Gladstone and Luanne Meehitiya for so working hard on this and bringing the show together. Thank you also to John Nudds, Cindy Howells and Emma Bernard for manning the stall during the Fossil Festival itself. The GCG stall was a little stuck out of the way but managed some excellent interactions with some of the younger geological collectors in the UK. If you follow Twitter you can look up the hashtag lymefossilfinds to see some of them. Look out for us at other festivals near you in the future. We have tentative plans for the GA Festival in London and Scarborough.

### **Geological Society**

I was invited to the Geol .Soc. on 13th May to a meeting to discuss how the GCG interacts with the Geol Soc. Unfortunately I couldn't attend and we were unable to find a stand in. However, I have been in discussion by e-mail with our new rep on the Geol Soc Science Committee. I was also invited to present a short talk about the GCG at the Geol Soc Geoconservation Committee Meeting on 11th May where I some excellent suggestions were made by Nic Bilham and some of the other members of the committee as to how the GCG can strengthen links with the Geological Society. We have also been asked to nominate a GCG representative for the Geoconservation Committee. If anyone is interested to fill that role then we'd be very happy to hear from you.

## NatSCA-SPNHC MoU

Sarah King and Emma Bernard have provided a report to committee from the emerging NatSCA-SPNHC-GCG committee and we look forward to implementing some of their suggestions. We were invited by NatSCA to have a stall at their AGM and this was staffed by Luanne Meehitiya and Mike Howe. Mike also kept up the good work and flew the flag for the GCG with a very well received talk on the 3D fossils project.

#### Other issues and letters

I wrote to Roy Clements thanking him for his sterling service as GCG Rep on the BGS Collections Advisory Committee. I also wrote to the Shropshire Council regarding the Ludlow Museum and Resource Centre and spoke at their public meeting to discuss the way forward. I was requested to write in support of the teaching of A Level Geology in schools and sent out a message on the listserver asking for others to do the same. We continue to monitor both situations

#### Blog

We've had a mini rush of people wanting to feature following Isla Gladstone's latest posts. Please do volunteer to answer the 6 questions if you have not already done so. It's a great way for us to build links with other Geological curators across the UK and to give some publicity for your collections. **Giles Miller, GCG Chairman.** 

## **New members**

Alex Peaker, Assistant Community Learning Officer, Dinosaur Isle.

## **Events and Exhibitions**

**4th July "Dinosaur Diversity on the British Isles"** at Milestones Museum, Basingstoke. 2pm. Talk by Dean Lomax (author of 'Dinosaurs of the British Isle') See: hampshireculturaltrust.org.uk/event/dinosaur-diversity-british-isles

### May to December - "Dinofest 2015" - Hampshire Cultural Trust

DINOFEST2015 will see some of the world's leading dinosaur exhibits stomp into Hampshire. Visitors can get up close and personal with awesome animatronic dinosaurs from the Natural History Museum, which will be on display in Southampton and Basingstoke. Many museums are involved with this event that contains Dinoexplorer, Dinosaurium, Dinos in your garden and other topics. Plenty of Natural Science Collections will also be incorporated.

See dinofest2015.co.uk for all the information, or contact Christine Hitchens, christine.taylor@hampshireculturaltrust.org.uk

## William Smith Bicentenery

A series of talks, exhibitions and events around the country celebrating the life and work of the map maker William Smith.

**Churchill and Sarsden Heritage Centre**, Oxfordshire: March 2015 - September 2015. Commemorative Exhibition on William Smith's Life and Work

**The Yorkshire Museum**, York: map display and exhibition from 22 May 2015. The story of the rocks: William 'Strata' Smith's geological map at the Yorkshire Museum

**The Natural History Museum**, London: mid-June to mid-October 2015 William Smith: his maps, rocks and fossils

**National Museum Wales**, Cardiff: September 2015 - January 2016. William Smith & His Maps

University of Bristol: Events beginning 7 October 2015

Visualising Landscapes & Geology, Past, Present & Future

**Oxford University Museum of Natural History**: October 2015 - January 2016. Handwritten in Stone: the life and legacy of William Smith

See www.geolsoc.org.uk/Events/William-Smith-Bicentenary/Exhibitions for a summary of all the events.

## Totally new Welsh dinosaur discovery on display!

From Tuesday 9th June **Amgueddfa Cymru – National Museum, Wales** will have on display the earliest Jurassic theropod to have walked in the UK. The specimen was found in March 2014, on the coast near Cardiff, and is being donated to the museum by its finders, Nick and Rob Hanigan.

The dinosaur came from just above the Triassic/Jurassic boundary, in an area which is normally better known for its marine fossils. It is a juvenile coelophysoid dinosaur and is around 40% complete. It is still being studied, and has no formal name yet, but the public are being asked to suggest ideas for a nickname. Visit the museum website at www.museumwales.ac.uk to find out more.

The museum is free entry and is open from Tuesdays to Sundays. Cindy Howells, Curator, Amgueddfa Cymru – National Museum, Wales

## Forthcoming seminars and workshops

Check our website www.geocurator.org for updates to our seminar programme or Contact the Programme Secretary **Kate Riddington** with any questions, thoughts or ideas for workshops and meetings. (k.j.riddington@bham.ac.uk)

#### 17-18 June 2015. Refloating the Ark, Manchester

'Refloating the Ark' is a two-day meeting exploring how museums with natural history collections can maximise their contribution towards environmental sustainability, by engaging effectively with the public and the scientific research community. The meeting is aimed at museum workers, environmental educators, conservationists, scientific researchers, students, amateur naturalists, funders and the biological recording community.

The meeting is very reasonably priced, at £25 for one day and £40 for both days, including lunch and refreshments. Please do come along, and spread the word! https://naturemanchester.wordpress.com/2015/03/06/refloating-the-ark-detailed-conference-programme/

# Friday 31 July, Saturday 1 August. Society for the History of Natural History Conference & AGM 2015

An unconquerable aversion to Piccadilly: Charles Waterton, taxidermist, traveller and pioneer conservationist at the Union Works and Wakefield One, Wakefield, West Yorkshire

Outline Programme: A day of talks on aspects of the life and work of Charles Waterton (1782-1865), which will include the SHNH AGM, and be followed by a visit to the exhibition in the Museum at Wakefield One. Pat Morris will give a demonstration at Wakefield One on "The inside story" showing how Waterton achieved his results.

Speakers include Jan Graffius, curator at Stonyhurst College, on Waterton's education and Catholic upbringing; Pat Morris on the taxidermy; John Whitaker on Waterton's Wakefield connections; Adrian Padfield on the Curare story and John Chalmers on the disagreements between Audubon and Waterton.

#### Contact: meetings@shnh.org.uk

#### 31 Aug - 4th September 2015. 63rd Symposium for Vertebrate Palaeontology and Comparative Anatomy, 24th Symposium of Palaeontological Preparation and Conservation with the Geological Curators' Group

What: The annual SVPCA and SPPC meetings in 2015 will be hosted by Ocean and Earth Science, University of Southampton.

Where: SPPC and SVPCA talks, poster sessions and some social events will take place in the National Oceanography Centre (NOC), Southampton (home of Ocean and Earth Science). SPPC is jointly hosted this year with Dinosaur Isle (Gary

Blackwell, Sandown, Isle of Wight) and the Hampshire Cultural Trust (Christine Taylor, Winchester). On the afternoon of 31st August SPPC delegates will have the chance to visit the HCT collections at Winchester.

Registration: Registration through the SVPCA website from mid April. Online payment will be possible via the University of Southampton online shop (registration costs: £50 delegate registration; £20 for students).

Fieldtrips: This year we plan a pre-conference field trip to the Jurassic Coast (Kimmeridge) (Sunday August 30th) in concert with delegates attending the Flugsaurier 2015 meeting (hosted at the University of Portsmouth: www.flugsaurier2015.com) which is all about pterosaurs. If you would like to book a place on this trip (costs TBA) then please email Gareth Dyke (gareth.dyke@soton.ac.uk) or David Martill (david.martill@port.ac.uk). First circular: http://svpca.org/years/2015\_southampton/first.circular.pdf Further details: http://svpca.org/years/2015\_southampton/index.php

# **1-2** December 2015. GCG AGM: Not just rocks in the cupboard: communicating geoscience through collections

Where: NHM, London Further details to follow.

# Meeting Reports

# 'Be a Curator' at the Lyme Regis Fossil Festival, 1-3<sup>rd</sup> May 2015

2015 marks the 10<sup>th</sup> anniversary of the Lyme Regis Fossil Festival, which happens every year on the weekend of the early May bank holiday. This free festival sees activities and walks organised by museums, universities and societies on the subject of fossils and other areas of natural history. These activities are enjoyed by hordes of visitors to this historic town on the Jurassic coast, and particularly by enthusiastic families. Each year there is a theme and this year it was "Mapping the Earth", linking to the 200<sup>th</sup> anniversary of the publication of William Smith's geological map.

2015 is also the first year that the GCG has been involved in the festival. Thanks to a grant from the Curry Fund, the GCG were able to develop a new activity that aimed to inspire a new generation to be good geological curators. The "Be a Curator" activity invited participants to curate a fossil, labelling information on its identification, collection details and age, before photographing and tweeting their finished museum display. Many participants brought in their own fossil finds whilst others used ours. The results can be seen on Twitter by searching for #LymeFossilFinds15, a hashtag that we used to build up an online collection. We all enjoyed the busy, fun atmosphere and look forward to developing "Be a Curator" further for future public engagement events.

Luanne Meehitiya - Birmingham Museums & GCG Committee Member.

## HOOG meeting on William Smith, 23-24th April 2015

This long awaited meeting, held in the Geological Society premises at Burlington house, London, was every bit as interesting as had been promised. Over 110 delegates attended the 2 day meeting and were treated to talks detailing all aspects of William Smith's fascinating life and career, and also those of several contemporaries.

Hugh Torrens kicked off the first day with a keynote talk about Smith's early life. Although many of us knew the basics, there were still many interesting details, painstakingly researched by Hugh, which had us reaching for our notebooks. Owen Green regaled us with the story of Smith's work on the sea defences in East Anglia, a tale continued by Peter Riches who concentrated on the east Norfolk section. The morning was brought to a close by John Mather who spoke about the search for underground water supplies and how Smith and his work helped in this endeavour.

A lunch break gave everyone a chance to examine a couple of the original Smith maps laid out upstairs, and also to see some of Smith's fossils on display. The afternoon session started with Richard Irving relating the tale of William Smith and his treasured home, Tucking Mill. This was followed by Cherry Lewis explaining the links between Smith, John Farey and David Mushet.

Tom Sharpe gave a fascinating talk about the map itself, detailing its production history and different editions. He is aware of around 105 surviving maps, and thinks that of the original 350 or so it is likely that about 150 are still in existence. This was followed by Karen Cook explaining some of the techniques behind the actual printing and production of the maps. John Henry then finished the day with a talk about how Smith drew up the maps, using various existing base maps as the Ordnance Survey was still in its infancy and much of the country had not been accurately mapped onto the modern triangulation network we have today.

The first day was rounded off with a wine reception and dinner in the Geological Society, which included a chance to hear a number of poems directly inspired by William Smith's story.

Day two started with a more international flavour with talks on geological mapping in both France and Italy before Patrick Wyse Jackson talked about Smith's Irish connections and how the blank areas of the 1815 map were filled in by his 1820 version. Martin Pedley spoke about Smith's Northumberland county map and its development in different editions. Duncan Hawley rounded off the morning by explaining how William Smith might have missed the whole of the Mesozoic strata in south east Wales, also muddling the Carboniferous Limestone with Permian Magnesian Limestone by not examining any of the local fossils.

After lunch, Kate Santry brought us more up to date with a description of the new Oxford University Museum's interactive online catalogue of their extensive Smith archive. This archive was probably deposited there by John Phillips, but not

discovered until the 1930s. Peter Wigley has been using modern techniques to overlay the Smith maps onto their modern counterparts, and to digitally stitch the county maps together to produce an exceptionally detailed overall map. This has resulted in a virtual 'fly-over' contoured version of the map which can be found at www.strata-smith.com.

The final session of the meeting was dedicated to the keynote talk by Simon Knell, who rounded off the tale of Smith's life, following on from the very first talk the previous morning. We learnt what happened after he came out of the debtor's prison and how his career took off again with the aid of his nephew John Phillips. His title 'Father of English Geology' is often puzzled over, given the number of other renowned early geologists., but Simon explained that 'English Geology' referred specifically to the systematic study of fossils and their strata, rather than the wider geological field. In this sense, Smith definitely was and is the Father of English Geology.

The meeting finished with a question and answer session chaired by Simon Knell, Tom Sharpe, Hugh Torrens and John Henry, followed by a visit to the site of Smith's London home at 15 Buckingham Street, now occupied by an office building. On Smith's birthday, 23rd March, this year David Attenborough unveiled a plaque on the wall of this building, to commemorate the bicentenary of the map which literally did change the world!

**Cindy Howells**, Department of Natural Sciences, National Museum of Wales

## Moray Geology: Past, Present, Future at Elgin Museum

On 21st-22nd March, Elgin Museum hosted the 'Moray Geology: Past, Present, Future' conference to celebrate its Scottish Government Recognised Collection of Devonian fish, Permian and Triassic reptile and Permian trackway fossils and mark the completion of a year-long development project.

Over 80 people heard experts from the world of palaeontology and geology, such as Prof Mike Benton (University of Bristol) and Dr Nick Fraser (National Museum of Scotland), describing their work on specimens from the Recognised collection. The talks were followed by a welcome reception at Elgin Museum providing the opportunity to see the permanent displays of geology and palaeontology. A special temporary display exhibited related research posters, a sketch of the fish Cheirolepis by Lady Eliza Gordon Cumming of Altyre alongside several specimens from the Devonian Lethen locality, Nairn, she might have drawn from, illustrated letters from Hugh Miller, and models by Stephen Caine and Dr Paul de Buisonje, kindly provided by Bob Davidson, of various fish (Mesacanthus, Coccosteus, Osteolepis, Dipterus, Diplacanthus), the early tetrapod Elginerpeton and dinosauriform Saltopus that inhabited Moray millions of years ago.

The weekend was rounded up with a day visiting local find sites. In the morning participants visited Cuttie's Hillock in Quarrywood to the west of Elgin known for rare reptile trackways and body fossils of the paraiesaur Elginia mirabilis and dicynodonts Geikia and Gordonia. The group also visited Lossiemouth where fossil

of Stagonolepis, Brachyrhinodon, Leptopleuron and Saltopus were collected. The afternoon was spent on the Moray Coast, where the range and relative abundance of Permian reptile trackways from the Clashach Quarry was demonstrated, and at beach level, cross-bedding, ripples and soft sedimentary structures of the same age were highlighted as evidence for the Moray area being a hot, arid desert covered by sand dunes and occasionally subjected to flash floods. Despite the slightly damp conditions on the day the group remained enthusiastic throughout, providing an enjoyable excursion all round, and a memorable end to an informative weekend of events.

**Elgin Museum** (www.elginmuseum.org.uk) is open Mon-Fri 10am-5pm and Sat 11am-4pm where details of the conference will be available shortly as a proceedings booklet.

### The UCD Mineral Collection – New Developments

There have been several significant developments regarding University College Dublin's rescued mineral collection. Readers may remember that last year (2014), some 5,000 historic minerals—Irish and international, with labels going back 200 years—belonging to UCD were rescued from awful conditions within an old shipping container by myself (Patrick Roycroft), who had received a grant from the Heritage Council of Ireland for the purpose, and with very generous support from the National Museum of Ireland-Natural History (NMI, i.e., Matthew Parkes and Nigel Monaghan). That initial rescue phase was a big job, lasting for 9 months during 2014 and requiring the help of 15 volunteers, many working in parallel for weeks at a time. Happy to say that the rescued minerals are now safe with the NMI and are on their way to becoming a workable, and accessible, collection. But for 2015, the focus has had to be shifted; and there has been a transfer of ownership.

The Heritage Council of Ireland put out a grant call in March this year whose theme was Ireland's industrial heritage and community. With some advice from Matthew Parkes, I put in for a grant by which to use the Irish minerals in the UCD collection to put together a series of downloadable handouts informing the general public of their mineral heritage. We planned to do on a county by county basis, i.e., starting from something that people can relate to (their local area) and disseminating the handouts via the websites of local heritage centres, libraries, schools, the web-based Geoschol project, and the Irish Geological Association (which is amateur focussed). If possible, we will try to get anything of special interest into local newspapers. The application was successful (it is grant CBH05247), and I will receive, upon completion, E4,000 from a total pot of just over E500,000 – or almost 1% of the national budget for heritage in 2015. We are all very happy about that: not least that it shows confidence by the Heritage Council in the value of a minerals-based project.

The other significant development is that on the evening of Tuesday, May 5th, Prof. J. Stephen Daly of the UCD School of Geological Sciences transferred ownership of the mineral collection from UCD to the National Museum of Ireland.

It will still be known as the UCD Mineral Collection, however. But it now belongs to the people of Ireland and will, over the coming years, be fully curated and catalogued. With this new acquisition, the mineral collections of the NMI have, overnight, increased by over 50%. What's more, there is still a sizable portion of the UCD collection still sitting in UCD: an estimated 2,000 more specimens that were not part of the original rescue because they were not in as much immediate peril as the ones in the shipping container. These will also be taken into the NMI collections in due course.

However, the aim for this year, with the help of the new 2015 Heritage Council grant, is that the Irish minerals in the UCD mineral collection will act as the seed by which to start the task of publicising Ireland's mineral heritage to the people of Ireland, almost all of whom have no knowledge that we have a 'mineral heritage'.

For more information, either Follow, Like or Share the Facebook page "UCD Mineral Collection" https://www.facebook.com/pages/UCD-Mineral-Collection/738136006225828.

**Patrick Roycroft**, c/o National Museum of Ireland-Natural History, Merrion Street, Dublin 2. E-mail: proyc6@aim.com and proycroft@nmi.ie

## Publications

Taylor, M. A. 2015. Rediscovery of an Ichthyosaurus breviceps Owen, 1881 sold by Mary Anning (1799-1847) to the surgeon Astley Cooper (1768-1841) and published by William Buckland (1784-1856) in his Bridgewater Treatise. *Geoscience in South-West England*, **13**, 321-327.

*Matthew Forster Heddle - Mineralogist and Mountineer* by Hamish Johnston A book about one of Scotland's most famous mineralogists: Matthew Forster Heddle (1828-97), written by his great great grandson. NMSE - Publishing Ltd, ISBN-10: 1905267983, ISBN-13: 978-1905267989

A Memoir to the map and delineation of the strata of England and Wales with part of Scotland by William Smith (reproduction by BGS/NERC re-mastered from an original held in the BGS Library. Also available as a set with the William Smith 1815 Geological Map of England and Wales with part of Scotland (reproduction, folded).

*The Cobbe Cabinet of Curiosities - An Anglo-Irish Country House Museum,* edited by Arthur MacGregor. ISBN: 9780300204353, ISBN-10: 0300204353

This book contains a survey and analysis of a fascinating cabinet of curiosities established around 1750 by the Cobbe family in Ireland and added to over a period of 100 years. The Cobbe museum, still largely intact and housed in its original cabinets, now forms a unique survivor of this type of private collection from the Age of Enlightenment.

#### News

#### A new sauropod from Yorkshire

A good month for dinosaurs. As well as the unveiling of a very old dinosaur in Wales a description of 'Alan' was published in the journal PLOS ONE. Alan is a new species of suaropod from Yorkshire. The identification comes from a fossil vertebra bone found in Whitby and it has been dated to the Middle Jurassic ~176 Ma which is the earliest stratigraphic occurrence for a British sauropod dinosaur.

The bone is now held in the collections at the Yorkshire Museum in York.

# Volunteers wanted to join local history research project in Herefordshire and Worcestershire

The "A Thousand Years of Building with Stone" project, managed by the Herefordshire and Worcestershire Heritage Trust and funded by the Heritage Lottery Fund, is looking for volunteers to help with projects and information on building stones and quarries.

An exhibition is currently on show at the Cider Museum in Hereford about building stones in Herefordshire

Anyone interested in finding out more about the project and volunteering can visit www.buildingstones.org.uk e-mail building.stone@worc.ac.uk or telephone 01905 542014.

#### New minerals in the news (or not)

Perhaps surprisingly around 50-60 new minerals are approved each year by the International Mineralogical Association Commission on New Minerals Nomenclature and Classification. They are then published in the academic press. Only a few of these make it into the news, mostly by judicious use of social media. New minerals are always deposited in museum collections, but sometimes the new mineral is discovered in the collections in the first place. A few recent highlights are:

**Icosahedrite** - Al<sub>63</sub>Cu<sub>24</sub>Fe<sub>13</sub>, the first natural quasicrystal has what is known as forbidden symmetry - as it has a crystal structure that should exist in nature. After many many years of searching museum collections for 'forbidden crystals' Professor Luca Bindi of the University of Florence discovered a promising sample in the collections of the Natural History in Florence. Gruelling field work in the remote Kamchatka Region, Russia discovered the origin of the samples and established that this mineral has an extraterrestrial origin.

See: http://www.lastwordonnothing.com/tag/icosahedrite/

**Fontarnauite** - a double salt of sodium and strontium with minor contents of potassium and calcium. It was discovered in the Emet Borate District of Turkey. by a group of scientists from the Science and Technology Centres of the University

of Barcelona and the Faculty of Geology. Its name pays tribute to Ramon Fontarnau i Griera (1944-2007), who headed the Material Characterization Section of the Science and Technology Centres Services of the University of Barcelona.

**Steinhardtite** - a new crystalline form of aluminum combined with significant amounts of iron and nickel. This mineral was found in the Koryak Mountains in Russia's Kamchatka Peninsula aby an international group of scientists, and is thought to be meteoric in origin. It is named in honour of Paul Steinhardt, Princeton's Albert Einstein Professor in Science and a Professor of physics.

# Web sites of interest

Comment on our obsession with dinosaurs http://www.theguardian.com/books/2015/jun/05/dinomania-dinosaur-obsession-science

Six questions for a geological curator - continues with David Gelsthorpe. https://geocollnews.wordpress.com/

Essential interactive map for people who like their ornamental and building stones. http://londonpavementgeology.co.uk/geo-sites/

## Shows

## 5 September - Southampton Mineral & Fossil Show

Community Centre, Lyndhurst

Guest display for 2015 will be Bournemouth Natural Science Society with displays of some of the superb mineral and fossil specimens from their extensive collection. Displays from the Dinosaur Isle Museum from the Isle of Wight and The Dorset Group of the Geologists' Association

See http://www.sotonminfoss.org.uk/smfsshow.htm

## 14 November - Sussex Mineral Society Show

Clair Hall, Haywards Heath, Sussex Tours, workshops, displays See http://www.sussexmineralandlapidarysociety.org.uk/home/show

## **Editorial note - electronic Coprolite**

Coprolite is now produced as an electronic 'first' edition. It will be made available on our website at geocurator.org and distributed to members via email. Please keep your emails up to date with the membership secretary. For the time being those who wish to continue have a hard copy may contact me at helen.kerbey@museumwales.ac.uk, or tel: 02920 513901.

A format suitable for printing as a booklet is available on our website geocurator.org



Keep in contact

Web site: Geocurator.org Facebook: Geological Curators' Group. Twitter: OriginalGCG and hashtag #GCG.



Affiliated to the Geological Society of London registered charuy no. 296050