

BCG

Newsletter No 8 Biology Curators Group



Bio - Deterioration

Cover design by Jim Rowland, Design and Production Unit,
Tyne and Wear County Council Museums.

NOTE FROM THE SECRETARY

Those members who did not attend the Annual General Meeting will be receiving Newsletter number 7 (December) along with the current newsletter. In number seven you will read my report of 1977's activities and see the composition of the new committee. It will be obvious that this along with other correspondence should have been circulated earlier but my activities regarding both B.C.G and other groups has been virtually nil over the past three months. In this note I wish to put forward some mitigating circumstances and hopefully to explain my reasons for this lack of communication.

In June of 1977 plans were prepared for the complete restorage and reorganisation of the Vertebrate Zoology collections at Merseyside County Museums. Offices and filing systems were relocated in November but early in January 1978 the building of a new Taxidermy laboratory brought forward plans to move the Osteology, Bird and mammal collections. The physical moving of cabinets and the reordering in new systematic sequences of the collections occupied the academic staff fulltime and is only just being completed. This work has also linked in with the XVIIth International Ornithological Congress to be held in Berlin in June of this year and the publication of the bird type list at Liverpool. The collections are now organised in Peter's sequence so visiting researchers coming before and after the congress can use the collections without the constant supervision of myself. All time has been concentrated on this task the result being a three month backlog on all enquiries, letters and research. This is now being tackled and at last a large number of letters, accounts etc have been passed over to the new officers and members of the committee. This alone will ensure in the future no repetition of the inactivity of the last three months for which I am solely responsible. The collections should not be moved again for the next forty - fifty years. It is extremely unfortunate that the removal of collections and the allocation of work to the new committee came at one and the same time, but all defects should be rectified soon and I ask all members to write to the appropriate person concerning errors of membership, lack of newsletters etc known to them. It is also unfortunate that this period of inactivity and inefficiency on my part should also coincide with the raising of the personal membership fee to £3. The activities of B.C.G. continue apace, the survey of collections is due to be published by the B.C.G. this year, (hence part of the increase), the guidebook for record centres is being published jointly by the N.C.C. and B.C.G. and a new survey of holdings in Universities and other institutions is also being undertaken. The new committee with a representative in every region should improve communication overall and a detailed listing of B.C.G's aims and activities will be circulated to everybody. Membership is still rising and I can only hope that members continue to give their active and financial support although my activities have of late been curtailed and give the impression of a non-caring secretary. I can only promise a greater activity during the rest of the coming year.

Peter Morgan.

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EDITORS NOTE

I would like to take this opportunity of putting on record the thanks of BCG members to Stephen Flood for his efforts in the past in producing the Newsletter. Only after struggling desperately to put together this present issue have I personally realised the amount of time and effort involved. Stephen's activity will no doubt increase still further in his new role as Chairman, in which we wish him well.

Reg Harris' lecture on Biodeterioration proved to be one of the highlights of the AGM in December, and after some persuasion I managed to extricate his copious notes from the depths of the B.M. (N.H.) The article on Biodeterioration in the Newsletter is a result of my editing of these notes, and any errors which may have crept in are undoubtedly mine. I hope the article will provide a useful point of reference to the processes of biodeterioration, some of the techniques involved in preventing it, and the precautions which should be taken in using these techniques.

Geoff Hancock has ably assisted in the compilation of this issue, and it may be useful at this point to mention the division of labour between Geoff and myself. For this first issue it has in fact proved a very random division, but could all contributors please note that for further issues articles dealing specifically with the history of collections, or those with a zoological bias (excluding marine zoology) should be sent to Geoff Hancock. I will be responsible for articles dealing with aspects of botanical collections, marine biology, techniques, biological recording and items of general interest. Similarly, requests for information and minor notices should be forwarded to me at Sunderland. I hope this division will give more time and opportunity for editing and if necessary for refereeing.

The Committee are at present still examining the possibility of reproducing the Newsletter by photo-litho, which will give a more polished appearance, allow the reproduction of photographs, and perhaps lead to advertising revenue. For the present however, production will continue to be centred on St. Albans Museum.

P. Davis

The copy date for the July Newsletter will be 3rd June.

BIODETERIORATION

A. DEFINITIONS AND EXAMPLES

Biodegradation can be defined as "the harnessing of the decay capabilities of living organisms (mainly micro-organisms, but also includes fungi and algae), to transform a waste material into a more acceptable form or to use the waste as a growth medium to produce a useful end product". It is a term also used to describe chemical formulae that appear to carry out some of the above mentioned capabilities.

Some examples of biodegradation are:

- a) fungal protein for animal feed from food industry wastes.
- b) low volume sanitary landfill by composting town waste.
- c) protein from natural gas. Methanol is produced from natural gas. Bacteria (*Methylophilus methyotropus*) feed on this and produce a substance containing nearly 80% crude protein.

Biodeterioration is defined as "any undesirable change brought about by the activities of living organisms on material of economic or other, importance"

It is a process of considerable concern to the museum biologist, leading to the breakdown of museum specimens and other material used in the field of museology.

The breakdown of substances by biological action can take many forms. For example, tannic acid in oak wood used in cupboards may produce sufficient acid to cause decalcification of mollusc shells in a dry collection. Sulphur bacteria have long been suspected of having something to do with the formation of oil, this breakdown occurring when the bacteria play a part in releasing the oil from oil shale deposits to build underground oil deposits. This is happening gradually in the oil shale area of the Lowlands of Scotland at the present time and can be considered a useful biodeterioration process. Concrete thiobacillus will corrode and break down concrete, especially in new buildings when water is being passed into the atmosphere from the drying concrete. This has caused pyritisation problems in the new Palaeontology Wing of the B. M. (N.H.). Another form of this bacteria causes oxidation of iron sulphide in mines to form acid waters which will severely damage pumping machinery, and it is also responsible for the breakdown of fire hoses due to the presence of sulphur in the hose lining (used in vulcanisation). None of these bacteria can function without water so dry climate is the remedy.

Bacteria can infect fluid preserved specimens, especially if part of the preserving formula contains glycerin (*Bacillus subtilis*), and it can destroy the specimen. Moulds grow readily on the surface of the preserving fluid formaldehyde in tanks or large containers not properly sealed. Colonies of fruit flies and house flies can then breed in the area of mould. Constant vigilance is necessary to keep biodeterioration at bay.

B. HAZARDS AND PRECAUTIONS

In preserving specimens, and preventing biodeterioration, the museum biologist will encounter

a variety of hazards. Some of these are:

1. Preserving fluids - formaldehyde, alcohol, mercuric chloride, acetic acid, nitric acid, osmium tetroxide.
2. Live or freshly dead specimens. Quite small animals can inflict damage, which must never remain untreated. Poisons from mosquito, bee and wasp stings may cause serious effects to some people. Exudates from certain animals, and hair, fur and feathers can cause allergic reactions and even anaphylactic shock. Parasites, both ectoparasites (fleas, lice and ticks) and endoparasites (nematodes etc) will certainly be present on and in freshly killed specimens. All material from the sea is potentially dangerous because of the marine bacteria present. Stale seawater is highly 'septic', and echinoderms and crustacea are particularly dangerous. Freshwater snails and bivalves, and terrestrial molluscs are also dangerous and should be handled with care. Insect larvae are also a source of allergic reaction due to the hairs, many of which when broken release poison from associated glands. The hairs also float in the air and can cause inflammation of the eyes and skin. Infection by bacteria and viruses is also a considerable hazard. Many animal and plant tissues are reservoirs of viruses and/or bacteria, and although human skin is normally an efficient barrier, lesions on its surface will allow entry to the body, as will certain other areas including the conjunctiva of the eye, the respiratory and urinary tracts and the gut. Wear rubber gloves when handling any preserved or freshly dead material on all occasions.
3. Preserved material. Take care in handling poisonous snakes even after years in alcohol as time could merely concentrate the toxin and a scratch could give a less but still dangerous effect of a snake bite. Handling large numbers of frogs and other amphibians preserved in alcohol can sometimes give an allergic reaction in certain people - wear gloves and take sensible precautions.

Material preserved in formaldehyde solutions are usually safe to handle but improperly preserved material (failure to inject a body cavity for example) could remain a dangerous source of sepsis and possible allergy - again take reasonable safety precautions. (The presence of a germicide does not necessarily mean safety from infection).

Handling numbers of skins that may have been treated with arsenical soap will give violent allergic reactions - rash and swollen eyes a little while after handling skins may be the symptoms.

Precautions against biological hazards are based on the following principles:

1. Protection: use the appropriate protective clothing, appliances and prophylactic measures.
2. Restriction: limit the number of people in contact with the biological materials.
3. Education: ensure that all personnel are aware of any hazards etc and any procedures to be adopted.
4. Substitution: do not use dangerous substances when non dangerous material may be available.

C. THE CAUSES OF DETERIORATION

1. Humidity:
 - a) excessive wetness - rotting, damp heat, mildewing, bacteria and fungi (moulds), pyritisation.
 - b) excessive dryness - desiccation and splitting of skin and other preparations, damage to herbaria, insect and other dry collections, evaporation in spirit collections.
2. Contaminated air: sulphur dioxide (bleaching), hydrogen sulphide (tarnishing), soot and dust (staining), grease from oil vapour from central heating, apparatus etc.
3. Neglect: pest infestation can only occur in neglected collections. Pests include moth, silver fish, book lice, flies, various beetles (particularly the dermestids), rats and mice, squirrels (problem in rural museums and those set in parkland or garden areas).

It is important to point out that neglect, although seemingly an act of incompetence and lack of interest could just as easily be a series of unfortunate happenings. A slight change of undetected humidity or dryness could cause untold damage.

D. THE PREVENTION OF DAMAGE TO DRY BIOLOGICAL MATERIAL

Many reagents act in several different ways:

for example:

Thymol is a useful bactericide, fungicide and fumigant, and much underrated.

Camphor is a good bactericide, fungicide and fumigant. It is also underrated mainly because the synthetic reagent does not have the effect of the natural chemical. This is true of the majority of chemicals mentioned.

p. Dichlobenzene is also a good bactericide, fungicide and insecticide. The colour loss noted is perhaps due to an impure chemical.

In the following notes many chemicals will be mentioned and repeated for different uses.

1. Bacteria and fungi infestations

These usually occur in conditions of high temperature and humidity, and although individual specimens can be dried out (ovens or desiccants such as silica gel, salts of cobalt or phosphorus pentoxide) climate control is the only real answer.

The lower permissible limit of relative humidity is set by hygroscopic materials which are the most sensitive to over drying conditions because they contain moisture. Skin and leathers may suffer from a low RH and a safety limit should be set at 50% RH.

A high level of relative humidity results in the development and growth of moulds and fungi on any material that might provide nutriment. 'Moulds' and 'fungi' are words used indiscriminately to describe growths of minute fungi of which there are many species. Tiny threads called hyphae form a mycelium "mat" which throws up fruiting bodies called spores. Fungi thrive on conditions of damp, warmth and darkness but growth may be prevented by keeping the RH below 68%, although in actual practice it might be safer to go to 65% RH.

The limits of atmospheric relative humidity are thus defined as lying between 50 and 65% RH, and temperatures of 60 to 75°F (16 to 25°C).

Mould and bacteria treatments:

Thymol. 1 oz. of crystals in a tin suspended over a 40w electric bulb is sufficient to sterilise 16 cubic feet of cupboard space - keep doors shut for 24 hours after light has been switched off. B.M. use a thymol chamber to treat oil paintings, but it can be used to fumigate skin collections. Thymol does not remove the mould or bacteria colony, but simply kills it, and adequate cleaning is necessary after treatment. Thymol papers can be prepared from 10% thymol in alcohol. White blotting or filter paper are soaked in this solution and allowed to evaporate (usually overnight). Alternatively crystals of thymol can be ironed between sheets of filter paper. Used between mildewed sheets of paper (herbaria) and in books etc.

Chlorocresol. An efficient bactericide and fungicide. Crystals kept in container in case or can be used as with thymol. It is also used in the field for collecting, a tin with crystals covered with tissue paper. Specimens are treated as a Riker mount, and have been kept for up to 6 months without any change - a useful new method.

Camphor. A much underrated reagent although the rate of evaporation is a disadvantage.

Naphthalene flake. One of the oldest and safest fumigants used scattered in containers, cases, etc. Can be used as thymol is used.

P. Dichlobenzene. Often causes changes in colours of specimens but still widely used nevertheless.

Pentachlorophenol - Mystox - used usually 5% in a selected solvent.

Formaldehyde and Potassium permanganate

and

Formaldehyde and Chloride of Lime (Calcium hypochlorite) "Bleaching powder".

Both used in the same way. A small pile of chemical is placed in a tin and the formaldehyde (40%) added. Take care as the rapid oxidation causing the release of formic acid gas very occasionally flares (hence the use of tin). After 24 hours or so thoroughly ventilate the area and to finally remove traces of the gaseous formaldehyde sprinkle the floor with ammonium hydroxide which converts the residual formaldehyde to hexamethylenetetramine which is odourless and harmless. No lasting protection but very effective.

Specific problems:

a) Bone collections - look for mould or bacteria staining. Keep bones in plastic bags or cover skeletons etc not in display cabinets. Fat often forms a corrosive area which can break down.

b) Skin collections should be kept at 60 to 65°F (16 to 18°C) and very slightly humid. Dressed skins should be refrigerated at 4°C at low humidity.

c) Egg collections: Change cotton wool every 2 years (non absorbent is best). Never use coloured wool. Check for fungi and mould infestation with ultra violet light - a colour in degrees of orange usually denotes contamination.

2. Insect infestations

These can only occur due to neglect. The most widely used insecticides are:

Paradichlorbenzene - used as a dry crystal, spread in cupboards and through skin collections. It induces foxing in skins and it seems reasonable to confine this reagent to plant material although that too has colour problems. Still widely used. Some toxic effects (do not spend too much time in heavy atmosphere of this reagent!)

Flake naphthalene - one of the oldest of reagents used - more effective if powdered - needs replacement at frequent intervals as it volatilises rapidly.

Camphor - still widely used in entomological collections. Its insecticidal action is probably suspect but it probably acts as a deterrent.

DDT - the most effective contact insecticide which is not now used for obvious reasons. Even if the reagent is taken out of the collections the DDT will remain.

Vapona strip (dichlovos) - used at Tring, B.M. (N.H.), for bird skin collections. There is some evidence of cumulative poisoning and precautions should be taken to avoid inhalation of fumes.

Carbon disulphide - a dangerous toxin still in use, particularly in the U.S.A. - 24 hour treatment usually sufficient.

Xylene as a killer of all insects in spray form.

Ethylene dichloride/Carbon tetrachloride. A mixture of 3 parts Ethylene dichloride to 1 part Carbon tetrachloride is used in the National Museum of Canada - a spray toxic to most insects.

Mercuric chloride Possibly the most efficient agent against pest infestation of any sort is mercuric chloride used in alcoholic or aqueous solution. It is diluted until when brushed onto black paper it does not leave a white deposit - there is so much variation between batches of mercuric salt that this crude method is still the best. Probably around 0.5%.

Formaldehyde Fumigation (as previously described)

Mystox LPLX A chemical based on pentachlorophenol, used 5% in white spirit. Try to make sure that no liquid condenses onto specimens, as it can cause colour change.

Mystox LSE Use as 5% in distilled water it is an inhibitor used in a similar manner to Eulan.

3. Preserving and protecting skins

Alum dressing This is the oldest of skin preparation methods, "tawing" the skin with an excess of alum after preliminary cleaning. Action is reversible, water must therefore not be allowed to come into contact with tawed skins. Tawing is still used for the preparation of wool skins, tawed leather is used for gloves, and to a limited extent in bookbinding.

Oil dressing used in chamois leather making. An oxidised oil is used, often cod oil or Lankrolene. Skin may be fixed in formaldehyde after cleaning which is treated with dilutions of the oil well rubbed in. The skill is in removal of excess oil with a detergent, which gives an excellent result.

Tanning Vegetable tanning - infusion of oak bark. In ancient Egypt acacia pods were used rather than oak bark. Mineral tanned skin - although alum tawing is a form of mineral tanning the term is usually reserved for the use of salts of chrome.

Deterioration of skins is due to:

moisture: at worst converted into a black syrup-fungus and moulds-mystox compounds can be used to combat this.

insect attack: pyrethrum and lethane in an odourless distillate (obtainable from Shell-Mex).

An additional problem is dealing with taxidermy specimens of mammals and birds. To keep the hair and skin in reasonable condition after many years exposure in galleries the following formula was used at Baroda Museum.

Lanolin	100 gms
Naphthalene flake	50 gms
Camphor oil	25 ccs
Pyrethrum 2% (extract)	10 ccs
Phenol	10 ccs
Hexane	1000 ccs

Dissolve lanoline in the hexane (say 600 ccs) and the rest of the hexane is used to dissolve the naphthalene flake. Two solutions mixed and the pyrethrum added. Stir well and add camphor oil. Continue stirring and then finally add the phenol.

Brush on to specimens. It can be sprayed but care needs to be taken in re-arranging fur or plumage. Dry mounted specimens keep supple and soft and do not crack. Useful for mounted heads etc.

Lankrolene treatment for skins

Lankrolene is an oil readily emulsifiable in water. Skins prepared for tanning are placed in 5% formaldehyde for at least two weeks. They are then thoroughly washed to remove this reagent and then the flesh surface is rubbed with a solution of lankrolene in water. The skin needs to be well impregnated and the process may take several hours. Excess oil is then removed and the skill is in removing by using a detergent sufficient of the oil to leave the skin soft and dry. Lankrolene is available from Lankro Chemicals, Eccles,

Lancashire.

Eulan treatment for skins

Eulan, Edolan in the U.S.A., is an aromatic sulphonamide derivative, the formula of which is not divulged as it is used in the cloth and carpet industry. Used as a dilute 1% aqueous solution. Skins may be dipped or material may be sprayed and allowed to dry. Eulan is persistent and will remain in spite of any other treatment.

Fresh skins need not be tanned. After skin has been removed wash all blood and grease from the skin and soak in a solution of Eulan in water at 100F. The quantity of water should be adequate to well cover the skin and the quantity of Eulan calculated at 1.5 to 2% of the skin weight. Submerge the skin for 10 to 15 minutes - measure out an equal quantity of acetic acid equal to 1% skin weight and soak the skin for the same time in the acid solution at 100F (38C). This is to lower the pH and to allow the skin to fix the Eulan. (Not necessary in dried or otherwise treated skins). Rinse in cool water, degrease etc. and dry skin using usual techniques or dress as required. Eulan is not affected by any reagent after fixation and does not wash out or deteriorate. Reason it is not necessary to fix prepared skins is that most tanning and preserving agents will have a sufficiently low pH to fix the Eulan.

Important Note - this reagent does NOT kill any invading pest, but merely discourages them. It can be used on dry insect collections, trophy heads and on material on open display without hinderance. It would appear to have no affect on colour.

Safety precautions are necessary when using Eulan, which is harmful if swallowed. It may cause eye and skin irritation in strong solutions, so do not get on skin or clothing. Use face mask and gloves when using the concentrate.

4. Conservation of bone

Bones are easily warped by exposure to heat and damp, and they are decomposed by the prolonged action of water due to hydrolysis of the ossein, the inorganic framework is easily disintegrated by acid contact.

If bones are in good condition they are easy to conserve. If fragmentary waterlogged or in a fossil state they have to be cleaned, strengthened and stabilised. Restoration fully may be impossible.

General: wash in soap and water using a detergent - surface only using brush (not cotton or a sponge).

Bones may be strengthened by the use of polyvinyl acetate although it has been largely superseded by the use of Bedacryl (a polymethacrylate emulsion) diluted from a concentrate to use as required.

Horns and antlers require similar treatment as for bone. An acrylic polymer in toluene can be used to protect the often loose, scaly surface.

5. Treatment of Stains

- (a) Oil, fat and grease stains. Pyridine in its purest form is a valuable solvent for old, partially oxidised oil, and for asphaltic stains, much more effective than

- benzene.
- (b) Wax and candle grease stains. Some grease and wax can be removed with a fine scalpel or razor blade. Soak area in petrol and brush away the stain. Xylene almost as good.
 - (c) Fly stains. Hydrogen peroxide at 20 vols. Stipple any spots with a mixture of equal parts Hydrogen peroxide (20 vols) and 80% alcohol.
 - (d) Tea and Coffee stains. Damp the areas, stipple 2% aqueous potassium perborate and expose to sunlight for an hour or so (also use electronic flash).
 - (e) Ink stains. A number of methods are available, necessary due to the differing formulae.
5% oxalic or citric acid removes most iron ink stains.
As a last resort paint over stain with 0.5% potassium permanganate, after 5 minutes cover with 2% oxalic acid. Wash well.
 - (f) Oil paint. Use paint stipper "Nitromors Green Label" - (ventilation essential) any residue remove with pyridene.
 - (g) Stains caused by algae - lichens etc. Use a little dilute (2%) Ammonia or treat with 5% formaldehyde.

E. DAMAGE TO FLUID PRESERVED SPECIMENS

Loss of preserving fluid can result in the drying up of specimens. Recovery of alcohol preserved specimens is possible by immersion in dilute solutions (aqueous) of sodium orthophosphate (1 to 3%). Evaporated containers should never be 'topped up' directly. Test the remaining alcohol if possible, sometimes the remaining solution becomes stronger on evaporation while at other times it evaporates almost to water. Topping up without testing could result in complete disassociation of the cells making up the tissue of the specimen and a sludge in the bottom will be all that remains. This sludge will curiously enough almost always contain perfect separate cells.

Formaldehyde preserved specimens require similar treatment, although there is less chance of complete breakdown unless completely dried out. Dried out formaldehyde specimens are very prone to mould which is very difficult to remove. Modern preservatives contain humectants (which means that even if evaporation takes place no specimen will ever completely dry up). Propylene glycol is a humectant and fungicide and is used in post fixation preservation.

Reconstitution methods - use 1 to 5% aqueous (sodium orthophosphate) for most specimens, exceptions being archaeological material including human remains. May go up to a maximum of 15% aqueous for reconstitution, and heat slightly to increase the action. Very good method for reconstituting herbaria for close microscopic examination.

Procedure for the transference of material from alcohol to post fixation reagents.

Wash samples in de-ionised water to remove excess alcohol and then transfer for several days to the following:

A.	40% formaldehyde	10 ml
	Propylene glycol	5 ml
	Phenoxetol	1 ml
	Water	84 ml

(this reagent may be used for several transfers)

Wash again in de-ionised water and then transfer finally to the following:

B.	Propylene glycol	10 ml
	Phenoxetol	1 ml
	Water	89 ml

The possibility of transferring several specimens from alcohol to solution A at the same time may be considered providing that they are properly labelled and easily identifiable.

Propylene glycol is a humectant and no sample immersed in solutions containing this reagent will ever completely dry up even when all solution is evaporated off. Propylene glycol as an additive to preserving fluids has a softening effect, relaxing stiff tissues - 2 to 5% added to alcohol reduces the rigidity of arthropodlimbs. It is a powerful inhibitor of moulds and appears to assist the penetration of formaldehyde. It lowers the freezing point of preserving fluids and has solvent properties so that phenoxetols may easily be dissolved. It also breaks down to pyruvic acid and acetic acid and is therefore relatively harmless to man - preferred to the use of glycerine which can encourage moulds and bacteria.

Treatment of discoloured alcohol

Mix in activated charcoal and allow to stand for 24 hours. Filter through thick Whatman filter paper (glycerin grade).

Raising the percentage alcohol

Dehydrate copper sulphate by heating in metal container or hot air oven until colourless. Place cooled reagent in bottom of a bottle (Winchester Quart) to a depth of 3". Pour in the alcohol and allow to stand for at least a week. If during this time the reagent turns blue pour off the alcohol into another bottle, remove the copper sulphate and re-dry in an oven etc. Pour treated alcohol into another bottle with the 3" dehydrated copper sulphate. Check the alcohol percentage with an alcoholometer.

F. PYRITE DISEASE

The problems of pyrite disease are well known, and most treatments are only partially successful. Much depends on obtaining a suitable museum climate to house the material - below 60°F and above 80% RH are optimum for pyrite growth. Most treatments are a neutralisation of the breakdown by exposure to ammonia followed by impregnation or coating. New ideas may be to freeze dry in a suitable climate produced by a dehumidifier using lithium chloride. The major problem is how to deal with the specimen when at constant weight. Some form of coating while still under vacuum might work satisfactorily.

A good deal of research has been carried out on this and other problems of biodeterioration at the Biodeterioration Unit at the University of Aston, Birmingham. A publication (SB16), 'Biodeterioration of Books and Museum Specimens' should be available in the near future. A catalogue of potentially biodeteriogenic fungi is available at a cost of £2.50.

G. CONCLUSION

It would appear that the work against biodeterioration is not taken seriously enough. Bearing

in mind that the curators of today are in charge of material that will be required for study well into the next century and beyond. Too often I have been told "We are too busy to take time to look seriously at the collections". When that occurs a serious mixup of priorities has occurred. The care and upkeep of a biological collection is the most important part of a museum curators job. However, this task could be made far easier with the installation of proper climate controls in all museums - this could effectively mean the end of biodeterioration.

R. H. Harris
Histology and Preservation Section,
Dept. of Zoology,
British Museum (Natural History).

Some recent references to Biodeterioration and Biodegradation.

1. Biodegradation of Polymers and Synthetic Polymers. Sessions 18 and 21 of the 3rd International Biodegradation Symposium. 1976. Price £7.00 ISBN 0 85384 708 5.
2. Biodegradation of Wood. Session 23 of the 3rd International Biodegradation Symposium. 1976. £3.00 ISBN 0 85334 711 5.
3. A. Harry Walters (1977). Biodeterioration Investigation Techniques. £18.00 ISBN 0 85334 696 8
4. A. Harry Walters and John S. Elphick (1968) Biodeterioration of Materials. Volume 1. £24.00 ISBN 085334 623 2
5. A. Harry Walters and E. H. Hueck Van der Plas (1972) Biodeterioration of Materials Volume 2. £20.00 ISBN 0 85334 538 4
6. Deterioration by Insects, Rodents, Birds and Animals. Sessions 2 and 8 of the 3rd International Biodegradation Symposium 1976. £4.00 ISBN 085334 704 2
7. Fungicide Toxicity and Metabolism. Session 20 of the 3rd International Biodegradation Symposium 1976. £3.00 ISBN 0 85334 713 1
8. General biodeterioration and deterioration of organic wastes. Sessions 11, 12, and 16 of the 3rd International Biodegradation Symposium 1976. £4.00 ISBN 0 85334 707 7
9. Materials deterioration and mechanisms of deterioration. Sessions 3, 9, 10, and 24 of the 3rd International Biodegradations Symposium 1976. £12.00 ISBN 0 85334 705 0

All these titles are published by Applied Science Publishers Ltd. (22 Rippleside Commercial Estate, Ripple Road, Barking, Essex).

ENDANGERED SPECIES (IMPORT AND EXPORT) ACT 1976

At the BCG specialist session at the Museums Association Conference in Bradford, 1977, John Burton, Assistant Secretary to the Fauna Preservation Society spoke on the above Act, and referred to the implications which it held for Museums. Three recommendations came from the session - affiliation of the Museums Association with I.U.C.N., the production of indexes to scheduled species held in Museums in Britain, and the need to develop displays in museums which are conservation-oriented. Stephen Horne has commented on the latter in this Newsletter.

I have received from John Burton the 'Notice to Importers and Exporters' circulated by the Wildlife Conservation Licensing Section of D.o.E., dated 17th January 1977. No amendments have been made to the scheduled species or to the implementation of control measures since that date, although minor modifications may be made later this year. It is also probable that Britain may make certain unilateral decisions regarding the scheduling of certain species and their derivatives. It is impossible to reproduce in full the annexes in the Newsletter, as they occupy 20 sides of very small print, but the notice itself is reproduced below, with some examples from Annex 1 and Annex 2 which may serve to clarify points raised in the notice itself. The complete document is available from Wildlife Conservation Licensing Section, D.o.E., 17/19 Rochester Row, London, SW1P 1LN.

The problems of scheduling species (and ending up with 20 page documents!) are discussed in the December 1977 volume of Oryx. At Washington in 1973 when the Convention on International Trade in Endangered Species was originally set up and signed, few administrators realised that more than a handful of endangered species were involved. As pressure on the environment continue to increase and more species become endangered, the only real solution must be reverse listing, i.e. prohibiting everything except a small, free list of common species. This was suggested originally by Britain, and other countries are introducing similar systems. Unless complete agreement by the members of the Convention on reverse listing can be reached, it may be that the Convention could collapse as unenforceable. If reverse listing is agreed, then the specialist session suggestion of the preparation of specimen lists of endangered species could become a non-starter, unless some criteria could be found which would qualify 'endangered'.

P. Davis
Sunderland Museum

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IMPENDING MEETINGS

Osteology Seminar

Seminar, jointly with MAG and AMSSEE, will be held on May 22nd at Brighton. Details in Museums Bulletin or from Charles Steel, Booth Museum, Brighton. Reduced rate for BCG members.

Joint International Conference on the History of Museums and their Collections.

A BCG/GCG and Society for the Bibliography of Natural History joint conference on the above theme is planned for 1979. Provisional dates at present are 4-6 April or 9-11 April 1979, and the meeting will be held at the British Museum (Natural History).



WILDLIFE CONSERVATION LICENSING SECTION
Department of the Environment
 17/19 Rochester Row London SW1P 1LN

Telephone 01-834 8181 ext 258 and 259

NOTICE TO IMPORTERS AND EXPORTERS

ENDANGERED SPECIES (IMPORT AND EXPORT) ACT 1976
 CONSERVATION CONTROLS ON ANIMALS AND PLANTS AND THEIR DERIVATIVES

17 January 1977

1. Conservation controls on the import and export of endangered wildlife will be operated by virtue of the above Act with effect from 3 February 1977. The controls are designed to implement the 1973 Convention on International Trade in Endangered Species of Fauna and Flora. They are similar in nature to those in force since 1 January 1976 and described in the Notice to Importers and Exporters dated 15 December 1975 which is superseded by this Notice.

2. The Act re-enacts and extends these existing controls to include some additional species and parts and derivatives. Some changes have been introduced, including a different method of listing certain groups of animal and extended controls on the movement of live animals.

LISTS A AND B

3. Annex 1 lists the animals and plants covered by the controls. List A sets out the endangered species which are to be strictly controlled. List B comprises the vulnerable species, which will be in general licensed readily subject to certain conditions. The list of excepted kinds sets out those for which no licences will be required.

4. Part I of Annex 1 covers mammals, birds, reptiles and amphibians where the majority of species are subject to licence. In this part List A and the list of excepted kinds are set out in two separate columns; all other species are in List B. Part II of Annex 1 covers fish, insects and molluscs where the majority of species are excepted from licensing. List A and List B are set out in two separate columns; all other species are excepted.

5. Annex 1 applies to live and dead specimens. The definition of 'dead' in this context includes specimens which are frozen, dried, stuffed, eviscerated, chemically preserved, etc, provided they are substantially complete and externally resemble the complete dead animal or plant.

6. Annex 2 lists the parts and derivatives (such as furskins and ivory) to be controlled. Some parts and derivatives of species in Annex 1 will not be controlled because they are unlikely to be in trade or because they are not considered to be readily recognisable. Conversely some parts of species which are not endangered are included in Annex 2 because they closely resemble those of endangered species. In Annex 2, parts of List A species are treated as List A and the other parts as List B.

7. The lists in the Annexes differ slightly from the Schedules to the Act, because of recent changes made to the Convention. Further changes may be made from time to time. Trade interests may be assured that no such changes will be made without the same wide prior consultation that has taken place hitherto.

IMPORT OF LIST A SPECIES

8. All applications for the import of any specimen, whether a live or dead animal or plant or a listed part or derivative, of a species in List A will be considered by one of the scientific authorities appointed by the Secretary of State. A separate application will be required for each species involved. Each licence will be valid for one consignment only and will normally be valid for 9 months. In considering each application the factors the scientific authority will take into account will include the status of the species in the wild, the origins of the specimen, the purpose of import and (in the case of live animals) the accommodation to be provided and the proposed recipient's ability to care for it. The Department of the Environment (DOE), the principal Management Authority for the operation of the Convention in the UK, will decide on the advice of the Scientific Authority whether or not to issue a licence. Licences will not normally be issued for primarily commercial purposes.

9. A licence to import a specimen of a species on List A will not be valid unless it is accompanied by a valid export permit. The UK import licence will be issued in triplicate. The licence itself (the white document) is for surrender to Customs while the yellow copy is for retention by the importer. The blue copy should be sent by the prospective importer to accompany the application to the exporting country for an export permit; the export application will not be considered by an exporting country party to the Convention without this copy licence.

10. In most cases, when a licence is issued for the import of a live animal on List A, the Secretary of State will also direct that the animal should be kept at named specified premises. Where such a direction has been issued, it is an offence under the Act to keep the animal elsewhere. Any requests to vary the specified premises should be addressed to DOE, well in advance of the required move.

IMPORT OF LIST B SPECIES

11. Licences for the import of any specimen, whether a live or dead animal or plant or a listed part or derivative, of a species on List B will normally be issued readily on application and the system has been designed to meet the needs of legitimate trade. Up to 6 species may be included on each application form. Each licence will be valid for more than one consignment, and for up to 9 months, and will be for a specified number of specimens. Again many will carry a condition making the licence invalid unless it is accompanied by an export permit from the exporting country. Only a single copy of the import licence will be issued. This licence must be presented, together with any export documents required, to Customs at the time of import of each consignment. It will be endorsed with details of the goods imported and, if not exhausted or expired, will be returned to the importer. Export documents and exhausted licences must be surrendered to Customs. Expired licences should be sent to DOE (see address in paragraph 24).

DOCUMENTATION FROM COUNTRY OF EXPORT

12. Import licences will be endorsed to show the type of documentation, if any, required from the exporting country. If the country is party to the Convention, an export permit will be required as described in paragraphs 9 and 11 above. If however the party state does not control a particular part or product (presumably because it deems the product unrecognisable) a letter from the management authority of that state certifying that no controls exist on that product will be acceptable as equivalent documentation. A list of names and addresses of management authorities in other party states is at Annex 3.

13. If the country is not party to the Convention, documentation equivalent to a Convention export permit will be acceptable in respect of any goods. Addresses of selected authorities are in Annex 3; DOE is prepared to help in finding other addresses, but the responsibility for obtaining documentation will normally rest with the exporter.

14. No export documentation will be required in respect of animals, plants or parts which are controlled by the Act but are not on the Convention. For example no documentation will be needed for those mammals, birds, reptiles and amphibians which are on List B merely because they are thought not to be in regular trade. Nor will it be required for parts and derivatives controlled by Annex 2 of species which merely resemble endangered species.

DECLARATIONS

15. On importation of any mammals, birds, reptiles or plants not accompanied by an import licence Customs may require a declaration from the importer or his agent giving the full scientific name of the species being imported and stating, if this is in accordance with the facts, that the importation of the species is not restricted by the Endangered Species (Import and Export) Act 1976.

TRANSIT AND TRANSHIPMENT

16. Licences will not be required for specimens which are entered for transshipment or transit under Customs control.

EXPORTS

17. The export of all specimens on List A or List B will be allowed only under export licence. The same application form is used for List A and List B. Up to 4 species may be included on each application form.

18. When applying for a licence the prospective exporter will be required to give details of the origins of the specimen and to include documentary evidence where appropriate. Where possible this should include the date and place of import and the number of the UK import licence, if any. The exporter will also be required to supply details of the way in which it is proposed to prepare and ship a living specimen. Where the application for an export licence is for a live specimen of a species on List A, it will need to be accompanied by an import permit or, in the case of a country not party to the Convention, equivalent documentation from the importing country. Where, however, the application is for a part or derivative which has previously been imported into the UK the import permit or equivalent will not be required. The export licence issued (the white document) should be surrendered to HM Customs at the time of export. Where the importing country is Party to the Convention and the species concerned is on the Convention, an extra (blue) copy of the licence will be issued, which should be presented to Customs of the importing country. Export licences will be valid for one consignment only and will normally be valid for 6 months. It may be possible to modify this system to help traders wishing to export large numbers of small consignments of List B plants and parts and derivatives. Any such trader interested in further details should write to DOE.

HEALTH CONTROLS AND OTHER LICENCES

19. Importers and exporters are reminded that the issue of a conservation licence does not remove the necessity to obtain a health licence or certificate where required. Health licences may be obtained from the appropriate Agricultural Department. Where documentation is required from other countries, applicants should ensure that they obtain the correct conservation licence or permit : licences issued for other purposes will not be acceptable.

OPEN GENERAL LICENCES

20. There are certain goods controlled by the Act which for convenience will be placed under Open General Licence. This means that, in effect, a licence is issued to the public at large to import or export such goods. As a result, no applications for licences by individuals or firms are needed. The goods which will be covered by such licences are: (import and export) goods licensed under the previous controls for which the licences have not yet expired, certain personal effects, samples of no saleable value, herbarium specimens, poultry eggs; (import only) re-imported goods; (export only) orchid hybrids. The effect of the licence for poultry eggs is taken into account in Annex 2. An open individual licence will also be issued in respect of certain museum specimens exchanged by approved institutions. Copies of these open licences are available from DOE on request.

OUTSTANDING IMPORT LICENCES

21. Any licences issued by DOE under the Import of Goods (Control) Order 1954 and Export of Goods (Control) Order 1970 will remain valid until their normal expiry date. New application forms will be available and should be used for all future applications.

WARNING

22. Traders are reminded that goods which are imported or brought to a place for exportation contrary to a prohibition are liable to forfeiture and the Customs and Excise Act 1952 provides for prosecution and penalties for evasion of the import and export restriction. Also the Endangered Species (Import and Export) Act makes it an offence knowingly to sell or display goods which have been illegally imported.

23. Although all care has been taken in the preparation of this Notice, it is intended for guidance only. In cases of doubt reference should be made to the terms of the Endangered Species (Import and Export) Act 1976 and regulations made thereunder.

WHERE TO OBTAIN THE REQUIRED DOCUMENTS

24. The DOE is the Principal Management Authority for the UK and will be responsible for the issue of the required documents for residents of Great Britain. Applications for licences and any enquiries about this note should be sent to:-

Department of the Environment
Wildlife Conservation Licensing Section
17/19 Rochester Row
London SW1P 1LN
(TEL: 01-834-8181 Ext 258 or 259).

Northern Ireland issues licences separately and applications from residents of Northern Ireland should be sent to:-

The Department of Agriculture for Northern Ireland
Animal Health Division
Dundonald House
Upper Newtownards Road
Belfast BT4 3SB
(TEL: 0232-650111)

GROUP	LIST A (ENDANGERED KINDS)	EXCEPTED KINDS
	Carnivores (Contd)	
Bears	<i>Selenarctos thibetanus gedrosianus</i> (Baluchistan race of Asiatic black bear) <i>Tremarctos ornatus</i> (spectacled bear) <i>Ursus arctos</i> (brown bear) (Italy only) <i>Ursus arctos nelsoni</i> (Mexican brown bear) <i>Ursus arctos pruinosus</i> (Tibetan brown bear)	
Raccoons		<i>Procyon lotor</i> (North American raccoon) <i>Procyon cancrivorus</i> (crab-eating raccoon)
Otters, weasels etc	<i>Aonyx microdon</i> (Cameroon clawless otter) <i>Enhydra lutris nereis</i> (southern sea otter) <i>Lutra felina</i> (marine otter) <i>Lutra longicaudis</i> (South American otter) <i>Lutra lutra</i> (Eurasian otter) <i>Lutra provocax</i> (southern river otter) <i>Mustela nigripes</i> (black-footed ferret) <i>Pteronura brasiliensis</i> (giant otter)	<i>Martes zibellina</i> (sable) <i>Mustela furo</i> (domestic ferret) <i>Mustela vison</i> (American mink)
Genets and civets	<i>Prionodon pardicolor</i> (spotted linsang)	
Hyaenas	<i>Hyaena brunnea</i> (brown hyaena)	
Cats	<i>Acinonyx jubatus</i> (cheetah) <i>Felis bengalensis bengalensis</i> (leopard cat) <i>Felis concolor coryi</i> (Florida puma) <i>Felis concolor costaricensis</i> (Costa Rica puma) <i>Felis concolor cougar</i> (eastern puma) <i>Felis jacobita</i> (Andean cat) <i>Felis rufa escuinapae</i> (Mexican bobcat) <i>Felis marmorata</i> (marbled cat) <i>Felis nigripes</i> (black-footed cat) <i>Felis pardalis mearnsi</i> (Costa Rica ocelot) <i>Felis pardalis mitis</i> (Brazilian ocelot) <i>Felis planiceps</i> (flat-headed cat) <i>Felis temmincki</i> (Asiatic golden cat) <i>Felis tigrina oncilla</i> (little spotted cat) <i>Felis wiedii nicaraguae</i> (Nicaraguan margay) <i>Felis wiedii salvinia</i> (Guatemalan margay) <i>Felis yagouaroundi cacomitli</i> (jaguarundi) <i>Felis yagouaroundi fossata</i> (jaguarundi) <i>Felis yagouaroundi panamensis</i> (jaguarundi) <i>Felis yagouaroundi tolteca</i> (jaguarundi) <i>Neofelis nebulosa</i> (clouded leopard) <i>Panthera leo persica</i> (Asiatic lion) <i>Panthera onca</i> (jaguar) <i>Panthera pardus</i> (leopard) <i>Panthera tigris</i> (tiger) <i>Panthera uncia</i> (snow leopard)	<i>Felis catus</i> (domestic cat)
	Seals	
Seals	<i>Mirounga angustirostris</i> (northern elephant seal) <i>Monachus</i> (monk seals)	<i>Callorhinus ursinus</i> (northern fur seal)
	Elephants	
Elephants	<i>Elephas maximus</i> (Asian elephant)	
	Sea-cows	
Dugongs	<i>Dugong dugon</i> (dugong or sea-cow)	
Manatees	<i>Trichechus inunguis</i> (Amazonian manatee) <i>Trichechus manatus</i> (West Indian manatee)	
	Odd-toed ungulates	
Horses	<i>Equus hemionus hemionus</i> (Mongolian wild ass) <i>Equus hemionus khur</i> (Indian wild ass) <i>Equus przewalskii</i> (Przewalski's horse) <i>Equus zebra zebra</i> (Cape mountain zebra)	<i>Equus asinus</i> (domestic donkey) <i>Equus caballus</i> (domestic horse) <i>Equus caballus x asinus</i> (mule and hinny)

PARTS AND DERIVATIVES TO BE CONTROLLED

In the following list, parts of animals and plants in List A of Annex 1 are treated as List A; other parts are treated as List B.

1. FURSKINS of the animals listed below whether raw, tanned or dressed; whether whole or in pieces or cuttings (including head, tail and paws); whether or not the pieces are assembled or sewn together; and rugs, coverlets, coats, jackets, capes and stoles made wholly or partly from such furskins (except where the fur skin is mere trimming).

Acinonyx jubatus (cheetah)	Felis tigrina (little spotted cat)
Amblonyx cinerea (oriental small-clawed otter)	Felis viverrina (fishing cat)
Aonyx (clawless otters)	Felis wiedii (margay cat)
Arctogalidia trivirgata (small-toothed palm civet)	Fossa fossa (Malagasy civet)
Chrotogale owstoni (Owston's banded civet)	Genetta (genets)
Colobus angolensis (Angolan colobus)	Hemigalus derbyanus (banded palm civet)
Colobus guereza (guereza)	Hyaena brunnea (brown hyaena)
Colobus polykomos (western black and white colobus)	Lutra (common otters)
Crocuta crocuta (spotted hyaena)	Lutrogale perspicillata (smooth-coated otter)
Enhydra lutris (sea otter)	Mungos mungo (banded mongoose)
Felis bengalensis (leopard cat)	Panthera nebulosa (clouded leopard)
Felis colocolo (pampas cat)	Panthera onca (jaguar)
Felis geoffroyi (Geoffroy's cat)	Panthera pardus (leopard)
Felis guigna (kodkod)	Panthera tigris (tiger)
Felis jacobita (mountain cat)	Panthera uncia (snow leopard)
Felis lynx pardina (Spanish lynx)	Paradoxurus (palm civets)
Felis marmorata (marbled cat)	Paraonyx (clawless otters)
Felis nigripes (African black-footed cat)	Poiana richardsoni (African linsang)
Felis pardalis (ocelot)	Pteronura brasiliensis (giant otter)
Felis planiceps (flat-headed cat)	Ursus (= Thalarctos) maritimus (polar bear)
Felis rubiginosa (rusty-spotted cat)	Vicugna vicugna (vicugna)
Felis serval (serval)	Viverra (civets)
Felis silvestris (European wild cat)	Viverricula indica (small Indian civet)

2. VICUGNA. The hair, whether or not carded and combed, of *Vicugna vicugna* (vicugna); the yarn and fabric made wholly or partly from the hair; and coats and jackets made wholly or partly from the fabric.

3. PANGOLIN. The skin and scales of *Manidae* (pangolins).

4. IVORY, BONE AND HORN. The tusks of *Elephantidae* (elephants), *Suidae* (hogs), *Monodon monoceros* (narwhal) and *Odobenus rosmarus* (walrus); the horn of *Rhinocerotidae* (rhinoceroses) and the teeth of all animals, if unworked or simply prepared but not cut to shape, and parts, powder and waste thereof.

5. TROPHIES. The stuffed head, or the skull together with the skin covering it, of *Elephantidae* (elephants) and *Rhinocerotidae* (rhinoceroses).

THE BCG AND EDUCATION

As a member of the BCG working in a Museum Education Service I should like to comment upon the report (as it appeared in the December newsletter) read by Geoff Stansfield to the general forum at the Museums' Association Conference at Bradford in July 1977 regarding museums and conservation of wildlife. In addition I wish to respond to the Hon. Secretary's request for articles "to increase debate about the role of the BCG and the area which it should be examining".

The general conclusions reached by the Specialist Group at Bradford are under three main headings: Research and recording; Planning and management; and Education.

Under Education the meeting identified 'a shortfall in conservation orientated exhibits'. Whilst agreeing that this is an area which requires improvement, one must ask: "Is that all?" Was it lack of time which prevented greater elaboration or is it that the only educational tool considered to be of importance in Museums is the exhibition on public display? I hope not.

The recommendations are also in three parts: Affiliation to the International Union for the Conservation of Nature; an increase in research facilities; and production of indices of specimens of endangered and recently extinct species held in Museums. Again, one must agree that all of these are required, but surely the BCG should press for these and more.

Exhibitions showing aspects of conservation can be tailor-made but, as the meeting found, these are few and far between. There are, however, a relatively large number of natural history exhibits in existence which could be biased towards conservation in various ways. Addition of appropriate labels, or rewording of existing ones can change the emphasis of an exhibition without major structural alterations being necessary. Interpretive literature aimed at the general public and the various levels of formal education can also achieve this, if couched in suitable language.

Museum Education Services can add greatly to the bias given to wildlife conservation without necessarily even having a public display, although this obviously helps. Use of the reserve collections intramurally, especially when tied in with appropriate fieldwork, can serve an extremely important function. Children are able to inspect specimens before seeing them in the field and their importance can be emphasised. Animals which are likely to run away from school parties on site can be seen at the Museum and the diversity of life appreciated. Habitats apparently containing little life can be shown to be important by describing where the specimen being shown would live. 'Out of season' plants can also be appreciated in this way, and extinct animals with their emotional impact can be seen.

Loan specimens with appropriate supporting literature, in-service teachers' courses and lecture programmes can also help to spread the conservation message to schools, colleges and the general public. Unfortunately manpower and facilities for interpretation and research (as mentioned by the group) are too often not available. I see one role of the BCG, together with other professional groups such as the GESM, to be to campaign for more interpretive facilities as well as research facilities.

Sverre Bakkevig in the December (1977) newsletter said that he felt that "they talked too much about the history of the collections, and too little about the functions ..." at Liverpool in September 1977, and I notice that on the formal agenda, at least, there was no mention of

Natural History collections specifically as educational tools, particularly for children and students below post-graduate level.

There are, of course, many problems involved in allowing groups to handle reserve collection specimens and the ultimate decisions to accessibility must always lie with the curatorial staff caring for the collection. Nevertheless, the educational benefits of such an approach are immense and expansion of Museum Education Service roles is essential. I believe that the BCG should actively help in the expansion of the number of Museum Education Services and that it should also become involved with in-service training of staff in contact with these.

This involvement could take two forms. First it could provide background information either through seminars or information leaflets to help in the safe care of specimens used in the Services' programmes: What signs are there that a specimen needs attention? Usually, but not always it is obvious. Why can I not give that particular specimen to an eight year old, however well-behaved he may be? After a few years the basic principles become clear; but it would have been pleasant to have known them early on.

Secondly BCG members might consider finding out in more detail what the roles of Museum Education Services are so that a mutual understanding of the problems faced by biologists working in educational and curatorial fields can be reached. One example is that it is difficult to persuade the upper levels of the secondary schools (O and A level GCE) to come to the Museum to study anything which is not on the syllabus. Conservation of wildlife rarely is (although a way may be found through 'Ecology'), and so even a large-scale, purpose-built exhibit may not draw them in. Should the BCG approach examination boards, or at least support those who do?

I should be interested to hear from any other BCG members who are involved in Museum Education Service work to discuss the above points and other issues of mutual interest.

Stephen Horne,
Merseyside County Museums
December 1977

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MONKS WOOD MEETING ON LOCAL RECORDS CENTRES, 1/2 DECEMBER 1977

This meeting was attended by 66 delegates from Local Biological Records Centres throughout Britain, when a variety of topics relating to biological recording were discussed. The principal aim was to comment on the Draft 'Handbook for Local Biological Records Centres'. Throughout the course of the meeting a number of amendments were suggested, and work has now been completed on the final copy for the Handbook, which has now been passed on to the printers. Final version available shortly!

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ON MOBILE LITTORAL ENVIRONMENTS

An example of the littoral habitat which is perhaps insufficiently considered by marine ecologists is that to be found on ships hulls, the primary concern with which would seem to be its removal. In fact such a habitat answers many of the needs (and criticisms) of biologists with regard to the "rocky" littoral. For example, the effective uniformity of the hull-substrate solves problems of quantitative sampling with regard to sample areas, while the very mobility of this environment allows a degree of remote sampling with the minimum of effort on the part of the biologist. At the same time, the effects of tidal activity are non-existent other than the artificial "incursion" caused by the loading of the vessel.

It must, however, be accepted that the community structure will be relatively artificial with regard to the limitation of pelagic settlement and rapid development between defouling operations, and the variation in physical conditions of the surrounding water as the ship moves from port to port.

Investigations of such communities are rewarding with regard to community structure, quantitative biology, and records of species (bearing in mind the obvious problems with regard to type/record localities): one would thus hope to see liaison between museums marine research institutions and shipyards where defouling operations make this environment available to the biologist. Such a liaison is developing at the Dove Marine Laboratory with regard to the Tyne yards.

In December, 1974, two dustbinfulls of material were obtained from Redhead's shipyard on the Tyne as they were defouling the M.V. Arctic Shore. The vessel had been cleared in April, 1974, and had spent the intervening months on the Gold Coast of Africa. In this time it had developed a fouling community, based on Balanus tintinnabulum, of an average thickness of 10cm., which was causing a decrease of some thirty per cent in ship's speed. Unfortunately the sample area was not recorded, and no quantitative analyses of community structure have been performed.

No plants were observed in the sample. The dominant animal was B. tintinnabulum, ranging in size from 5 to 85mm. (height), and this species formed a secondary substrate for the remainder of the community, of which the most dominant species were Mytilus perra, a common West African mussel, and a hydrozoan as yet unidentified, forming a dense cover over the most of the barnacles. These three species were by far the most dominant, and in the case of the latter two surprisingly exclusive, since no other hydroids or bivalves were found in the sample. Young specimens of other barnacles, e.g. Lepas, Conchoderma, were present, probably having settled on the return voyage.

Within this sessile growth were many polychaetes (most unidentified, but including Nereis sp.) and amphipod crustacea, though the latter were familiar species which may again be assumed to have settled in transit or in the Tyne. Ten specimens of an unidentified tanaid were retrieved, as were twenty-three specimens of a pycnogonid of a hitherto undescribed species: the latter has since been named Endeis picta n. sp. (Bamber, in press), and type specimens are at the British Museum (including the holotype) and South Shields museum. It is possible that the hydroid and tanaid are also new to science.

This example demonstrates the value of fouling communities with regard to obtaining examples of non-local fauna, of unusual community structure and, in this case at least, of unusual species. The identification work already performed on fouling organisms by researchers concerned with de- and anti-fouling means that the appearance of new species is unlikely to be frequent. However the structure and inter-relationships of the fouling population as convenient examples of "young" littoral communities warrants further investigation.

Roger Bamber, Tyne and Wear County Council Museums, South Shields Museum.
(Reproduced from 'Porcupine' Newsletter, Dec. 1977, by permission)

COUNCIL FOR NATURE, NATURAL HISTORY SOCIETIES COMMITTEE

I have been the Museum Association's representative on the Natural History Societies Committee of the Council for Nature since 1971, following on from the previous representative who was Geoff Stansfield. For various reasons, this Committee scarcely met for three years, and when it did was mainly engaged in discussions on how it could improve its effectiveness, who should be represented on it and what its future was.

From 1974 the Committee has become considerably more active organising three national meetings for natural history societies which has proved a reasonably successful method of improving contact between the Council for Nature and natural history societies. A further national meeting is planned for September 1978 in the Sheffield area, and it is proposed to follow a biennial pattern in future. The programme on the theme of "Natural History in Urban Areas" will be arranged taking into account the replies received from a questionnaire on the subject.

The Committee is composed of representatives from national and local amateur natural history bodies, the local representatives being elected on a regional basis. Its main objectives have recently been restated and are as follows:-

1. To serve the needs and aims of the affiliated bodies.
2. To encourage co-operation at all levels between natural history disciplines.
3. To collect and disseminate information on natural history and conservation to its affiliated bodies.
4. To organise national meetings of natural history bodies to exchange ideas and information.
5. To initiate regional meetings of the natural history societies on topics of current interest.

One of the topics that has been discussed by the Committee over the last two or three years is Biological Record Centres, and this is undoubtedly an area in which liaison with natural history societies through the Council for Nature could be of considerable benefit. Currently on the recommendation of the full Council, the Committee has become involved in the production of a "Handbook for Natural History Societies". This will be between 5,000 and 10,000 words in length, covering many of the subjects on which enquiries are at present received by the Secretariat of the Council for Nature. It will include sections on Administration, Publications, Activities, Field Meetings, Junior Sections, Co-operation, Publicity, and Finance. The Co-operation section, for which I have undertaken responsibility, will include some mention of the resources available in museums. Draft submissions have already been prepared, and applications for grants toward the publication of this handbook are being made to various bodies. A joint meeting with the Council for Nature Youth Committee has been arranged to discuss junior sections of natural history societies, and I have been nominated as one of the four members of the Committee to attend this meeting, which is on the 24th January.

If any members of the BCG have comments on any of the topics or activities described above, I shall be pleased to hear from them and if relevant to pass them on to the Natural History Societies Committee. The next meeting of this Committee is in April 1978.

Having now served as a representative on this Committee for six years, I had already considered that I might well resign from this particular office in 1978, and now that representation has been vested in BCG I feel that this might be in any case an appropriate time to hand over. I think that it would, in any case, be more appropriate now that someone more active in natural history should be the profession's representative, and I should be pleased to hear from any volunteers who would be prepared to consider succeeding me.

Janet E. Chamberlain
Portsmouth Museums

REQUESTS FOR INFORMATION

Ross's Gull (Rhodostethia rosea)

Michael Densley, Principal Officer, (Museums and Exhibitions) for Rotherham Borough Council has been studying Ross's Gull for a number of years and is anxious to look at all specimens in museums in Britain, and to list them with their details. Could all museums with specimens of this species send details - please do not assume that Mr. Densley is aware of the existence of the specimen - no matter how apparently well-known. Details to Central Library and Arts Centre, Rotherham S65 1JH.

Prosobranch Molluscs

Dr. Vera Fretter is involved in a research project 'The Prosobranch Molluscs of Britain and Denmark' and requests research material, particularly Toxoglossans, Eulima, Balcis and Pyramidellids. If anyone can help please contact Dr. Fretter at the Dept. of Zoology, The University, Whiteknights Road, Reading, RG6 2AJ.

Convoluta

Shelagh Doonan would be extremely grateful for any information on, or sightings of Convoluta on beaches. From a distance, it looks like a spinach-coloured stain on the sand but on close inspection, hundreds of worms (0.5-44mm long) can be seen. In Britain, the furthest north (published) records are from the Channel Islands, but verbal reports have recently been received for Aberthaw, and Port Erin, Isle of Man. Any specimens, in sea water, to Shelagh Doonan at Microbiology Department, Marischal College, Aberdeen University - please.

Teaching specimens wanted

Durham University (Zoology Dept) have recently been working through their collections, and are seeking a variety of mounted and skeletal vertebrate material to fill the most obvious gaps. The following are most urgently required - mounted tenrec, fruit bat, flying lemur and anteater, and skulls of aadvark, tarsier, camel, pronghorn, hyrac, pika, and manatee. However, any offer of mounted or skeletal material would be gratefully received. Donations preferred, but purchase also possible. Please contact Rosemary Anderson or Mike Stacey at Department of Zoology, Science Laboratories, South Road, Durham City.

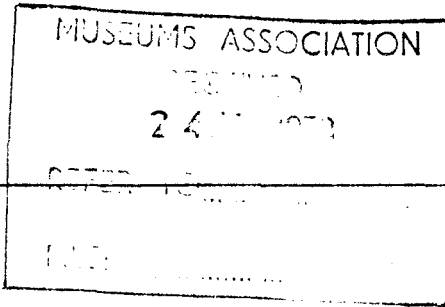


Countryside Commission
 John Dower House Crescent Place Cheltenham Glos GL50 3RA



Telephone Cheltenham (0242) 21381 ext 268

Miss B Capstick
 Museums Association
 87 Charlotte Street
 LONDON W1P 2BX



Your reference

Our reference
 30/24(L)
 Date

January 1978

Dear Sir/Madam

RESEARCH REGISTER NO 9

The ninth edition of the Countryside Commission's Research Register will be issued later this year, covering current studies and theses completed or in progress during 1976 and 1977 on countryside recreation and landscape conservation and amenity in Great Britain. We have received many favourable comments on the usefulness of earlier editions and clearly there is value in collecting this information together and making the work of contributors more widely known.

We wish to reach as many sources as possible and would be glad if you would consider whether the organisation you represent in the Countryside Recreation Research Advisory Group has undertaken any relevant research.

FORMS FOR CONTRIBUTIONS

If there are such planning studies or research projects in this field we should be grateful if you would enter the details on the attached form. The form is the same as that used by the Department of the Environment in preparing its own Research Registers and, in order to reduce the number of requests to provide information in this context, the Department and the Commission are again proposing to exchange information with a view to including studies in one or both Registers as seems appropriate. It will therefore be sufficient to fill out only one such form for each study. It would be helpful, however, if forms relating to studies chiefly concerned with countryside recreation and landscape conservation could be sent to this address. Copies will then be sent to the Department.

GUIDELINES

The Guidelines used for the selection of studies for the Countryside Commission's Research Register are as follows:

- i. the Register is concerned chiefly with countryside recreation and landscape conservation. In a multi-disciplinary field it is difficult, if not impossible, to set down firm criteria for the Register's scope, but we are aiming to be as comprehensive as possible. For example, studies into the socio-economic or ecological aspects of rural areas which have a recreation or conservation content will be included; but ecological studies of wildlife or studies of rural employment or rural transport problems, having no real connection with recreation or conservation, will be excluded;
- ii. the Register is chiefly restricted to research projects and those planning studies which have an original research content;

iii. studies undertaken by central and local government (and their agencies), private consultants and similar organisations will be included. Work within university departments at post-graduate level will be included but undergraduate university theses will not;

iv. only studies undertaken within the United Kingdom will be included.

Further guidance on the range of subjects included in the Countryside Commission's Research Register may be obtained by reference to earlier editions.

SUBMISSION OF FORMS

Contributions to the next edition of the Register must be received by 31 March 1978. We would be grateful if the information could be typed on the form(s) provided and sent to the above address. Additional copies of the form may be obtained by telephoning 0242-21381 Ext 205 or 270.

The amount of information that can be given under the different headings will vary from study to study but guidance on the amount of detail to be included can be obtained, again by reference to earlier editions. Where, for example, results of a study are not yet available, you may wish to devote most of the abstract to aims and methods and indicate only briefly what results are expected.

Studies included in Research Register No 8 will not be included again unless confirmation is received that they are still in progress. Preferably we hope that you will send us a new form bringing the abstract up to date.

GUIDANCE ON COMPLETION OF FORMS

Please put your name at the top of the form if it differs from 311 or 321.

Title (211): All research is "A study of ..." or "An investigation of ..." some problem, so these introductory words can be omitted.

Research team (221): The immediate leader of the team and his/her senior assistant(s) should be named. The affiliation (organisation) of the investigator (researcher) should also be given, or simply "as 311A".

Costs (221): If you cannot give an exact figure, please indicate the approximate cost using asterisks to show the following bands:

*under £5,000
**£5 - 10,000
***£10 - 25,000
****£25 - 50,000
*****over £50,000

[Keywords (511): To help us with indexing, please underline key words in the summary.]

Reports issued (711): A bibliographic reference would be appropriate. For unpublished work, please indicate where copies may be obtained.

QUERIES

If you have any queries, please contact Mr A H Done (Ext 270).

Yours faithfully



for R M SIDAWAY
Head of Countryside Information Branch

**DEPARTMENT OF THE ENVIRONMENT
REGISTER OF RESEARCH**

NAME OF PERSON COMPLETING THE FORM														
1	2	3	4	5	21	31	41	51	61	71	80			
211	TITLE	A	TITLE											
221	RESEARCH TEAM	A	1ST INVESTIGATOR (PROJECT LEADER)					AFFILIATION						
		B	2ND INVESTIGATOR					AFFILIATION						
		C	3RD INVESTIGATOR					AFFILIATION						
311	RESEARCH ORGANISATION WHERE PROJECT IS CARRIED OUT	A	NAME OF 1ST RESEARCH ORGANISATION											
		B	ADDRESS											
		C						COUNTRY			RESEARCH ORG. PROJECT CODE			
		D	TELEPHONE					TELEX/CABLE						
		E	NAME OF 2ND RESEARCH ORGANISATION											
		F	ADDRESS											
		G						COUNTRY			RESEARCH ORG. PROJECT CODE			
		H	TELEPHONE					TELEX/CABLE						
321	SPONSOR(S)	A	1ST SPONSOR											
		B	ADDRESS											
		C						COUNTRY			RESEARCH ORG. PROJECT CODE			
		D	TELEPHONE					TELEX/CABLE						
		E	2ND SPONSOR											
		F	ADDRESS											
		G						COUNTRY			RESEARCH ORG. PROJECT CODE			
		H	TELEPHONE					TELEX/CABLE						
331	PROJECT DATA	A	TOTAL BUDGET					STARTING DATE		ESTIMATED COMPLETION DATE		ACTUAL COMPLETION DATE		
		B	ANNUAL BUDGET					PRESENT POSITION				DATE OF COMPLETION OF THIS FORM		
		C	NO. OF STAFF (CURRENT YEAR)											

1	2	3	4	5	21	31	41	51	61	71	80
SUMMARY DESCRIPTION OF PROJECTS AIMS, METHODS, PROGRESS TO DATE AND RESULTS											
511	A										
REPORTS PUBLISHED OR PENDING PUBLICATION	A	TITLE (1)									
	B	AUTHOR					DOCUMENT DATA *			DATE OF PUBLICATION	
	C	BIBLIOGRAPHIC DETAILS (JOURNAL OR PUBLISHER OR SOURCE IF UNPUBLISHED)									
	D	TITLE (2)									
	E	AUTHOR					DOCUMENT DATA *			DATE OF PUBLICATION	
	F	BIBLIOGRAPHIC DETAILS (JOURNAL OR PUBLISHER OR SOURCE IF UNPUBLISHED)									
	G	TITLE (3)									
	H	AUTHOR					DOCUMENT DATA *			DATE OF PUBLICATION	
	I	BIBLIOGRAPHIC DETAILS (JOURNAL OR PUBLISHER OR SOURCE IF UNPUBLISHED)									
Equipment		Please list any special equipment/facilities used by the research group									

* IF JOURNAL ARTICLE ENTER HERE VOLUME, ISSUE NUMBER, FIRST AND LAST PAGE NUMBERS.
IF A REPORT ENTER TYPE OF REPORT (e.g. THESIS, INTERIM REPORT) AND NUMBER OF PAGES.

NOTES FROM THE A.G.M.

The 'official' account of the A.G.M, has not yet been prepared, so there will be a full report on the resolutions made by the membership in the next Newsletter, together with the delayed financial report. The paper delivered by Reg Harris, on Bio-deterioration, forms a major part of this Newsletter, and a few other items are recorded here, for information.

Discussions centred on the items recorded in the Minutes of the Committee Meeting and circulated in the December Newsletter.

1. Subscriptions. It was felt that the recommended increase to £2 (£3 for institutions) did not adequately reflect the status of the group and would not allow a sufficient standard of production of publications. There was a majority vote for a personal subscription of £3 and £5 for institutions.
2. Publications. Investigations into the cost of producing the Newsletter by litho-printing indicated that the current run of 200 would not justify the increased cost. It was suggested that special report etc., which would have a resale potential outside the group, should be produced more professionally. (The survey of collections made by the group last year should, pending grants or loans, be produced in this way by July; free to members).
3. Professional Groups Committee. The Secretary's report was discussed at length and, although members felt that the B.C.G. should maintain links with the Museums Association, it is probable that the Group would resist formal affiliation. Regret was also expressed that the Museums Association Council had resolved to widen the scope of the committee to include non-discipline groups.

Because of shortage of time the meeting was unable to discuss a number of resolutions submitted by Graham Walley, of Nottingham Museums. It was agreed that these should be included in the Newsletter (see below) so that members could express their views to committee members before these topics are discussed. There may be time to cover some of them at the Specialist Session of the M.A. Edinburgh Conference, and it has been suggested that documentation, and relations with M.D.A. could form a topic for the Annual General Meeting 1978.

The A.G.M. marked the retirement of Geoff Hancock as Chairman of the Group. He has guided B.C.G. to a strong position and we are grateful to him for the work he put in.

Steve Flood
St. Albans.

PROPOSALS FOR DISCUSSION AT B.C.G. ANNUAL GENERAL MEETING

1. "That the B.C.G. compiles a register of all type British natural history specimens in British museums and that the following are given careful consideration:
 - that the basic information is recorded on IRGMA cards
 - that the B.C.G. issues an internal convention on the way the cards are to be filled
 - that the cards are sorted to produce a variety of indexes,"
e.g. group-museum-types held
group-author/collector-museum-types held.
2. "That the B.C.G. formulates a policy on the care of type collections and issues guidelines for the maintenance of type material and encourages that they are adhered to."
3. "That the B.C.G. encourages a policy of placing in public museums all type material at present held in private collections, and that the status type should be officially questioned if they are not so placed."
4. "That the B.C.G. makes representations to the national and large provincial museums to establish the principle that all duplicate determined specimens are made available to provincial museums before they are otherwise disposed of."
5. "That the B.C.G. compiles a register of available expertise in all Natural History groups that can be called upon by curators wishing to have their collections assessed."
6. "That the B.C.G. represents the views of its members on the use of the present IRGMA cards to the MDA, as and when necessary.
 - that it formulates an internal convention for biology curators which standardizes the filling in of cards and the use of keywords.
 - that it investigates the formation of a national natural history sites catalogue and confers with the MDA on the production of a suitable natural history locality sheet."
7. "That a long term aim of the B.C.G. should be the compiling of a list of the range of natural history collections held by all British Museums."

G. Walley
Nottingham.

BCG MEETING - MUSEUMS ASSOCIATION CONFERENCE. EDINBURGH 5 JULY 1978

Due partly to the success of the Biology Curators Group meeting held as a half-day symposium during the Museums Association Conference in Bradford last year, the Association has, in planning this years conference, set aside a whole day for the specialist sessions. The theme for this years specialist session organised by the BCG is to be "Research material in Museum Collections". This topic was covered, in part, by the highly successful joint meeting of the BCG, Systematics Association and Geology Curators Group "The Function of Local Natural History Collections" Liverpool last September. It is hoped that the papers presented in Edinburgh will provide the basis for continuing the stimulating discussions on the role of natural history collections which developed out of that meeting.

This year the Museums Association has waived the daily conference fee for the specialist sessions day, and it is hoped that this action will encourage those BCG members who might otherwise have been unable to attend the meeting to do so as day visitors to Conference. I am sure that there is no need to point out that the BCG session is open to all members of the Group whether or not they are members of the Museums Association. In order to provide the greatest opportunity for members to attend as day visitors the BCG has, unlike the other specialist groups organising a session, arranged for an excursion to take place in the morning and the main business session of the meeting to occur in the afternoon. It is hoped that this will allow sufficient travelling time for day visiting members to make their way to Edinburgh to take part in the main business of the meeting.

The programme for the meeting is as follows:-

- 09.15 Depart from University of Edinburgh Pollock Halls for Royal Botanic Gardens, Inverleith Row.
- 09.30-10.45 Tour of herbarium together with a short talk on the role of the herbarium and the preparation of material for incorporation into the collections.
- 10.45-11.00 Travel to Royal Scottish Museum, Chambers Street
- 11.00-12.30 Tour of the Natural History storage in the Royal Scottish Museum.
- 12.30-13.20 Lunch
Conference delegates are reminded the Association has made no provision for lunch during specialist sessions. Depending upon the number of members wishing to attend it is hoped to arrange temporary membership of the University of Edinburgh Staff Club, Chambers Street, where luncheon facilities are available at reasonable prices.

The afternoon session will take place in the lecture theatre of the Royal Scottish Museum:-

- 13.30-14.15 N Philip Ashmole of the Department of Zoology, University of Edinburgh.
"Are museums useful for research?"
- 14.15-15.00 Geoff Hancock, Senior Keeper of Natural History, Bolton Museum and Art Gallery, "A collection rescue operation in the North West".
- 15.00-15.15 Coffee
- 15.15-16.00 David Heppell, Principal Scientific Officer (Curator of Mollusca) at the Royal Scottish Museum and Member of the Council of the International Commission on Zoological Nomenclature.
"The Type Concept - steady state or big bang?"
- 16.00-16.30 E C Pelham-Clinton, Assistant Keeper (Curator of Entomology) at the Royal Scottish Museum.
"Insect Hoards".
- 16.30-17.15 Discussion.

Certain of the arrangements still to be made in Edinburgh require some estimate of the number of members likely to attend. Would all BCG members wishing to attend the specialist session on Wednesday 5 July (including those attending as Conference delegates) please contact:-

Mr I H J Lyster
Department of Natural History
Royal Scottish Museum
Chambers Street
Edinburgh
EH1 1JF

If, in doing so, each member could give some indication as to what time on the Wednesday they are likely to arrive to take part in the meeting, this would be greatly appreciated. Final arrangements must be made by 1 June 1978 so please ensure that Ian Lyster is informed by that date, at the latest, if you intend to attend the meeting.

GEOFF SWINNEY
28.2.1978

Biology Curators Group Officers Committee 1978.

Chairman

Stephen Flood,
Keeper of Natural History,
St. Albans Museum,
Hatfield Road,
St. Albans, A21 3RR.
0727 56679

Editor

Peter Davis,
Keeper of Natural Sciences,
Sunderland Museum,
Borough Road,
Sunderland, SRI 1PP.
0783 41235

Assistant Editor

Geoff Hancock,
Senior Keeper, Natural History,
Bolton Museum,
Le Mans Crescent,
Bolton, BL1 1SE.
0204 22311 Ex 361

Committee

Jim Bateman,
Keeper of Zoology,
National Museum of Wales,
Cathays Park,
Cardiff, CF1 3NP.
0222 26241

Martin Brendell,
Dept of Entomology,
British Museum (Natural History),
Cromwell Road,
London, SW7 5BD.
01 589 6323 Ex 462

Dave Erwin,
Keeper of Zoology and Botany,
Ulster Museum,
Botanic Gardens,
Belfast, BT9 5AB.
0232 668251

Co-opted

Peter Lambley,
Keeper of Natural History,
Norfolk Museums Service,
Castle Museum,
Norwich, NR1 3JU.
0603 22233

Ray Ingle,
Dept. of Zoology,
British Museum (Natural History)
Cromwell Road,
London, SW7 5BD
01 589 6323 Ext 435

Secretary

Peter Morgan,
Keeper of Vertebrate Zoology,
Merseyside County Museums,
William Brown Street,
Liverpool, L3 8EN.
051 207 0001 Ex 16.

Treasurer/Membership Secretary

Kelvin Boot,
Assistant Curator, Natural Sciences,
Exeter City Museums,
Royal Albert Memorial Museum,
Queen Street, EX4 3RX.
0392 56724

Museums Association Liaison Officer

Geoff Stansfield,
Dept. of Museum Studies,
University of Leicester,
152 Upper New Walk,
Leicester, LE1 7QA
(Co-opted)

Committee

Mike Hounsome,
Keeper of Zoology,
Manchester Museum,
University of Manchester,
Oxford Road,
Manchester, 061 273 3333

John Mathias,
Assistant Keeper, Natural Sciences,
Leicestershire Museums,
96, New Walk,
Leicester, LE1 6TD.
0533 539111

Adam Ritchie,
Keeper of Natural History,
Dundee City Museums,
Albert Square,
Dundee, DDI 1DA.
0382 25492/3

Co-opted

Eric Greenwood,
Assistant Director (Adademic),
Merseyside County Museums,
William Brown Street,
Liverpool, L3 8EN.
051 207 0001

Dick Hendry,
Senior Conservation Officer,
Glasgow Museum,
Kelvingrove, G3 8AG.
041 334 1134.