MONTH SECTION INDEX

August, 1999

This magazine if broken into a number of sections to keep downloading
and uploading of the magazine to reasonable times.
This section contains categories of articles that repeat monthly.
And also carries Feature articles that didn't fit into 1.4 MB of memory in the Features Section
All items are new each month except that future shelling events pages are repeated each month till a new schedule is received. Pages are only modified to delete events that have already occurred.

Feature Articles

NOTE: This section is on line in both HTML and Acrobat versions.

In the Acrobat version, the only links that are effective are those in a red box (Links to the General Index). It is recommended that Acrobat users select Bookmarks using an icon on the upper left. This will give you links to each article or species presented. Viewing at 150 or 200% magnification is recommended. Normally use the hand icon for moving around a page and the left/right arrows on the icon strip to change pages. Magnification can be set by clicking on the section at the bottom of the screen with a magnifying glass and % magnification RETURN TO GENERAL INDEX

Meeting Time and Place

The August Meeting of HMS

will start at 7:30 PM on Wednesday, August 4, 1999
(Talk story and show shells) at 7:00 PM
at the First United Methodist Church, Victoria and Beretania Street
If you lose track of us, meetings are the first Wednesday of each month.

Speaker and Program

Our current vice-president, Dave Watts, will be presenting a program on diving in Australia. Dave is in the Navy Civil Engineer Corps and lived in Exmouth, Western Australia for three years. Dave has been fishing, diving, collecting shells and taking underwater photos for almost 20 years. He is well known to all local members and, based on a number of prior programs, this is sure to be of considerable interest.

The program will consist of a slide show of marine life and a display of some Australian shells.

Exmouth is a small town on the North West Cape in Western Australia. The town has a population of around 3000 people and the next town is 250 miles away. The closest traffic light is over 600 miles away. Exmouth has become a little more well known in recent years because of the Ningaloo reef running along the coast in that area and the fact that large numbers of whale sharks frequent the area.

Editor's Note: We are in need of file photos of our members. An article has more meaning if the author and participants have a photo included.

At this time, our photo file of HMS people is quite sparse. Please loan us your photo prints or slides that are recent and especially if they are old. Club history is always of interest.

If you are in town, be sure to join us.

Coming Malacological Events

1999 SUMMER & FALL
SHELL SHOWS AND MEETINGS

Aug. 20-22 **Jersey Cape Shell Show**
Wetlands Institute, Stone Harbor, New Jersey
Jersey Cape Shell Club, P.O. Box 124
Stone Harbor, NJ 08247
(609) 653-8017

Sept. 10-12 **North Carolina Shell Show**
North Carolina Aquarium at Ft. Fisher, NC
Ann Buddenhagen, 804 Westwood Drive
Raleigh, NC 27607
(919) 782-8903
E-mail: pabjetster@aol.com

Sept. 18-19 **Central Florida Shell Show**
Central Florida Fairground, Orlando, Florida
Jake Dominey, 700 Tam O'Shanter Drive
Orland, FL 32803
(407) 894-3033

Sept. 18-19 **International Shells & Fossils Bourse**
Ottmarsheim, France
Salle Polyvalente, Rue de la Priscine
Michel Rioual, 2 Rue des Vergers
68490 Ottmarsheim, France
(3) 89-26-16-43

Oct. 1 - 3 **Annual German Shell Fair**,
Vienna, Austria
Wolfgang Fischer, Matinigasse 26
A-1220 Vienna, Austria
43 (1) 47654-3302, FAX-3342
E-mail: h330p6@edv1.boku.ac.at

Oct. 30 **British Shell Collectors' Club Shell Show**
Napier Hall, Hide Place & Vincent St., London, England
Kevin Brown, 12 Grainger Road
Isleworth, Middlesex TW7 6PQ, England
44 (181) 568-8333

Nov. 7 - 8 **Philadelphia Shell Show**,
Philadelphia Academy of Nat. Sciences
Franklin Parkway & 19th Street, Philadelphia, PA
Al Schilling, 419 Linden Ave.
Glenside, PA
19038 (215) 886-5807

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This list of shell shows and events was compiled by Donald Dan, COA Awards Chairman. 2620 Lou Anne Court, W. Friendship, MD 21794, U. S.A. Tel. (410) 442-1242 or 442-1942.
Email donaldan@aol.com.

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If you have updates or additions to these activities, please include HSN as a copy-to addressee on Email you send to others, or send directly to HSN editors using the link below:

Email now

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THE SHELL GAME: MOLLUSK'S SHELL DETERIORATION IN COLLECTIONS AND ITS PREVENTION [2]

by

SALLY Y. SHELTON [1] *

[1] Director, Collections Care and Conservation San Diego Natural History Museum, P.O. Box 1390, San Diego, California, USA

[2] Originally printed in "The Festivus" Vol. XXVIII(7), page 74, Adapted from a presentation to the San Diego Shell Club, March 1996, with permission of the author.
The Festivus editor, Carole M. Hertz, and author, Sally Y. Shelton have kindly consented to its reproduction here.

* Currently at the Smithsonian Museum
Email: Shelton.Sally@NMNH.SI.EDU

Many of us think of collections storage as an essentially inert environment. We don't detect anything going on, so we assume that nothing is. This is, of course, not true. Collections storage can be a very hostile environment indeed. After the silverfish have made lace out of all your labels, acidic storage has crumbled them, humidity changes have split the thin shells and light has faded everything, you start to put some time and thought into the storage environment.

I define storage as everything that is not active handling. A collections case is storage. So is an exhibits case. So are the various envelopes, cigar boxes, film reel cans and other containers we all have worked with. A specimen will spend 95 to 100% of its time in collections storage, yet the selection and design of storage systems tend to be very casual, even haphazard.

Thomas Browne of Scotland was apparently the first to describe the deterioration of mollusk shell collections in 1839 in **A Conchologist's Text-Book.** He described the white, spotted or streaky surface marring shells in collections cabinets but did not offer a solution to the problem. Since then, there have been a number of publications on the problems and possible solutions, the latter ranging from the sane to the utterly ridiculous.

Browne's book was promptly plagiarized for publication in the United States and published as **The Conchologist's First Book** under no less a name than Edgar Allen Poe. (This was apparently set up by colleagues of Poe hoping to take advantage of very different copyright laws and to use Poe's name as an attraction. Poe was evidently paid for the use of his name and was solely responsible for the introduction and preface. The illustrations were copied from Browne; the whole thing is noticeably inferior to the original. Such a practice was not exactly illegal at the time; whether it is unethical is another discussion.)

The first serious publication on this form of shell degradation was done in 1896 by Agnes Kenyon who described the characteristic problem:

> "While on a visit to Tasmania, I had the opportunity of visiting a collection on which the near vicinity of the sea had the effect of partially destroying the enamel of the dorsal surface, by streaks or clouds of a whitish or lime-like substance, the saline particles in the atmosphere evidently exerting a corrosive effect." Mrs. Kenyon was closer than she knew, and closer than anyone else would get for thirty years, to the true cause of the problem.

An alternative view was aired in 1899 by Loftus St. George Byne, M. Sc., in a presentation to the Conchological Society of Great Britain and Ireland. Mr. Byne, an amateur conchologist who had previously published on marine mollusc faunas, was asked to investigate the deterioration of shells in collections by J. Cosmo

Melvill of the Society, who had noticed the deterioration of a *Mitra* shell. Melvill's preface to Byne's paper is the first time that this condition is described as a "disease" (Byne, 1899a: 172).

"….I have seen too frequently in the almost hermetically-sealed drawers of the British Museum, a dullness first pervading the exterior of certain smooth species more markedly e.g. *Conus, Cypraea*, and especially Naticidae. Then grey acid efflorescence, both tasting and smelling strongly of vinegar covers the whole surface like a powder, rising doubtless from the interior, and the specimens are soon almost irretrievably ruined."

Byne took this challenge seriously and set out his conclusions in his very first page:

"The most remarkable facts are:

1. Only marine species are attacked.
2. Highly-polished shells, such as those of *Cypraea*, are the most likely to be affected.
3. It does not extend to every specimen in a drawer, and of several mounted on the same tablet, perhaps only one is attacked.
4. Loose shells are also destroyed, but there are comparatively few of these compared with the number of those mounted on cards.
5. The shells affected are from twenty to fifty years old, but the corrosion does not appear until after the lapse of about ten years. The process is thus an extremely slow one.
6. It occurs principally amongst the shells kept in drawers in the dark, where the air is confined and seldom changed.
7. If the tongue be placed against one of the shells, an astringent alum-like taste will be observed. *"(1bid, p.* 173).

Other than providing two examples of the Victorian scientist's tendency to use all senses in exploring problems, these conclusions are mostly notable for two things: Most are largely either wrong or misleading and they persist in the literature today in spite of published work modifying or disproving them.

Byne eliminated high humidity as a cause of the problem because he was assured that the Natural History Museum was "excessively dry," and excluded dampness as a cause without further comment. He did recommend the use of turpentine to kill fungal attacks. He considered the effect of sulfuric compounds in the atmosphere, but rejected that when he could not find calcium sulphate, (He did not test the air, but relied on figures from a paper published five years earlier.) He considered the effect of salt remaining in marine shells that had not been soaked in fresh water, but did not find any after unspecified "chemical tests," and further dismissed the idea of salts in suspension in the atmosphere because the shells in consideration were not near the sea.

Byne decided that the cause of the efflorescence was butyric acid. He apparently determined this by the vinegary smell (which would indicate acetic acid), by chemical tests showing the presence of calcium butyrate, and by his assumption that the butyric acid was liberated by the breakdown of organic matter. In other words, parts of the animal left in the shell would rot and release butyric acid, which would then attack the shell. He further stated, "The fact that the shells exposed to daily public inspection in the top cases are less attacked is explained on the hypothesis that the light acts as a deterrent. " (Ibid, *p. 176).*

Byne suggested that specimens adhered to cards with gum arabic were attacked more than specimens adhered with Canada balsam. He noted that the specimens adhered with Canada balsam were attached to glass instead of to card stock, but made no connection between the ma-

terial and the deterioration.

Byne's "prevention" was definitely worse than the problem:

"In the case of those shells which are badly affected, nothing can be done, and their instant removal is absolutely essential, for if left they only increase the mischief with those just beginning to show signs of corrosion. I recommend that they be soaked for twenty-four hours in a solution of corrosive sublimate (I part in 1000 water) and then thoroughly dried. As an experiment all shells should be subjected to such a treatment, in the hope that it may prove effectual." *(Ibid, p.* 177).

For those of you who, like me, tried to sleep through chemistry, corrosive sublimate is mercuric chloride. Between its use and the tasting of the shells, it is possible that there was a high turnover in Victorian conchologists.

Byne's first presentation was read before the Society in February 1899; his second in June of the same year. Here he amplified his original conclusions:

"At the time of writing my former paper I did not possess any knowledge of bacteriology, but I had come to the conclusion some months before that the corrosion was due originally to the action of bacteria." (Byne, 1899b).

Byne's reasoning ran thus:

1. Butyric acid compounds are present.
2. Butyric acid does not exist in the atmosphere; it must have an external origin.
3. It must come from fermentative breakdown of the animal.
4. Both aerobic and anaerobic bacteria "can cause various carbohydrates to ferment, producing butyric and acetic acids" *(Ibid).*
5. Often a portion of the liver is left attached to the interior apex of the shell.
6. This and the adhesive could both undergo anaerobic fermentation in a hermetically sealed case.
7. Butyric acid has been found.
8. The shells in the top cases exposed to light are unaffected, and light is "deadly" to bacteria.
9. Therefore, the process of deterioration is caused by bacteria.

A breathtaking example of circular logic with no testing or proof, and no real understanding of microbiology at all, this contention has stayed in the literature on the subject for nearly 100 years,

Byne rejected suggestions from peers to treat the shells by boiling them in oil or rubbing them with turpentine (a reversal from his first paper), oil of cloves, or formalin, for which we should be moderately thankful. Without ever doing a culture from the shells or any other work to determine the culprit, Byne stated that he was more than ever convinced that the problem was bacterial and that the corrosive sublimate treatment was the only one.

After a seven-year break, Byne (1906) published in the **Journal of Conchology,** a brief note with a decidedly hostile tone that his opinions on corrosion of shells had not changed and that he was still of the opinion "that the mischief is the result of the action of Bacilli. " He wrote that "extensive chemical experiments" showed butyric acid on the calcium carbonate of the shell resulting from the bacillus of butyric fermentation. He added that he "never isolated any definite bacillus, as I have neither the knowledge or means of doing so... " and "I have not seriously considered the problem of damp, because it has not come into any case I have looked into ... Nor does the suggestion of Mrs. Kenyon that 'saline particles' are responsible recommend itself to me." He went on to recommend the following prevention methods:

"The shells must first be thoroughly soaked in water, rubbed with soap, and

then perfectly dried. They are then to be rubbed over with a small quantity of linseed oil, any excess being removed with a rag. I am quite sure that this treatment will act efficaciously. I formerly recommended soaking the shells in a solution of corrosive sublimate, but this is cumbersome. I find it a good plan to take the drawers out of my cabinet and leave them in the air for a day. This does away with chance of mustiness and damp. I have a great objection to the smell of oil of cloves, and should never use it. I shall be pleased to receive criticisms or suggestions." (Byne, 1906).

One has to wonder why, if dampness is dismissed as a source, the airing of the cabinet drawers to minimize exposure to damp is necessary. A few pages later in the same edition, the following note was published by B.R. Lucas:

"Sometime back, after reading Mr. Byne's paper in this *Journal* ... I thought it advisable to sterilize my shells, and started, unfortunately, on some of my best, *viz., Cypraea pallida* (Gray); these shells of the dark type had a brilliant polish and free from any markings or spots other than the natural ones on the shells. I soaked them for two days in warm water at about 37*C, then put them in a solution of mercuric chloride, 1 gramme in 500 cc. of water. They remained in this for twenty-four hours at 37C, were then taken out and allowed to dry without polishing. I made sure that the ... solution was not acid, yet when I started to polish up the shells with a clean duster I found that the lustre was considerably impaired, and that the shells were marked nearly all over with bright yellow metallic looking spots that seem to have got underneath the enamel of the shell, and through microscopic cracks in the enamel..." (Lucas, 1906).

Byne responded to Mr. Lucas in the next edition in which he stated that he had "withdrawn this treatment in favour of the rubbing over of the surface of a shell with linseed oil" (Byne, 1907). Although Byne's science is certainly suspect, the term "Byne's disease" had become entrenched.

In 1907, Agnes Kenyon read her second paper on the subject of corrosion of shells at the Society's September meeting but the text was not reprinted. In 1908, Byne resigned from the Society with no further publication on the subject.

In 1909, Mrs. Kenyon published "On the Deterioration of Shells in Cabinets." She reopened the discussion of the effects of humidity or dampness, noting that severe fading and a whitish film had occurred in instances of shells being in damp storage areas (the latter in a room where plants were growing in an ornamental rockery full of water). She noted:

"I have also seen a general collection, which was kept shut up in a locked cabinet, with numbers of shells clouded over or streaked with a sort of efflorescence - -I do not think there was any corrosion, but simply a blotching of the surface. This I attribute to the fact that the owner resided for several years close to the sea. When a high wind drives the breakers to shore, the air is laden with saline moisture which is carried a considerable distance inland .... viz. corrosion of shells, whether due to bacteria or some other cause, I have had no experience, nor have I ever noticed the vinegary aromatic odour....

"My collection has always been admired for the beautiful polish of the specimens -- those, of course, which do not naturally possess an epidermis -- and I am usually credited, by non-collectors, with the use of

chemicals to achieve this effect. I immerse my shells in very hot water, sometimes with a little soap in it, for a longer or shorter period according to the solidity or delicacy of the specimens, and then, after draining the shell thoroughly, I dry with a soft rag and polish with another one. The use of oil is only permissible for faded or dead shells in order to bring out the colour and improve the worn parts. Soap, if used, should be dissolved in the water and not rubbed on the shell, and if the shell is very thin and delicate it is better to use tepid water. Shells with an epidermis should never be put into fresh water or the epidermis will crack and peel off. I should be inclined to suggest to the South Kensington Museum authorities to try very hot water as a cure for the corrosion from which their shells are said to suffer. I am unable to make the experiment, as I have never had an instance of such corrosion in my own cabinets" (Kenyon, 1909).

This is noteworthy because Mrs. Kenyon recorded two of the major factors in the development of "Byne's disease:" high humidity and confinement in a cabinet. History does not record what her cabinets were made of, but the cabinets at the Natural History Museum were always made of oak, and oak was a popular wood for this purpose. She, and Byne in his original paper, were very close to the true cause but did not quite pinpoint it.

Lucas, (1916) in a note on land snails, described a "fungal treatment" of linseed oil, benzol, and thymol, inside and out, to treat what was probably not a fungus but rather an efflorescence.

In 1934, British government chemist John Ralph Nicholls cited Dr. Alexander Scott at the British Museum (Scott, 1921) as saying that lead medallions in oak museum cases became badly corroded even when not in contact with the wood.

It was certainly never generally recognized by shell collectors before this date, at least not in print. Nicholls (1934) pointed out that oak and some other hard woods such as teak continually evolve traces of acetic acid even when seasoned. He studied shells affected with the white efflorescence at the Natural History Museum and deduced that there was no evidence to support a bacterial attack. Nicholls studied a range of shells in various stages of deterioration. He noted that the efflorescence could be scraped off, but not simply brushed off. He found that it was soluble in water and consisted almost wholly of calcium acetate and some traces of other salts. All the affected shells had been stored in oak cabinets, not treated in any way other than washing, not lacquered or varnished, and were exclusively marine. Vaseline-coated shells were not affected, and the museum atmosphere "is normally dry. "

"The mechanism of the deterioration therefore appears to be as follows: The oak wood of the drawers continually emits traces of acetic acid and these vapours can only escape with difficulty from the closely-fitting drawers. Marine shells retain sea-water which, on evaporation, leaves a small residue of salts; according to the amount of seawater and to the porosity of the shells, this residue may be spread over the shell or be located at the place to which the seawater drains. This residue, being hygroscopic, is in a condition to absorb the acetic acid vapours, which would react with the calcium carbonate of the shell forming the incrustation. Where dirty shells had been washed the salt would be removed and the normal surface of the shell, not being itself hygroscopic, would not absorb the acetic acid and would not be attacked.

"The prevention of such deterioration would appear to be simple. Either oak cabi-

nets should not be used or all shells before being mounted should be washed and dried. Added precautions when oak cabinets are used would be the periodical aeration of the drawers by opening them, and the smearing of the shells with Vaseline if this does not affect their appearance." (Ibid).

There, 62 years ago, in a brief and well-reasoned paper with thorough analytical testing to back up its results, was the real answer, or most of it. Minus, of course the Vaseline (I'll discuss surface treatments later). If anyone should be recognized today, it should be Nicholls and not Byne.

Calclacite, or calcium chloride acetate, was identified as a specific efflorescence "found on fossils and limestones in wooden museum cases" in 1958. This specific form includes a chloride ion and is most likely found where there is a source of chloride (Van Tassel, 1958). Calclacite is sometimes used as a synonym for Byne's-type efflorescence, but that is inaccurate, as will be seen shortly.

In 1961, S.G. Clarke and E.E. Longhurst studied the effects of acetic acid vapors from wood on metals and found that such corrosion was very dependent on the concentration, the metal, and the relative humidity (RH). Corrosion-time curves increased dramatically with higher RH levels. When acetic acid vapors in a 1 % solution were added to the atmosphere, the corrosion was even more widespread and damaging. Kiln-dried woods in confined atmospheres with zinc samples liberated acetic acid vapors that aggressively attacked the metal (Clarke & Longhurst, 1961). This closed-system testing method was later refined by W.A. Oddy (1973) of the British Museum and is standard practice today for testing materials that will be in close contact with each other.

Products made from wood--cardboard, paper, and the like--also tend to be acidic unless specifically treated to remove the acids. Acid-free or alkaline-buffered products are normally marketed as "archival."

Museum conservators have followed this problem with very useful results. E.W. FitzHugh and R.J. Gettens (1971) described calclacite and other salts found on objects in wooden cases. They found that calcareous materials reacted with acidic vapours to form calclacite (calcium chloride acetate) and that lead, zinc and vitreous enamel yielded formate salts. FitzHugh and Gettens suggested that hygroscopic salts already present in the materials would deliquesce at high RH to produce a liquid site for reactions,

This paper was reinforced in 1982 by a paper titled "Trouble in Store" by Tim Padfield and his colleagues. In researching the problems associated with poor storage design and materials, the authors noted the following:

"In this laboratory we have identified calcium acetate and calcium formate as a 1 mm-thick corrosion crust on a cowrie [sic] shell which was originally aragonite ... It had been stored for five years in a box of Douglas fir with a glass lid. We have also found a hydrated calcium acetate nitrate growing on a carved coral brooch. The corrosion had penetrated so deeply that when the salts were washed out the coral was quite porous. "

Padfield and his colleagues classified this and many related problems as being symptomatic of "internal pollution" -- the result of acetic, formic, and other acid vapors liberated by the various woods, cloths and papers making up storage and display case environments. Synthetic materials also deteriorate and release volatile compounds. The better the case is sealed and the less often it is opened, the more such vapors can damage materials stored for long periods of time. In effect, sensitive and hygroscopic materials act as absorbers of internal pollutants, with distressing

results. Padfield and his colleagues found that museum cases were typically 100 times less well ventilated than the room around them, In effect, the "hermetically sealed" cases Byne mentioned were doing more harm than good. Though they were doubtless not truly hermetically sealed, the closed internal circulation and very low leak rate compounded the problem caused by the case materials. Padfield concluded with recommendations for increasing the amount of air exchange in cases.

In 1985, Norman Tennent and Thomas Baird published the definitive paper on the chemical identification of mollusk shell efflorescence. Noting that the problem remained serious and poorly understood in malacological collections, Terment and Baird re-examined the work of Byne and Nicholls. They found that the only conclusion of Byne's that was sound was that not all shells are affected, and that Nicholls had oversimplified the problem by identifying the efflorescence solely as calcium acetate. Using infrared spectroscopy, Terment and Baird determined that, in spite of Byne's claims, calcium butyrate and other butyric acid products were never found even in shells that were exposed to a butyric acid atmosphere for 18 months. Exposure to acetic and formic acid, however, resulted in efflorescence formation within hours.

Tennent and Baird found that gastropods and bivalves were both susceptible, as were land shells and marine shells. Efflorescence on marine shells is much more widespread, however. The periostracum was not quite as protective as Mrs. Kenyon thought: Terment and Baird observed efflorescence popping through the periostracum. Nevertheless, the most vulnerable spots on a shell are those that are most worn and least protected. Protection was also afforded somewhat by surface coatings, including Byne's linseed oil. It was difficult to identify all factors when specific preparation techniques were seldom documented, but the practice of boiling shells in salt water may have contributed to later deterioration.

The efflorescences Terment and Baird identified tended to be calcium acetate or a calcium acetate-formate double salt. The common feature of all the shells examined was their long-term storage in oak cabinets. The authors also determined that some shells showed, not an efflorescence, but a layer of aragonite converted from calcite. They leave open the question of whether this is a prelude to breakdown. Calcium stearate and salts of fatty acids have been observed in unique instances where the parent compounds were found in the storage media.

"The removal of efflorescence is not problematic; since the salts are water soluble, cleaning in water is an effective treatment. Nonetheless, because efflorescence occurs as a result of reaction of calcium carbonate with acid vapours, the shell surface is often irreversibly disfigured. Thorough water-washing probably carries the advantage of aiding in the prevention of deterioration. There is considerable circumstantial evidence that collections treated by soaking or boiling in water are less susceptible to Byne's disease...

"Since oak and certain other woods are the principal source of deleterious acid vapours, storage cabinets should be made of safer materials. It is fallacious to assume that old oak cabinets will no longer liberate acetic acid; an oak core from a lead statue dating from the eighth century BC has been shown to liberate sufficient acid to corrode lead, even after almost three millennia. The possibility of coating wood in a bid to seal in harmful vapours ... is a topic of current research. Despite the prevailing view that varnish provides little protection against acid vapours, long-term protection has been afforded by the coating applied to certain shells at the end of the last century." (Terment & Baird, 1985).

Mollusk shells are clearly not alone in their vulnerability to acidic storage environments; the same problems have been noted in collections on birds' egg shells in museum collections (Agnew, 198 1).

This should be the end of the story, but is not. The information has been slow in reaching the shell collectors' community. In 1980, Alan Solern published his standards for malacological collections, adopted by the Council of Systematic Malacologists and later reprinted in **Curator**. In this report, he states that light-free and dust-proof cases are sufficient to protect collections, without ever considering what materials to recommend in the construction of those cases. Many popular publications recommend a variety of storage methods and preparation techniques which are damaging in the long run. Most surface coatings fall into that category, especially coatings based on shellac, cellulose nitrate, polyvinyl alcohol and the like. They tend to shrink and yellow over the years, marring the surface of the shell (or even destroying it in cases of severe shrinkage). They also tend to act as dust and pollutant traps as they soften in high temperatures, further darkening and obscuring the surface. Shells which might be useful for biochemical work should never be prepared with caustic compounds, heated or microwaved, or coated with anything.

Unforgivably, Abbott and Dance (1982) referred to Byne's disease as a "bacterial blight" as late as 1982.

"In some countries where cool, humid conditions prevail, a bacterial blight (sometimes known as 'Byne's disease') may attack glossy shells. The surface becomes chalky white and has a faint odor of vinegar. Badly damaged shells should be thrown away. Lightly affected shells should be soaked for a day in strong alcohol, then dried. Keep your shells in as light and airy a place as possible. " (Abbott & Dance, 1982).

The most minimal of research would have kept this misinformation out of the popular literature. (The alcohol does nothing, needless to say, except to introduce a new contaminant.) Even worse is the following recommendation from the 1985 **Cowries of the World.**

"If you live in a humid climate, mould may sometimes appear on the shells. This can be prevented or arrested by a small light bulb in the bottom of a 'well' made through the drawers of the cabinets. Bore a three-inch hole in the back of each drawer to promote the circulation of the warmed air which dries out the cabinet and effectively checks mould growth ... Mould can be discouraged further by dipping the shell in 1:500 bichloride of mercury to which detergent has been added so the solution will spread smoothly over the surface. This chemical is deadly poison, and the shell should be handled carefully until dry." (Burgess, 1985).

Unfortunately, it can be hard to convince people that the fact that something has appeared in print does not make it true, or right, or valid for all time. A little work would have shown that the problem is not mould, and that the use of a deadly antiseptic would do no good.

Shell Club newsletters provide a wealth of "tips," some good and some awful. The problem with most club newsletters is that the articles are unreviewed, so anything that the editor allows in gets printed. These should be read with heathy skepticism. Really good articles tend to hatch further articles in bigger journals; be wary of those that sound good but are never picked up by a reviewed journal. For example, an article in **the American Conchologist** (Davies**,** 1987) starts off strongly, but veers off into speculation that the true culprit is carbon dioxide in the atmosphere. There is no experimental evidence

provided and no suggestions for further work: the author sets out his speculations as fact. The mechanism is based on the assumption that carbon dioxide will "leach" out of the air when humid air cools and condensation forms. Such a system would have to be ultra-closed and -- internally -- ultra humid, far more so than even most unprotected storage. It is an example of bad science -- Byne science, if you will -- in print.

What is the answer? Very simply: many shells cannot last long in acidic storage environments. It is not a complicated problem and does not require complicated solutions. The ideal solution is to store shells in steel cabinets with powder-paint finishes, in archival boxes and trays. Cotton, cork, and plastics should also be avoided. Labels and tags should be generated on acid-free paper. Older labels should be encapsulated in Mylar (never laminated!) and archived separately. Cases should have a low but steady air exchange at the rate of one change per day. Specialized cases for storage and display can be constructed to hold the specimens within at a constant RH and temperature, with filters to absorb outside pollutants.

That is the ideal, and not an inexpensive one. A more practical approach would include the following preventive conservation steps:

1. Write down everything you do to a shell and keep a permanent record of all chemicals and methods used in its preparation. Problems may not show up in your lifetime, but may plague your heirs or beneficiaries, who will need to know how a shell has been treated in the past in order to save it.
2. Invest in archival storage supplies, even if it is only a few boxes at a time.
3. If you have the option, replace wooden cases with steel ones. If you don't have that option, definitely avoid the use of plywood and particle board at all times, which evolve acidic vapors from their glues as well as from the wood itself. New wood is more acidic than old wood, and hardwoods are more acidic than softwoods. Cork is very acidic.
4. Use freezing instead of pesticides or fumigants.
5. Plastics vary tremendously. Never use PVC plastics: they are a source of chloride radicals as they break down [2]. Stable and inert plastic materials such as Mylar, Ethafoam, and the like are acceptable.
6. Spend the most money on the materials that will be in direct contact with the specimen, such as labels and trays. This is an important investment.
7. Look into wood coatings. Museums use a variety of paint-type coatings to minimize the release of organic acid vapors from wood. It's better in the long run to coat the wood rather than the shell.
8. Use anoxic barrier films to create enclosures for shells if storage in wooden cases is unavoidable.

Above all, remember never to rely on outdated literature. Be wary of claims in unreviewed journals, or those that are more than 15 years old. Find out if new research has come along that sheds more light on the subject. Don't look for a magic chemical in place of common-sense approaches. Don't accept untested hypotheses as recommendations.

Byne's" disease" is not a disease, and our understanding of it owes very little, ultimately, to Byne and his work. But, like the Holy Roman Empire or the Irish elk, it is a misnomer that has become so entrenched that there are no useful synonyms yet.

[2] A simple test to determine if a given plastic is a PVC plastic or not is known as the Beilstein test. Form the end of a clean copper wire into a small loop, and hold the loop in a bunsen burner flame to get rid of residual impurities. Touch the hot loop to a non-essential sample of the plastic, to melt a bit of the plastic onto the loop, and re-

turn the loop to the bunsen flame. A brilliant green flame indicates the presence of PVC. Plastics that "smell like plastic" are losing their plasticizers and deteriorating, and should be avoided.

LITERATURE CITED

AGNEW, N..
1981. The corrosion of egg shells by acetic acid vapour. ICCM VII(4):3-9.

BROWNE, THOMAS
1839. A Conchologist's Text-Book.

BURGESS, C. M.
1985. Cowries of the World. Gordon Verhoef Seacomber Publications. p. 16.

BYNE, LOFTUS St. GEORGE
1899a. The corrosion of shells in cabinets. Journal of Conchology (6):172-176.
1899b. The corrosion of shells in cabinets. supplement. Journal of Conchology 9 (8):254.
1906. The prevention of corrosion in shells. Journal of Conchology (12):360-361.
1907. The prevention of corrosion. Journal of Conchology 12(l):32.

CLARKE, S. G. & E. E. LONGHURST
1961. The corrosion of metals by acid vapours from wood. Journal of Applied Chemistry 11:435-443.

DAVIES, F.R.E.
1987. What's eating my shells? America Conchologist 15(2):9-10.

KENYON,AGNES
1897. Notes on the effects of the atmosphere on the shells of Mollusca. Papers and Proceedings of the Royal Society of Tasmania 68:88.
1909. On the deterioration of shells in cabinets. Journal of Conchology 12 (10):266-269.

LUCAS, B. R.
1906. On the danger of using mercuric chloride in the sterilization of highly-polished shells. Journal of Conchology 11(12):365.
1916. Preservation of land shells. Journal of Conchology 15(4):128.

NICHOLLS, JOHN R.
1934. Deterioration of shells when stored in oak cabinets. Chemistry and Industry 1077-1078.

ODDY, W, A.
1973. An unsuspected danger in display. Museums Journal 73(l):27-28.

PADFIELD, T., D. ERHARDT & W. HOPWOOD
1982. Trouble in store. In Science and Technology in the Service of Conservation. IIC Washington Congress, p. 24.

POE, EDGAR ALLEN
The Conchologist's First Book,

SCOTT, ALEXANDER
1921. The cleaning and restoration of museum exhibits.

SOLEM,ALAN
1980. Standards for malacological collections.

TENNENT, NORMAN & THOMAS BAIRD
1985. The deterioration of Mollusca collections: identification of shell efflorescence. Studies in Conservation 30 (2):7385.

VAN TASSEL, R.
1958. On the crystallography of calclacite, Ca(CH3COO)Cl.5H.0. Acta Crystal 11:745-746.

IHSN Editor's NOTES: "Effloresce" is defined in Webster's **Collegiate Dictionary** as "2. Chem. a to change on the surface, or throughout, to a powder from loss of water of crystallization. b to form or become covered with a

Recent Finds: Strombus photography

One thing about photographing molluscs and their animals is that when you look at the photo prints or slides later, you will always see some details that you didn't notice before. This comes about when your project is to make a detail description of your specimens. In order to make a detailed written description, you have to look very closely. I find that I miss major points during the actual photography, as my sight isn't too acute. I can pick them out on the photos later.

There is always discussion amongst photographers as whether to use print film or slide film. The more professional photographers tend toward slides as commercial publishers prefer them. The stated reason is that slides have greater definition than prints. In photography magazines there is beginning to be more arguments in favor of print film. Under many circumstances, print film technology has progressed (I was going to say developed, but thought better) to the point where definition is as good as slide film or perhaps better, and the color intensity range is now often better.

For the shell hobbyist, prints have a lot of advantages. To use a slide and see any detail, a projector is required and you don't usually carry a projector around with you. You can compare 4 or 5 prints at a time, laying them out on a table or desk. Not many people have 2, never mind 4 or 5 projectors, to use to compare photos. You also have to be in a darkened area to view slides. You can have several small slide viewers, however, without breaking the bank, but the magnification provided is minor.

Today, getting a picture into print almost always involves scanning it electronically. Without a print, making adjustments during the scanning process is from memory of the slide. For this reason, as much as any other, I use print film and get two prints so that I can view one while doing the scanning. You can have prints made of your slides, but that is fairly expensive. Another problem with slides is that good scanners for slides are expensive.

There isn't much question that making high quality graphics is deteriorated to a degree when scanning prints. Almost every step in producing a graphic deteriorates definition of the graphic to a degree. A graphic from scanning a print doesn't have better definition than the print which is not better than the film image. But the better slide scanners can usually scan your print film and produce the best definition available when this is required. For internet use, high definition requires more memory on the internet than is available, and download time is greatly increased. Medium definition obtained by scanning prints is usually used on the internet for these reasons. High quality graphics is a requirement of printed publications, however.

In producing graphics, the operator is often able to improve the overall quality of a photograph. Photos of a live shell are usually taken in a hurry and the background may be obnoxious but it might not be possible to repeat the photo later. Background can be changed without decreasing the validity of a photo. Sometimes a photo doesn't have good contrast and that can be improved. This is especially true of old black and white prints of subjects no longer available.

Since molluscs move around while you are photographing them, it is difficult to take a picture of a small part such as an eye of a small mollusc and have it properly framed. In producing a graphic, you can crop the photo to contain only the item of interest.

While in Cook Islands last year, I photographed two specimens of *Strombus (Gibberulus) gibberulus* Linnaeus, 1758. One was a juvenile while the other was adult. It was a good opportunity to display the difference between juvenile and adult and I will display this here.

Though I have photographed this species in many Pacific areas, I still noted something I hadn't seen before.

The adult is on the left, the juvenile is on the right.

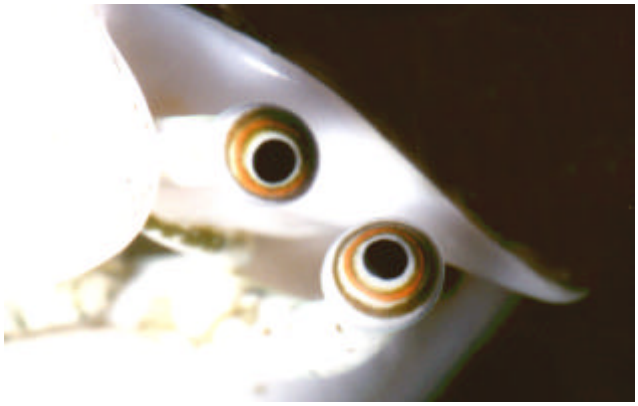
The shape of the adult is different, the callus on the columella is developed and the lip of the adult has a concave area from the suture to the shoulder periphery. The stromboidal notch is lacking on the juvenile, but developed on the adult.

Spiral cords are seen on the body whorl of the juvenile but not on the adult..

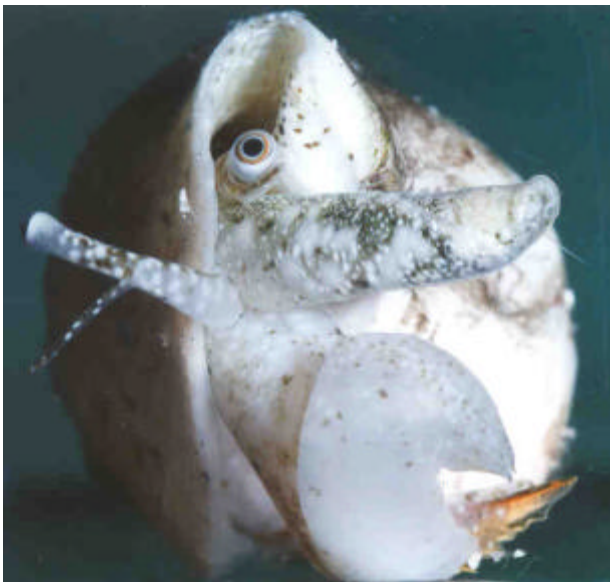
Both are almost white enough on the ventral side to qualify as subspecies *S. gibberulus albus.* On the dorsal side there are brown and brown-red markings.

The apex of the adult and juvenile are alike. Here we see the many spiral cords on the early teleconch whorls that are not present on the body whorl of the adult. The protoconch has about 4 convex, smooth, pink-tan whorls with the nuclear whorl low and dome-shaped. The first varix is seen on the first teleconch whorl.

The eyes are always interesting. Here the eye stalks are both near the shallow adult stromboidal notch. The eyes rotate within the swollen eye stalk as can be seen here on the right. One is looking down while the other is looking up.



Above, the eye stalks are in a more normal position with the right eye near the stromboidal notch and the left in the anterior canal.
The tentacles rise from the sides of the eye stalk, are tapered, and can reach past the eye a short distance.



The proboscis column is long, cylindrically tapered, flexible and has the mouth at the tip. Watching on a video camera, we were able to see the two lips open apart and grasp bits of coral and ingest them.

On the right is the surprise item.

The picture is of the posterior canal of the juvenile specimen. The unknown process is light grey with white spots and curves. I believed it rises from the mantle.

I hadn't seen this during photo taking nor on my first look at the photo prints. After scanning the print, and looking at it with considerable magnification, the process is fairly clear.

MOLLUSK OBSERVATIONS

posted in CONCH-L Email Exchanges.

CONCH-L is a "list server" in internet terms. It can be accessed by persons who have an Email connection, even though they do not have a connection to the internet itself. You can become a "subscriber" to CONCH-L by sending an Email to

listserv@cc.uga.edu

with no entry under SUBJECT, and in the text portion enter **only the following line followed immediately by a space and your name in full**:

subscribe CONCH-L

Do not add anything else, but click on "SEND".

Example:
Subscribe CONCH-L Wesley Thorsson

How a listserver works.

Send Email now

Link is good only on HTML version

Persons on the list send in an observation by Email, which is automatically forwarded to all members on the list. This message is called a "posting". Members, who have comments or further observations on a subject, Email them and these comments are also sent to all on the list. Sometimes the subject matter diverts to allied subjects. Many "postings" are of general interest and may prove of help to a number of HSN readers. Note: Always enter a pertinent subject as all postings are maintained in their archives, and retrieval is easier if the subject is pertinent. When the same subject is used in various postings, the postings can be linked together in your display of your mail. The subject is then called a thread.

While these Email items are public to all members on the list, and are available anytime from the COA archives, they are technically private as is all E-mail. Members on the list whose queries and responses are used in this home page have agreed to the use of their posting.

Hints in using CONCH-L.

Each message sent by CONCH-L will have a "From" line that gives the Email address of the submitter of the posting. If you want to respond to a posting on a personal basis, Select that Email address being careful not to select a blank space. Under File or Edit, select COPY. Then select your browser's version of MAIL which will start a new Email form. From Edit or File menu select PASTE and the address will be inserted on the "Mail To" line. Enter the Subject (normally the same subject as the Email being answered) and then enter your text and send the message.

Sending personal messages to all CONCH-L members by using Reply, will waste other people's time.

Avoid repeating all the incoming message when you do use Reply. Delete all but a minimum to identify the question being answered

Don't be too critical on a personal basis.

Thank people who assist you, but by personal Email.

Shelling Stories

This continues the thread of the same name in July IHSN, Month section, page 8.

From: G Thomas Watters <gwatters@POSTBOX.ACS.OHIO-STATE.EDU>
Fri, 21 May 1999 07:32:01 -0400

The story behind this story goes back 130 years to the United States Civil
War. In the end, We (The North) had more toys and beat Them (The South),
although they don't seem to appreciate that fact.

My friend and I, from Ohio (in The North), were on a little expedition to North Carolina (The South) collecting freshwater molluscs. Since a couple of generals from Ohio nearly won the war single-handedly and gave several Southern cities the opportunity to re-landscape themselves, Ohioans are a little more unwanted in the South than most. We went to the Rocky River at a site miles from any visible habitation. We started under a bridge at a place that was obviously well used by the local gentry based on the number of campfires, beer bottles, and condoms. We hadn't been in the water more than 10 minutes when suddenly we heard screaming. Looking up, we saw a grizzled gentleman who obviously had participated in the Civil War yelling invectives at us to the point where he had turned beet red and we feared a coronary. He ranted non-stop for at least 10 minutes -- apparently this was his property and he had seen us through binoculars, and although he usually called the local authorities, he decided to come down and welcome us personally.

We apologized profusely and made the fatal error of saying "We didn't know we were trespassing," at which point he uttered the most profound and rational argument ever spoken in North Carolina: "Do you own this land? No? Well then someone else does and you're TRESPASSING!" Can't argue with that. Anyway, I mentioned to him that we had came all the way from Ohio to get to this site. Suddenly, he mellowed and said: "OHIO! Why you're just a cupple a northern boys! You don't know no better!" And just like that he became our best bud, telling all sorts of local tales, inviting us back anytime we wanted, etc. Southern hospitality - sometimes it pays to be a stupid Northerner. We would have just shot him in Ohio.

G Thomas Watters, Ohio Biological Survey
& Aquatic Ecology Laboratory
Ohio State University

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From Wes Thorsson
I had written this but not posted it:

There are an unlimited number of adventures that can be encountered in the course of diving from a boat looking for molluscs. Most of mine involved a diving partner, Mac, from 1955 to 1996 with time off for exile periods out of Hawaii at the government's whim. Most involved problems with boat diving.

One of the worst experiences is losing a dive partner. I lost track of Mac near the end of a dive and came back to the boat alone. Usually, I was the last to return, but Mac wasn't there in the boat. After ten minutes, I started to snorkel around the area looking for him but wasn't able to see him. Another ten minutes, and I was convinced the worst had happened so decided to go for help, and shortly ran into a fire rescue boat and stopped them to report a missing diver. We both returned to the dive site, which we had well marked by shore ranges, but just as we got there, a radio call came in saying that Mac had called in to report that he had come up ashore and was not at the boat ramp.

Mac then said that he had come up fairly far inshore and ran into an inshore current he couldn't swim against and made a swim to shore.

Then there was the time we were dredging and the dredge caught onto something very heavy, probably a commercial line of crab traps. From full speed ahead trying to break loose at a number of angles, the mistake was made to stop the engine. With a polypropylene dredge line acting as a rubber band, the boat was immediately pulled backward, bringing the stern under the water and turning the boat over within ten seconds or so. You shouldn't be able to do that with a Boston Whaler, but we did and everything heavy in the boat went to the bottom. We gathered the floating items and tied them to lines from the boat and waited for the next passing boat.

Turning a Boston Whaler over isn't easy in either direction. We had a line around the boat over the bottom and tried holding ourselves out of the water while holding onto the line and feet on the boat. This gave a lot of leverage, and I am not a lightweight, but it didn't work. Another boat came along and we gave them the end of the line and had them run away from our boat. This did work, so we got back in the boat and restored what order was possible. Of course the engine didn't work, having died trying to run underwater, so we were towed back to the dock. Fortunately, we have towed others back to the dock more times than we were towed.

Some fishing people don't like divers too well. One day we came up from a dive at the side of the boat in an area that often had large tiger sharks present. Our heads broke through a mess that turned out to be a barrel of pig guts that some one had thrown out around our boat, chumming for sharks. Fortunately, no sharks that day.

Another time in the olden days of double hose SCUBA, we had left our gear on the beach for a while. After lunch we did the second dive and I found that I was getting mostly water from the SCUBA in lieu of air. Looking at the hose, it was obvious that it had been neatly cut. Fortunately it was the outer hose so if you tilted a bit you could still operate. That allowed finishing the dive, though a little quicker than normal.

Most of the problems were caused by engine failures. One day the engine stopped and wouldn't give us the time of day anymore. We were fairly far out of the harbor and well off shore. The current was running strong in the direction of Kauai. The cure was to paddle the boat near shore and intercept one of the few boats around (we dived during the week when traffic was low). Two or three hefty pulls on my paddle and it broke. A paddle without a handle isn't much help. Tried splicing the handle back on without much luck. Then took apart some of the flooring and used the boards as paddles. Not too efficient and quite hard on the hands and wind of two fairly ancient divers. Kept watching Kaena Point, which was in the distance when all this started. It now was looking quite close and if we didn't get near shore before we passed it we might have a long sea stay. As my mother said the other day when we were driving along the shore, "My, the ocean takes up a lot of space". However, we did get into the boat travel area near the shore and a boat came along and towed us back.

There were quite a few more stories. They tend to accumulate over 40 years. Not all bad. I will always remember seeing my very first *Cypraea talpa* on the side of a cliff at least 20 feet away. And it turned out to be **very** large. Or the first five inch *Cypraea tigris* seen on the top of a cave about ten feet away. Or the first *Cypraea gaskoini* seen from the surface in 10 – 15 feet of water.

Have you ever been under a large overhanging cliff at 85 feet during an earthquake? Gives one pause

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Melanistic Cypraea

From: Ross Mayhew
<rmayhew@NS.SYMPATICO.CA>
Tue, 13 Apr 1999 13:34:29 -0300

Seems I have been misjudging the Cypraeidae crowd - they are a lot more clever than I had thought! (but still shamelessly overpriced and oversplit!!!). In any case, here are a few questions I have long wondered about, which I toss out to the Cyp people on the list:

1) Exactly how does melanism occur, and why do the cowries seem to be the only family that displays this feature to such an extent?
2) Why does rostratism, and to a lesser extent, freak pattern formation, often accompany melanism?
3) Why do cowry shells display so many more kinds of anomalies and malformations than any other mollusc families - seems they are more often deformed, diseased, or just plain odd, far more often, and in more ways than any other taxa of our favorite phylum - but why??

-Loose Canon in Canada, -Ross M.
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From: "Wesley M. Thorsson"
<thorsson@HITS.NET>
Tue, 13 Apr 1999 09:07:49 -1000

"Mysterious cowries of New Caledonia" by R. Pierson Et G. Pierson, (Preface by C.M. Burgess) is probably the primary book on the subject of Melanism and Rostration. It is wonderfully illustrated showing very many combinations of these two abnormalities, and ponders the cause at great length. Most causes are excluded.

One interesting thing is that photos show that the mantles of melanistic Cypraea are different (primarily in color) from normal specimens. The mantle base is more black than normal.

Both abnormalities occur separately and in combination. They affect only a small portion of a population in the same area. At one time, I spent a week in the primary melanistic area, and found one melanistic *C. arabica* but about a hundred normal specimens. I think this is confirmed as typical.

Pierson lists the species that have the various combinations of abnormalities present. Pierson also says that juvenile specimens are never effected (they never found a melanistic or rostrate juvenile) so these traits are added after the shells form a base, or after they are adult. Does anyone have specimens to refute this?

Pierson says that they never found a melanistic or rostrate individual laying or associated with eggs. This intimates that they don't reproduce so that the trait is not handed down genetically.

As to minerals being the cause: various minerals are present in many places in New Caledonia that do not have melanistic or rostrate *Cypraea*. The main refining plants are in Noumea, with considerable transfer of metals to the ocean, but there they have never found melanistic *Cypraea mappa* though they are fairly common. The same is true with other species.

Pierson eliminates the metal as the sole cause.

Pierson lists 18 species that have never been found to be melanistic or rostrate that are found in the areas involved with 38 other species that are sometimes melanistic, and 4 species that have never been found melanistic or rostrate that are found only outside the melanistic/rostrate areas.

Pierson's photo of a very black C. arabica has a mantle that has normal papillae (to me) but the

base of the mantle is more grey than normal.

Pierson didn't finish with a final cause, but eliminated a lot. He was a medical doctor and makes comparisons with human abnormalities.

Work still remains to be done. Evidently nothing will be proved by taking a normal *Cypraea* from other areas and introducing the suspicious metals into the aquarium. What experiments would you propose for some of our malacology students? Perhaps organizations such as HMS, COA, AMS, and WSM could be induced to offer grants for that specific research?

Cones spring to mind as having melanistic specimens. They occur in New Caledonia in all degrees, and in Apia, Samoa where I have collected melanistic *C. marmoreus*. What other species are melanistic? What would compare with *Cypraea* rostration, and what species have that abnormality?

Wes

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From: Lynn Scheu
<amconch@IX.NETCOM.COM>
Tue, 13 Apr 1999 19:05:17 -0400

What a good job you did at covering the abnormal cowries, Wes. That book is super. Some of the shells illustrated are amazing. I've always thought freak shells were, well, freaky! That is, until I met the "Porcelaines Mysterieuses de Nouvelle Caledonie" by Pierson and Pierson. Wow! (BTW, remember "porcelaines" means "little pigs," whence we derive our word for "porcelain".)

To what you said, Wes, I have other points to add and questions that have
occurred to me in observing a lot of these shells.

1. There are also melanistic cowries off Queensland, especially Tryon Island. Is there any geologic peculiarity or metal or pollution in the water there? What other localities do people have melanistic cowries from? *C. tigris* gets a big black blotch in a certain area in the Philippines, I believe.

2. I understand that nickel mines are one of the suspicious factors in New Caledonia.

3. Rust on wrecks causes dark, rusty red shells in some of the *Cyp. Lynx*, *arabic*a and *pantherina*, etc in the northwestern Indian Ocean and Red Sea as well, I think. Isn't this akin to "melanism" in the sense that it is excessive deposit of a pigment, though a different pigment than melanin?

4. Note that not all oddities from New Caledonia are melanistic. Rostration has been mentioned as another effect of whatever the factor is in New Caledonia. And rostration is also to be seen in shells from off Tryon Is. Queensland. Also, I have seen a New Caledonia *Cyp moneta* which was quite heavily rostrate and had an intense deep yellow stripe down its back. The rest of the shell was white. This is an intensification of the yellow pigment just as melanism is an intensification of the black one. But it is a localized intensification, not over the entire shell.

5. Most of the really rostrate and/or melanistic specimens I have seen are very heavy shells for their size. And it has already been stated that none of the affected shells are juveniles. Could it be possible that these are all very mature shells and that the rostration and melanism or intensification of other pigments are the effects of some external factor like metals in the water, in combination with age. Age is the factor I am aware of in senile *Strombus gigas*, the ones Clench named Strombus samba. They develop a very heavy shell with aperture narrowed by shelly material, and the aperture gets an aluminum-like glaze ? Also it seems to me that it would take some doing -- energy and resources and time -- to pro-

duce some of those "Napoleon's Hat" rostrate *Cypraea stolida* one sees at fantastic prices! (Plus more energy and resources to drag it around!) Are there a lot of unaffected but otherwise elderly cowries in the Prony Bay area of New Caledonia?

6. I don't know a lot about the concept or content of pigments. Is this phenomenon of darkening in cowries always melanism, a laying down of the pigment melanin which I believe is dark or plain black? Or can it be an excess of red pigment? Or just an excess of pigment? The dictionary would seem to indicate the latter, yet my Brittanica says it is black pigment. *Cyp. cribraria* forms its very familiar normal pattern of red pigment. But it appears, when one observes a series of such shells in all degrees of melanistic development, that the dark shell is dark through the heavy deposition of red pigment, not black. And so the abnormal New Caledonia *C. cribraria* shell is not truly "melanistic," as I would understand the term.

Whoa! I didn't mean to get to 6!

Ross asked why this tendency toward deformity of pattern and shape is the case with cowries more so than other shells. I would say that, aside from localized melanism and rostration, they are not [more inclined to be deformed]. But cowries are so smooth and glossy, often regular and specific of pattern, and smoothly and regularly rounded in shape, that deformities are just more evident.

Also the incurving of the outer lip at maturity is going to accentuate any injury the animal sustains at that point in its development from bulla to adult. And bites out of the mantle are exaggerated hugely in any animal that keeps polishing its shell and adding to its pattern the way cowries do.

Then maybe, given the resourcefulness at escape and cone-foiling, and the clever maneuverability we have witnessed second hand in Don's aquarium, many cowries live through attacks that would end fatally in other less resourceful groups.
Lynn Scheu

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From: NORA BRYAN
<nora_bryan@TRANSCANADA.COM>
Tue, 13 Apr 1999 19:31:08 -0600

Very interesting cowrie thread that Ross started, but for the benefit us newbies
(or maybe just me)- what is rostration?
Nora

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From: Art Weil <artweil@FUSE.NET>
Mon, 12 Apr 1999 16:14:14 -0700

AHA! Finally a question I can answer. ROSTRATE indicates the production of beak-like formations, a sort of pulling out of one end or the other.
Art

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From: Lynn Scheu
<amconch@IX.NETCOM.COM>
Tue, 13 Apr 1999 22:05:17 -0400

Sorry, Nora, and anyone else to whom I was speaking a foreign language.

That was all stuff that was rather specialized to cowry collectors, and I had so many questions (as you saw) and observations, that I thoughtlessly failed to provide explanations for others. It was my first real opportunity to talk to anyone else about this aspect of collecting cowries, and I had thought about them for a long time. Excuse!

Rostration is an elongation of the cowry. Cowries, though glorious in gloss and pattern, in general tend to be fattish round lumps. They do vary in shape: some are sort of cylindrical or even almost tubular (think *Cypraea testudinaria* or *Cypraea isabella* are examples) or humpbacked and shortish for their height, like the *Australian Cypraea decipiens*, or big and roundish like *Cypraea tigris*, and so on. But some cowries have those little terminals or ends pulled out to an extreme length. Think *Cypraea hesitata* from Queensland, or childreni from Hawaii and elsewhere. Their posterior and anterior canals are elongated, stretched or extended. That is rostration. Rostration comes from the latin word "rostrum" for beak and in biology it refers to a beaklike or snoutlike part.

And in those "magical" waters of Prony Bay around Noumea, New Caledonia, cowrie species which are not normally rostrate can become so by a lot of shelly buildup on the terminals. The "Napolean's Hats" to which I referred are extremely rostrate *Cypraea stolida*, with the length of the beaks combined being longer even than the length of the shell itself. They turn up on the ends also. One wonders how the animals even got their heads out far enough to look around. No wonder they don't seem to breed!

Does this help?

Lynn Scheu

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Insects in Shells.

From: Scott Schubbe
<ParkAver@AOL.COM>
Fri, 14 May 1999 07:16:32 EDT

Are dermestid beetles found world-wide? Is there any type of preventative for them? The thought of opening my shell case and finding all the opercula and data slips chewed to bits is horrifying. Can't imagine anything wanting to eat a nasty dried-up operculum. Except my dog once. I dropped it on the kitchen floor, and the little beggar snatched it up, tried to swallow it, and proceeded to yak and wheeze all over the house 'til he got it unstuck off of the back of his tongue. Maybe I should of recorded that on the data slip for that shell.

Scott, Florida

****

From: Ken Zentzis
<zenken@SWBELL.NET>
Fri, 14 May 1999 07:47:29 -0500

I believe the family has various representatives throughout the world (well, except perhaps Antartica). Insect collectors keep small trays of paradichlorobenzene flakes ("moth crystals", as one company calls them) in their cases and drawers. It is most effective in killing, and preventing infestations. Rather smelly, however. You could segregate anything suspicious and make your own fumigation chamber out of a box and a plastic bag. Naphthalene "moth balls", don't seem to work as well. But be careful if using PDB. No contact with your skin, and try not to get a big whiff of the stuff. If used long-term [with shells], it needs to be replenished on a regular basis, since it evaporates.

I used to use cut-up pieces of Shell No-Pest strips containing Vapona for my insect boxes. They were very effective but messy. Something oily (presumably the Vapona) would ooze out...I believe Vapona is no longer used... deemed too dangerous for the general population to use safely...

Ken, Wichita

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Deterioration of Shells in Storage.

This thread began with the following posting from Andrew K. Rindsberg who saw the referenced article on the Internet and asked for more information. As you will see, there was a lengthy discussion. Kim Hutsel indicated that there was a definitive article on the subject in **Festivus,** the San Diego Shell Club Magazine. For a full discussion on the subject go to page 4 of this section and read the article by Sally Y. Shelton. Remember, read and learn, but there can always be errors in postings.

From: arindsberg@OGB.GSA.TUSCALOOSA.AL.US
Thu, 17 Jun 1999 16:09:49 -0500

At http://www.mailbase.ac.uk/lists/sea-site/1999-03/0031.html, Barry Kaye Wrote:
"Calcium carbonate is susceptible to 'Bynes disease' or 'Efflorescence X' - basically, if stored in wooden cupboards or on wooden shelves in unventillated [cabinets], acetic or formic acid from the wood result in the formation of hydrated calcium formates or acetates (the actual formula is a bit more complicated). These new minerals appear as a white 'fluff' on the surface of the ceramic (problem is very common with natural history collections of shells, and results in white blotches, and damage to the surface of the shell)."

Interesting. I'd like to hear more. Are bacteria involved? What can be done about it?

Andrew K. Rindsberg

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From: John Jacobs <johncheryl@EARTHLINK.NET>
Thu, 17 Jun 1999 21:45:31 -0400

Bynes disease is a very serious problem to shell collectors and museums. The Bishop Museum in Honolulu replaced their wooden cabinets with metal ones a few years back because of this problem. They also replaced their old cardboard boxes with archival quality boxes. Land shells are particularly susceptible because of their thin shells. Wood, acidic paper and cardboard boxes can eventually cause Bynes disease.

I've seen Bynes disease. Once a shell has it, it's too late; the shell is permanently damaged.

John

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From: Carol Simpson <epitonium@AXS2K.NET>
Thu, 17 Jun 1999 22:06:57 -0400

How long does it take for Byne's disease to show up on the shells?

Carol

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From: Andrew Vik <liavik@EARTHLINK.NET>
Fri, 18 Jun 1999 04:20:51 -0400

John: What material is an archival quality box made from?

Andrew

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From: Charles Sturm <csturmjr+@PITT.EDU>
Fri, 18 Jun 1999 11:19:59 -0400

Archival boxes tend to be made from paper that is acid free with or without a buffer of CaCO3. The lack of acid prevents the box from contributing to the developement of Byne's Disease (or my preferred name, Bynesian Deterioration). It was [once] thought to be of bacterial origin, or at least having a bacterial component to the process, by Byne when he did his original investigations. If I can find my original posting on this I will repost it (with references to Bynes papers).

Other archival containers can be made out of certain plastics, borosilicate glass vials (shell vials), and metal. Each and every substance has its pros and cons and the final decision comes down to what you are preserving and how much money you can spend on the supplies.

Fri, 18 Jun 1999 15:17:15 –0400 addition
In addition, ventilation of the cabinets is helpful. I run the dehumidifier in my basement at least twice a week. Every several weeks I will run it with the doors to the cabinets open. Don't know if this level of paranoia is necessary but I feel better :-)

Charlie

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From: Jose Eduardo de Alencar Moreira <edumoreira@ANATEL.GOV.BR>
Fri, 18 Jun 1999 10:27:31 -0300

There's no bacteria involved and even known as "disease" it's just the result of acid vapor reacting with calcium. There is a very interesting and informative article issued in **Festivus** by Sally Shelton (as far as I know she is not a relative of Doug Shelton), Director of Collections of San Diego Natural History Museum, a specialist in Byne's disease. I interviewed her for our shell club newsletter an year ago and she is very cooperative.

It's also interesting to know Byne's and Byne's disease story from the beginning.

Eduardo Brasilia, Brazil

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From: Kurt Auffenberg <kauffe@FLMNH.UFL.EDU>
Fri, 18 Jun 1999 09:42:57 -0400

Bynes Disease is indeed a great threat to shell collections. It appears as a white dust on some shells. It attacks some groups more than others and even within these groups certain individuals more than others. This probably has something to do with the 'density' of the matrix of the group and/or individual.

There has been quite a bit of fairly recent research on the subject. John's comments are correct. However, I must add one very important point, which may keep some of the list from having heart palpitations. High or drastically fluctuating humidity is also necessary to cause major problems. So, the good news.....anyone with wooden cases and/or those who can't afford the expensive archival boxes, don't panic! If you live in an area with high humidity, invest in a good air conditioner or at least an efficient dehumidifier for your collection room. And watch your cowries, some Muricids, small cones, and micros in general.

And buyer beware:....what looks like a good deal on an old shell collection housed on some tropical island for the last fifty years, may not be a [good] deal at all.

Kurt

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From: "Kim C. Hutsell" <khutsell@IX.NETCOM.COM>
Fri, 18 Jun 1999 09:06:57 -0700

You're right. Sally wrote several papers on Byne's and one was in the Festivus. I'll post the issue number when I get home tonight. It's too extensive or I'd post the article here. I'll even go one step farther. Anyone who would like a copy of Sally's article from the Festivus, I'll be glad to send them one. Anyone who collects shells should have a copy of Sally's article in their library. By the way, Sally is at the Smithsonian, now. Our loss, their gain.

The Festivus article on Byne's is: Vol.XXVIII, No.7, July 1996.

Byne's doesn't spread from one shell to another

like an infection. It's a chemical reaction that takes place under optimal conditions. Everything has to be just right within the structure of the shell for it to be affected. One specimen can be completely involved while another sitting right next to it is unaffected. Bleach will halt the reaction but will not undo any damage.

Kim Hutsell San Diego

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From: arindsberg@OGB.GSA.TUSCALOOSA.AL.US
Mon, 21 Jun 1999 09:40:43 -0500

Kurt Auffenberg wrote concerning Bynes' disease,"...And watch your cowries, some muricids, small cones, and micros in general.

Now, that is interesting. In the Cretaceous and Tertiary [periods] shell deposits in Alabama, some groups of aragonitic shells weather more rapidly than others, even right next to one another in the sand or silt. Almost all gastropods weather more quickly than almost all bivalves, regardless of shell thickness. Some gastropods weather especially quickly, notably the cones and epitoniids. I surmised that this was due to shell structure--the size, orientation, and packing of aragonite crystals in layers within the shell. Organic matter may also be part of the shell, and some may remain after tens of millions of years; bivalve ligament is commonly preserved in the Eocene beds. But it's interesting that some of the same families of gastropods deteriorate relatively quickly whether they are modern or fossil. I would like to hear more about this.

Thanks for all the comments on Bynes, people! This has been an informative conversation.

Andrew K. Rindsberg

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From: David Campbell <bivalve@ISIS.UNC.EDU>
Mon, 21 Jun 1999 14:30:14 -0400

For epitoniids, the shell is calcite rather than aragonite, which is relatively unusual for snails (especially relatively delicate ones, as opposed to Ecphora or Platyceras). This may be related to their ease of dissolution in some settings. In the Eocene limestones here in North and South Carolina, they are the only gastropod shells remaining because the aragonite is gone.

David Campbell University of North Carolina

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From: arindsberg@OGB.GSA.TUSCALOOSA.AL.US
Mon, 21 Jun 1999 13:39:45 -0500

Thank you for the correction, David. The beautiful Upper Cretaceous epitoniid Striaticostatum Sohl, 1964 is also calcitic, and as a result is very well-preserved at sites where all other gastropods have been reduced to mere molds.

Andrew K. Rindsberg

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Go to page 4 for Sally Y. Shelton's article.

Reefcombing

One problem with being an editor of a magazine that is supposed to be issued on schedule monthly is getting to take a shelling trip or other travel. We have had a trip to the mainland East Coast planned for some time to visit family and friends there. This had to be carefully fit around the schedule for getting out the **Internet HSN**. I try to get it on line on the last day of the month, and have been successful in at least that regard for the past 2.5 years. Golly Gee, has it really been that long?

It takes almost a week to make final corrections and adjustments to the documents before they can be put on line. That leaves about a 25 day window for trips, and the airlines don't usually jump up and schedule you on the dates you request so it is slightly less than 25 days really, or you cut time doing something. As a result, I was working on June, July, and August issues at the same time. Perhaps things are not as smooth as they should be.

The printed **HMS Bulletin** uses some articles from IHSN that aren't dependent on color and can be reduced in length when necessary. It serves as the meeting notice locally, and additionally gives some articles to people without Internet Access. Since the IHSN editor has the programs from which it is produced, and others try to avoid them, the Bulletin is also done by the IHSN editor. Another two days more or less, but it goes out for the production and distribution people at least 10 days prior to the start of a month. Another conflict as the next month's issue hasn't been finally edited yet. So, it has proof reading by only the editor's wife. However, the print-ready copy can be completed anytime.

Although programs to convert from one type document to another are automatic, they are not exactly perfect. Sections of IHSN are done in **Microsoft Publisher**, not because it is perfect, but because it gives the best results (compared to **PageMaker**) in converting sections to both Acrobat and HTML versions. Time does not permit making two. One problem in converting documents is that what you see on the screen isn't always what you get on the converted version. This requires some minor modifications to be sure the last line in an article section isn't left out on the converted version. Again, time comes in and there is a limit to the number of times you can modify the original document and converting it to Acrobat and HTML. That accounts for some blank lines and some missing lines - - not poor proof readers. The way it works out, the HTML version is put on line converted from the document corrected for Acrobat as the Acrobat version is our official final document. The best we can do till we get a couple more editors. Return to General Index