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THE GEOLOGICAL CURATOR

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THE GEOLOGICAL CURATOR

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COLLECTIONS AND INFORMATION LOST AND FOUND.

All items relating to this section in the Geological Curator should be sent to:

Dr. Hugh S. Torrens, Geology Dept., University of Keele, Keele, Staffs. ST5 5BG. Tel. 0782-621111 Ext. 493.

INFORMATION SERIES ON GEOLOGICAL COLLECTION LABELS

All enquiries and items should be sent to:

Ron. Cleevely, British Museum (Natural History), Cromwell Road, London SW7 5BD. Tel. No. 01-589-6323 Ext. 418.

NOTES AND NEWS

All items relating to this section should be sent to Tony Cross, Curtis Museum, High Street, Alton, Hants GU34 1BA.

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Typed by Sylvia Robson, Tyne and Wear County Council Museums.

THE GEOLOGICAL CURATOR

Vol. 3 No. 7

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EDITORIAL

COVER PHOTOGRAPH

Our cover photograph shows the remarkable forger of fossils and antiquities Flint Jack photographed at Salisbury in 1863. See articles on his life and activities on pages 435 and 444

EDITORIAL

Many readers will no doubt have noticed that the last two issues of the Geol. Curator have been 'slimmer' than their predecessors. Regretfully, because of rising costs of production, the number of pages has had to be reduced to between 30-40 per issue.

COLLECTORS, COLLECTING AND GEOLOGICAL SITE CONSERVATION

The correspondence (on p. 458) relating to the conflicts between collecting and geological site conservation (reproduced from Circular No. 838 of the Geologists Association) is of direct relevance to all museums with curators actively involved in the field collection of geological material. At present an organised approach to collecting from scientifically important sites is almost (with a few notable exceptions) completely non-existent. Surely we should not only ensure that the material from these sites is safely deposited in our museums but also take the initiative in undertaking and/or supervising the actual operation of collecting to make sure it is executed properly and comprehensively.

Many continental museums take a leading role in this sort of work as exemplified by a recent conversation I had with a German colleague during the visit of the Natural History Committee of ICOM to the North East. His museum has been able to persuade the relevant 'Local Council' to postpone its intention to infil a nearby quarry. Instead the council has leased the site to the museum which, each summer, organises student volunteers to 'quarry' (under supervision) superbly preserved Eocene vertebrate and invertebrate fossils for the collections.

This sort of approach and organisation is reminiscent of that adopted by our archaeological colleagues who systematically 'excavate' sites of importance recording everything about the position and stratigraphy of each 'find' using paid or unpaid 'volunteers'. Surely a similar system could and should be introduced (where appropriate) for the many palaeontological sites of importance especially for threatened or temporary exposures where, perhaps funded by the Manpower Services Commission, controlled 'rescue collection' operations could be mounted.

I suggest this as a possibility but, in fact, it has already been proved a viable proposition by several institutions. For example the Zoology Department of the University of Newcastle upon Tyne in collaboration with the Royal Scottish Museum and with the co-operation of the National Coal Board were able to undertake the excavation of an amphibian 'bone bed' discovered by Mr. Stanley Wood in the Carboniferous rocks at the Cowdenbeath Opencast Site near Edinburgh. More recently Ian Rolfe at the Hunterian Museum instigated an M.S.C. funded scheme, supervised by Stan Wood, to 'excavate' a carboniferous site at Bearsden, near Glasgow, with astounding results. (See Wood, S.P. 1982 New basal Namurian (Upper Carboniferous) fishes and crustaceans found near Glasgow, Nature, 297, pp. 574-577). Stans fascinating account of his discovery of the site and the subsequent progress

of the project is published in this issue (p.423). Incidentally this article also highlights the excellent educational potential of such a project in arousing immense local interest. More recently still the B.M.N.H. (experts in this field) undertook the highly organised 'dinosaur dig' in Surrey (see p.452).

Perhaps with the guidance of the National Museums and the Geology and Physiography Section of the Nature Conservancy Council it is time that geological curators considered the possibility of forming regional 'rescue excavation' groups for the detailed collection/recording of important sites utilising the enthusiasm and expertise of amateurs and professionals alike. Perhaps we should also look to our archaeological colleagues for advice on the organisation and financing of such schemes. Certainly the Bearsden Project is a shining example of what can be achieved in this respect.

FORTHCOMING MEETINGS

Friday 9th December, 1983

A.G.M. at Warwick Museum.

Programme.

10.30 - 11.00	Coffee (Council chamber, Shire Hall)
11.00 - 11.20	General history of Warwick Museum by the Curator, Dr. W.C. Allan.
11.20 - 12.00	The geological collections in Warwick Museum by T.P. Besterman.
12.00 - 13.00	Tour of displays and stores at Market Hall and stores in The Butts.
13.00 - 14.00	Lunch (in local pubs within a few minutes walk of the Museum)
14.00 - 14.30	History of Geology in the Midlands by Prof. F.W. Shotton, F.R.S.
14.30 - 15.00	Triassic Reptiles from Warwick and their significance by Dr. M. Benton.
15.00 - 15.30	A short paper by Dr. Gerald R. Fitzgerald (Nat. Mus. Canada).
15.30 - 15.45	Tea.
15.45	10th Annual General Meeting.

AGENDA

1. Apologies
2. Minutes
3. Matters arising
4. Chairman's Report
5. Secretary's Report
6. Treasurer's Report
7. Editors Report
8. Recorders Report
9. Election of Officers and Committee for 1984
10. Any Other Business.

NOMINATIONS FOR COMMITTEE AND OFFICERS

Committee There are two vacancies for Committee members. Members are reminded that nominations must be sent to the Secretary no later than 18th November.

Officers Howard Brunton completes his term of office as Chairman and Philip Doughty (Ulster Museum) will be proposed as the new chairman. The other officers are willing to continue in office but any alternative nominations must also be received by 18th November.

Geoff Treasure

(Group Secretary)
Merseyside County Museum.
Liverpool L3 8EN.

Wednesday 15th February, 1984. Leicestershire Museum.
A meeting to celebrate 10 years of G.C.G.
Friday-Saturday 8th-9th June, 1984. Ludlow Museum.
Including a field trip (9th June) to Downton Gorge and the Ludlow Anticline.
Friday 7th September, 1984. Castle Museum, Norwich.
Topics to include Quaternary research, Specimen storage and conservation.
Friday 7th December, 1984. A.G.M. at the National Museum of Wales, Cardiff.
April 1985. Meeting at Winchester (Hampshire Museum Service)
July 1985 Meeting to coincide with the Museums Association Conference at Birmingham.
September, 1985 Meeting at Bolton Museum.
December, 1985 A.G.M. at Brighton Museum.

MUSEUMS ASSOCIATION CONFERENCE - SWANSEA 1983

Tuesday, 20th September 1983 : Field trip

G E O L O G Y A N D S C E N E R Y O F T H E G O W E R P E N I N S U L A

Leader: Professor T.R. Owen

Meet at 2.00 p.m. at the entrance to the Department of Geology, University College of Swansea.

An Area of Outstanding Natural Beauty, the Gower Peninsula lies to the south-west of Swansea. The succession there ranges from Old Red Sandstone to Coal Measures and the cliff scenery of the southern coast exposes Hercynian structures in the Carboniferous Limestone. The area is also noted for its Pleistocene deposits, and the numerous sea caves on the coast include sites such as Bacon Hole, Minchin Hole, and Paviland Cave, the source of William Buckland's "Red Lady".

Professor Owen has recently retired from a Personal Chair at the University College of Swansea, where he has worked for many years on the Carboniferous rocks of Wales. His publications include "The geological evolution of the British Isles" (1976).

If you intend to participate in this field trip, please contact

Tom Sharpe,
Department of Geology,
National Museum of Wales,
Cardiff,
CF1 3NP.

(Tel. 0222 397951 ext.215)

by 10 September, 1983.

Geological Information Group of the Geol. Soc. Lond. Meeting.

The Geological Information Group is holding a workshop meeting at Burlington House, Piccadilly at 2.00 pm 14th September, 1983 on Computer Applications in Geology VI.

The format will be informal and discuss the theme:

Future directions of computing in geology:-
Relationships between the GIG and other Specialist Groups.

As you are no doubt aware, the GIG has been in existence for a number of years, and we are concerned that there appear to be many geologists in the other Specialist Groups who use computers as tools for their work, and yet are not members of the GIG and take little part in our activities. We have a number of subgroups with particular interests:

GEOLOGICAL DATA (databases and data management systems, graphics, databases, the interface between geologist and machine, data processing, end-user data presentation, etc.)

MATHEMATICAL GEOLOGY (numerical modelling, statistical applications and data analysis, Matheronian geostatistics, computer cartography, simulation techniques, digital filtering, etc.)

GEOSCIENCE INFORMATION (sources of geological information, literature on specific topics, literature management and bibliographic databases, information searching and exchange, etc.)

Following an extremely successful regional meeting on Computing in the Field earlier this year, we are seriously considering the formation of a new MICROCOMPUTER special interest area.

Through its own meetings and conferences, and joint meetings with other Specialist Groups of the Society we seek to provide a forum for discussion and dissemination of all aspects of the interest areas. Some of our most successful recent meetings have been concerned with

* Microcomputer applications in field geophysics
* Artificial intelligence and geology
* Archives and conservation
* Databanks and databases in geology
* Remote sensing of geological information

We are concerned that the general level of computer literacy among geologists is still very low, and much still needs to be done to improve their education in this field. We feel that the GIG can offer a forum for the exchange of ideas between those working in different areas of what has become, in practice, an increasingly fragmented subject. One can often find that the data are different, but the methods of solution are common between subareas. Despite increasing industrial demand for geologists with computer skills, we have been both surprised and disappointed at the lack of young geologists(particularly research students) who take part in GIG meetings.

It is hoped members of other Specialist Groups who use, or are interested in computer methods will participate in this meeting. The GIG is in process of becoming formally affiliated to the International Association

for Mathematical Geology, and we feel that the Geological Society should, through the GIG, be able to take a leading role in the promotion of computing methods in geology in this country.

Full information of the meeting can be obtained from the Hon. Sec. GIG, Dr. R.J. Howarth, Dept. of Geology, Imperial College, Prince Consort Road, London SW7 2BP.

Suggestion for a future meeting.

The History of Provincial Museums

Many of the national museums have had their histories written, but the history of provincial museums and their collections has been almost ignored.

Stuart Davis of the Local History Department at Birmingham and I are interested in holding a one-day seminar on the subject in Birmingham in the early part of 1984. I should be interested to hear from anyone

a) who would like to attend (no deep commitment necessary at this stage)

and

b) feels they could contribute a talk on some aspect of the history of provincial museums and their collections. We would also be interested in brief reports on work in progress.

Gail Durbin
Education Officer,
Castle Museum,
Norwich.
NR1 3JU.

LETTERS TO THE EDITOR

The worst Curated geological object recurated?

This letter refers to an article published in Vol. 2. Nos. 9 & 10 pp. 553-559 of the Geological Curator.

THE NORTH EAST OF SCOTLAND LIBRARY SERVICE
MUSEUMS SERVICE

J. E. CHAMBERLAIN-MOLE B.A., F.S.A., Scot.
MUSEUMS ORGANISER

Peterhead Arbuthnot Museum
St. Peter Street
Peterhead

Telephone Peterhead 77778

Dr. Hugn Torrens
The Editor
Geological Curators Group
Geology Dept.
University of Keele
KEELE
Staffs.
ST5 5BG

28th June, 1983

Dear Sir,

Information, Lost and Found

I refer to an article sent to you by Dr. Graham Durant of the Hunterian Museum, Glasgow (The Worst curated geological object? !) in which he told you what we feared was the tragic tale of Banff Museum's "Auld Been".

I am glad to tell you that the story has a happy ending : the "Auld Been" had been AWOL (I will not go into details) but has now been returned - albeit with a split - and will be treated in future with the deference to which it is entitled. This, of course, after it has been submitted to the indignities which our conservator considers necessary to tend the split.

Needless to say, we greeted the "Auld Been" with cries of joy when it returned to Banff.

Yours faithfully,

J.E. Chamberlain-Mole
Museums Organiser

University of Keele

Keele, Staffordshire, ST5 5BG

Telephone: Newcastle (Staffs) (0782) 621111
Telex: 36113 UNKLIB G

Department of Geology

Dear Editor,

We should all be grateful for the fascinating article on Oatlands Park Grotto and its history in the last Geological Curator, even if it shows once again how the English treat their heritage! Perhaps we can hope this article will stimulate research into the several, still surviving examples and where the geological material used in them came from.

To judge by Alexander Pope's activities a generation earlier, Bath and its stone working industry had a catalytic effect on a number of setters-up of grottos. It was however galling to find the source of the material on the Parsons family in the second paragraph of note ii on page 386 of the Oatlands Grotto article unacknowledged and the material misquoted! Page 222 of Images of the Earth ed. L.J.Jordanova and R.Porter 1979, with the relevant footnotes, clearly states that Robert Parsons (1718-1790) was the father of Thomas Parsons (1744-1813) who introduced the study of fossils to the first Bath Philosophical Society. The common occupation of these two Parsons' in stone masonry and carving gave them a particular insight into the world of fossils which abounded in the area and were sent widely out from it, as we have seen.

Yours sincerely,

Hugh

4.7.1983 Hugh Torrens

TEL.: (0249) 3709

ETYMOLOGICAL RESEARCH
(PALAEONTOLOGY UNIT)
1. LAINES HEAD
CHIPPENHAM
WILTS. SN15 1PH

The article by M.E. Barton and J.B. Delair on Oatland Park Grotto and its Ammonite Fossils, Geol. Curator Vol. 3. No. 6 was most interesting. If anyone is considering further research into the subject we have one in Wiltshire not yet totally demolished. It is in the grounds of Bowood, near Chippenham. I visited it some years ago shortly before becoming a warden of the Yelde Hall Museum in Chippenham. The inventory of geological specimens at that time read:-

"10 Ammonites broken
13 fossils various"

Horrors, the grotto walls had rather a lot of gaps and there was no place on the card index being compiled for 'vandalised' or 'by vandalism'. Naturally dating back to pre-G.C.G. days there was no record of donor, source or location.

This may be doing an injustice, the specimens all damaged, could have been left over from the original construction which would not place us in the category of handlers of stolen goods. Bowood House and gardens are open to the public and our broken ammonites are in storage.

"can get you a better one of those, missus." is not the wisest way of encouraging youthful collectors.

The grotto is tiny compared with that whcih existed at Oatlands.

Irene King,
Etymological Research,
Palaeontology Unit,
1 Laines Head,
Chippenham,
Wilts.
SN15 1PH.

THE BEARSDEN PROJECT
or
QUARRYING FOR FOSSILS ON A HOUSING ESTATE

by S. P. Wood

I'm often asked "Where do you start looking for rare fossils"? My usual answer is brusque but true, "Fossils are where you find them". Extraction of same is another matter however and when you have to extract them from within a modern housing community, problems do not have to be sought which is one reason for presenting this article. Forewarned is forearmed.

This circumstance was encountered recently at Bearsden on the outskirts of Glasgow about 5 km north-west of the city centre and coincided with my settling in the area to take up a temporary Y.O.P.* Supervisor's post at the University of Glasgow's Hunterian Museum. A few hundred metres from my new back door, I discovered exciting rare fossils in predominantly marine shales exposed in a stream, the Manse Burn, which bisects the estate although the houses do not encroach closer than 25 metres on either bank.

The local council (Bearsden & Milngavie), owners of the burn flanks kindly gave their permission for a trial dig into the shales in 1981 (Fig. 1). This excavation necessitated cutting through an unofficial dog walking path worn out of the undergrowth by canine loving residents. Unfortunately this brought us into acrimonious contact with one of the 'natives'. Supervising my team of willing manpower services Y.O.P's in removing overburden on the first day, we were bluntly told to clear off (which is what we thought we were doing) by a 'youngish', I'm being kind here, woman who objected to our turf lifting and "-- general vandalism". I of course informed her we had council permission to work their land and inquired if she had similar license to present herself from where she was voicing her tirade. At this she made off at a good pace despite being heavy with child. Heavy that is from without rather than within, for without hung a kind of mini hammock complete with papoose. As they receded away the little red oval face bounced into and out of view like some confused setting sun taking encores, and with that we turned back to our task. But again we were disturbed, this time by the local constabulary as our contemporary Minnehaha had, by phone or smoke signal, contacted the police on our behalf (Fig. 2). However this unexpected uniformed visit turned to our advantage as the police, satisfied with our bona fides kept a near 24 hour vigil on the site thereafter. Their co-operation was even more welcome the following year (summer 1982) when we opened up a more ambitious quarry further downstream.

The activity of the relatively small 1981 excavation had brought to life a bevy of hitherto redundant rate payers associations, resident groups, and other local bodies, each outfit perplexed as to why their particular quango had not been priorly informed. How many more secretaries of this that and the other were itching to write of their role in this rampant democracy we didn't wait to find out.

Instead, at the commencement of the 1982 field work which again had been sanctioned by the council (in no small part due to the private viewing we gave at the Council Chambers in the wake of the unique 1981 finds), a circular (Fig. 3), was produced by the Hunterian Museum outlining the purpose, extent, duration etc., of the work envisaged at the new site.

* Youth Opportunities Programme; a government financed scheme (administered by the Manpower Services Commission) to sponsor temporary employment projects for young people.

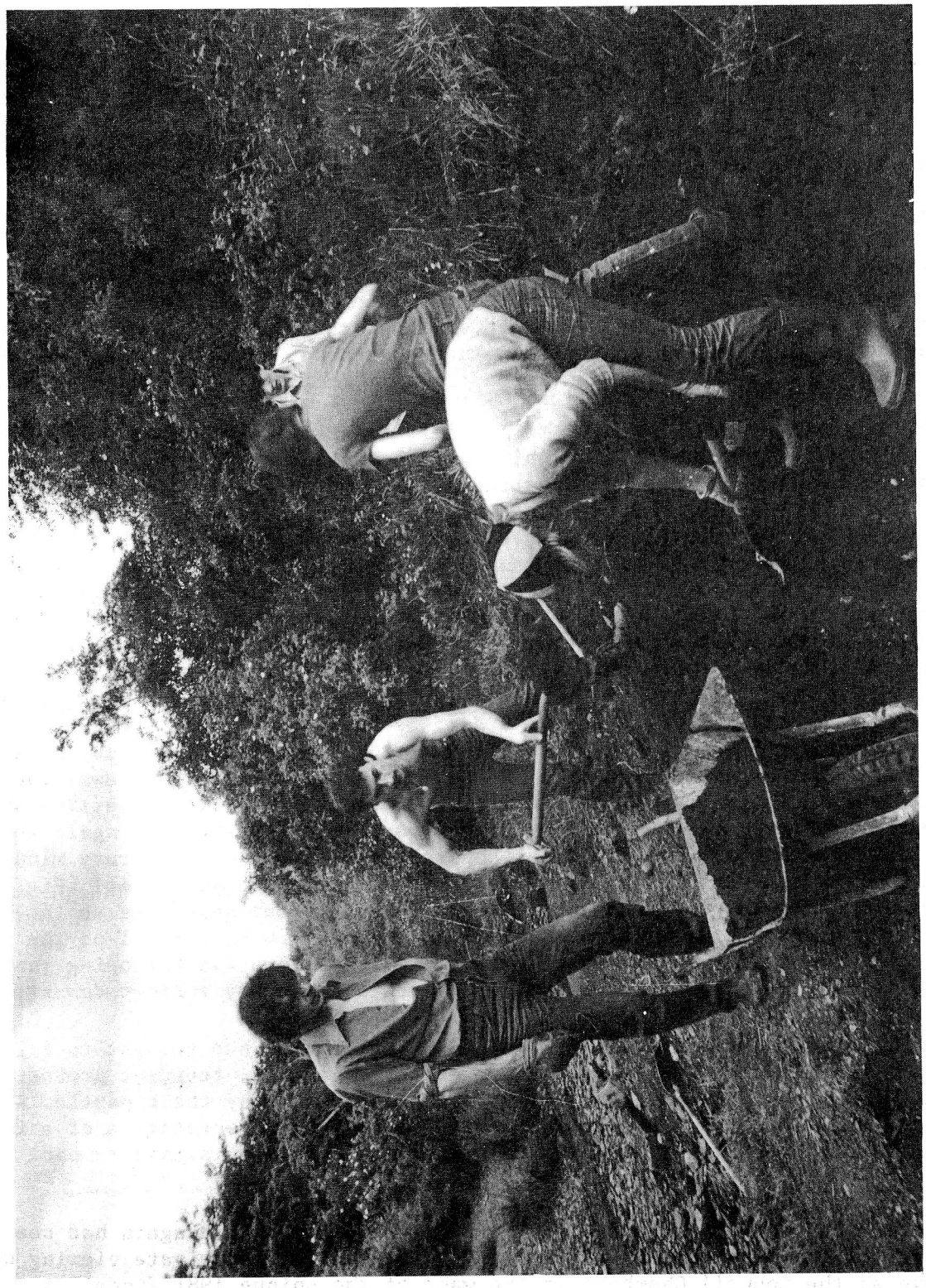


Fig. 1. 'Clearing Off' during summer 1981, Author on left.

Fig. 2. "Well, it was like this officer ....."

This was hand delivered to over 1,000 homes in the immediate area and included an invitation to encourage enquiries on site as to progress and finds. The Museum education department (which is financed by the governments temporary employment scheme) together with the design team, drafted and illustrated the information sheet and this advance notification was welcomed by the residents and the other interested parties. As a further insurance I wrote personally to the householders in close proximity to the proposed quarry.

These public relations excercises we knew to be necessary and especially so bearing in mind the proportions of the new site which were to be approximately 30m x 15m and some 5m deep.

A caterpillar earth mover was hired (financed by the Geological Conservation Review Unit of the Nature Conservancy Council (Newbury Berks)). Two days later the whole site was fenced off to comply with safety regulations. Once again the Nature Conservancy Council are to be thanked for defraying the cost of the fencing and for help in its erection.

Voluntary help was forthcoming whilst in the field from Glasgow University students during summer recess, from local people on an ad hoc basis and from Glasgow Geological Society whose secretary advertised our need in their periodical billet. This latter appeal produced two good helpers who carefully marked the fossiliferous bed into metre squares and who throughout the summer continued to painstakingly record the position and level of each fossil as it was won.

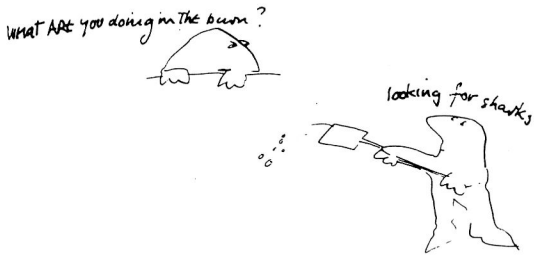
Meanwhile the two Y.O.P's and myself carried on with the strenuous quarry work, starting at one end and methodically working towards the other where we arrived so to speak several months and even more accidents later. Removal of the rock c.1 metre thick was achieved using a variety of heavy duty hand tools and smaller trimming implements. Barren shale was removed by 'builders' barrow upwards (we were several metres below surface and stream level) by way of a series of sloping planks (Fig. 4.). These barrow journeys were hazardous when wet and often led to acrobatic involuntary exchanges of place twixt contents and carrier. In the same vein returning empty from the spoil heap aloft occasionally resulted in an arrival other than synchronous!

Later these problems we put behind us as it were, as once work had progressed away from the starting end of the quarry, we were able to back fill using the opencast technique, thus saving much time, energy and elastoplast.

At the height of the summer each Wednesday afternoon children from the estate were invited by another circular (Fig. 5) delivered by volunteers on Mondays. The estate was not blanketed with these deliveries, just two or three hundred houses were served each Monday, to save the dig being swamped with freckled flesh on Wednesdays. Houses thus served were shaded on a map of the estate to avoid duplication in ensuing weeks, in this way the whole community was invited systematically in controlled weekly quotas.

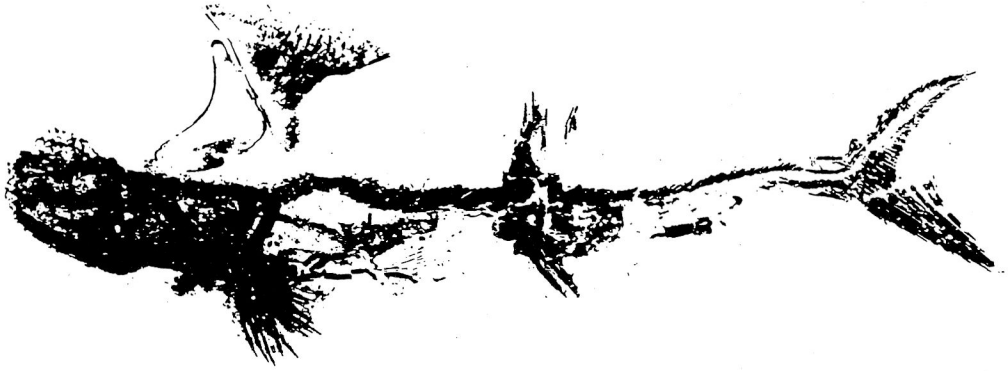
Some 70 children were usually in attendance and this figure was just about manageable using our 3 teachers from the museum and myself as site manager (a sort of 'head-mister' if you like).

BEARSDEN SHARK HUNTERS NEWS



What is going on? A geological excavation financed by the Hunterian Museum, the Nature Conservancy Council and the Manpower Services Commission, is being undertaken, to collect 330 million year old fossil fish and shrimps. This is a completely new site, discovered by Mr S. Wood in 1981, on land owned by Bearsden and Milngavie District Council, who have kindly encouraged this project.

Why is this site so important? Many of the animals are proving to be quite new to science: at least twelve of the present total of twenty-one fish are hitherto unknown. Bearsden will shortly come to rank with the relatively small number of other sites that have become internationally famous for the fossil fish that they have yielded.



Well preserved fossil fish of this age are rare throughout the world and the information that will result from this dig will help in understanding the early evolution of such fishes. The new shark finds have already solved several problems that American workers could not solve from their own material, discovered recently in Montana.

Why are they here? When these rocks were forming, the area was situated near the equator, beneath warm shallow seas in which the animals, now fossilised, lived.

How long will the dig last? The excavation will last until September 1982. The hole has already reached its maximum size: it will grow no larger. Successive rock layers are now being painstakingly removed, one by one, to a depth of 1 foot below the current floor level. After this the hole will be filled in and the site reinstated to its former condition. We regret any inconvenience to local residents during this phase of activities.

What happens next? The fossils removed from the site will be cleaned and prepared in the laboratory and eventually displayed in the Hunterian Museum. The fossils will

Fig. 3. Front page (reduced) of initial circular prepared for use at the 1982 dig.

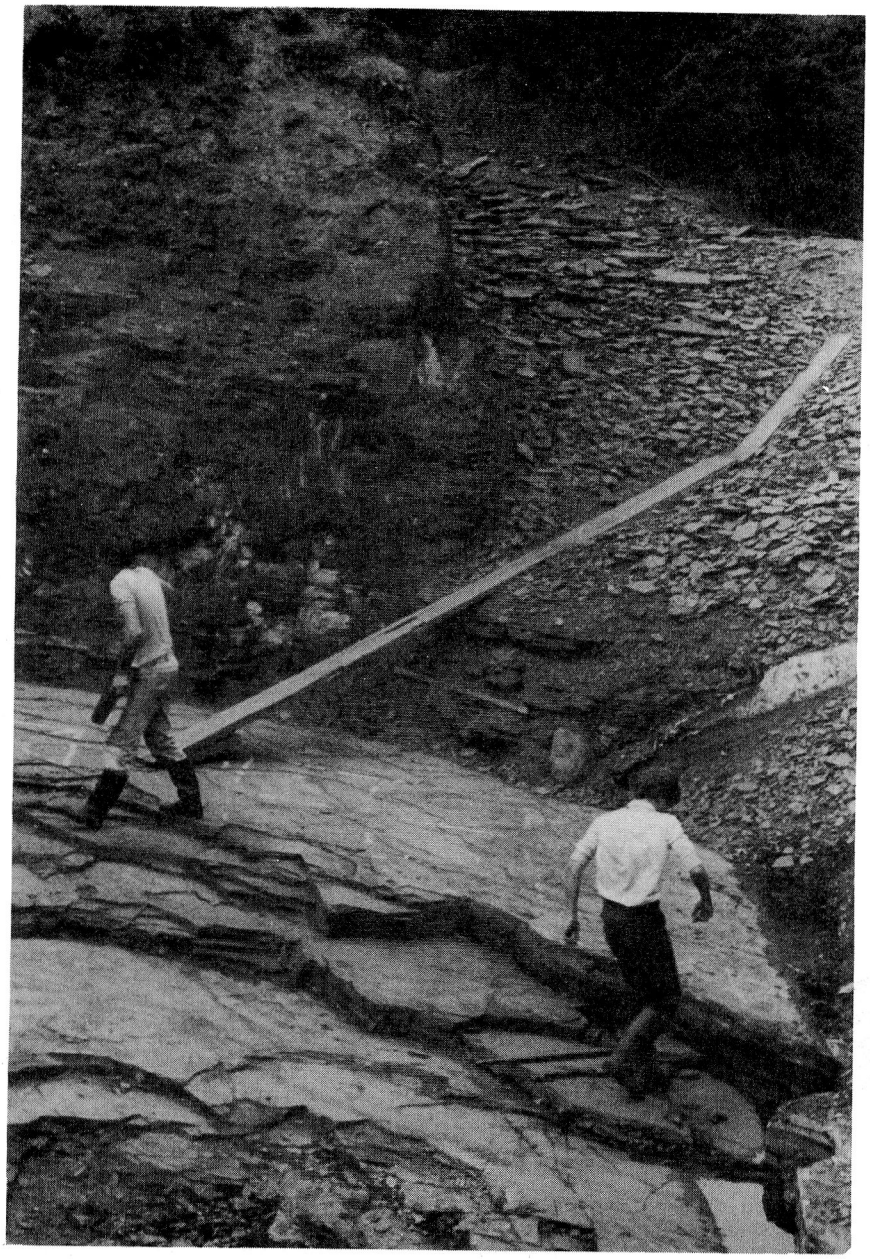


Fig. 4. Inside the Quarry; in the background the notorious sloping planks.

It is fair comment to describe these afternoons as highly beneficial providing on the one hand an open air museum in which the people could participate whilst also in creating an esprit de corps between ourselves and the neighbourhood in general. A fine example of public involvement was the forging of small geological hammers for children, by a Clydeside shipyard worker who lived locally and who generously donated them (Fig. 6).

These we rationed out at each weekly session together with a sheet of illustrated Bearsden fossils. On this sheet drawings of the shelly fauna were shown on one side and on the other, reconstructions of the fishes and shrimps (Fig. 7) to be found. Finally after identifying their finds by referring to the field sheets, plastic bags were made available to carry off their collections.

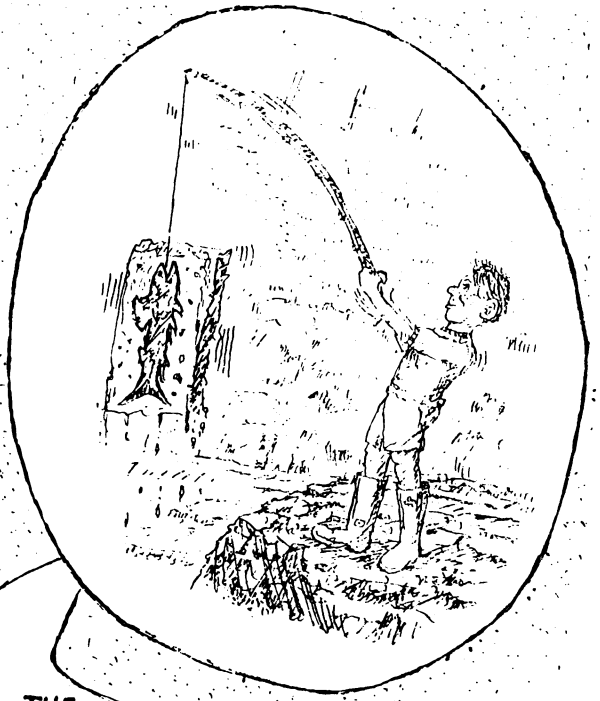
A typical afternoon for the children whose average age was 13 but included 5-65's started at 2.00 p.m. with an introductory talk lasting about a quarter of an hour. This usually comprised of 3 teachers talking in turn for several minutes on topics related to the fossils preserved in the quarry. An impressive 4ft by 2ft coloured submarine reconstruction of Carboniferous sea life in the vicinity based on specimens obtained, was also exhibited each Wednesday. This usually impressed the keen youngsters and was responsible for many a stampede towards the spoil heaps which had been purposely enriched using unopened slabs quarried prior to their arrival (Fig. 8). Young faces became caked and young limbs blackened as over back and bottom the afternoon went by. After two hours onslaught beneath the blurr of flailing small arms distally strengthened by equally small hammers, all slabs had succumbed and their produce triumphantly carried off in dozens of plastic bags by a now uniformly grey and weary unisex army.

For the majority of children this had been their first contact with palaeontology and being allowed to take part had merely whetted their appetites, but this desire we satisfied too .....

As a planned follow up to the field classes the education unit ran several sessions within the museum confines to which the Bearsden children were invited. Attendance was good and the children were able to compare fossil shrimps brought in from the quarry with live specimens we borrowed from the Glasgow University Zoology Department. One of the many activities in this museum package was a competition. The idea was that each child having looked at a fossil shark from Bearsden should paint his or her impression of what it may have looked like in real life. There were three winning categories according to age and prizes consisted of books on dinosaurs and other fossils. Winners were photographed and appeared in the local press and the museum enjoyed the benefits of the publicity. The winners were also given a visit to our fossil preparation laboratory and specimens collected earlier by themselves were cleaned up, trimmed and deposited back into school bags, via eager young hands. Before leaving each was given an opportunity under supervision to operate some of the power tools we employ. Bulging eyes under caps askew gave notice that they considered this operation as one not to be missed giving us as hosts, much satisfaction.

In addition to good publicity in the media, the museum was also able to recoup some of the money outlayed on the project by retailing T-shirts, badges and slide packs all specifically designed by our staff in relation to the 1982 dig. These were put on sale simultaneously at the museum shop and at a stall manned by one of the Y.O.P.'s on site. The stall also proved

BEARSDEN SHARK HUNTERS



REMEMBER TO WEAR YOUR WELLIES!

HI KIDS,

WOULD YOU LIKE TO 'HOOK' A FOSSIL?
IF SO, COME AND FISH AROUND IN THE MANSE BURN QUARRY, WITH ROSEMARY & AILEEN, FROM THE HUNTERIAN MUSEUM, (WED. 2-4pm JULY 7th 14th 21st, 28th)
---- YOU MAY FIND AN OLD SHARK LIKE ME.

For further information contact
Education Officer
Hunterian Museum 339 8855 ext 221

Fig. 6. One of the locally made childrens geological hammers in use.

popular with orderly school groups who came by appointment from local schools, and also was a big hit with other private parties, geological societies, natural history societies and so on. We also ran conducted tours at weekends such was the demand.

The time and effort in planning, co-ordinating and effecting the Bearsden project is of course considerable but the returns are equally so. In strictly monetary terms there is admittedly a deficit even though we are still moving T-shirts, slide packs, etc., across the museum shop counter. However the scientific value of the fossils, containing as they do many type specimens as yet undescribed, is immeasurable. The discovery of such a large number of new vertebrate and crustacean species in mainland Britain, the most geologically searched and researched island in the world, has undoubtedly brought the Hunterian Museum back into the limelight of the international palaeontological area. Indeed such was the international presence at times in the quarry that we ourselves could be identified as the ethnic minority.

The collection contains a near complete Namurian (basal Upper Carboniferous) marine community with superbly preserved specimens relating to various trophic levels. These range from large chondrichthyan carnivores to minute crustaceans still with the most delicate of tactile antennae attached. In addition to these biotic extremes are a host of new actinopterygian fishes. Research work is now underway on these and other fossils collected on site which include allochthonous plant material and palynological assemblages.

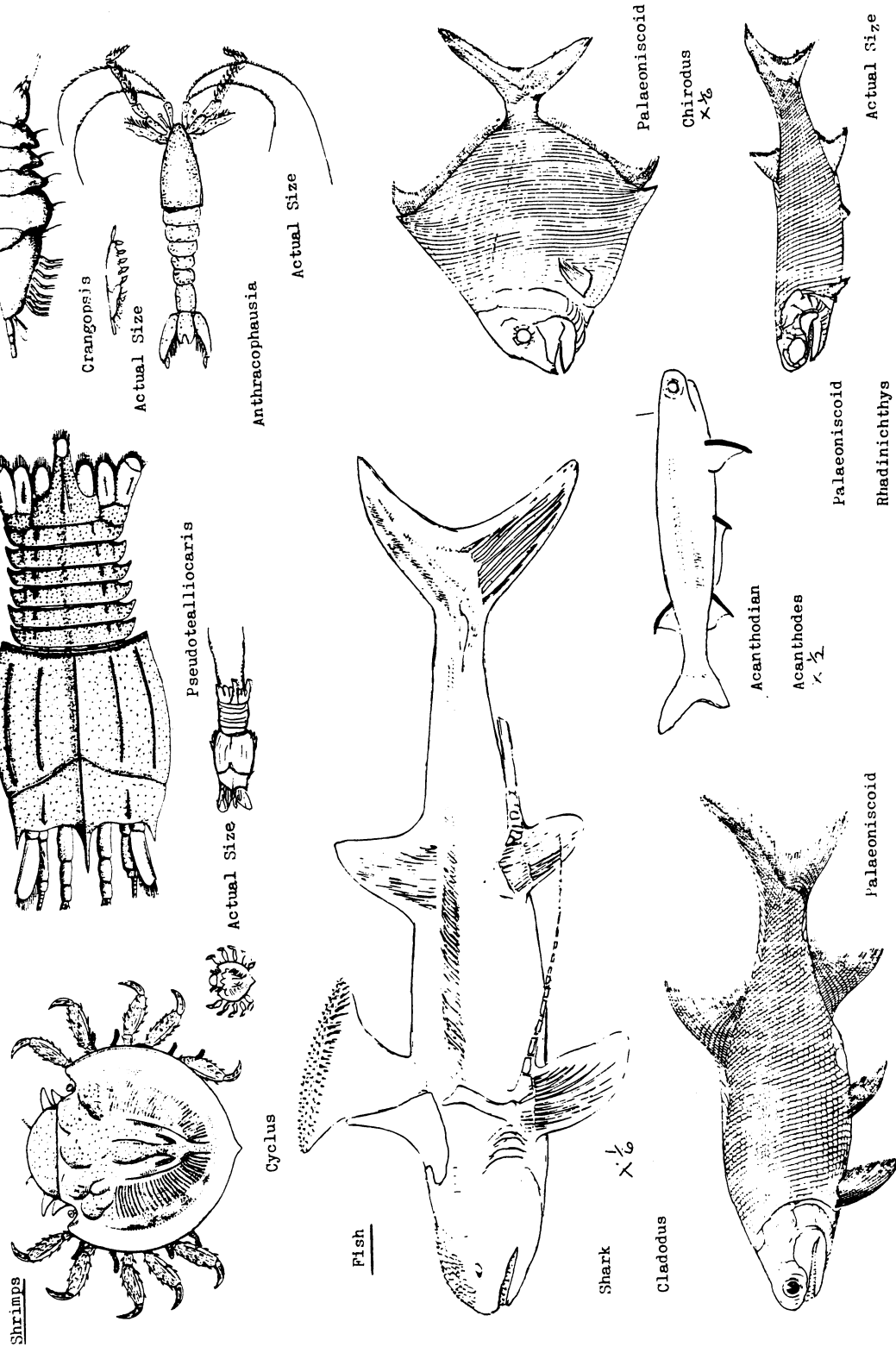


Fig. 7. Reverse side (reduced) of identification sheet used by children visiting the quarry.

Fig. 8. Rush hour on Wednesdays at the quarry.

With this treasure trove permanently on display, the museum will continue to act as a magnet not only to thousands of Bearsden and Glasgow citizens, but to untold visitors from further afield for many years to come.

Seen in this light the benefits to the museum are immense and surely justify the considerable inter-departmental commitment the project demanded.

For the possible benefit of others faced with a similar task in future I'll briefly pass on a few important lessons based on the Bearsden experience:

a) Let the locals know in advance about your project.

b) Keep them informed whilst work is in progress e.g. a notice board on site.

c) Use the local press to work in your favour.

d) If on council land seek out the person directly responsible (e.g. Parks Superintendant) as well as contacting the director (who will in turn refer the request to the appropriate committee). Emphasise all benefits your activities will create for the community.

e) Keep the site tidy and at the end of the project infill and landscape the excavation.

f) Make the site safe, inform the police with regard to security.

g) Invite the land owners to private visits during op's.

h) Invite the locals to help at the outset, this stifles a 'them and us' situation developing and can alleviate potential vandalism.

i) Close liaison with the Nature Conservancy Council is essential. They may be able to offer financial assistance and expertise.

j) Elect a field manager who can be on site throughout to handle problems such as flooding etc., as they occur.

Reference: Wood, S.P. 'New basal Namurian (Upper Carboniferous) fishes and crustaceans found near Glasgow' NATURE LOND. VOL 297, No. 5867, pp. 574-77, JUNE 1982.

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FLINT JACK - A MEMOIR

by A. G. Credland

The name of Flint Jack is widely known amongst antiquarians and museum curators though they may be less familiar with the details of his life. Most major museums and similar institutions which have important collections gathered together in the last century will contain examples of his handiwork, chiefly worked flints but also counterfeits of ancient pottery, mediaeval seals and fossils. This article has been written with the intention of making available the salient points of his career and an itinerary of his movements is appended which may help in establishing the true origin of various items of doubtful authenticity.

In 1867 Flint Jack after being found guilty of theft was placed in Bedford gaol and it was here whilst serving a twelve month sentence that he was interviewed by Llewellyn Jewitt, F.S.A. He had assumed a variety of aliases whilst selling his wares and in the north was known as John Wilson of Burlington (Bridlington) and Jerry Taylor of Billery Dale, Yorkshire moors. More widely he was referred to by the nicknames Fossil Billy, Cockney Bill, Bones, Shirtless, Snake Billy and the Old Antiquarian, but universally as Flint Jack.

Frank Stevens refers to William Smith (alias Skin and Grief or Snake Willy) who was active in East Yorkshire making flints, urns and hammer heads c.1855 and this may be the same man. [1]

His origins were a matter of speculation, clearly some thought he was a Londoner by birth, hence Cockney Billy, the Whitby Gazette referred to him as an Irishman born in Derry and the Whitby Times claimed he came from Carlisle. Flint Jack added further confusion himself when he told the Bedford majistrates that his name was Edward Jackson and was a 'bricklayer of this Borough'. Jack informed Jewitt however that he was born at Sleights near Whitby in 1815 the son of a mariner and his real name was Edward Simpson. The focus of the miscreant's activities was Yorkshire and it seems we can accept his story as the truth at least as far as he was capable of the truth after years of covering his tracks and allowing for the effects of many years of slavery to drink. [2]

At the age of fourteen Simpson was taken into the service of Dr. Young the Whitby historian whom he regularly accompanied on his geological excursions. [3] An interest in fossils and antiquities received further encouragement during his six years stay with Dr. Ripley, also at Whitby. After the death of his employer in 1840 Simpson as a young man of twenty five or twenty six put his knowledge to good use scouring the neighbourhood for fossils which he then sold to collectors and dealers in the area. They were impressed by his skill at cleaning his finds which were thus rendered more valuable both to the serious geologist and to the dilettante who was perhaps more interested in their aesthetic appeal.

Simpson was first tempted into the manufacture of specimens in 1843 when a Whitby dealer in curiosities showed him a barbed arrow head and asked whether he could make another like it. This was the beginning of over twenty years of walking the highways of England (Scotland and Ireland too)

selling pottery, seals, and flints, mostly spurious, along with a variety of fossils genuine and otherwise.

In 1844 he made his first pot, an 'ancient British urn', moulded from clay dug from the cliffs of Bridlington bay. Fashioned after the pattern of those he had seen in museums and private collections it was allowed to dry in the sun before a light firing using dried grass and brambles. The pride of the craftsman was not satisfied with these productions and he built a hut in Stainton Dale, between Whitby and Scarborough, where he proceeded to make further forgeries undermore controlled conditions. The range of his products continued to expand and he converted an old tea tray he found near Pickering into the semblance of a breast plate which he then sold to a Mr. Pycock of Malton. Next Simpson prepared a Roman milestone with the inscription IMP CONSTAN EBUR. Given an appearance of age by burying it in the ground it was then dug up and sold to Capt. Copperthwaite of the Lodge, Malton for five pounds. Various luminaries such as Mr. Roach Smith and Mr. Newton of the British Museum were puzzled by it but would not dismiss the piece out of hand.

Trade in fossils and 'antiquities' provided a steady income but in 1846 Simpson began the unhappy addiction to strong drink which eventually led to his downfall, though at the same time his amazing facility in working flint was still developing. Apart from producing barbed and tanged arrowheads he also made a series of flint combs, fish hooks as well as a number of pieces which are apparently just expressions of his virtuosity and bear little or no relation to any prehistoric flints. Some have a fan-like form extending from a stalk with a series of cusps along the convex outer edge (see Fig. 1). It is perhaps not surprising that so many people, collectors, dealers and antiquarians, were convinced by these forgeries. The art of flintworking, other that knapping gun-flints, was regarded as extinct and unattainable and who would believe that this ragamuffin itinerant could have created such things himself. His very scruffiness served as a bona fide. In addition the localities where authentic worked flints might be discovered were less well known at that time than was subsequently the case and the genuine pieces not available in great abundance for comparison. The law of supply and demand combined with the lack of field experience of the closet antiquarian and fossil collector would successfully sell his counterfeits for many years to come. All the while he was travelling the countryside he was picking up fossils and the raw materials for his fake flints, constantly selling and replenishing his stock. Occasionally Jack made a stop for extended periods of fossilising. He stayed the best part of a month in Peterborough with Dr. Henry Porter in 1846 whom he accompanied on fossil-hunting expeditions. Whilst in the doctor's employ he carved a piece of fossil wood into a signet ring inscribed with the name of 'Ingulfus' which he claimed had been found by a labourer digging in the graveyard of Croyland Abbey. A little later, in Colchester, Jack struck up a temporary partnership with a Jewish dealer who disposed of his forged antiquities in the London trade. Returning to legitimate work Jack was given a sum of money by the authorities at the York museum and he spent the best part of a year (1848) collecting fossils and shells on their behalf from the Yorkshire coast. After extensive travels in the north of England and Ireland he returned to his home district where in 1852 he spent a while gathering fossils for some gentlemen of Scarborough and Whitby, probably members of the respective Literary and Philosophical

Societies of these towns both of which had important museum collections of geological material. Moving south he stayed at Bottesford for some time collecting and disposing of fossils from the lias there.

During 1847 or 1848 Simpson had made contact with Mr. Tennant in the Strand and supplied him with fossils.[4] In 1852 he was employed by Tennant collecting fossil material, often from ships ballast and stone yards, for forming into sets of geological specimens for sale.

The probability is that the overwhelming majority of fossils that Simpson handled were authentic though some may have been improved. One wonders whether the sobriquet sometimes applied to Simpson, Snake Willy, was the result of the well-known practice of doctoring ammonites by carving a serpents head on the outermost end of the coil to render it into a 'snake-stone'. The ganoid fish preserved in the Hull Museum and described by my colleagues (p. 444)seems naive, quite unlike his sophisticated flints, and one can hardly believe that any serious geologist or fossil-hunter would be deceived by it.[5] I would suggest that such items were offered to the merely curious or those whose sympathy could be roused by Jacks half-starved, unkempt appearance, in the same way the gypsy woman finds a buyer for her clothes pegs and knick-knacks. The prices he charged were often small, certainly in his latter years when he was eager for a few pence to buy a drink or a bite to eat. In the year of his imprisonment, 1867 Jack was befriended by James Wyatt of Bedford who recorded their conversations in his diary extracts of which were published by permission of Wyatt's grandson in 1953.[6] Jack told him that "when some species are scarce and people don't know them well you must do your best; you understand me? Today I know them well you must do your best; you understand me? Today I sold a very pretty ammonite for six pence and some nice food to a lady, and it was a good thing I assure you! I made it of a very nice fragment of the North-amptonshire sand-stone which works very well if you are careful to get a piece out of the right stratum. If I had not sold this I should have been without food all day."

Flint Jack was essentially a craftsman at heart and he was greatly impressed by some of the authentic flint tools belonging to Wyatt. He modestly admitted that his own skills did not match up to those of his prehistoric ancestors. Asked how they produced the small conchoidal fractures on the flat surface of the arrow-heads and leaf-shaped spears he said "no man alive can do it: it is a barbarous art that is lost. I know the nature of flint as well as any man but I can't do that." Equally he was offended by the clumsy forgeries Wyatt had purchased in Amiens and positively outraged at the way a fine ancient celt had been 'improved' by a modern hand. According to Wyatt he refused to regard his own forgeries as moral offences and considered it excusable to palm them off as antiquities as they were such fine pieces of handiwork.

After leaving Mr. Tennant in 1854 he visited Wiltshire, Somerset, Devon and Dorset. At Lyme Regis he made the acquaintance of three geologists, unfortunately not named, and stayed there a fortnight collecting fossils "from the last dip of the Lias, and making and selling forged flints."

Returning once again to Mr. Tennant in London he found that his patron had heard the growing volume of gossip and rumour regarding his fraudulent

activities. To a sympathetic ear Jack was not unwilling to admit to these and boast of his dexterity. As early as 1845 Mr. T. Kendall of Pickering asked his opinion of a number of flints he had recently bought only to be told that they were all made by Jack himself. Kendall treated him sympathetically and was given a demonstration of making flint arrowheads, celts and 'hammers'. Tennant was also understanding and instead of dismissing him persuaded Jack to appear before the members of the Geologists Association. He gave his demonstration at a meeting held in Cavendish Square on the 6th January 1862. Following a paper by the Vice-President, the Rev. Thomas Wiltshire, entitled "on the Ancient Flint Implements of Yorkshire and the Modern Fabrication of Similar Specimens". The report in the Proceedings refers only to a 'person in attendance' who fashioned a variety of arrowheads but a more circumstantial account is given in the Peoples Magazine and quoted by Jewitt:-

"He wore a dark cloth coat, hanging in not unpicturesque rags about the elbows. It was buttoned over a cotton shirt which might have once been white, but which had degenerated to a yellow brown. About his neck was a fragment of a blue cotton handkerchief; his skin was of a gipsy brown, his hair hung down in lank black locks about a forehead and face that was not altogether unprepossessing, except for the furtive and cunning glances which he occasionally cast around him from eyes that did not correspond with each other in size and expression."

The only implement he carried was a small bent iron rod and "taking up his hat and bundle, seated himself in a conspicuous position and prepared to exhibit his skill. He undid the knots of his red handkerchief, which proved to be full of fragments of flint. He turned them over, and selected a small piece, which he held sometimes on his knee, sometimes in the palm of his hand, and gave it a few careless blows with what looked like a crooked nail. In a few minutes he had produced a small arrowhead, which he handed to a gentleman near, and went on fabricating another with a facility and rapidity which proved long practice. Soon a crowd had collected round the forger, while his fragments of flint were fast converted into varieties of arrow-heads, and exchanged for sixpences among the audience."

This public exposure of course only confirmed the rumours and he found it increasingly difficult to sell his stock. Once it was unequivocally established that he was in the habit of faking antiquities it must have been a struggle for him to sell even authentic items for at some time or another he had gulled most of the amateurs, collectors and museum officials of his acquaintance.

In 1863 Mr. Stevens,[8] curator of the Salisbury museum realised that he was being offered spurious flint artefacts by Flint Jack and as a caution to the unwary persuaded the offender to make a complete set of flints for exhibition. At the same time Jack's photograph was taken by a Mr. Treble in Stevens house and a copy placed alongside them (see cover photograph).

During August the same year Simpson was placed in the Beverley House of Correction for stealing jet belonging to a Mr. Major of Church Green, Bridlington[9] and the following years seem to have been a catalogue of incidents involving drunkeness and theft. On the 18th January, 1867, when he visited James Wyatt in Bedford, he was "very poorly clad, unshorn and

shivering with cold and hunger ..... his shoes were nearly worn off his feet and he was suffering acutely from the cold. His old alias "Shirtless" was never more applicable than at this time, and he really seemed to have arrived at the notion that being without a settled occupation and a home was very trying when the thermometer stood at 15 degrees."[10]

Receiving clothes and money from Wyatt and a Mr. Haddock he set off with the intention of seeking regular employment in London (with Tennant?) but instead went on a spree. He stole a barometer which he soon discarded then removed a clock from a Methodist Chapel which he tried to sell for five shillings at a public house. Apprehended by the police he was brought to trial at the Borough Quarter Sessions on the 11th March 1862 and given a twelve month sentence in Bedford gaol.

Here he retained the interest of antiquaries like Jewitt whose compassion is clearly expressed in The Reliquary where the article ends with an appeal for contributions to Jacks welfare, "and through the hands of Mr. Roberts, the governor of Bedford Gaol, hand them over to 'Flint Jack' in such a manner and under such arrangements as seem most judicious."

The final years of Edward Simpsons life are hazy and the author has not discovered details of either the place or time of his death. A postscript, however, is given by Tom Sheppard, the then curator of Hull Museums, who writing in 1908 records that he had met some years before a former associate, he calls him 'accomplice', of Flint Jack.[11] This man, A.C. Elliott, an ex-policeman together with a photographer did a roaring trade selling pictures at one shilling each. The subject of the photograph, Flint Jack, receiving a pint of rum each morning as long as the boom lasted. Taken in Stamford (Lincs.) in 1873 Simpson is shown in typical flint-dressing pose, seated in a chair. He looks considerably older than in the 1863 picture with a white beard extending from ear to ear.[12]

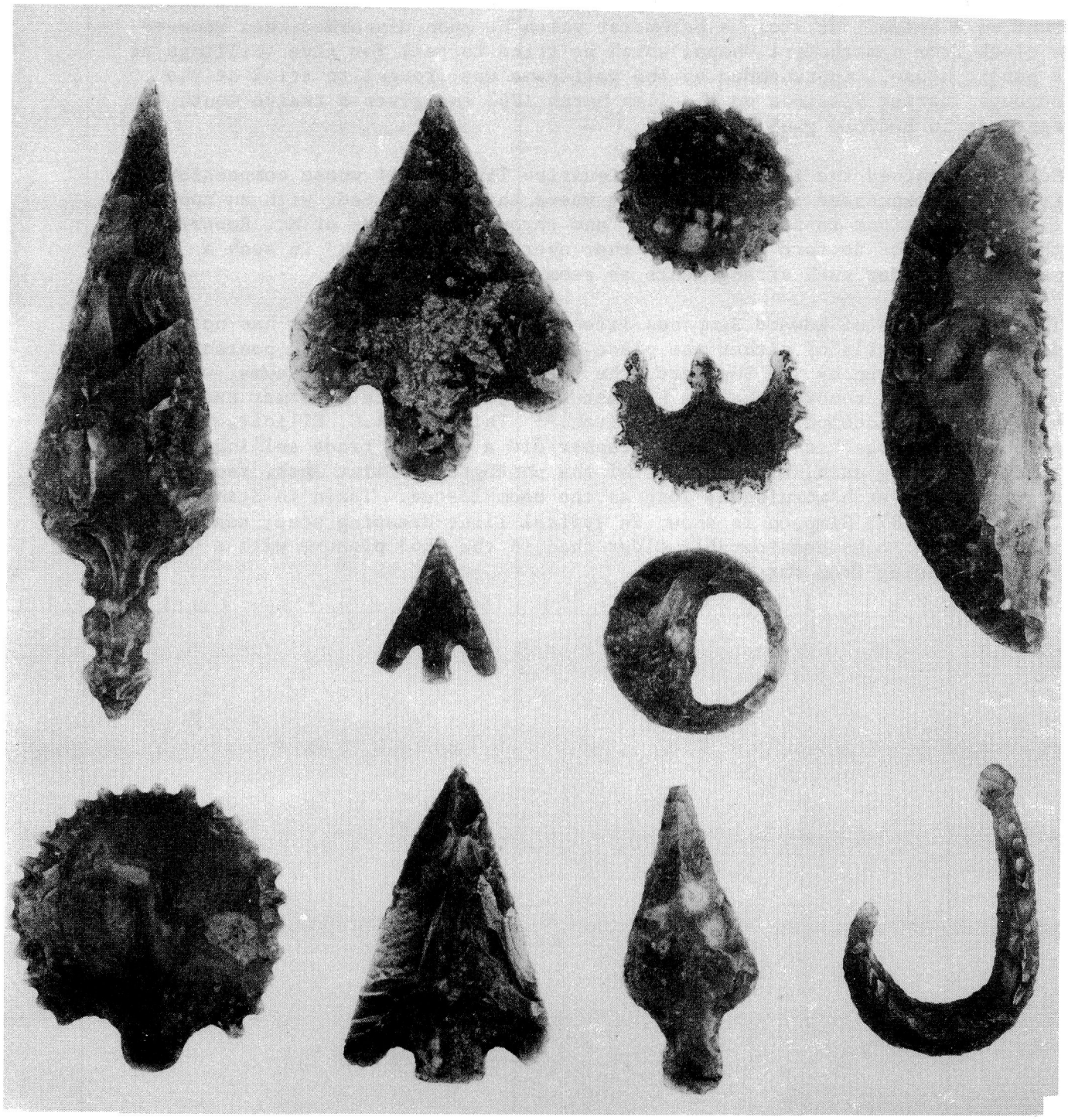

Fig. 1. Flints worked by Edward Simpson, alias Flint Jack; actual size (Hull Museums)

Itinerary

1845: began to extend his 'walks' from Scarborough to Pickering.

1846-7: Malton; Mr. Pycock purchased his armour; Capt. Copperthwaite buys 'Roman milestone'; flint comb sold in Scarborough; Bridlington; Hornsea; Hull, sold a large stone celt to the Mechanics Institute; Lincoln, sold flints (forged) and fossils at museum; Newark; Grantham; Stamford; visited Roman camp at Caistor and Water Newton near Wansworth, Northants; Peterborough, acompanies Dr. Henry Porter on his field trips; Huntingdon; Cambridge; Brandon (no doubt learning a few tips from the gun-flint makers and collecting raw material for his fakery); Newmarket; Norwich; Yarmouth; Thetford; Ipswich; Colchester, does business with a Jewish dealer; Chelmsford, London, traded with Mr. Tennant in the Strand, initially only fossils later flints and antiquities, some counterfeit flints bought by British Museum.

The market reached saturation so he headed north again; Ware; Hertford; Bedford; Northampton, where several collectors were taken in by parcels of faked fossils 'salted' with some genuine pieces; Nottingham; Market Harborough, two antiquarians duped; Leicester, the museum bought flints and fossils; he visited the Civil War battlefield of Willerby Field and traced part of the Roman Fosse, Nottingham, Newark, Lincoln and Brigg; thence from Nottingham to Clay Cross, Chesterfield, Sheffield, Wakefield, Tadcaster; York; then to Bridlington having arranged to collect fossils and shells for the York museum which occupied much of the next year.

1849: Fossilising expedition to Staithes, Guisborough, Redcar, Stockton, Hartlepool, Darlington, Richmond and remained with Mr. Wood throughout the winter.

1850: Barnard Castle; Kirkby Stephen; Kendal; Ambleside; Keswick; Cockermouth; Whitehaven, Workington; Maryport; Carlisle; Wigton; Alston Moor; Haltwhistle; Hexham, from where he visited Hadrians Wall noting many Roman inscribed stones built into local cottages; Newcastle, sold his stock of fossils to the museum. Picked up some flint on North Shields beach and sold the products at Durham; Northallerton; Broughton (sold flints to some gentlemen); Thirsk; Easingwold; Helmsley; Kirby; Pickering; Scarborough. Then two tours of Westmoreland with fossils and forged flints; sold material to a banker at Kendal, a barber at Ambleside, Flintoffs museum at Keswick and a gentleman in the same town. Whilst there he carved a number of seals, rings and beads in coal and amber which he sold locally.

1851: York; Leeds; Manchester; Liverpool; thence to Ireland, by steamer to Belfast where he sold a mixture of genuine fossils and forged flints to the museum curator; Antrim; Giants Causeway; Londonderry; Armagh; Drogheda; Dublin; and back to Bridlington.

1852-3: Employed collecting fossils by gentlemen at Scarborough and Whitby; then set out for London but stayed a while at Bottesford collecting and disposing of lias fossils. In London employed by Mr. Tennant preparing sets of geological specimens for sale.

1854: Wiltshire; visited Stonehenge, Avebury, Salisbury, Marlborough and Devizes; Bath; Taunton; Lyme Regis etc; Bridport, where he sold an arrowhead to a druggist for a shilling; Weymouth; Blandford; Poole; Southampton; back to Salisbury; Winchester; Reading; Oxford; Banbury; Dunchurch; Stratford-on-Avon; Warwick; Leamington; Coventry; Birmingham; Lichfield, where he had two gentlemen customers; Burton; Derby; Matlock; Buxton; Castleton; Sheffield, where he sold forgeries to the museum curator; Barnsley; Wakefield; York; Malton, selling forged flints to the proprietor of the Malton Messenger; passed the winter on the Yorkshire coast.

1855: Visited Scotland but details unknown.

1856-8: ?

1859: Houghton-le-Spring; Durham; Barnard Castle; Brough; Lancaster; Ulverston; Bootle; Ravenglass; Whitehaven; Carlisle; Longtown; Haltwhisle; Hexham; Norwich; Durham; Darlington; Richmond; Leyburn; Kettlewell; Harrogate; Leeds; Selby; Hull; Grimsby; Louth; Boston; Spalding; Lynn; (selling flints and lias fossils all the way). Yarmouth; Norwich; Ipswich, probably visiting Brandon again.

1861-2: In London with Mr. Tennant.

1863: Salisbury 1867: in Bedford gaol.

NOTES

1. Stevens, F. Oct. 1944. Museums Journal, p.123

2. Jewitt, L. Oct. 1867, "Flint Jack - A memoir and an appeal", The Reliquary, pp.65-76.

   Llewellyn F.W. Jewitt, F.S.A. (1816-86); born at Kimberworth near Rotherham in 1816. Vice president of the Derbyshire Archaeological Society and honorary curator of the town and county museum at Derby. Founder and editor of the Reliquary and was living at Winster in the High Peak at the time he penned his account of Flint Jack. Died 1886 at Duffield.

3. George Young (1777-1848); born near Edinburgh and trained in theology. Appointed pastor of the presbyterian chapel in Whitby in 1806 and gained a detailed knowledge of local history and topography. Author of a two volume history of Whitby published in 1817 and A Geological Survey of the Yorkshire Coast, Whitby, 1822.

4. James Tennant, F.G.S. (1808-81); born at Upton, near Southwell, Notts., apprenticed to G. Mawe dealer in minerals at 149 The Strand. After Mawe's death he purchased the business and established a high reputation as a mineralogist. Recommended by Michael Faraday for the post of teacher of mineralogy at Kings College where he later became both professor of mineralogy and geology. President of the Geologists Association in 1862-3 he was appointed mineralogist to the Queen and superintended the cutting of the Koh-i-nor diamond. Tennant also looked after Baroness Burdett Coutts mineral collection.

5. Boyd, M.J. and Watson, R. "A fossil fish forged by 'Flint Jack", this issue p.444 See also Sheppard, T. 1932. "Fact and Fiction in Geology", Hull Museum Publication no. 179, pp. 73-92. Presidential address delivered at the Hull University College, 21st November, 1931, also published in the Proceedings of the Yorkshire Geological Society, Vol. 22.

6. Blacking, J. 1953. "Edward Simpson-Alias Flint Jack", Antiquity, no. 108; pp. 207-11.

7. Jewitt op.cit.; Wiltshire, Rev. T. 1859-65, Proceedings of the Geologists Association, Vol. 1, pp. 215-26.

8. Mr. E.T. Stevens, author of "Flint Chips: a guide to prehistoric archaeology as illustrated by the Blackmore Museum, Salisbury", 1870.

9. A piece in The Observer written by Joseph Stevens, date lined December 1880, at Oxford Road, Reading, and published sometime in January of the following year. In 1871 Jack was arrested as a vagrant and sent to the Northallerton House of Correction for one month, Hull News, 1st April, 1871 p.4.

10. Blacking, op.cit.

11. Sheppard, T. January 1908, "Forgeries and Counterfeit Antiquities", Hull Museum Publications, no. 53, pp. 17-18.

12. ibid, p.4.

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A FOSSIL FISH FORGED BY FLINT JACK

by M. J. Boyd & R. Watson

In view of their relative rarity as fossils, vertebrates appear to have occupied a disproportionate amount of the time of palaeontological forgers. Usually such forgeries are composed, at least in part, of genuine fossil or recent vertebrate remains. Two examples which spring immediately to mind are 'Piltdown Man' and the fossil sea serpent of Albert Koch, the latter being constructed by its exhibitor from the bones of several individuals of the Eocene whale Basilosaurus (Wendt, 1968 pp. 263-265). However, a 'fossil fish' which is registered in the collections of Hull Museums as KINCM 8.38.8 is a rather unusual example of this genre of forgery in that, although apparently made for sale to the unsuspecting collector and meant to be taken seriously, it is entirely inorganic in origin. The 'fish' in question (Figure 1) was carved last century by 'Flint Jack', the well-known Yorkshire forger of prehistoric artefacts, from a slab of micaceous sandstone, said by Sheppard (1910) to come from the Coal Measures of the West Riding. As will be apparent from the figure, the forgery is far from convincing as a fossil fish and in its crudity, as well as its mode of execution, is reminiscent of the celebrated Lugensteine of Johann Beringer (see figures in Dance (1976 pp. 100-102)). Nonetheless, there was clearly a market for such items as 'Flint Jack' is reported to have made a series of these 'ganoid' fishes (Sheppard, 1910), and their manufacture must have been a fairly lengthy process.

It is not certain precisely when 'Flint Jack' produced his fake fossil fishes but, even by the end of his life (see below), the taxonomic implications of the term 'ganoid' had altered little from those of the word as originally used by Agassiz (1833-44), who grouped all fishes with well-ossified scales bearing a lustrous, enameloid outer layer in the single taxon, Ganoidei. Traquair (1877), for instance, regarded the Ganoidei as including - in modern terminology - the Class Crossoptergygii, the actinopterygian sub-classes Chondrostei and Holostei, and (less certainly) osteostracans, placoderms and acanthodians. However, there can be little doubt as to what sort of 'ganoid' the subject of the present paper is meant to represent. The presence of jaws and the form of the fins and scales rule out the Osteostraci, Placodermi and Acanthodii. In addition, the presence of two dorsal fins eliminates the possibility that an early actinopterygian is represented. One is forced to assume that the 'specimen' is meant to be a crossopterygian. The scales are patently not cycloid in form, suggesting that a rhipidistian, rather than a coelacanth, is intended. The choice of Coal Measures sandstone for the 'fish' may indicate that 'Flint Jack' was copying a Carboniferous rhipidistian, such as Megalichthys, and imagined that rock of the correct age would add verisimilitude to the forgery. Alternatively, the fake may, as implied by Sheppard (1910), have been meant to represent one of the Devonian fishes described in Hugh Miller's "The Old Red Sandstone". In the latter case, Osteolepis would seem the most likely candidate.

'Flint Jack' was born at Sleights near Whitby in about 1815, the son of a sailor. His correct name was Edward Simpson, although during his life he used a variety of aliases including Edward Jackson, Jerry Taylor and John Wilson. He also acquired a number of nicknames besides 'Flint Jack', such as 'Fossil Willy', 'Cockney Bill', 'Bones', 'Shirtless', 'Snake Billy', and 'The Old Antiquarian'.

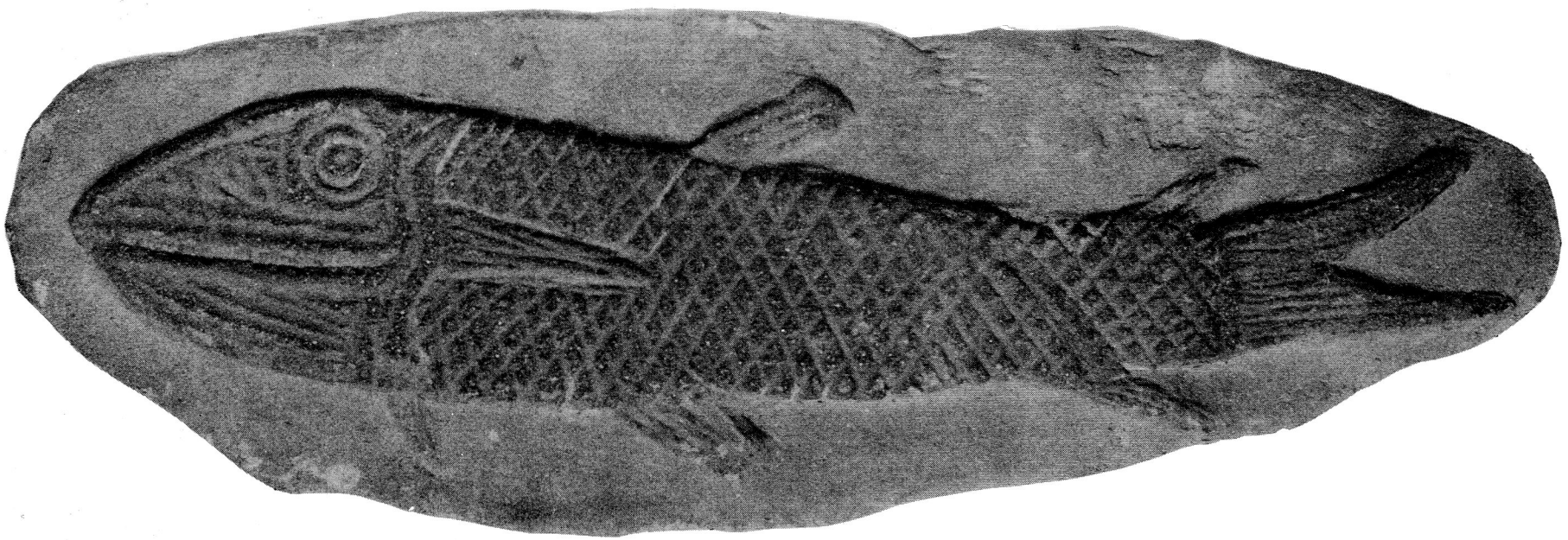

FIGURE 1. KINCM 8.38.8. Fossil 'fish' carved by 'Flint Jack'. Actual length of slab 275mm.

His early interests in archaeology and geology developed when at the age of fourteen he went to work for Dr. Young, the historian of Whitby. Then he went to Dr. Ripley's but took to the road selling his forgeries, after the doctor's death in 1840. Over the years he went on a number of 'tours', moving on to avoid suspicion. However, in 1860 he admitted his fraud to the London dealer, James Tennant, who had become suspicious. From then on his trade appears to have gone into a decline. In 1862 he demonstrated his techniques to the Geologist's Association in London.

By 1867, 'Flint Jack' appears to have started drinking heavily and he was sentenced to twelve months in Bedford jail for stealing. After his release from prison his history becomes more hazy and he disappeared around 1873, probably dying in a Yorkshire workhouse.

Although Hull Museums have a large number of flint implements faked by 'Flint Jack', the 'fish' described above is the only example of his palaeontological handiwork that the authors are aware of. We would be interested to hear from other institutions possessing 'Flint Jack' forgeries. (See Flint Jack - a memoir on page435).

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THE CONSERVATION OF SUB-FOSSIL BIRD BONE

by A. M. Doyle

INTRODUCTION

This article deals with the conservation of sub-fossil bone which has become fragile owing to excessive drying out in museum storage environments. The development and use of an apparatus is described which uses polyvinyl acetate emulsion (pva) for the conservation of sub-fossil bone.

For the conservation of non-mineralised archaeological and sub-fossil bone, various grades of polyvinyl acetate (pva) emulsion have been used for many years both as diluted aqueous solutions for consolidation and undiluted as adhesives. Emulsions such as Vinamul N9146 (no longer manufactured by Vinyl Products Limited) have been used in the Natural History Museum extensively and successfully on a wide range of material (Croucher & Woolley, 1982). Various methods of application, including vacuum impregnation, immersion of either whole or part of a specimen, or brushing and dropping on of the emulsion, are described by Rixon, 1976 and Dowman, 1970.

However, with certain types of sub-fossil bone, especially those retaining collagen or other protein decomposition projects, these methods of application are often found to be ineffective (Howie, 1979). The probable reasons for this are that brushing on pva emulsion, even very dilute solutions, often does not give sufficient penetration; whilst immersion or vacuum impregnation tends to put strain on the bone by causing it to swell and may result in irreparable damage. Furthermore, uncontrolled drying of wet material can cause shrinkage and splitting.

The method described here is easily controlled and safer to use on such susceptible bone and was specifically developed for the treatment of Pleistocene and Holocene bird remains such as the New Zealand Dinornithiformes or Moas. It could be applied to any size and type of porous bone.

METHOD

Two different concentrations of pva were used, firstly a concentrated solution to seal the bone ends and secondly a dilute solution to penetrate through as much of the bone as possible. The first stage of the treatment was to re-attach loose or damaged specimen labels using a water-proof varnish: Polybutylmethacrylate, as a 30% solution, in acetone or ethyl acetate proved most suitable. The bones were then examined for any loose pieces which might become detached during treatment. These were glued firmly back in position with the concentrated pva emulsion. Any large cracks were filled with concentrated emulsion and, where possible, closed with a clamp until the pva had set. In the case of the limb bones, either the proximal or distal ends were sealed with concentrated pva by brushing on with a stiff brush. With other bones of the skeleton, e.g. the ribs, pelvis and skull, damaged porous surfaces were sealed.

The bones were then allowed to dry for about two hours or until the pva had become transparent. The purpose of sealing the ends and broken surface was to prevent dilute pva from seeping through during the next stage of treatment without having time to accumulate inside the bone structure.

Laboratory scaffolding (supplied by Climpex) was used to support the bones (see figure 1) during treatment. The advantage of using Laboratory scaffolding was that it allowed flexibility in the size, shape and number of bones that could be treated at any particular time. Fig. 1 shows two diverse elements - limb bones and a pelvis - being treated together. The bones were suspended from the scaffolding using clamps so that they hung vertically (see figure 1). A trough was placed under the bones to collect the excess pva which flowed through the saturated bones.

Above the bones was placed a five litre container for dilute pva which was supported by the scaffolding as shown in figure 1. Dilute pva could thus be gravity-fed through the tubes without the need for additional pumps. In the base of the container six holes were punched and six lengths of silicone tubing (0.25cm internal diameter) inserted and sealed in place with self-curing silicone rubber (SILASTIC 732 RTV). A length of tube was directed to the end of each bone and by using additional clamps the tubes were adjusted to a height of 1cm. above the bone. During operation final adjustments were necessary to ensure effective application of dilute emulsion. Tube clips were attached about 1cm. from the ends of each silicone tube and firmly closed.

In order to maintain a continuous cycle of pva from the trough underneath the bones to the tank above, a peristaltic pump was used in conjunction with 1cm. internal diameter silicone tubing. A wire mesh placed over the end of the tube in the trough prevented any pieces or bone debris being recycled into the overhead tank causing a blockage in any of the silicone tubes. The other end of the tube was positioned in a hole in the mouth of the tank but not in the emulsion itself, as this was found to cause excessive frothing. Ensuring that the tube clips were closed, the tank was filled to approximately 2/3 capacity with pva diluted approximately 1:10 parts with distilled water.

The pva emulsion used for the treatment described was supplied by Williams Adhesives as Tenaxatex 3956. Experiments with different concentrations were carried out in an attempt to achieve thorough impregnation without leaving a gloss surface after air-drying. The recommended dilution for Tenaxatex 3956 was 1:10 in water. This dilution gave a solution with a solids content of 5% which is the optimum concentration for penetrating porous bone.

In addition any emulsion used for consolidating sub-fossil bone should satisfy the following requirements (Rixon 1976, p.10):

(a) High plasticiser content, no less than 20%
(b) Small particle size
(c) Negatively charged
(d) Homopolymer emulsion
(e) Matt or semi-matt finish.

A problem particularly associated with sub-fossil bone is that of the growth of moulds and fungi. It has been known for some time that pva emulsion is an ideal medium for the growth of moulds found in sub-fossil bone as well as for airborne moulds. To prevent the spread of mould to the remainder of the bone or to other bones being treated with the same reservoir

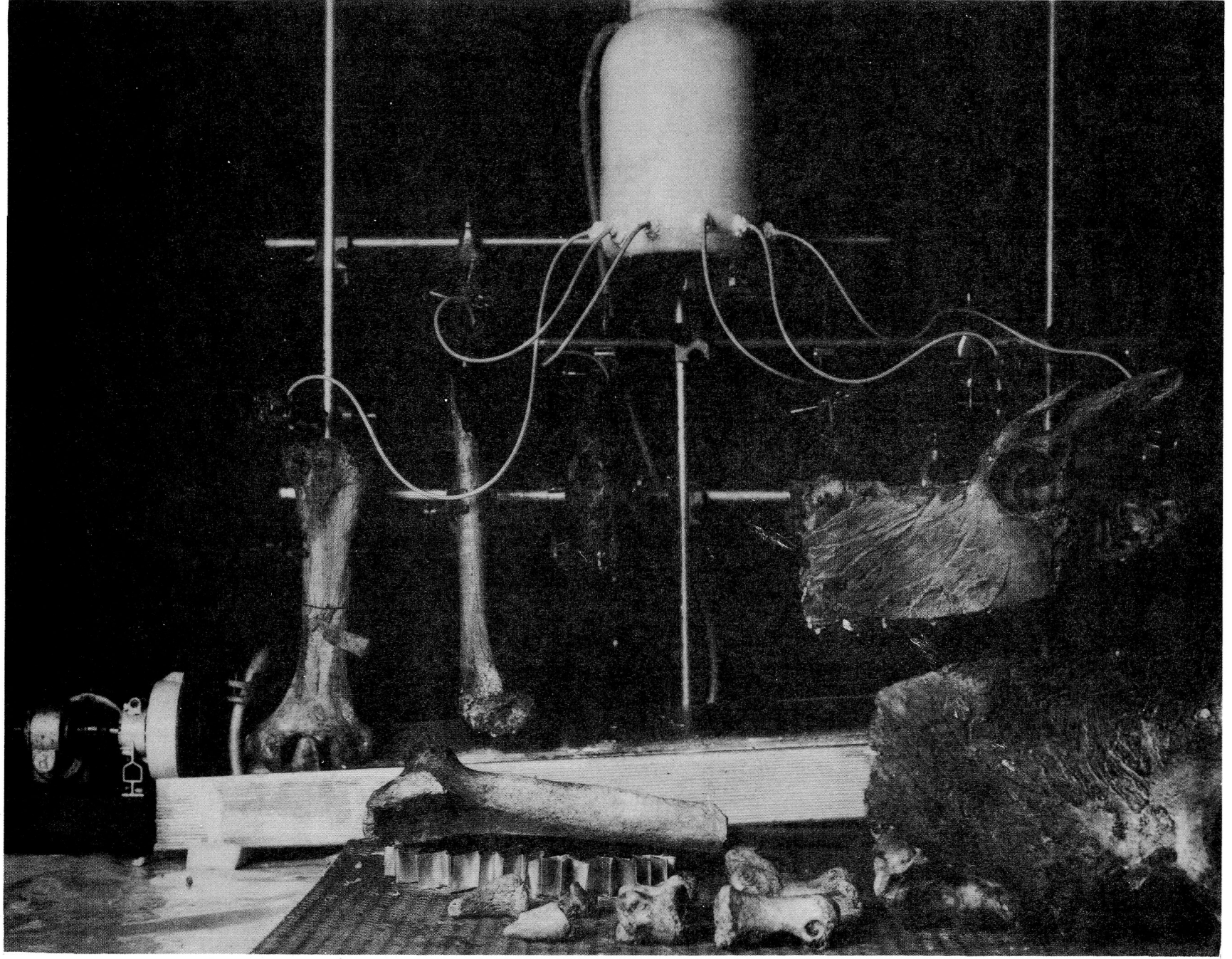

Fig 1 shows the application of PVA emulsion by gravity drip method to limb bones and pelvis supported on laboratory scaffolding.

of pva, a fungicide must be added to the tank. The use of Parmetol K40, a wide spectrum fungicide, at the recommended 0.1% dilution was found to be effective.

By trial and error, the flow of pva could be adjusted to suit the absorption rate of the surface of each bone, the aim being as far as possible to ensure that the pva spreads out inside the bone before dripping out of the base, without forming drops on the surface or flowing down the outside of the bone. To ensure that the bones were totally saturated with pva the tubes were regularly moved to other points on the bone surface, generally after about three hours of treatment.

Because the solids in the pva are gradually absorbed into the bone, it was found necessary to discard the pva after six hours running time as it had become very dilute. This timing will vary depending on the condition of the bone.

The apparatus was run until the bones were completely saturated with pva, which is indicated when the bone has become soft and pliable.

At this point the bones were removed from the clamps (acetone can be used as a pva solvent if they are stuck) and where some splitting had occurred the bones were banded with strips of polythene sheeting secured with masking tape or pads of lint free tissue and 'G' clamps. The bones were allowed to dry thoroughly on metal 'Zig Zags" (Rixon 1976, p.19). The drying time was not hurried, since placing the bones in an oven would dry them too rapidly and cause further splitting. If, while drying, the bones did begin to crack and split, they were placed in a humidity tent at a relative humidity of 85% which was gradually reduced by opening the tent to allow the bones to dry out slowly (see Howie, 1979).

When the bones were dry, the polythene strips were removed, and the bone surface wiped with lint-free tissue soaked in acetone to remove the surface shine and any excess pva which had formed pools in recesses and at the sealed end. After use, the apparatus was flushed out with water and a detergent such as Lissapol to prevent the tubes from clogging up. The tube clips were left open to allow any excess fluid to drain out.

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CROUCHER, R & WOOLLEY, A.R. 1982. Fossils, Minerals and Rocks: Collection and Preservation. British Museum (Natural History) London and University of Cambridge.

SUPPLIERS:

Parmetol K40
STERLING INDUSTRIAL
Chapeltown
Sheffield S30 4YP.

Tenaxatex WS 3956

WILLIAMS ADHESIVES LIMITED
247 Argyll Avenue
Trading Estate
Slough SL1 4HA.

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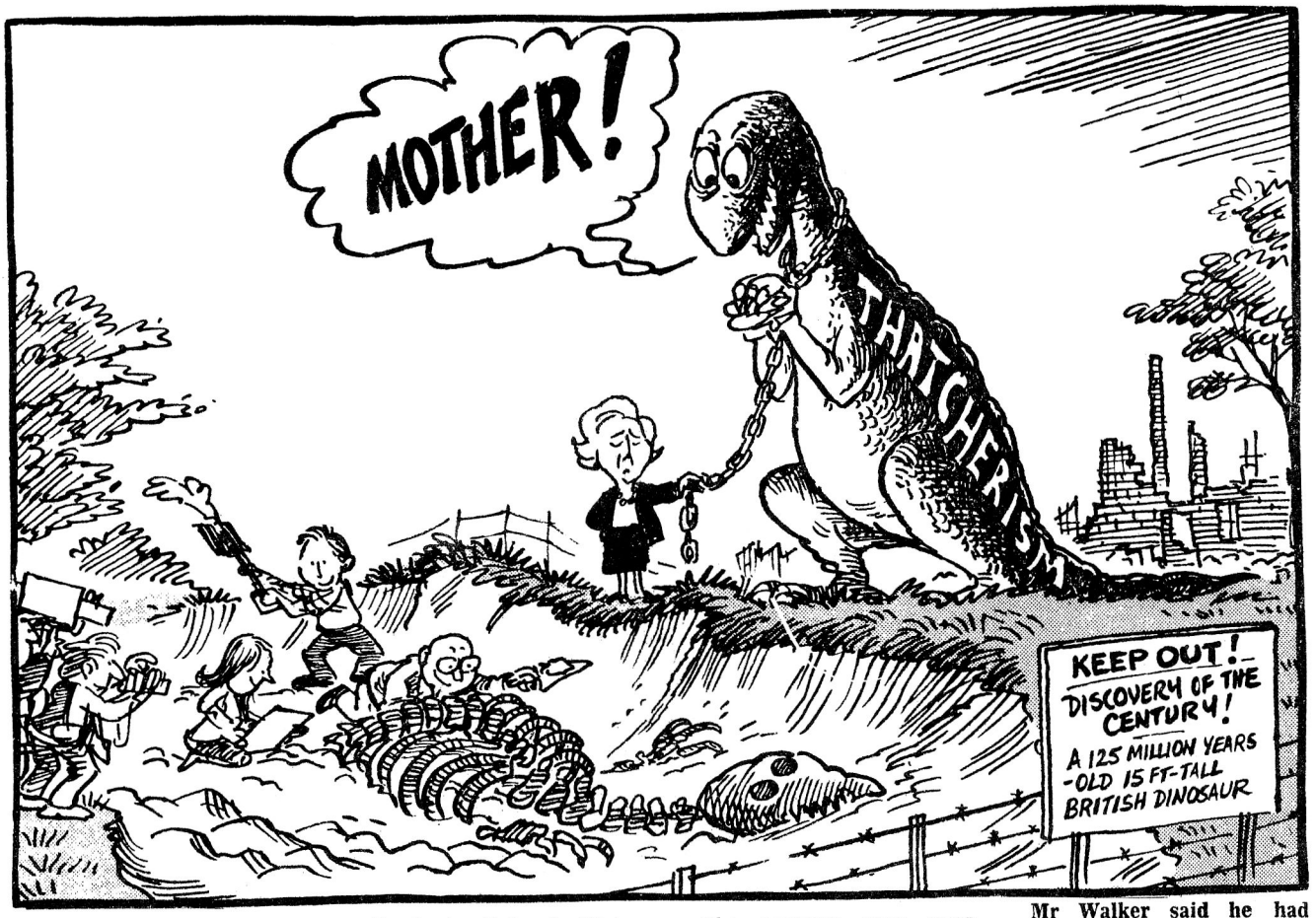
NOTES & NEWS

compiled by Tony Cross

MONSTER FIND HITS HEADLINES!

The recent discovery of a dinosaur in the Wealden Clay in Surrey caught the imagination of the press.

One response from The Guardian is reproduced here



Dinosaur 'find of century'

By Tim Radford

THE 125-million-year-old skeleton of a flesh-eating dinosaur previously unknown to science has been unearthed after its gigantic clawbone, at least half as long again as the talon on the hind foot of the ferocious Tyrannosaurus rex, was found in a Surrey clay pit.

London's Natural History Museum, which announced the discovery, said it was probably the most important find in Britain in this century.

The clawbone was found by Mr Bill Walker, an amateur fossil hunter who shattered it with a hammer as he tried to get it out of a rock, in January.

But it was not until the end of May, when the mud began to dry, that Dr Alan Charig and a team of experts from the museum in South Kensington were able to begin excavating the site.

They took three vanloads of bones, some of them crushed and broken, back to the museum to be reassembled into a skeleton.

The museum says guardedly that "a good proportion of the skeleton appears to be present, including parts of the skull with jaws and teeth serrated like steak knives."

It also says that the beast of Surrey could have been up to 15 feet tall (standing on its hind legs) and would no doubt have fed on herbivorous dinosaurs in the same part of Surrey.

The site has not been disclosed, to protect it from souvenir hunters.

"When I found the claw I really had no idea it was anything special," said Mr Walker, aged 55, a plumber who lives at Thornton Heath, Surrey "To me it was just a very nice dinosaur claw—that was exciting enough."

Mr Walker said he had picked up several pieces of bone from the pit when he saw a large rock, about the size of a ruby ball, with a small piece of bone sticking out.

"I gave it a good crack with my hammer and the whole thing disintegrated," he said. "I really could have cried. It just shattered into about 15 or 20 pieces.

"I could see it was a claw of sorts, so I picked up the pieces and took them home."

He tried to glue the claw together but found several pieces missing. "I went back to the pit and found the same rock with the missing pieces still in it. This time I took the whole thing home."

He had no idea of its significance and the claw stayed on his mantelpiece as just an-

Continued from page one

other specimen for three or four weeks. Then his son-in-law suggested taking it to the museum.

Southern England is unusually rich in fossil remains — the iguanadon was found at Lewes, the icthyosaur at Lyme Regis and the megalosaur at the Isle of Wight.

21st July, 1983

William Walker with his claw (picture by Martin Argles) and, below, how the Surrey dinosaur may have looked

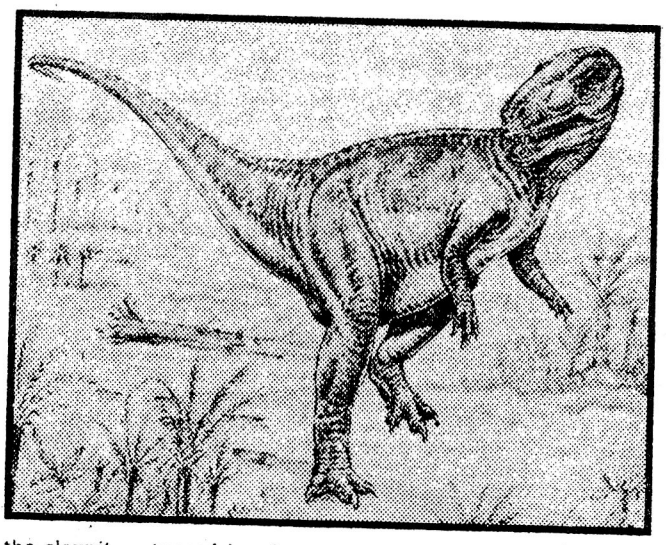
TIM RADFORD at the opening of the Superclaws inquest

A bone to pick with science

SCIENTISTS at the Natural History Museum yesterday began to reveal details of what will probably prove a prolonged inquest into a death at an undisclosed site in Surrey. The body was that of a well-nourished flesh eating dinosaur and the death occurred about 124 million years ago. The inquest is likely to be prolonged because the victim is a species hitherto unknown to science, and it is the only flesh-eating dinosaur to be found in strata of that age. Since the creature hasn't been described — let alone identified — it has been given no formal name: when news of its discovery was announced dramatically on Tuesday the press promptly dubbed it Claws, or Big Claw and at the Natural History Museum, where they are busily sticking it back together with superglue, at least one scientist has christened it Superclaws.

The creature practically clawed its way to the surface: a huge talon bone half as big as Tyrannosaurus rex, the most famous of the carnivorous dinosaurs, was found on a rainy January day by an amateur fossil collector from Thornton Heath, Mr William Walker, a 55-year-old plumber, who first got interested in fossils when he had to help his daughter through an O-level geology course. He found a nodule of iron carbonate, and gave it a tap with a hammer, and broke both the rock — and the talon bone inside. Three weeks later his son-in-law took the bone to be identified and the great claypit grope began.

Dr Alan Charig, the scientist who led the Museum team through more than a month of sifting for fragments at the scene of the death, said that when he and other scientists first went to



the claypit — turned by sleet and rain into a "chocolate blancmange" of mud — they thought they were wasting their time. But they poked around and immediately found bits of bone upon which the original claw could have been articulated. It was the first hint that what they were excavating was very nearly the complete skeleton — something very infrequent in the world of palaeontology, where species have to be reconstructed from a chunk of jaw, a tooth, and a shinbone.

First of all the death. Superclaws — which in fact has only one enlarged claw and is expected to turn out to be one of the megalosaur family — lived in Surrey during the lower Cretaceous era feeding quietly on iguanadons. In those days Surrey was moist and wet and leafy, and Superclaws died one day, probably of natural causes, since the bones were not greatly disturbed, in the shallow waters of a river estuary. Mr Peter Whybrow, who is now sticking the beast back together, is fairly confident that the water was shallow: fossil ripple marks were found near the body. The estuary deepened, covering the corpse with riverine silt as it decomposed. The water also covered some other evidence: the remains of some fish, and a quartz pebble. Dr Charig conjectured that the beast of Surrey may have been eating fish — they were found where its stomach would have been. Indeed, it might have been using its huge claw to gaff fish from the river. Mr Whybrow wonders if the fish weren't eating the carcase. Both agree that the quartz pebble is a gastrolith: a lump of stone swallowed by the dinosaur to grind its food, in the way that both pigeons and crocodiles do today.

As the millenia went by, and Surrey became dry land again, and the bones were buried ever deeper, iron carbonates began to form around the skeleton, converting it to mineral and preserving it. Then several million years of erosion began to wear away the surface; a brick company excavated the penultimate few yards, and the rain and Mr Walker's hammer did the rest.

Even so, the Natural History Museum scientists were thanking their lucky stars: most of the largest marine fossil reptile ever found once disappeared into a stone crusher before scientists rescued a flipper 22 feet across and a nine-foot length of lower jaw. In Surrey with the help of volunteers and the patience of the quarry workmen they found not only the claw but part of the skull, jaw, a number of vertebrae, shoulder and pelvic bones and some other claw bones.

Although it will take a year or more to reconstruct the creature enough to put it on display, the team have enough information to conjecture about its size, which they put at between 10 and 15 feet when standing on its hind legs. When pushed very hard, Dr Charig thought that it would probably have weighed two tons. And yes, it would move fast — purely at a guess, at 20 miles per hour. He wasn't sure how the creature would be named. It was normal to describe it in Greek or Latin: Megalonic meant big-clawed but that name had already been taken.

The press — in feverish attendance at the Museum's press conference yesterday — asked its discoverer Mr William Walker whether he hoped it would be named after him. No, said Mr Walker, he was leaving that entirely to the museum, they know about things like that. Well, said somebody, couldn't it be named after the daughter whose O-levels set Mr Walker off on his hobby? He smiled. But Dr Charig stepped in. He thought that was a nice idea. He could see no reason why there should not be a dinosaur called Ritasaurus.

The experience of working as a Volunteer, helping to excavate the Surrey dinosaur, prompted the following article from Phil Palmer of the British Museum.

Stratigraphical recording - two practical procedures. by Phil' Palmer

As a volunteer digger recently on the dinosaur-dig in Surrey, I was given a pickaxe and told 'Dig out that corner!' Two hours later there was no doubt in my mind that recovering large vertebrate fossils, even from 'soft' Weald Clay, is very hard physical work; and my usual tetchy impatience with the vertebrate palaeontologist's apparent indifference to the minutiae of stratigraphy was subdued. They clearly had their hands full of more immediate problems than the exact date when the animal lived. Since every one else was busily applying their special expertise to the dinosaur, I, having done my stint, went off and applied mine to the stratigraphy. But when someone, looking at some 90ft of varied clays, shales, sands and ironstones, asked 'Where do you begin?' it became clear that, if one has never done it before, recording that much rock can appear rather daunting. The following two procedures are offered as a reply, and directed essentially to those with a geological background, but who have never done any 'on-the-ground' stratigraphy.

The first procedure is for those rare occasions when time is unlimited and a fairly thorough account can be drawn up in a leisurely manner; when there is time to correct ones mistakes and argue the finer points of lithological differentiation on the ground. The second is for the usual desperate 'rescue-job', with very little time even to make a mistake and every one saying 'Come on, haven't you finished yet?'. Stratigraphy, in a very real sense, is 'time-consuming'; but this is not always apparent to those who have never done any.

(A) If time permits, the following 'A-Procedure' is recommended for establishing a stratigraphical record of any sedimentary geological exposure. It is important to follow the steps in the order given, both for economy of effort and the maintenance of priorities.

1. Walk all over the pit, or along the length of the exposure, and look at everything; but do not record, measure or collect. Take one or several photographs with a graduated 1 metre scale included. Use your eyes and hand lens and look only, until features become familiar and recognisable. Plunging straight in to recording will usually lead to wholesale corrections later.

2. Roughly sketch the major rock features as they are presented directly to the eye. Use simple descriptive rock terms like 'grey limestone' or 'brown sandstone', and avoid laboratory terms like 'microsparite'. Having established the major units, make rough measurements between them so as to establish the lithostratigraphical framework.

3. Now go over the sequence again filling in lithostratigraphical details of minor units, still using simple field nomenclature - 'small grey limestone nodules' and 'irony concretions with bivalves' etc.

4. Go home and study your results. Develop films and make large prints and study them together with written records and sketches. When you are satisfied that photographs and records match, and you can recognise the major divisions and also the minor units, make a return trip.

5. Return and measure the succession from minor unit to minor unit; and, at the same time, check the lithostratigraphical nomenclature used previously. You may decide that the 'brown sandstone' is better described as a 'buff-coloured siltstone'. Take photographs of interesting parts of the succession and make a note of it for identification on the print. Clearly identify and record any areas of doubt or uncertainty if, say, part of the succession is obscure, overgrown, or faulted. When you have finished and are satisfied that you cannot improve on the lithostratigraphical succession recorded, then that is the time to assign some sequential notation to each unit recorded; and a numerical notation is preferable to alphabetical. If you cannot decide what to regard as a bed then make each distinct unit a distinct bed and give it a number. Always number from the bottom upwards.

6. Now is the time to collect fossils from each of the lithostratigraphical units recognised, and to mark each bag or sample with the correct bed notation. It is at this point that even the most experienced stratigraphers can get into a muddle: keep cool and keep checking. When fossil collecting has reached the point of diminishing returns, stop and use the collection to make a biostratigraphical classification and impose it on the lithostratigraphical succession. Here it is wise to procure the help of an experienced stratigrapher, but if none are present then you may legitimately rest on your laurels with your lithostratigraphical recording. At least the basic facts are not lost. However, by studying Geol. Surv. 1" series geological maps of the area, a surprising amount may be learned from them; and, with a 6 figure O.S. map reference, one can pinpoint the locality with surprising accuracy so that it immediately becomes apparent, not only which formation the exposure was made in, but also whether the exposure was near the top or bottom, or roughly in the middle of the formation. Look at the Memoir that goes with the geological map and, if it appears a bit 'heavy', try the Regional Guide which will give a very general account of the formation, after which the Memoir may seem less formidable. Already the 'experienced stratigrapher' is becoming unnecessary.

7. In addition one can now collect rock samples from each lithostratigraphical unit, marking each with correct bed notation, for laboratory sedimentological studies. It is easy and quick to collect the samples but very long-winded processing them for study: however, once they are collected, the samples can rest until you, or a sedimentologist, are ready to deal with them. When this is finished you can add the laboratory sedimentological descriptive nomenclature to the field nomenclature:-

   "Bed 3, Dark grey fossiliferous limestone with irregular top surface: bioturbated microsparite with intraclasts, bioclasts and framboidal pyrite". Do not abandon the field nomenclature; it is the only way one can recognise rock units in the field.

It is assumed that procedures 1-7 will be distributed over 3 separate visits. This may be regarded as the minimum for reliable results for publication. Some stratigraphers will not publish unless they have made numerous visits over at least six months. Because it so easy to miss an important stratigraphical horizon in, say, 60 feet of varied lithology, it is understandable why stratigraphers are usually cautious.

(B) If time is very limited and will not permit a full account to be made, then adopt the 'B-Procedure,' which is designed to concentrate on the essentials and extract the maximum useful information.

1. Photograph the clearest part of the section with a 1 metre scale in prominent position.

2. Make a rough sketch of the lithostratigraphical framework, as in 2 of the 'A-Procedure,' but without details and without measurements.

3. Collect fossils and rock samples from each unit and put them together in same bag and measure as you go. Ignore smaller units and concentrate on major divisions: it is better to have an overall picture with a few errors, than a detailed account of only the lower

4. Work fast and, if you gain time use it to fill in details of minor units. If you are lucky, and the bulldozer breaks down, you may get a second chance. If not you will have a rough outline and scaled photographs which will yield further details. The chances are that no one else will do it and your record will be unique.

5. On returning home, immediately sort out your written and sketched field records. If you have worked fast there will be corrections and crossings-out, and these are best sorted out while the memories are still fresh. Draw up a clean account, but keep original field notes until you have checked them against enlarged photographs. Add to your finished account the length of time spent working at the exposure so that subsequent workers can judge the probable accuracy of your work. As with the 'A-Procedure,' it is important to identify and record areas of incertainty.

If it is uncertain how much time will be available, use the 'B-Procedure': then, if there is time, use the 'A-Procedure' from 3 onwards. Always work from broad general descriptions to detailed particular descriptions: if you work the other way around time may catch you out. A camera is a very useful tool in geology - if it is used. Even a poor quality photograph may have a rich information content, and it only takes about thirty seconds to take a camera out of its case, remove the lens cap, take an exposure reading, focus and press the shutter release and wind on three times.

If time is so desperately short that you have only one photograph and an OS. six-figure map reference, then all is not lost. First, locate your position on the 1 inch OS Series and transfer it to the 1 inch Series geological map. This will tell you not only the formation the site is located on, but also whether the site is at the top, the bottom, or near the middle: "uppermost Oxford Clay" or "middle Weald Clay" is quite a useful stratigraphical fix if no one has anything better. If a photograph shows a mappable rock unit then the chances are it will be mapped on the 1 inch geological series which are often surprisingly detailed. If it is mapped then you have a roughly measured distance on your scaled photograph between the fossil and a recorded and mapped rock unit. Academics may argue about the 'boundaries of the Callovian' or the 'validity of the Aalenian' but you now know, like Rabbit in Pooh Bear, exactly where you are. Seriously, stratigraphical data is an important part of the scientific information associated with any fossil: collectors and curators neglect it at their peril.

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Editors note

The following publication will be found immensely useful when undertaking stratigraphical recording of the kind described by Phil.

TUCKER, M.E. 1982. The field description of sedimentary rocks. London, Open University Press/Halstead Press. 112pp. price £4.95.

The following letters have been reproduced from the Geologists Association Circular (No. 838, July 1983). The discussion is of relevance to all geological curators involved in collecting and site conservation activities.

GEOLOGICAL CONSERVATION—RIPPLES AND GROUNDSWELL

One way or another, I think we might congratulate Ian Rolfe and our Secretary for the subject and treatment of the April Meeting. What was said has produced a response from Eric Freeman which could find echoes in other G.A. members, and so we publish it in full, together with a reply from Ian Rolfe. As if to fuel the fire, however, we also have need to draw attention to two quite separate instances of the problems which geological conservation poses when in the one case, people continue to collect well-known sites (Abereiddy Bay), and in the other, attempt to collect specimens best left for all to see (Osmington Mills-Bran Point). Both Eric Freeman and Ian Rolfe make suggestions which involve the Association in possible courses of action, or expressions of opinion. Perhaps others would care to join the debate?

GEOLOGICAL CONSERVATION: AN ALTERNATIVE FUTURE FOR THE PAST

Although I found Dr. Rolfe's lecture on Geological Conservation (8th April) both well argued and of great interest, I found myself disagreeing with much of what he said and I would like to express some alternative opinions on the subject.

Dr. Rolfe was greatly concerned by the use of power-tools by professional collectors from the continent at Scottish Old Red Sandstone fish localities, and he discussed the possibility of legislation to discourage such activities. I think that any such legislation would be unfortunate for six main reasons.

(1) I doubt if the problem of foreign collectors is as serious as it is made out to be. The best 'defence' we have against continental collectors is the English Channel. Any professional collector who can cross the channel, pay for accommodation in this country, find underexploited sites to work for saleable fossils, deal with locals who cannot speak his language, survive possible harassment by conservation-minded people, and after all that, still make a cash-profit from the enterprise, is in my opionion more worthy of admiration than blame. I suspect that in practice very few specimens of any importance are being exported from the UK.

(2) Legislation would probably ensure that such UK specimens as are sold abroad would either be unprovenanced, or worse, fraudulently provenanced, so as to protect the vendors. Any scientific value that the specimens originally had would thus inevitably be lost.

(3) Perhaps fewer problems would arise if fewer specimens of importance were left in the field, and more effort were put into their collection by those specialists who profess an interest in them.

(4) The obvious hyprocrisy of such legislation considering just how full our own museums are of foreign material, much of it purchased, (the 'London' *Archaeopteryx* springs to mind!), and some of it already of political sensitivity (such as the Elgin Marbles and the Benin Bronzes). There would also arise the possibility of retaliatory legislation against British collectors operating abroad.

(5) Legislation to curtail collecting wouldn't tackle the main problem for Geological Conservation, namely the steady loss of exposures due either to neglect or adverse land-use policies.

I consider my sixth objection to be the most important one, as it concerns British amateur fossil collectors, of which I am an example. It is likely that any legislation, licensing schemes etc., aimed at foreign commercial collectors would also be made applicable to UK citizens whose only fault is that they aren't paid to do Geology, but who do it essentially for its intrinsic interest. A cursory look at recent palaeontological literature will show just how much assistance the material collected by amateurs, past and present, has been to the present generation of palaeontologists. Adverse legislation would almost certainly cut off this source of supply. Law-abiding people would refrain from even attempting to collect research-grade material, while those people who **did** collect such material, either in ignorance or in deliberate defiance of the law, would be deterred by the fear of legal complications from either describing it themselves or bringing it to the attention of specialists. In view of their small numbers, I doubt very much whether increased field work by professional palaeontologists could make good the resulting difficult. Adverse legislation might also be expected to generate the conditions suitable for a flourishing black market in 'good' fossil specimens.

So is there a future for geological conservation? I think so, but I suspect that it will need a more constructive approach than an essentially defensive, 'hands off' policy. Here are a few suggestions.

(A) I think that more money is needed in Geology, and clearly this isn't going to come from public funds. I suspect that the present trend towards commercialisation in Geology will continue, and perhaps this wouldn't be altogether a bad thing. For example, it is possible that the decline in goodwill of landowners towards geologists could be reversed if it became an accepted practice for 'admission fees' to be charged for access to otherwise defunct quarries. This would also lessen the financial incentive towards infilling such sites with council refuse. Perhaps museums etc., would find it worth their while to actively recruit quarry workers to collect specimens for them in exchange for cash, a practice common in the last century.

(B) The formation of private museums should be positively encouraged by professional palaeontologists, not just grudgingly tolerated, or even worse, seen merely as representing a loss of valuable research material. Such a change in attitude would ensure that a greater number of valuable specimens would be collected and thus saved from destruction, and would in the fullness of time find their way into public collections. Is it too idealistic to suggest that the collectors of such specimens should also be encouraged to describe them themselves? Perhaps if museums were to provide short courses in curation and preparative techniques many of the problems associated with amateur collections would disappear. Couldn't a small part of the *Proceedings* be set aside on a regular basis for review articles on these and other topics specifically of interest to amateur geologists?

(C) Would it be a good idea for the G.A. to form a 'conservation corps', comprising volunteers willing to work as a team in the cleaning up of old quarries of interest to the Association? Perhaps a percentage of the annual subscription, or of field meeting charges, should be earmarked for such purposes.

In conclusion, the relationship between amateur and professional geologists has traditionally been a symbiotic one. Anything that widens the gap between the two groups, especially legislation, would be to the long-term disadvantage of both. It is to be hoped that for geological conservation the reverse may also be true.

Eric F. Freeman

Reply to Mr. Freeman

I do not disagree with much of what Mr. Freeman writes—similar arguments were well deployed at last year's British Association meeting in Liverpool by John Fowles and Stan Wood. Having employed the latter outstanding collector at this museum recently, I am certainly not against private collecting, nor against private museums: many of my best friends &c. ... But neither do I share the Great Train Robber mentality exemplified by Freeman's first argument, and I would hope that most members of the Geologists' Association would not do so either. The fact is that at the Sites of Special Scientific Interest that I referred to, theft of potentially important material occurred, without the owner's permission, and at unknown loss to science. One of these sites being quarried with power tools was the Old Red Sandstone fish bed at Black Park, Edderton. In their ignorance those collectors fairly certainly destroyed a large quantity of the very rare arthrodire fish *Ramphodopsis*. These occur in a very thin bed near the fish horizon yielding the commoner North West Scottish fish. Special techniques are required for their collection: the friable shale disintegrates if not strengthened in the field. Similarly at Lesmahagow, for the many unknown specimens shipped abroad, tons of debris was left behind from which we were able to collect useful specimens—but not after much erosion and removal by the stream had occurred.

SSSI's are designated for good reasons and should not be collected from lightly. These days, we are collecting information as much as specimens from sites, and we should be beyond the 19th Century looting practices. Not enough is known of many of these sites to permit unbridled collection. In this situation I think that McKirdy's 1979 proposals are relevant; that private collectors approach N.C.C. for permission to collect at SSSI's, in collaboration with relevant professionals, and on agreed terms. Each case would need to be carefully negotiated *ad hoc*.

I am only talking of legislative protection for the limited number of such SSSI's—not *all* fossil sites, many of which can tolerate a free-for-all treatment. And clearly the situation is different in coastal areas subject to erosion, as Mr. Fowles has rightly pointed out, where otherwise material of great scientific value and interest would be lost due to the predatory hand of Mother Nature herself. By refraining from collecting at SSSI's, amateur collectors can continue their traditional role that I agree is of such importance: in locating *new* sites, in showing their potential, and developing them as scientifically responsibly as is possible. The G.A. might be able to lead the way here again, by specifying detailed specimen recording methods for such sites: something the professionals have as yet written little about.

W. D. I. Rolfe

BOOK REVIEWS

R.D. CLARK 1982. Type, figured and cited Jurassic Cephalopoda in the collection of the Institute of Geological Sciences (Report 82/9).

London. H.M.S.O. A4 104 p., £10

D. PHILLIPS 1982. Catalogue of the Type and Figured specimens of Fossil Cephalopods (excluding Mesozoic Ammonoidea) in the British Museum (Natural History).

London. BM(NH). A4 94 p., £12.

Roger Clark's most useful compilation aims to list all I.G.S. Jurassic cephalopods of type, figured or "cited" status in an ascending stratigraphic order. This is what one would expect of an Institute whose collections are arranged in stratigraphic order. Despite the fact that most if not all Jurassic cephalopods would have thought nothing of making a journey on a scale of that from Edinburgh to London we are asked to use separate ascending lists for those specimens held in London from those now held in Edinburgh.

This stratigraphic listing at once reveals the length of time which has been allowed to elapse between finalisation of the text and its publication. The latest references in the three useful tables of Jurassic zones and subzones are dated 1978, four years before publication. The zonal scheme used is consequently rather dated and the Callovian ammonites are placed in the Upper Jurassic rather than the Middle Jurassic as in Cope et al. (1980). The same applies to the text - the Introduction to which is dated Easter 1978 - and which has not been able to include subsequent papers written by I.G.S. staff on the I.G.S. collections such as that by Penn and Merriman published in April 1978.

Several problems arise with this zone-by-zone arrangement which would not arise with an alphabetical or other order. The first concerns the indices or rather index; for the present work contains only one index - of specific names. No index of generic names is given and the only way to discover about specimens of, for example, the genus Tulites is to work through the relevant zonal lists. Since Tulites is currently thought to be restricted to a particular Jurassic zone one would not expect to look for it outside that zone or to find it recorded (p.48-9) in the next highest zone. What is not clear here is whether the stratigraphic order as now known has been used or merely the order as first described.

A second problem concerns specimens whose zonal position is unclear. The solution here would surely be to have separated such specimens as coming only from a particular stage, after the lists for the constituent zones of that stage. Lack of such an arrangement has caused specimens from the condensed Lower Bathonian near Beaminster in Dorset (see V. Wilson et al. 1959 p.231 - an I.G.S. publication citing the same specimens but not listed in this work) to be wrongly listed as occurring in an Upper Bathonian zone. Such anomalies suggest more thought should have been given to the citation of specimens from reinterpreted or still uncertain horizons.

Those who believe that the name of the original collector of a specimen in an important fact and often the only way to start to trace that specimen, will be glad to see that such information has been included here. The way in which this has been incorporated will be obvious from the reproduction of the single complete entry below:-

Ammonites humphriesianus J. de C. Sowerby
Woodward 1894, p. 111.
Emileites malenotatus S. S. Buckman HOLOTYPE
S. S. Buckman 1927, plate DCCII, pp. 46-48.
Trilobiticeras (Emileites) malenotatus (S. S. Buckman) HOLOTYPE
Parsons 1977, p. 110.
Inferior Oolite, Lower White Ironshot, *laeviuscula* Zone.
Dundry, Avon [Somerset]. [Buckman's corrected locality; Tate gave the locality as being 'Rodborough, near Stroud, Gloucestershire' and was followed in this by Woodward.]
S. S. Buckman Collection (ex R. Tate per H. B. Woodward), purchased 1928.
GSM 49293

What one would also like to see in addition is the record of the original collectors personal collection number for this and other specimens (in this case it is S.S. Buckman coll. no. 3923). An index of these collectors would have also been of additional value without greatly increasing the cost. Such an index would have more easily revealed the collector consistently but wrongly labelled D. Porter (for Dr. Henry Porter (1832-1868) see GCG vol. 1 no. 2 p. 49, 1974).

There are a number of printing errors and at least one reference cited (on p. 27) is nowhere given in the bibliography. The hand of a civil servant sub editor is surely to be sought in the delightful piece of information given on p. 48 that a particular quarry lies half a mile (or 801 metres) N.W. of Salperton Church, Glos.. Such an accurately located hole in the ground hardly deserves to be called a quarry!

Dennis Phillips' Catalogue forms a continuation of his earlier compilation for Mesozoic Ammonoidea published in 1977 and reviewed in GCG vol. 1 no. 10 p. 513, 1977.

It concerns only specimens of Type and Figured status unlike Roger Clark's which also includes merely cited material. It lists in 2 separate sequences non Mesozoic Ammonoidea and all Nautiloidea on pp. 1-54 and all Coleoidea on pp. 55-74 with references and two indices of specific names for the two sequences. The order within each sequence is merely alphabetical by generic name with adequate cross referencing where the generic assignment has been changed.

This alphabetical arrangement is easy to use but it does seem strange to find the Coleoids separated from the Ammonoids (which are so much closer in terms of evolutionary links to each other) but the Nautiloids grouped with the Ammonoids which are so distantly related.

The catalogue lists all known material up to May 1980 and thus does not include any subsequent type and figured material for example that in GCG vol. 2 no. 9/10 p. 601-3 of October 1980.

The catalogue seems very comprehensive and few errors or spelling mistakes have been noted, (though C.D. Sherborne is a surprise in a BM(NH) publication!). Personal collection numbers of specimens subsequently given BM(NH) registration

numbers are now given e.g. for the W.D. Lang and C.W. and E.V. Wright collections but just as in Roger Clark's catalogue no index of collectors is given. If such an index had been given the identity of "Mr. Day" on p. 56, 71 etc. might have been uncovered. He is Edward Cecilius Hartsinck Day (1833-1895). Two collections are given merely as F.I.D.S. and S.P.C. colls. (e.g. p. 19,60 etc). These are not apparently anywhere properly elucidated though one is obviously Falkland Islands Dependencies Survey and the other less certainly Somaliland Petroleum Company. The acquisition of specimens from the Torquay Nat. Hist. Society in 1935, Ludlow Museum in 1947 and Shrewsbury Museum in 1956 by the BM(NH) could also have been uncovered through such an index. I could also have discovered what I found by accident namely that my old schoolmaster H.C.W. Davies was a collector of fossils - a fact of which I was quite unaware.

In our review of the first section of Mr. Phillips' catalogue we noted it revealed one of the surprises in the V.E. Robson collection acquired by the BM(NH) in 1935. This was a probable holotype previously lost for 240 years. The present catalogue reveals yet another (p. 24) an American holotype which escaped for 88 years from the U.S. National Museum! We obviously need to learn more of how the Robson collection was acquired - especially in view of the recent discovery that Robson was also a leading light in the world of astrology.

All in all Messrs. Clark and Phillips are to be congratulated on the work which has gone into gathering and publishing all this information. Our thanks too to their publishers - though one hopes the BM(NH) will think of adding a printed spine title to future catalogues so that library users will find it more easily on the shelves. Colin Scrutton in a recent review (1983) of the revised coelenterate Treatise on Invertebrate Palaeontology - Part F applauds the innovation found in it with the quotation of "catalogue number, name and location of all primary type material of the type species of genera". This view and these two catalogues are welcome evidence of the important role curation has in Museum work, a role which has too often been forgotten.

References:

Cope, J.C.W. et al. 1980. A correlation of Jurassic rocks in the British Isles. Geological Society Special Reports 14-15.

Penn, I.E. and Merriman, R.J. 1978. Jurassic ammonites from the Shiant Isles, Outer Hebrides. Scot. Jl geol. 14 (1) pp 45-53.

Scrutton, C.T. 1983. Review. Palaeontological Association circular no. 111 pp. 13-15.

Wilson, V. 1959 (date of publication 12th February). Geology of the country around Bridport and Yeovil. London H.M.S.O.

Review by H.S. Torrens,
Department of Geology,
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"A pictorial guide to fossils" by Gerard R. Case, published by Van Norstrand Reinhld in May 1982 at £25.45.

This book fails, in my view, to be either a good, attractive coffee-table picture book, or a palaeontological, fully illustrated, academic text. It seems to set out to be both, with an emphasis of being 'a reference that identifies and classifies fossils to be found anywhere around the world...'. The author is an active vertebrate palaeontologist specialising on sharks. This much is clear from the 43 Case references in the bibliography, spanning 16 years and covering such titles as 'An occurance of the sawfish, Onchopristis dunklei in the Upper Cretaceous of Minnesota' to 'Fossil sharks: a pictorial review'. (There seems to be some imbalance here with only one reference each for the closely adjacent Charig or Colbert, and no specific reference for brachiopods!).

The book has 514 pages containing over 1300 illustrations, the vast majority of which are photographs - all black and white, so there are few pages of text alone. The illustrations are emphasised in the Foreword and Preface as illustrating 'the aesthetics of fossils' as well as a 'presentation of past life forms...'. The author explains how 'Many specimens have been photographed from several perspectives to give the reader a multidimensional view of the fossils. The author has taken special care to secure the finest drawings and photographic illustrations for the book'.

After this build-up and in view of the price, one might expect to find some superb fossil illustrations. Some are good, many are nice, many indifferent, and some plain bad; these look like dark grey mud on a black background. There is a nice picture of Dr. Stevens' children from New Zealand, alongside a big Lytoceras specimen, and an example of a Czechoslovakian museum label on what we are told is a pectoral girdle from a Permian shark. Many of the poor quality illustrations look as if they would have benefitted from better lighting or the use of special sprays before being photographed.

What of this 'multidimensional view of the fossils'? Well, trilobites are clearly a favourite of the author and Phacops rana milleri (Stewart) is blessed by six separate illustrations. Essentially the same two views appear in four of them and the other two detail the cephalon and eyes of the subspecies. Only two species of brachiopod are viewed in three aspects, but the Rensselaerina specimen suffers from being in the bad category of photographic prints. Incidentally, the text around this part of the book contains some funnies: We are told on page 110 that 'There seem to be very few specialists in trilobites...', perhaps this is confirmed by some mislabelled illustrations! In the brachiopod section we learn that the productid Juresania' ... pretty much stayed close to the bottom of the ocean floor.' Many chonetaceans, such as Anoplia, Neochonetes, Lissochonetes etc. are called productaceans, and the maximum size for a fossil brachiopod is said to be 80mm, whilst in fact they reached about 250mm.

Especially in the invertebrate chapters there are several factual errors and misidentifications. This is not too surprising within the wide scope of the work, undertaken by a shark specialist. Case has undoubtedly collected together a vast array of photographs (all credited) and attempted to cover a very wide field, so much so that I fear the results are not a success.

Review by Dr. C.H.C. Brunton.

Adam Sedgwick - Geologist and Dalesman

Having once attended a wedding in the picturesque village of Dent in North West Yorkshire, I could hardly fail to notice it or the cobbled street leading to it. The huge block of Sha p Granite inscribed with his name has been likened to his character and is a solid and lasting monument to a remarkable local man.

Adam Sedgwick (1785-1873) is one of the great figures of British Geology. In this enthusiastic and devoted bibliography, Colin Speakman takes the reader from Sedgwick's humble beginnings in Dent to Cambridge where he became Woodwardian Professor. It is anticipated that the book will appeal to those with an interest in the history of science or those with a love of the Dales.

Published by
The Broad Oak Press
jointly with Trinity College, Cambridge, and the Geological Society of London.
1982 £4.50 (Fellow)
£5.75 (Non-Fellow)

Tony Cross

The Poetry of geology.

It has been said that Geological poems are among the most entertaining attempts to describe the physical world in which we live. This recently published collection of 'geopoetry', drawn from British and American sources of the eighteenth and nineteenth centuries, is an outgrowth of bibliographic studies pursued during the past decade. Selections were found in a variety of sources, including religious tracts, medical treatises, geological textbooks and monographs, and periodicals for farmers, miners, educated ladies, and children. The subject matter and tone of these geological poems is no less diverse, with verses ranging from the humorous to the pedantic, advocating various scientific, social, and religious doctrines.

The principal object in assembling this collection has been the provision of enjoyment for those who are fascinated by the Earth and its history. It is not intended to be an historical analysis of science or poetry, although it is hoped that these selections will demonstrate the widespread popularity and understanding of geology in the nineteenth century. In keeping with the nineteenth-century contents of the book, the format and typography are representative of the small poetry volumes that abounded before 1850. Woodcut illustrations have been taken from geological textbooks and treatises of the day. Brief explanatory notes on the source and content of each poem are found at the end of the book.

Edited by R.M. Hazen.
George, Allen & Unwin (1982)

Tony Cross

It's appeared at last! For ages folk in the deep South have been awaiting publication of the new edition of The Hampshire Basin - one of the IGS series on British Regional Geology.

It is 50% bigger; has a full colour cover (it should be captioned as St. Aldhelm's not "St. Albans" Head); is printed on glossy paper; contains twenty-three photographs, eight of them in colour; thirty five figures and has thirteen tables. Has that convinced you to rush out and buy a copy? However, unlike my now-tatty, old, plain green-covered third edition, bought sixteen years ago as a budding school-boy geologist for six bob - this new work will set you back £4.50.

The first edition was written by the late C.P. Chatwin and published in 1936. It was followed by second and third editions in 1948 and 1960. With the passage of time knowledge has both increased and diversified, while interpretations have changed, so for the fourth edition the text has been revised and largely re-written by Mr. R.V. Melville. A chapter on structure has been contributed by Dr. E.C. Freshney and the book has been edited by Mr. G. Bisson.

As one involved in adult education groups of geology students, this book looks a useful aid relevant to the interested general reader. An introduction that mentions geological conservation is a notable feature and I commend all who visit the Dorset Coast and adjoining areas to acquiring a copy and recommend it to others.

The Hampshire Basin and adjoining areas by R.V. Melville M.Sc., and E.C. Freshney B.Sc., Ph.D.

HMSO 1982 (£4.50).

Tony Cross

Formed Stones, folklore and fossils

This booklet is a revised and expanded version of an article that was first published under the same title by Mike Bassett in 1971 and which provided a handy reference for all manner of information.

The revised edition, like its predecessor, describes some of the better known groups of fossils that are associated with Folklore, both ancient and modern, and explains the origins of their colloquial names. Emphasis is placed on examples that have originated in Britain, but the opportunity is taken to draw attention to comparative examples from other parts of the world.

The same easily readable format is followed but with double the number of pages, 32 in total, there are many interesting additions including Ammonites and Architecture, Bull's Hearts, Snake's Eggs, Cat skulls, Crystal Apples, Unicorns, Glossoptera not to mention Toad stones! A useful feature is a small, but comprehensive bibliography.

The quality of the publication for this price is outstanding with an appealing cover and a high standard of illustration, both photographs and drawings. My only criticism is that a poor illustration showing the "Crows Nests" at the Fossil Forest near Lulworth Cove in Dorset, used in the original edition, reappears here.

It must have been very difficult deciding which items had to be left out but perhaps the 'Fossil serpent' poster from Neath, which does not appear could be illustrated and written up in these illustrious pages. Similarly, another Welsh item worthy of wider appreciation is the story of St. Keyna (alias St. Cenau of no fixed abode, having been born in Brecon, associations with Somerset and Cornwall and buried in what is now Llangenny)

This booklet should be on every Curators bookshelf and used regularly as an aid to showing our Curatorial colleagues the all embracing nature of geology!

Price 95p.
National Museum of Wales, Geological Series no. 1. October, 1982.
ISBN 0 7200 0264 8

Tony Cross

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(affiliated to the Geological Society of London)

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THE GEOLOGICAL CURATORS GROUP

The purpose of the Group is to improve the status of geology in museums and similar institutions, and to improve the standard of geological curation in general, by:

- holding meetings to promote the exchange of information

- providing information and advice on all matters relating to geology in museums

- the surveillance of collections of geological specimens and information with a view to ensuring their well being

- the preparation of a code of practice for the curation and deployment of collections

- the advancement of the documentation and conservation of geological sites

- initiating and conducting surveys relating to the aims of the Group