BOURNEMOUTH NATURAL SCIENCE SOCIETY & MUSEUM

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Newsletter Spring 2021

Photo credit: Jill Abbot

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BNSS News *Jill Abbot*

The AGM and the Assembly which followed took place via Zoom on 16th January. James Fradgley proposed a vote of thanks to all the Trustees and Volunteers for their work over the past year. In particular thanks were due to Mike Skivington for his year as President, which followed some 15 years of his membership and a considerable period as Chairman of the Assembly. Particular recognition was due to Ray Chapman who was retiring as Secretary and Trustee after 20 years as a member. Ray had been responsible for the accreditation of BNSS as a Museum and acts as the Curator. He was active in the publication of "The Natural History of Bournemouth". Ray will continue as Chairman of the Geology Section. Ray Chapman responded by thanking Grenham Ireland for his past year as Chairman of the Trustees. President Mike Skivington ceremonially and remotely passed the Presidential badge of office to Bruce Longstaff (pictured right) and wished him a successful year.

Colin Lord was awarded the Volunteer of the Year award with grateful thanks from everyone for all his work on the lantern roof project now successfully completed. New Trustees elected were Jacque Bainbridge, Colin Lord and Keith Butt. At the Assembly, we welcomed Eleni Dimitriou as Section Chair for Photography. Eleni is reviving the BNSS Photography Competition (see accompanying flyer). Further details of Officers and their contact details will be sent to all members on a separate sheet. The Programme for Zoom lectures is well advanced. We can't yet set dates for reopening but we are hopeful for the summer. Work on some planned improvements, both inside and out, should also go ahead. Some field trips planned for last year may well be able to happen too.

An Interview with Bruce Longstaff, our new President. *Jill Abbot*

What did you think when you were invited to be BNSS President?

The suggestion that I become the 2021 President was a large surprise. As most know I have never been a scientist, neither professional nor amateur, unlike most of my illustrious predecessors.

Where do your interests lie?

I have an interest in astronomy, as is also probably well known within the Society. Outside that speciality, I am a complete generalist.

How did you first learn about the Society?

I was introduced to BNSS in about 2004 by Tony Ruth whom many will recall with affection. He asked me to attend Open Days with my portable telescope. It was many years after that I actually joined.

What is your background?

Professionally I've been largely involved in aviation; for 20-odd years an air traffic controller in the Royal Air Force. I have been in business most of the rest of my career, lastly with my own company providing all sorts of items to airports far & near. The nearest I have been to museums was, for a year, in tourism, as general manager of the London Dungeon. Not what you'd call a proper seat of learning.

***Do you have any thoughts on what you would like to see improved*?**

I have started my year with a couple of ideas, the first of which is seeing what we can do, within the funds we might find, to improve access to Bassendean for those who are not good on stairs.

I have lived in Verwood for a little over 22 years. Presently I am secretary of the Wessex Astronomical Society.

Disability Questions *Jill Abbot, BNSS Assembly Chair*

Our 2021 President is very keen to secure access improvements for everyone who visits BNSS at 39 Christchurch Road. We would like your help to determine what is needed. Members and others come to the building for lectures, the collections, open days and to volunteer in various ways. We also have a lovely, but under-used garden. Is it difficult for you to enjoy a visit to BNSS? Do you have a visual impairment, a hearing problem, dodgy knees or are you wheelchair bound? We want to know whether there are things that would make it easier for you.

Bruce's Questions:

1) If you are 'mobility limited' (ML) what features would you like to see at 39?
2) We have level access to the lobby outside the lecture hall. If you are ML, is the stair lift adequate for you to reach the Museum Room floor?
3) If you use the stairlift and use any kind of wheeled device to give you freedom of movement, how do you get it to the Museum Room level?
4) Can you access any other floor?
5) How do you get attention for admission or access while you are still in the car park?
6) Can you get to the garden?

Please send your answers and suggestions to me at assembly@bnss.org.uk **as soon as possible**. Alternatively write to me at 39 Christchurch Road BH1 3NS, or phone 01202 553525 leave your number and I will phone you back.

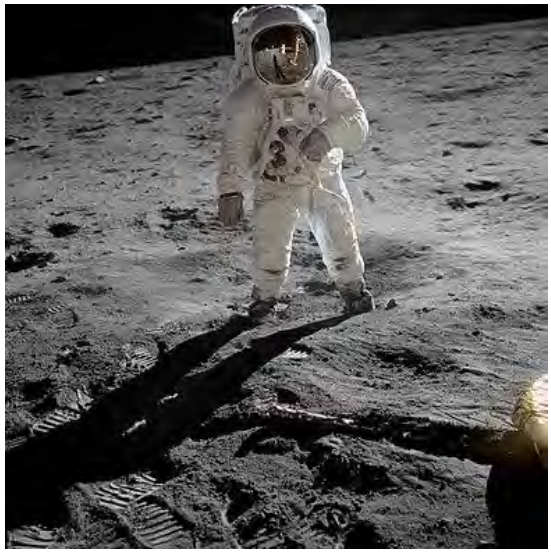
We have an Assembly meeting on 30th March by Zoom, at which we are scheduled to discuss access. We need your input before then to be most useful.

"The First Stars" talk was given by **Dr Dan Whalen** of Portsmouth University Department of Cosmology and Gravitation. One of the facts we need to explain is how supermassive black holes emerged so early in the universe, after a few hundred million years. The first stars formed about 100 million years after the Big Bang.

Dan showed how Dark Matter helps material to coalesce more easily, aggregating matter into nodes where star formation could take place. The stars were potentially much larger than any today, at around 1000 solar masses. These stars would have re-ionised the universe and would also have split molecular hydrogen to make atomic hydrogen. Molecular hydrogen is a good cooling agent, which enables less massive stars to form. Without so much cooling, the matter then available to make stars could potentially make even more massive stars. These stars could have had masses up to about 100,000 solar masses, and would eventually collapse to form black holes of that mass. These could have been the seeds for the late supermassive black holes.

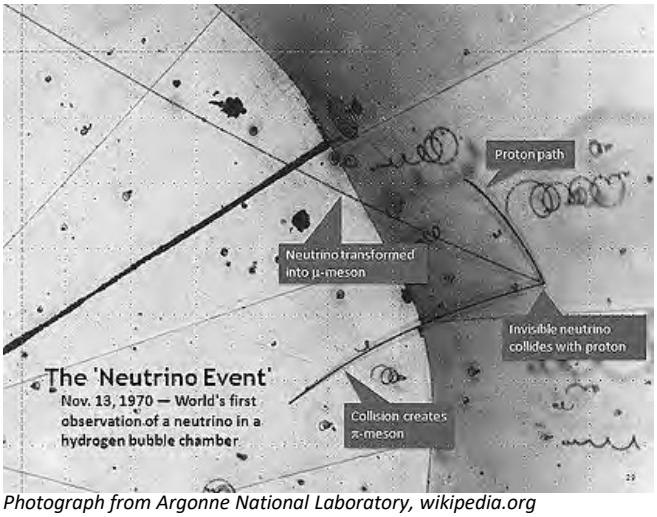
Illustration of first stars, Photo credit: NASA/WMAP

"Apollo – the Sequel" was a talk given by **Dr David Whitehouse**, former BBC Science Correspondent, based on his new book "Space 2069", looking to the future 100 years after Apollo 11 landed on the Moon. There has been a lot of robotic exploration of the Moon, especially around Shackleton crater at the south pole, which has perpetual sunlight and ice in the perpetual darkness of the crater. We expect Moon landings with people soon, 2024 to 2026, and this would be an ideal place for a base. The problem is the political wind blows in all directions, and this is a long-term project. The Artemis project includes other nations, especially Europe to work on the Moon landing.



Buzz Aldrin photographed by Neil Armtrong,Photo credit: NASA

All sorts of technology will be needed to make a base work. 3-D printers to make equipment. Processing and compaction of the dusty surface, especially extracting water. We then looked at a Mars landing: it has similar problems to the Moon. It's essential to make a Moon base work first so we have the knowledge needed for a Mars base. We looked at the human body problems of a 10-month flight, which may be very severe. A rotating craft to provide some gravity may be a partial answer. Perhaps we can speed up the flight to make it 3 months, which would be much more manageable. David had many excellent slides and videos. He's hopeful we can reach Mars by the 2069 date.



Photograph from Argonne National Laboratory, wikipedia.org

"Neutrinos" was a talk given by **Mark Gibbons**, a frequent visitor to BNSS. Neutrinos are produced by the most elementary nuclear processes in stars, in unimaginably vast numbers. Neutrinos hardly interact with the environment, passing through matter like it wasn't there. If you wanted to be sure to stop a neutrino, you would need a lead shield 100 light-years thick! We are pervaded by neutrinos – trillions pass through our bodies every second of the day and night. This talk examines these particles in some depth, and asks if they deserve their place as one of the candidate particles for dark matter. Mark adeptly took us through some of the complications surrounding both the nature and detection of neutrinos. We also looked at some of the cosmological implications.

Lady Presidents – Dame Kathleen Lonsdale *Ceri Edwards*

Photo credit :Chronicles Insight - Pioneering Irish Women in STEM

Kathleen was born in 1903 in County Kildare, the youngest of Harry and Jessie Yardley's ten children. When the marriage broke down in 1908, Jessie and the children moved to Essex. In 1914, Kathleen gained a scholarship for Woodford County High School for Girls. Woodford did not have the facilities to offer physics so Kathleen was transferred to Ilford County High School for Boys. Aged 16, Kathleen won a place at Bedford College to study physics where she was noticed by William Bragg. She gained a B.Sc in 1922 then an M.Sc from UCL in 1924. Bragg invited her to join his team of X-ray crystallographers at the Royal Institution where in 1929 she proved the planar structure of the benzene ring in hexamethylbenzene. Here Kathleen met her husband, Thomas Lonsdale. In 1934, Bragg offered Kathleen a job that included childcare. She was awarded a D.Sc in 1936. In 1935 the Lonsdales became Quakers, which resulted in Kathleen's imprisonment for pacifism in 1943. Her experience led her to campaign for prison reform. 1945 saw her become one of two women to be admitted to The Royal Society, where she promoted women's science. She was President of the BNSS 1964/5. She died of cancer in 1971. Lonsdaleite, an allotrope of carbon, and buildings in UCL, Limerick and Dublin City Universities have been named after her.

Mosquitoes, Covid-19 and dogs *Grenham Ireland*

In a talk in January entitled "From mosquito bites to sniffer dogs" new BNSS member and volunteer **Dr. Sophie Wulff** gave us insight into the work going on at the London School of Hygiene & Tropical Medicine (LSHTM) where she has worked at the Arthropod Control Product Test Centre (ARCTEC) after training as an entomologist.

Anopheles mosquito, *Photo credit ARCTEC*

She started by describing what is known about how female mosquitoes detect humans in order to obtain their blood meal needed to produce eggs. They use visual cues and heat but can also navigate towards a plume of odour from a human. She then went on to tell us about experimental work by Prof. James Logan's group in Africa showing how the malaria parasite (Plasmodium) which is transmitted by the Anopheles mosquito can change human odour to make mosquitoes more attracted to malaria-infected children and therefore potentially increase the transmission of the parasite. The work involved testing children's socks and the chemicals changed were the abundance of volatile 7-10 carbon aldehydes. Since dogs have a sense of smell many times better than a human they have begun to be used by scientists to try and detect human diseases by odour. The initial work by Dr. Claire Guest in 2004 was on human bladder cancer but this has been extended to show trained dogs could detect malaria-infected children (as above), patients with Type 1 diabetes and recently, and topically, to try and detect those humans infected with Covid-19.

Will they bite? Photo credit: ARCTEC

Sophie described some ongoing trials involving LSHTM and Durham University (https://www.lshtm.ac.uk/research/centres-projects-groups/using-dogs-to-detect-covid-19) and work published from scientists in France & Germany. Finland is currently using sniffer dogs at Helsinki airport using swabs from passenger's skin in a test which takes only one minute (https://www.theguardian.com/world/2020/sep/24/close-to-100-accuracy-airport-enlists-sniffer-dogs-to-test-for-covid-19) and is reported to have a high degree of accuracy.

Early Bronze Age CSI: A very cold case from Knowle Hill Farm, Dorset

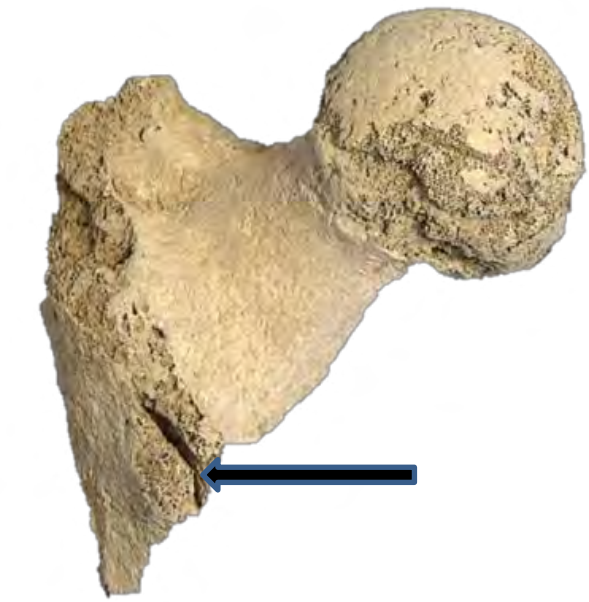
Gabrielle Delbarre (Bournemouth University)

On 8th December 2020, I presented on behalf of an international CSI team of professional archaeologists, the results of our investigation into a very cold case. Our case began in 2016 when an unusual burial was discovered during the excavation of an anomalous barrow at Knowle Hill Farm, near the "Knowlton Henge complex" where 'classic' Beaker graves are well attested. Southeast of the barrow was a large grave pit containing traces of a wooden chamber/box, which revealed the disarticulated remains of a tall (1m75) and robust man, c. 25 years old. Grave goods include an exceptional European Beaker, tanged and barbed arrowheads (see right) and a large stone wrist guard. Radiocarbon dates (3863 ± 34 BP) confirmed that our man was a very early Beaker migrant to the UK.

Photo credit: Martin Green

Photo credits: Martin Green

Osteological analysis and 3-D microscopy of his skeleton shows evidence for trauma consistent with a violent death, likely inflicted with a metal blade, in a 'person to person combat' context. Our victim died as a result of one blow which severed the deep femoral artery and penetrated well into the left femur's lesser trochanter (see arrow, below). This murder is potentially one of the earliest instances of 'death by metal' in the UK.



Posteriror view of upper part of left femur showing where bone had been penetrated with a sharp blade at arrow. *Photo credit Gabrielle Delbarre*

The absence of metal objects from the grave assemblage is anomalous compared to similar Beaker burials in this area. The disposition of the bones within the grave suggests that the remains were rearranged after the grave was disturbed by anthropogenic action. Some of this was done with apparent care, but the widely distributed skull fragments suggest it may have been intentionally smashed. In the absence of evidence for post-mortem manipulation of the body in a region where forms of curation of bodies, including mummification, is well documented during the Beaker period and Bronze Age, coupled with evidence for anthropogenic agency in grave disturbance and the remarkable absence of 'classic Beaker' grave goods, Knowle Hill Farm presents an early instance of possible grave-robbing or desecration in southern England.

Thanks to Bryan Popple for editing the article and to CSI team members Dr Martin Green (Down Farm Museum), Dr Joshua Pollard (Southampton University), Dr Mike Allen (Bournemouth University), Dr Phillip Snoek (Universiteit, Ghent, Belgium) and Dr Phillip Endicott (University of Uppsala, Sweden).

Great Bustards are Doing Well *Jill Abbot*

Initially there was considerable resistance to the reintroduction of the Great Bustard to Southern England. Along with other bird species they had been hunted and persecuted to extinction here in the mid 18C. New legislation, under the Habitats Directive 1992, required the UK Government to explore the feasibility of reintroducing species to where they once had been in the natural ecosystem. The Great Bustard Project, set up in 1998, conducted comprehensive studies of existing populations elsewhere, as well as considering the suitability of potential release environments. In 2003 DEFRA agreed to a ten year trial licence to GBP. There were serious hurdles and scepticism put in GBPs way but they had good co-operation from Russian authorities, who were keen to rescue eggs from nests destroyed by new farming practices and widen the life chances for the species. Later the Spanish population, initially thought by "experts" to be different, were shown by DNA testing to be the same as the original British birds and became the source of subsequent egg collection for the project from 2014. **David Waters**, Project Manager showed us how the birds, a social species, interact with one another.

The much larger males display magnificently to their dowdy females; the dowdiness being both a superb camouflage against flying crows seeking eggs, and a problem for those looking to protect nests from farm vehicles. During the chick rearing process white shapeless clothing and covered heads enable those feeding and caring for young birds not to be identified as humans. Gradually the population has grown as has the affection and pride for the birds among the local farmers and landowners. There are now some 100 breeding pairs living independent lives and we hope to arrange a visit (see www.greatbustard.org).).

Chick being fed using mannequin to avoid imprinting, Photo credit: bbc.com

Microminerals *Grenham Ireland*

Mike Brooke took time off from his role as a Broadstone Councillor to tell us all about 'Microminerals'. These are generally specimens that are less that 1 cm in size down to only a few millimetres which means that often one needs specific techniques to mount and view them. It was the latter which Mike concentrated on using examples from his own collection. In order to observe such specimens in detail, a microscope is often needed and he discussed the use of stereo microscopes and the use of a trinocular head to allow the attachment of a camera to the microscope to allow photography. However, there are problems as only part of the specimen being captured in focus at any one time. He described ways around this by taking multiple images at different focuses and then using software to re-align the images and combine them to create a single 'in focus' image. He talked about crystals and their size in relation to how long they have taken to grow and also their impurities and inclusions and how you can get two different crystal forms of the same substance. He also showed a specimen of the rare, and now unobtainable, dendritic gold from Hope's Nose Torquay (see picture above). Mike showed us some stunning images with beautiful colours to illustrate this small geological world.

Dendritic Gold, Hope's Nose. *Photo credit: James St. John*

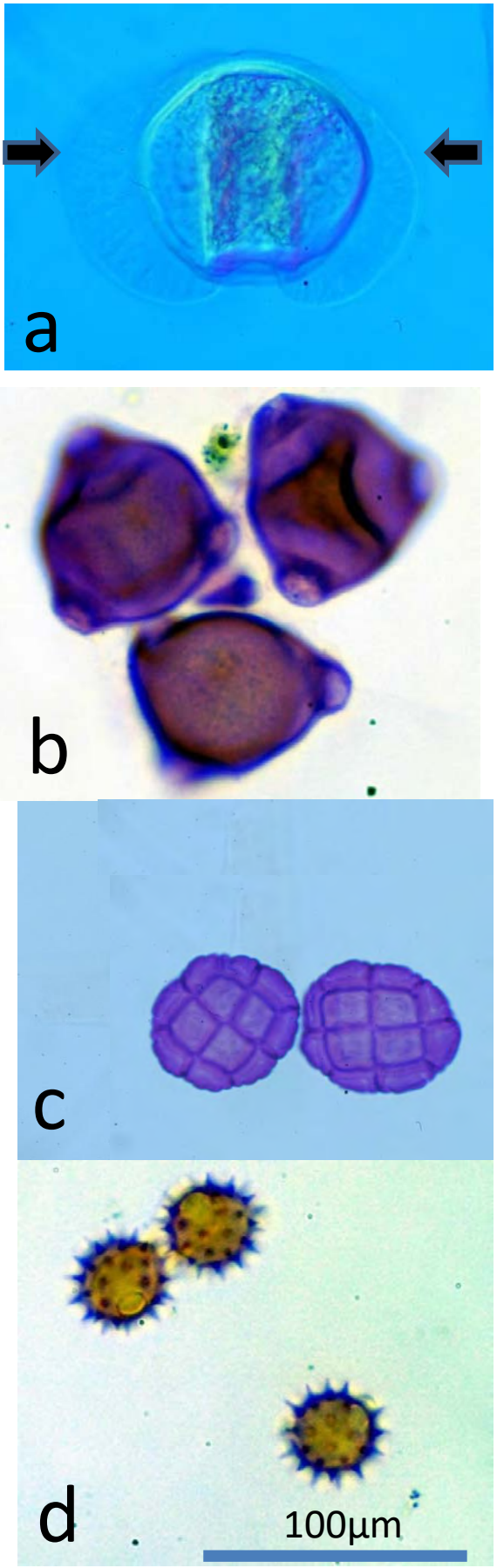
https://commons.wikimedia.org/wiki/File:Dendritic_crystalline_gold_(Hope%27s_Nose,_Devon,_England)_(16420571574).jpg

Pollen *Grenham Ireland*

Well here I am sneezing as soon as I step outside my back door in February – why? Could it be the catkins dangling from the thin hazel branches poking above my very mixed hedge? But why not in previous years? The hedge has missed its cut for two years so many more catkins this year and there are clouds of pollen from the catkins.

Each pollen grain contains the cells which will form the male gametes of plants which are needed for their reproduction. Pollen evolved more than 375 million years ago and consequently plants no longer required an aqueous habitat for reproduction. Pollination involves the movement of pollen to the female ovule either by wind or the agency of insects or other animals. Pollen grains come in a variety of shapes and sizes with additional surface textures and features of the outer coat or exine which allows pollen from different plants to be identified usually down to the species level – provided that you have a microscope (see figure). Pollen from flowers, which attract insects to aid pollination, often have a sticky surface or spikes. Pollen that is wind blown is often lighter and conifers have one or two additional air bladders which were originally thought to aid their dispersal. However, recent research has shown the bladders may help at the end of their journey in their transport to the ovule by flotation in the aqueous pollination drop secreted by downward directed ovules.

The study of pollen is called palynology and is important in a number of ways. Analysis of ancient pollen from peat cores can allow us to reconstruct what the ancient vegetation was thousands of years ago since the exine is well preserved. Bee keepers study pollen in honey to determine at which plant their bees have been feeding. In 1827 botanist Robert Brown studied pollen grains in water and described them 'jiggling about' but couldn't understand the phenomenon which he called 'Brownian motion'. Later in 1905 Albert Einstein published a full mathematical explanation based on the many water molecules hitting the pollen grains and moving them about.



Legend: Examples of different pollen under the microscope a) Cedar of Lebanon – note the two air sacs arrowed, b) Fuchsia, c) Mimosa, d) Coltsfoot – note the spikes. b-d stained and photographed from Victorian slides.

Taxidermy *Keith Patenotte*

Taxidermy is from the Greek 'taxi' meaning 'to arrange', and 'derma' meaning 'skin'. Hello fellow members. I have been asked by Grenham to write an article about taxidermy as I have been restoring the BNSS collection for a number of years. My personal passion is for butterflies and moths, which started when I was a five-year-old boy in 1944, watching the tortoiseshell butterflies laying eggs on the nettles in my Gran's garden. I mention this because Lepidoptera - Latin for scaly-wings – do come into the remit of taxidermy as the bodies and larvae of the large species need cleaning, drying out and then stuffing with cotton wool. I joined the BNSS about 12 years ago after attending an open day. I met a great group of welcoming, likeminded volunteers, who shared my passion for things.

Much of the BNSS taxidermy collection was in very poor condition. Having spent most of my life repairing and restoring everything in sight (another obsession), I took on the task of restoration (fools rush in?) not realising what a mammoth task I was taking on. A better name for the collection would have been 'The BNSS all-day, all-you-can-eat buffet', as every creature and fungi that could have attacked the case had turned up with their friends for lunch! One of the earliest types of taxidermy was the making of clay frames, over which the cured skin was stretched. We could also include the process of Egyptian preservation by mummification as an early form of taxidermy, such as the hippopotamus discovered in the temple of Thebes. In 500BC, cured gorilla skins were hung in the Temple of the Carthaginians and were still there at the sacking of Carthage in 146BC. Preservation of animal skins goes back to early man, who used them for clothes, bedding, water carriers, amongst other uses. The first animals known to have been subject to taxidermy are a rhinoceros, dating back to 1500AD at the Royal Museum of Vertebrates, Florence, and a crocodile dated 1627AD, in the St Gall Museum in Switzerland. It is not known how these two were preserved.

The late 1700s to about 1910 were the 'glory years' of taxidermy, with the Victorians taking it to new heights. This included the 1851 great exhibition which took place at the Crystal Palace, where 6 million visitors saw creatures that they did not even know existed. In 1867, for the Paris Exposition, Edouard Verreaux, a French taxidermist, made a superb tableaux - an Arab on a camel being attacked by two lions (right). More of this next issue with grave robbing, body-snatching and deadly poisons.

Photo-credit: Ben Ledbetter, Architect
https://commons.wikimedia.org/w/index.php?curid=78919293

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