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Barton Bed Fossils - do they fade?

The Bracklesham and Barton Beds are two clayey formations of the British Middle and Upper Eocene that outcrop along the south coast of England between Bognor Regis and Poole. The formation tends to contain well-preserved fossil molluscs, in particular a wide range of gastropods, some up to 10cm long. The fine grained mud of these deposits is rich in pyrite and so Barton beds fossils tend to feature heavily in collection conservation programmes.

The mud trapped inside the whorls of the shell can be rich in finely disseminated pyrite, salt from the sea-shore localities adds to localised high humidity and pyrite decay sets it. The result a combination of some or all of the following - acrid smells, crusty yellow and green efflorescence, crumbled mud mixed with white efflorescence, upper whorls blow off turret shells. Any visible broken shell structure tends to have rather a ragged appearance presumably due to acid attack from the decay by-products.


Whilst conserving material from these formations for pyrite decay, I have noticed that some shells also seem to be susceptible to light damage. In particular are those specimens on display at the Horniman Museum in the north hall on the balcony. This display has been in place for in excess of twenty-five years and for the early period, the arched roof was glazed (much like a railway station terminus roof). Consequently, these specimens had been exposed to daylight for at least five years.

In 1990, the specimens were assessed as showing damage from pyrite decay and were removed for pyrite decay treatment, repair and consolidation. As part of the treatment, the shells were cleaned and in some areas, patches of mud picked and swabbed off. The main mud-free parts of the shell were rather chalky in texture and dull very pale grey or fawn colour, but where the mud had been present, the more solid shells seemed to be a pale pink colour and considerably less chalky. This suggests that these types of fossil shells may be susceptible to light damage causing fading. Specimens were displayed in wooden table cases painted with emulsion paint, so Byne's disease type damage from carboxylic acids may also have contributed, but similar pink patches underneath mud has been noted subsequently in other collections.

I have not collected this type of material in the field and most of the material I have conserved has been from older collections where specimens would have been on display for long periods. I have therefore not seen fresh specimens.

Has anyone else come across this problem?

Kate Andrew
Shropshire County Curator of Natural History
Ludlow Museum



Natural History Specimens on display - lighting considerations.

Because ultraviolet light cannot be detected by the human eye, its potential for damage needs to be assessed, and monitored prior and during the display of specimens to minimise this risk. This damage can in its simplest terms be described as 'fading' (though darkening or yellowing are other adverse effects from light). Whilst a herbarium sheet's scientific data may not suffer any notable fading, further to the amount lost during the pressing and drying process, its intrinsic value and state prior to display may be altered. As carers of these collections we have a responsibility to maintain and stabilise their condition. It could be argued that as with specimens assigned for 'handling' on the gallery, so particular specimens for display should be thought of as expendable. This may not always be desirable if the display itself deals with actual 'specimens' rather than 'species'.

UV light levels can be effectively reduced by the use of protective film or varnish applied to windows or the lamps themselves. In D. Lampard's article in Issue 8 (*Ten Agents No. 4*) he discusses the application of film directly onto the display case glass itself. Though the primary function of the film in this case was as a 'safety barrier' and little information was gathered on its physical or chemical make-up, it was found to contain filters capable of removing 95% of UV light.

UV filter film generally has a limited effective life, so therefore should be checked regularly with a hand-held UV meter and replaced when necessary. The actual specimens themselves should be regularly checked for signs of damage, as it is the cumulative effect of light rather than brightness which ultimately leads to a specimen's deterioration. A photograph taken prior to display could be used as a comparison.

The recommended maximum illuminance for the limitation of light damage is 50 lux for the exposure of botanical, entomological specimens, fur and feathers (*MGC Standards*). For un-dyed organic material such as leather, horn, bone, and wood, a higher level of 200 lux is acceptable. The maximum UV radiation limit for all biological specimens is 75µW/lumen.

Lighting within a case or gallery can be an intensive source of heat and reduce relative humidity. Exposure therefore should be monitored at different times during the day. Ventilation needs to be provided to dissipate any excess heat. It may not be the actual specimen that is directly affected by the heat but the means of mount/display method. At Liverpool we had an incident where the delicate petals of a herbarium specimen, which was adhered to its mount fragmented. This was most likely due to the contraction and expansion of the adhesive used.

If the lighting is within the case, ideally a cold source of light should be used, e.g. fibre optics or fluorescent tubes with the motor outside the case. Alternatively, keep the lighting outside the case altogether.

Rates of chemical degradation of organic material will also be increased with temperature. Light radiation, UV in particular, speeds up this degradation by photo-oxidation. Substances can be more or less susceptible to this type of damage depending on which parts of the spectrum they absorb or reflect. For example, materials that appear red to us will absorb mainly in the blue end of the spectrum (shorter wavelength; more damaging). Therefore, red materials are often weaker than the same materials which are coloured blue.

*Donna Young
Liverpool Museum*

Courses and Meetings

Handling the Past

29 June 1999 Public Records Office, Kew

The Public records Office is holding a one day forum for a limited number of participants to discuss issues relating to the training of staff in the proper handling and care of archival and library material. It will be aimed specifically at non-specialist staff. The forum will take place at the Public Record Office, Kew. The fee for the day will be £30.00.

For further information and to reserve a place, please contact:

Sue Seber, Preservation Services
PRO, Kew, Richmond, Surrey, TW9 4DU
Tel: 0181 876 3444 ext 2440
Fax: 0181 392 5254
E-mail: preservation@pro.gov.uk

Reversibility – Does It Exist?

8 – 10 September 1999 London

The British Museum Department of Conservation, will hold a three-day conference from 8-10 September 1999 in London.

The concept of reversibility as applied to cleaning, stabilisation, consolidation, assembly, and restoration will be addressed, as will changes to the physical or chemical properties of objects as a result of conservation. The conference will be confined to the portable heritage, excluding buildings but including mosaics and wall paintings.

For further information and registration pack please contact:

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