

Natural Sciences Conservation Group

Newsletter

Issue 2

NATURAL SCIENCES CONSERVATION GROUP



Listers Conch

Setting up a Myco-herbarium

Paper, Glue and Print Conference, NHM

Submitting Articles

When submitting articles to the editor for the NSCG newsletter, whenever possible please submit a printed copy and a copy on computer disc, either 3.5" or 5.25", in Word for Windows format (.doc), WordPerfect 5, ASCII format (.txt), or Rich Text Format (.rtf). This will help reduce editing time by cutting out the need for OCR scanning or having to retype the whole document.

Drawings and diagrams should be in black ink on white paper or card. Photographs should be black and white prints.

Articles should be sent to:

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Editorial

As winter rolls on and animal casualties trickle into museum freezers this time of year can bring its own benefits. Now it is cool enough (!!) to face the storeroom of fluid-preserved specimens from your museum director's last trip abroad. Winter always seems to abound in those jobs that have been procrastinated from the previous year and which lack any creativity. This winter, however, has seen the creation of a selection of freeze-dried slices of fungi (see below).

SPNHC's *Collections Forum* has also come up with some useful articles for fluid preservationists, like myself: darkening of certain reptile skins has been attributed to a reaction occurring within 6 months of fixation from fresh using formalin preservation (Stuart) and the use of 1% glutaraldehyde mixed with 2.5% formaldehyde and buffered with 2% sodium glycerophosphate has, so far, been found to be effective for preserving marine collections and helping to overcome the problem of lipid preservation in fish livers (Stephenson and Riley). There is also a table, covering a two year period, showing pH fluctuation of buffered formalin and formol-glutaraldehyde mixtures without being used on specimens. In the meantime I presume that all of you members out there are blissfully happy since I have had no grievances to air in this newsletter, nor much else apart from Paul Browns Paper, Print and Glue seminar review and Maggie Reilly's conch crunch! Next deadline for news, views and articles is the 20th June.
Simon Moore, Group Editor.

Notes from the Chair

Dear members

Welcome to our second newsletter. This should reach you in the same week as our AGM, being held at Ipswich Museum. On behalf of the committee I would like to thank Bob and his team for all the hard work they have put into this meeting and I am looking forward to what should be an interesting day.

News hot off the press is that Louise Bacon, workshop co-ordinator for the World Congress meeting at Cambridge, has asked our group to present a 2 hour workshop at this prestigious international conference. This is where you can help. The workshop will cater for up to 40 conference delegates and we have been asked to approach it from a hands on natural sciences conservation aspect. I am looking for volunteers and offers of help to demonstrate techniques such as mount making, herbarium mounting, taxidermy, spirit preparation and any other easily demonstrated low risk activities. I look forward to receiving comments and offers soon.

Kate Andrew, Chairperson

Bibliography of Current Articles 2

Stephenson, AB & Riley JL 1995: Fixation and preservation of museum marine collections using formaldehyde/glutaraldehyde mixes. *Collections Forum*, 11 (2): 58-68

Stuart, JN 1995: Observations on formalin-induced darkening of herpetological specimens. *Collections Forum*, 11 (2): 39-45

Williams, SL & Smith HC 1995: Effect of osteological processing treatments on dimensions and moisture absorption of rodent skulls. *Collections Forum*, 11 (2): 46-57

Bits and Pieces: the story of Lister's Conch

In 1986, the Hunterian Museum's most precious shell specimen, *Strombus listeri* or Lister's conch was severely damaged whilst on display loan to our neighbouring institution, Glasgow City Museum and Art Gallery. The shell is both historically and scientifically important. Its historical significance stems from the fact that it is one of the oldest traceable natural history specimens in Europe - its ownership can be traced back to the John Tradescants, father and son, respective gardeners to Charles the I and II of England. At Lambeth, in London, the Tradescants founded the first recorded museum of natural objects in Britain. The shell is the holotype of the species and was the only known specimen until well into this century.

The damage occurred on the morning before the exhibition was due to open when workmen were erecting the title board above a number of showcases, one of which contained the *Strombus listeri*. The title board slipped, hit some of the cases which toppled over domino-fashion, the *Strombus* fell out and was crushed by one of the cases. The shell was broken into hundreds of fragments but given its importance we decided to try and have it repaired. Initially it was not apparent to us who might undertake such a job but on professional advice we took the shell to a ceramics conservator (Ellen Breheny at Hopetoun House, West Lothian). We understood that it was an extremely difficult job with no successful end result guaranteed but we still felt that it was worthwhile to try.

The first step was to lay out the pieces and see what there was to work with - there were well over 200 pieces.

Figure 1 shows the initial stages of the work where the larger pieces of the shell have been stuck together using Ablebond 342-1 epoxy resin. The inner spiral of the shell has been partially reconstructed with the fragments glued onto gummed paper. This difficult three-dimensional jigsaw presented an additional problem in trying to fit the



Figure 1

pieces back in place. Certain torsion forces are exerted in the formation of a gastropod shell giving rise to areas of strength and weakness. When a shell is damaged like this one, the pieces do not simply fracture, there is some release of these torsion forces and the pieces warp, particularly in the inner spiral. Consequently it is very difficult to get adjacent pieces to fit together properly. The larger pieces of shell on the lip were fitted together first, then the body of the shell was reconstructed. The internal structure was strengthened using nylon gossamer and Ablebond 342-1. When partially reconstructed, the shell was filled with a calcium carbonate in gelatine filler to form a support for the inner floating fragments. The lip was then reattached to the body. Gaps were filled with a mix of Ablebond 342-1, barium sulphate and ground pigment to match the body colour. When no longer necessary the inner mould of calcium carbonate and gelatine was washed out with hot water. On gap-filled areas, the pattern was retouched with ground pigments in

Paraloid B72 and xylene. The upper part of the spire of the shell had broken into a few large fragments and was relatively simple to repair. However the lower part of the spire where it adjoins the body of the shell sustained the worst damage and was too fragmented to allow accurate reconstruction. The end result is that the shell is in two large pieces and about 40 small fragments as shown in figure 2.



Figure 2

We are satisfied that as good a reconstruction as possible has been made of the shell. The specimen retains its historical value and most of its scientific value but is no longer any use for illustration or exhibition. Splendid modern examples of this species such as the one shown in figure 3 can be purchased fairly cheaply.

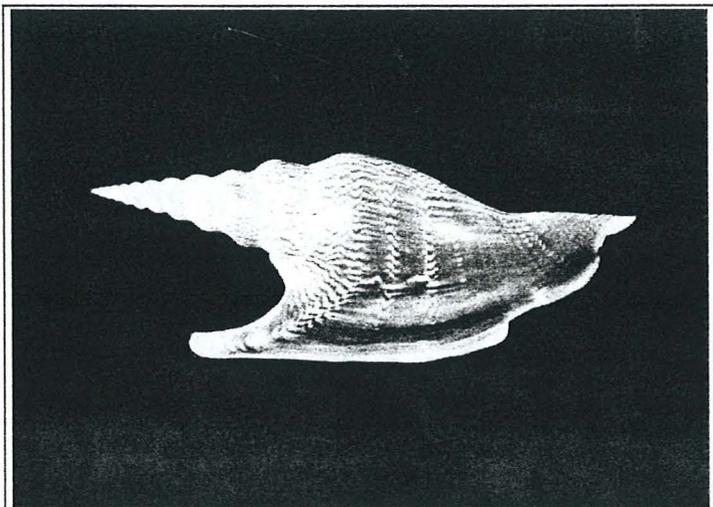


Figure 3

There was one positive outcome to this story. When the shell was smashed open it was found to contain foraminiferal sand which provided us with further information on the shell's origins and gave the Hunterian Museum one of the earliest collected samples of marine sediment.

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A Mycoherbarium for Hampshire

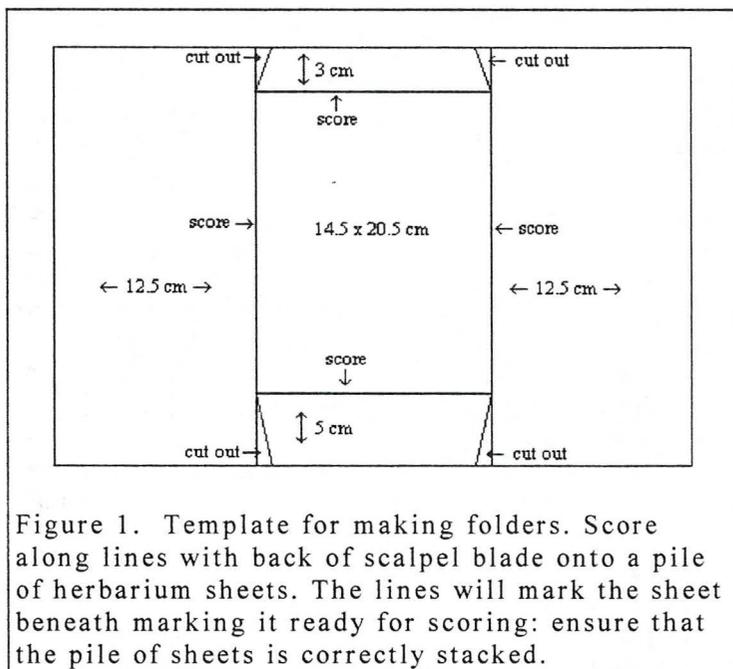
The preservation of fungi for a scientific collection has always been desirable but problematic: specimens lose their shape and colour during controlled air drying and many become exceedingly fragile. Basidia and cystidia (the morphologically-important spore bearing and sterile cells lining the gill septa) become shrivelled, at least the spores are stable although a high-powered microscope is

needed to see them at all. Even storing whole sporocarps of basidiomycete fungi (mushrooms) is fraught with dangers of RH fluctuation which in excess of 55% causes shrivelling and distortion to the specimens which, themselves, take on a spongy consistency. Dried fungi are also palatable to insects, especially the beetle *Cis bilamellatus* whose larvae have been found to survive the freeze-drying process!

Hampshire's mycota is exceedingly varied, already about 2,500 species have been recorded from the New Forest alone where varied habitats and mycorrhizal associations are as abundant as the gastronomes who delight in depriving the Forest of its edible species by overcollecting. However that's another matter. Over the past 3 years Simon Moore, with considerable help from local mycologists, has gradually amassed a collection, (with full data) of freeze-dried fungi amounting (presently) to about 200 species. These range from fly agarics to pin mould on bread. Although some of these may look very pretty in a woodland diorama or smartening up a taxidermy case they are of only slight scientific value. To widen use of the collection, central slices of the sporocarp of each species have been taken and mounted as a herbarium specimen considerably facilitating microscopic and internal examination of each species without the worry of a visitor damaging a rare specimen. Tiny specimens have been sliced and dry mounted on microslides.

Technique for herbarium mounting

Since palm folders are too expensive (£2 + VAT each), herbarium folders for each specimen were made from herbarium sheets (Fig. 1), so that a rectangle of paper, cut from another sheet (4 per sheet), could be mounted inside the folder. This would then allow each specimen to be removed and examined without endangering the fragile and sensitive slice.



Slices were cut using an 19th century curve-bladed bistoury since the blade is narrow and nearly 10cm long: a Swann-Morton no. 25 also does a good job. Slicing through the mid-line was generally easy but the umbos of some otherwise fragile sporocarps were hard as stone and required finishing with a heavier blade. Bracket fungi, even tougher, were cut with a fine toothed bandsaw. Inevitably there were slight casualties to the fungi which were repaired from the underside of the slice using HMG cement B72. Water soluble adhesive (such as PVA) must not be used since it will partly rehydrate the hygroscopic slice and cause it to shrivel. Slices were attached to the mounting card using botanical strapping tape (Figs 2 + 3). The strapping tape was centred with a band of adhesive paper tape so that the centre of each strap would remain non-adhesive. This prevented the moist gum from rehydrating the slice and enabled researchers to detach

the specimen if required. Tougher fungi (cf. *Collybia* spp) were found to be easier to slice while still fresh whereas delicate specimens (cf. *Mycena* spp.) were easier to slice after freeze-drying.



Figure 2 Folding two-bladed bistoury with freshly-sliced *Inocybe geophylla*. The toughness of the sporocarp has resulted in some damage, to be repaired with HMG cement.

Specimen data was recorded on a labelling programme (Fig. 4) and printed onto adhesive labels for attachment to the outside of each folder. The accession number was recorded on the internal card with the specimen, and the scientific name of the specimen written on the outside of the folder so that it could be more easily read. Finally, each folder was placed in a 43 x 23cm standard size self sealing polybag and stored in a herbarium cabinet.

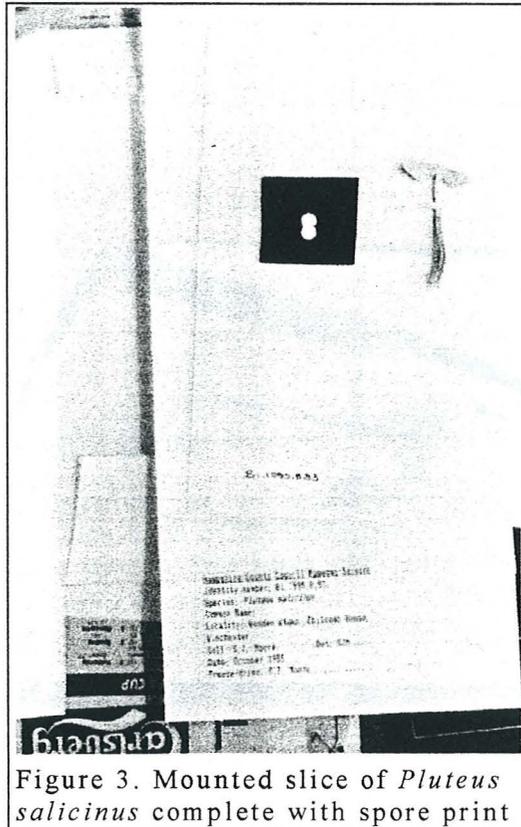


Figure 3. Mounted slice of *Pluteus salicinus* complete with spore print

Hampshire County Museums Service	Hampshire County Museums Service
Identity Number: Bi 1993.8.13.	Identity Number: Bi.1995.8.33.
Species: <i>Panellus stipticus</i>	Species: <i>Crepidotus variabilis</i>
Common Name:	Common Name:
Locality: On beech: Whitley Wood, New Forest	Locality: On birch: Whitley Wood, New Forest
Coll: A. Norris Det: A. Leonard	Coll: S.J. Moore Det: SJM
Date: 27.8.1993	Date: 21.9.1995.
Freeze-dried: S.J. Moore	Freeze-dried: S.J. Moore

Figure 4. Label Format

Step-by-step

1. Collect fungus with data (mycorrhizal association included).
2. Take median slice using bistoury or similar long-bladed scalpel.
3. Freeze, then freeze-dry slice (usually takes about 24-48 hours) until constant weight is achieved.
- 3a. Alternatively take slice (similarly) from freeze-dried whole fungus).
4. Cut mounting card (20.5cm x 11.5cm = 4 out of one herbarium sheet)
5. Make folder as per figure 1 and label exterior.
6. Mount slice onto card using straps of herbarium tape with middle blanked out - for thicker-stemmed slices mount a broader piece of paper tape onto the gummed side of the strapping tape.
7. Store in self-seal polybag and herbarium cabinet.
Maintain @ RH < 55%

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Paper, Glue and Print, a one-day conference at the
Natural History Museum, London, 31st October, 1995

About 80 delegates gathered for this meeting at the
Natural History Museum in South Kensington including
44 NHM staff and 14 from the Victoria and Albert

Museum. The day was sponsored by Arjo-Wiggins, represented by Simon Stanyer, and was organised by Jenny Moore and Janet Margerison Knight. The morning session chaired by Robert Huxley, comprised four talks.

The first speaker was Annemarie Wierda who is a freelance botany and paper conservator based in The Netherlands. She illustrated, with slides, the results of artificial ageing tests carried out on papers and glues with specific reference to PVA for adhering plant material. The accelerated ageing consisted of a twelve day exposure at 90°C and 50% relative humidity and was carried out at the Royal Library at the Hague. Twenty three papers and tapes were tested including many used at the NHM. Most papers survived well with slight browning in BM board 3 and Mesdox labels showing brown spots. Deterioration occurred with plastic envelopes probably due to the high temperature of the test. There was some variation between the same materials from different suppliers. Eighteen glues and three hotmelt glues were also tested using her own childhood herbarium specimens as test samples. Browning occurred with latexes, dextrin MC and cellulose Gripfix. or carbohydrate glues both here used as an adhesive and on the surfaces of linen tapes. Latexes, seccotine and Cow Gum remained sticky long after application and so were not considered suitable for plant preservation. The polyvinyl family of glues; PV Acetate, PV Alcohol and PV Acrylate, all performed equally well and were considered the best, although too liquid or too thick a mixture caused difficulties in application. Annemarie recommended that the pH of a glue or paper should always be neutral.

The effect of deep-freezing on herbarium specimens and old glues was also studied. she concluded that this can be used as a treatment against insect and fungal attack so long as the bound volumes or sheets are sealed within polythene bags to avoid further desiccation although condensation might be a problem. Also, freezing should be rapid to avoid expansion and contraction tearing. She concluded by describing and discussing the conservation measures which she applied to the

Boerhaave Herbarium volume at the Rijks Herbarium, Leiden. After initial photography, she used a minimalist approach by collecting loose fragments into small acid-free envelopes and dry-cleaning soot and dust deposits with gum powder, a Wishab sponge and Staedtler eraser. Holes and gaps were repaired with Japanese paper which was also use as flaps over delicate specimens. loose plants were reattached with Japanese paper strips and Methylcellulose in 10% solution which was considered to cause minimal damp cockling of the paper.

Brian Pitkin of the NHM talked next on "From Keyboard to Specimen - labelling insects using computers" and covered much of what has been published in his paper in The Biology Curator 4: 24-27 (1995). Many curators now use computers to register and database specimens, and labels can be generated at the same time for the specimens. Brian described his multi-user registration and labelling programme for the Entomology Department (NHM) in Paradox for DOS.

The primary requirement for labels is that the print, paper and glue should be as permanent as possible. All this is possible using computers, but Brian recommended that small number of specimens should continue to be labelled with traditional pen and permanent ink as an insurance against unforeseen deterioration. For similar reasons, glass microscope slides should be scribed with a diamond stylus in case the label comes unstuck and is lost. Brian quoted the favoured papers used within the NHM such as Wiggins Teape 100% rag (WT HWS 550) and Goatskin Parchment paper and Byron Weston Paper Co.'s Resistall as all suitable for immersion in spirit and formalin. Dry specimens require acid-free archive quality paper such as Mellotex Smooth Ultra White by Tullis Russel. Brian discussed the problems of a tried and trusted paper that seemingly changed its characteristics for the worse. One must be aware that products such as ink or paper may be "improved" by manufacturers without notification! Mistakes can also be made within museums; and Brian related the story of a complaint to a manufacturer about a paper which had not deteriorated in quality but which had

turned out to be from another source! Brian also described the ongoing search for suitable indelible and waterproof inks to be used in conjunction with laserjet, inkjet and dot matrix printers. Many inks used in computer printers are not water or spirit proof. Dot matrix printers help to press the ink into the paper unlike some other systems where the print can lift off the paper under certain conditions and float away.

"To Glue or not to Glue....?" That was the... title of Donna Hughes' contribution, referring to the preparation of fresh herbarium specimens. As with many techniques used in preparation, collections care and preventative conservation, those who use them have often done so because of custom, sometimes without fully understanding why they use them. Gluing specimens reduces risk of handling damage, keeps the data attached, makes specimens suitable for postage and because Linnaeus said so as he didn't like paper strips.. Methods which do not involve gluing specimen allow easier access to the underside, stop any damage when the specimen or paper shrinks and permits removal of bits for DNA analysis. Also there is no tasty food in the way of starch-based glue or pests to get stuck into. Alternative attachment methods are strapping with gummed paper and gummed linen-backed paper strips, which must be positioned correctly to avoid the specimens shifting. Sewing is another, which (in her opinion) can damage the specimen and the mounting paper. Also she discussed enclosing the specimens in card folders traditionally used for cryptogamic material, Mellinex and cellophane envelopes. Application methods to dispense the correct amount of glue to a specimen were illustrated. PVA from a commercial nozzled container or from a syringe need to be expertly controlled. The glass sheet method used at the Royal Botanic Gardens, Edinburgh allows only the parts of the plant which will have contact with the paper to be covered with glue. Brush application requires the glue to have a low viscosity to avoid too much pressure on the specimen. She asked whether anyone had tried spraying

glue onto the specimens. she summarised that glues to use should be stable, flexible, reversible and long lasting. Adrian Doyle talked about the use of PVA (Poly Vinyl Acetate) emulsion in the Palaeontology Lab at the NHM as consolidant, adhesive, and filler to stabilise subfossil and fossil bone. He listed the properties required and suggested advantages of PVA products as stable, non-tacky, flexible with high plasticiser content, transparent, colourless, matt finish, small particle size giving good penetration, negatively charged, and neutral pH. Methods of application, such as brushing, injection, immersion and vacuum impregnation were discussed. He showed slides of the gravity drip impregnation apparatus used in the Palaeontology Laboratory to continuously soak the bone with PVA emulsion, which acts by gravity. The PVA collects beneath to be recycled by pumping back to the top. This methodology is covered by his paper of 1987 in The Geological Curator 4(7): 463-465. PVA is also used as a base for powder paints for painting plaster replicas. Having discussed the value and uses of PVA Adrian concluded by describing some of the problems. After lunch there were demonstrations by Jenny Smithers of the plant mounting methods used in the NHM Botany Department, and Brian Pitkin demonstrated his registration and labelling computer programme. Megan Lyell brought some historical plant specimens from the Botany Department which were mounted on varied types of paper, often with unknown adhesives to demonstrate their variable condition. The final session comprised a "question time" led by the morning's speakers. Boris Pretzel of the Victoria and Albert Museum conservation unit contributed a number of comments to complement the list of requirements for ideal glues provided by Adrian Doyle. Simon Stanyer manned the trade display and handed out bags of goodies at the end of the day, including amongst the paper samples, a heat sensitive advertisement mug comparing the scalps of follicly challenged scientists (much like your reviewer!) with that of "Courier Super Wove". Rob Huxley closed the proceedings by thanking

the speakers and Jenny and Janet who had so ably organised the day.

- Doyle, Adrian M. 1987. The Conservation of Sub-fossil Bone. *The Geological Curator*, 4(7): 463- 465
- Pitkin, Brian. 1995. Labelling specimens in the Life Science Departments of the Natural History Museum, London using Computers. *The Biology Curator* 4 :24-7.

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NSCG Conference and AGM Ipswich Museum, 27-28 March

Registration and Coffee 9.30 - 10.15

Welcome Address 10.15

1. Preventative Conservation for Natural Sciences Collections.
Diana O'Sullivan. Horniman Museum London, and Care of Collections Forum.
2. Setting up a myco herbarium.
Simon Moore
3. Mounting Marine Vertebrates.
Paul Radcliffe. Geological Conservation Unit, Cambridge University
4. Problems of a Microscope Slide Conservator.
Paul Brown. Natural History Museum, London.
5. St Kilda Explored - an interactive exhibition.
Dick Hendry. Glasgow Museum

Break for lunch 12.30 - 2.00

6. The Control of Acidity in Formaldehyde Solutions being used for the Preservation of fish parasitology material.
Julian Carter. National Museum of Wales, Cardiff
7. The Conservation and Recovery of the West Runton Elephant
Gordon Turner-Walker. Norwich City Museum.

8. Moulding Fossil Material.

Lorraine Cornish. Natural History Museum, London.

3.15 - 3.30 Work In Progress - a short slot for delegates to show slides of any work in progress.

3.30 - 3.45 Coffee

3.45 AGM

Lunch will be provided at the Greyhound, 3 minutes walk from the Museum.

Unfortunately you will have to buy your own drinks, (unless you can get someone else to buy them or you).

On the second day the Natural History and Conservation departments at Colchester Museum have invited us round to view the Natural History Museum and stores.

I would like to know how many intend to go on the trip as soon as possible. In this way I can minimise our transport costs.

Fee for the AGM and lunch will be members £10 and non-members £15.

Cost of transport to Colchester will be £5 extra.

Please send your completed forms back as soon as possible, the caterers will then know how many buns to buy, and I shall know how many chairs to set out.

Remember, if you wish to serve as an officer on the committee send nominations to:

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