NAMHO
National Association of Mining History Organisations

INTERIM NEWSLETTER - DECEMBER 2004

Chairman / temporary editor's letter

I'm told that it's the editor who is 'interim' not the newsletter. It's a good point and we still need a regular editor - volunteers please. In the meantime I'll stick with 'Interim Newsletter' as a title just to reinforce the point.

My apologies if this newsletter appears a little later than intended but a combination of circumstances mean that my time has been limited over the autumn period. Summer, as always, was too short, at least the sunny bit was, and autumn has been busier than usual consequently there hasn't been too much spare time to chase up material for this edition. It would be useful if constituent organisations sent the editor copies of their newsletter - include NAMHO on your mailing list. However, there are a number of items which I'd like to bring to your attention.

NAMHO research seminars

Mining in the South-West of England; new approaches, new history? - the first in a new series of regional and topic based research seminars will be held in Exeter on Saturday 9 April, 10:30 until 5pm, and is organised in co-operation with the Centre for South-Western Historial Studies at the University of Exeter. The venue is the Parker Moot Room, adjoining the Amory Building, in Rennes Drive - on the main Streatham campus. As the title suggests, the aim is to look at the industry from different perspectives, co-operating with other disciplines, and perhaps re-interpreting our view of mining. Lunch will be included - the cost has yet to be determined but the price will be kept to a reasonable level.

More details / booking forms from me - *Peter Claughton <P.F.Claughton@exeter.ac.uk> , Blaenpant Morfil, Clynderwen, Pembrokeshire, Wales SA66 7RE*

A tale of three engine houses.

In recent discussions with a local authority officer on funding for a mining related project the comment was made that we, the British, had been too late in realising the funding opportunities which came with EU membership. Ireland, on the other hand, may have been late entrants the mining history community but they were quickly at the head of the queue for European money. MHTI are now in the final phase of conserving the Mountain Mine man engine house at Allihies, on the Beara peninsula

in the far west of County Cork. The work there has attracted significant grants from the E.U. through Cork County Council and has produced excellent results in stabilising the structure as a monument to mining to be enjoyed by future generations - some of it under the extreme weather conditions which go with such an exposed location. Another pair of engine houses, a classic 'Cornish' layout of pumping and whim engines, similarly exposed to the south-westerlies in their cliff-top location at Tankardstown to the east of Bunmahon, in County Waterford, are also due for conservation. The geophysical survey of the site was carried out a couple of years ago; now there will be a full archaeological assessment before work commences. Here again, there is a continental element with the inclusion of the Copper Coast initiative in the European Geopark network increasing its profile and attracting significant grant aid. The Castlecomer collieries, County Kilcenny, are also attracting investment as part of a wider scheme to promote the town and the Wandesford estate (MHTI Newsletter, 26 (June 2004), 5).

Europamines

EUROPAMINES [ex- MINET], the European Mining Heritage Network.

Some of you may have been following the very occasional references to the lengthy metamorphosis of the 1999 'MINET' project into its new successor hybrid, 'EUROPAMINES', not least because the otherwise attractive title MINET had very unfortunate connotations in French, Portugese and Polish. Apart from our singular lack of success in conjuring up a better title than Europamines [alternative suggestions are still very welcome, but need to be submitted very promptly to John Morris - see below], the project proposal itself has been funded in full by, and as submitted to the EU Culture 2000 Programme. Contracts were signed in July by the EU Secretariat and by the Geological Survey of Ireland (GSI), acting as the Lead Partner on behalf of a consortium of funding partners in the UK, Italy, Spain, Portugal and Ireland [Mining Heritage Trust of Ireland (MHTI), as well as GSI], along with a number of associate, non-funding partners in Cornwall, Germany, France and Poland.

The one year (August 1, 2004 to July 31, 2005), Euro100,000 budget project is basically an enabling action to provide for the creation of Europamines as a legally formulated entity which will provide a sustainable framework for pursuing, amongst other actions:

1) heightened awareness and appreciation of Europe's mining heritage, in all its diversity, technological, historical, architectural, social, cultural etc;
2) lobbying for the conservation of such heritage, to complement similar activities by other national and international groups such as TICCIH;
3) creating a series of communications and publicity tools, including a web site, information leaflets and display units;
4) providing a series of thematic, on-site training sessions (5 such sessions are planned in the 1 year period, in Cornwall (see note below), Spain (Linares - early December 2004), Italy (March 2005), Poland (late April 2005) and Portugal (June 2005)), and an annual conference; [NB all dates provisional]
5) and to create a partnership forum through which members will be able to identify mutually advantageous developmental and funding opportunities in the future.

Membership will be open to all site specific, regional or national bodies which are actively engaged in mine heritage conservation, presentation or research activities, and which will subscribe to a quality standard represented in the network charter and code of good practice. Many of these issues have been outlined in the first 'Europamines Bulletin' which has been circulated to all current project members for consideration and in-depth development at the first planned training session, in Cornwall in late September (See notice below). Ongoing reports on developments and reviews of actions will be provided on the MHTI web site - http://www.mhti.com - which will provide for more in-depth coverage via a hot-link to the Europamines web site, once it has been established.

MHTI is a funding partner in the project, a position due entirely to allocation of a special grant of Euro5,000 from the Heritage Council, an award which MHTI very gratefully acknowledges.
John Morris <john.morris@gsi.ie>

COST A27 "Understanding pre-industrial structures in rural and mining landscapes (LANDMARKS)".

COST is an intergovernmental framework for European Co-operation in the field of Scientific and Technical Research, allowing the co-ordination of nationally funded research on a European level. Under the 6th Framework a successful bid was made for an Action named COST A27 "Understanding pre-industrial structures in rural and mining landscapes (LANDMARKS)". The main objective of the Action is to identify and evaluate pre-industrial elements in the European landscape, particularly those threatened by the abandonment of traditional agricultural and mining activities.

Lynn Willies, of PDMHS, and Peter Claughton, NAMHO chairman, are members of the UK working party for this initiative; with at least two NAMHO groups expressing an interest in contributing. The Action is still in its early stages but I would expect to be able to provide more information shortly. In the meantime groups who feel they would like to contribute might look at the UK website -
http://www.soc.staffs.ac.uk/jdw1/costa27home.html
Peter Claughton

Digital archiving

In conversation with various delegates at the NAMHO 2004 conference in Coniston the subject of digitisation of mining history records, photographs, etc., was raised along with fears as to accessing those records in the future. Many individuals and groups now regularly store their records in digital form and there are a number of mining related databases in existence. Accessing the latter has been discussed since at least the NAMHO conference held at Derby Dale some years ago without resolving the matter. However, archiving and continued access to the data should not now be a problem. The Arts and Humanities Data Service (AHDS) was established some years ago to provide such a service, with sub-sections for both history and archaeology. Public access to databases could be problematic but archiving using AHDS does not necessarily mean public access; that would be controlled by the owner of the archive.

AHDS provides a hedge against loss of data and ensures access in the event of changes in technology.

If you have digitised mining related records or databases you should consider asking AHDS about archiving. Either contact AHDS direct - go to http://www.ahds.ac.uk - or contacting NAMHO with a view to a joint approach. Go to the AHDS website and look at the way that the metadata for the digital archives is structured, provide us with similar information on your records / databases and, if necessary we can make approaches on your behalf.
Peter Claughton

Accidents at tourist mines 1987 - 2001 (15 year period)

The background material for this item has been kindly supplied by the Mines Inspectorate, but all interpretations are those of the writer.

During the 15 year period some 30 accidents has been reported to the Inspectorate as required by regulations, on average 2 per year. Fortunately none have been fatal, but there have been some broken bones. The latter include shoulder 1, ribs 1, arm 2, elbow 1, wrist 3, leg 4, ankle 4, knee 1, foot 1, toe 1. The lower limbs are obviously worst affected, involving 12 fractures compared with the upper limbs 6.

Without doubt "slipping or stumbling" is the main cause of accident and involved 18 visitors and 2 tourist mine employees. Most of these involved slipping on slopes or off steps, but others including twisting ankles on objects or loose stones, or off the edges of paths. Not all resulted in fractures; back injuries and face injuries could also be serious and in several cases serious cuts and lacerations have been involved when the victim has fallen against sharp or pointed objects. Many slipping accidents occur to older people or to children.
Several accidents occurred when visitors fell off an object such as a wooden prop alongside an underground walk-way, but there were also cases when adults fell over children during play or children fell off playground equipment.

Surprisingly, none of the accidents were caused by banging heads, perhaps because helmets were usually in use or visitors (and guides) are particularly keen on avoiding this.

Guides and contractors have been subject to normal occupational hazards, losing a finger when cutting slate, falling off a ledge or over a low wall, or injuring a foot when tipping a mine wagon. The greatest single cause for guide and contractor injuries has however been falling off ladders, and usually only a short distance 0.5 - 1.5 metres. One sales assistant broke her leg falling in her shop.

There were also several easily avoidable accidents, for example, one boy threw a length of timber and hit another in the eye, and a 'trainee' within a mine area was injured jumping from one building to another.

Thank goodness none of the accidents involved roof-falls, explosions or inrushes - but even the smallest injuries can cause discomfort and cast. Everyone moving in and

about mines should always take the greatest care, particularly since visitors do not have the "pit-legs", or the senses developed by regular mining activity.

Addendum : The provisional list of reported accidents for 2002 shows an annual increase to 4, three of which involved fractures bones.

Ivor J.Brown

Viewfinder - new from English Heritage: August 2004

Viewfinder online picture resource currently containing about 30,000 historic photographs, including industrial subjects.
Go to http://www.english-heritage.org.uk/viewfinder for more information.

ENGLISH HERITAGE - REVIEW OF THE NATIONAL MONUMENTS RECORD

A report on the review of the National Monument Record is available from English Heritage on the Internet at the following URL - http://www.NMRreview.org

The report has been split into two parts. The first part containing the conclusions and recommendations of the report can be viewed online or in a downloadable PDF (Requires Adobe Acrobat Reader). The second part containing the full report is only available to download in PDF format. Additional documents relating to the review can also be downloaded from the bottom of the page.

BRITISH CAVING ASSOCIATION WEB SERVICES

The British Caving Association can now offer cut price web hosting solutions for its members. This is a fully featured service which gives you complete control of your webspace and email. Hosted on Windows 2003 servers or the latest Redhat Linux servers.

Information is available on the BCA web site
www.british-caving.org.uk <http://www.british-caving.org.uk>
email: webmaster@british-caving.org.uk

FORTHCOMING EVENTS

NAMHO AGM and Council Meeting

Saturday 12 March, at The Castle Inn, Highley, Shropshire. Those who arrive early will have the opportunity to see the mining exhibits at the Severn Valley Railway Museum, and there will be a visit to Kinlet Colliery after the meeting.

NAMHO Regional Research Seminar, south-west of England

Saturday 9 April, Exeter - see details on page 1 above

NAMHO 2005 conference - Dorking,
8-10 July

Full details on the programme and booking forms are available on the conference website - http://namho2005.wcms.org.uk/index.shtml - or by contacting the organisers by post - NAMHO2005 Conference Organisers,
13 Beaufort Road, Reigate, Surrey, RH2 9DQ

IMHC 2006

The International Mining History Congress in Belgium, 9-17 October 2006 - more details as available.

FUTURE NAMHO CONFERENCES / FIELD MEETS

At the Council meeting on the 13th November we had the opportunity to discuss future NAMHO conferences. In particular we were looking to 2006 which, in terms of organising a conference, is not very far off. As it is we now have a qualified offer of a conference, with an emphasis on the field / underground element, for 2006 in a relatively central location - more details once the venue is confirmed. But, looking a little further ahead to 2007 and 2008, it would be helpful to have some suggestions as to future conference venues, particularly from groups willing to do the organising.

We have been looking at the possibility of holding a conference in Scotland. There is a suitable venue available at the Scottish Mining Museum but the field element would be rather restricted without the help of local groups. If you have interests in Scotland, give the idea some thought.

The format of the annual conference / field meet is up to the organisers - perhaps you have a particular theme in mind, a particular mining field, mine or group of mines you would like to present to the wider mining history community. You don't have to do it alone, you can involve other groups; given a small group of committed individuals, the organisation is not difficult. NAMHO will provide financial support, in the form of loans to cover initial costs and deposits on a venue, and advice based on experience in organising past events.

MATERIAL FROM FROM THE NEWSLETTERS

Your temporary editor does receive newsletters from some of our constituent organisations; but as yet very few come to me in my role as editor, most come through my membership of particular groups. Some newsletters certainly stand out as very informative publications, for example, South Gloucestershire Mines Research Group - packed with a wealth of local knowledge. Some, although targetted at a regional interest group, contain material which should have a wider audience. Below is an article by Mike Osman from the Plymouth Mineral and Mining Club Journal, Vol. 34, 1 (June 2004), which addresses a feature in our relatively recent past - the

working life of the hard rock miner - and, like all such elements of history which are within contemporary memory, worth recording for the future. It appears with the consent of the author, and the editor of the journal concerned, and is, I'm sure, available for reprinting elsewhere - but check first.

ANOTHER DAY, ANOTHER DOLLAR

By Mike Osman

Does anyone not connected with the mining industry know what a metal miner actually does during a typical day? He goes underground, drills, blasts and comes up again, right? Well, yes, but there's a little more to it than that and on the probably unwarranted assumption that at least two people are interested, this article is an attempt to describe a day at South Crofty in the 1970's.

The nominal day is from 7am to 3pm and men working on the lowest level (380) are sent down first, at 6.30am. There is an unwritten rule that you change and go underground in your own time, but come up, shower and leave work in the company's time. We are driving a 7' x 7' tunnel on the 360 level, so I arrive about 6.20, change and then check the night shift book to see how many wagons of dirt the night shift mucked out of our end. The number gives a good idea of whether yesterday's blast was successful. Then its time to get my lamp (Number 276) from the self-service lamp room and draw a locked wooden Det box from the Det House, together with a couple of reels of connecting wire (the box was number 52 but the Italian Det man encouraged me to ask for number cinquente duo). The box contains four dets of each delay from 0 to 9 (ie 40 in total) and the key has to be kept on one's person.

The cage arrives at 360 about 2½ minutes after leaving surface and an immediate check is made as to whether there are any sharp drill steels waiting to be taken into the work place. The answer is no, thank goodness, as it's a 20 minute walk to the face and they are heavy to carry. Sometimes you can get a trammer to carry them at least part of the way on his loco, though it's against the rules. In this instance our night shift must have taken them in.

Straight into the face and yes, the round broke well. Then back to the croust seat a few dozen yards for a cup of coffee if your flask hasn't broken. (Those old glass refill vacuum flasks were not very robust and on more than one occasion I've seen a man arrive at work, find his flask was broken and go straight home again). Also, personally, I need a few minutes to wake up, having been on auto-pilot until now. Half asleep or not, we note that our night shift has laid a new set of 30lb track (good) but we'll need to extend the air and water pipes before blasting. After a smoke and coming fully awake (aarrggh, where am I?) we set both rock drills up at the face. They are Holman Silver 303's, introduced in 1970 and rated to drill at 17" per minute under favourable conditions. They have gradually superceded the Holman Silver 3's (12" per minute) and Atlas Copco Puma rock drills. The latter were nice handling machines but relied on very good air pressure and the further away you are from the shaft, the lower the pressure.

Before starting to drill, we now have to make a minute inspection of the face in case there is a socket with a tiny amount of unexploded dynamite still in it. Yes, I know

it's really gelignite, but we still call it 'dynie' or 'powder' and though drilling in a socket is both forbidden and stupid, you can't always see them, so great care is needed. There were two blasting accidents that I remember during the 1970's; both the result of drilling into explosives. In one case a young man had recently obtained his blasting ticket and had drilled a 6' round in a boxhole. On charging up the hole he found that he'd neglected to deepen one hole from 4' to 6' and so, pulled the primer (the stick of powder with the det in it) back out of the hole and set the machine up again (breaking regulations) to deepen the hole. Unfortunately, he'd pushed a stick of powder up the hole (these holes are drilled upwards almost vertically) to act as a cushion ahead of the primer and to protect the det from damage by being banged against the bottom of the hole when tamping. You have to tamp the powder (ie squash it in the mouth of the hole using a wooden 'charging stick') or obviously it will all fall out again. This cushion stick of powder had not fallen out and the miner had not realised it. The resultant explosion when he drilled into it blinded him, so we were told, and we had a collection for him but heard nothing more.

In the other case, a father and son team were drilling a small tunnel and drilled into dynamite left from the previous blast which was hidden in the face by the rock having turned to powder and then been re-solidified by the great heat. Sintering, the experts call it. They were both partially blinded.

Rules were broken, but both of the accidents could be partially blamed on the prevalent habit at the time of putting a cushion stick of powder ahead of the primer.

A det is directional and if pushed to the bottom of the hole it points out to the mouth and flame propagation will travel the full length of the hole, initiating all of the explosive. What, however, if there is a stick of powder behind the primer? On the rare occasion it will not initiate properly and I've seen many a rock face with bits of powder embedded in it where the round broke a few inches short. Perhaps it's lucky that there were not more blasting accidents.

OK. So we are ready to start drilling. First we have to mark the face with sockets an inch or so deep in the correct pattern and it is much easier to do with two of you. I wield the machine and my mate holds the drill bit on the face with his gloved hands. We call it 'collaring'. Once the face is marked, pandemonium breaks loose as both machines roar into life. I will drill more holes than my mate for several reasons:- I'm more experienced; I'm drilling the cut and easers (which are concentrated in the middle of the face and are thus faster, though need more skilled drilling); and he'll have to go for the explosives whilst I finish the drilling.

Well before we finish, the shift boss makes his daily visit, so we retire to the croust seat for a 'bit chat' and if he is a smoker he will cadge two or three cigarettes from us. I don't know what it is about shift bosses, but some of them turned into awful scroungers. However, a good one can facilitate your work to a high degree by, for example, making sure that the equipment you need day to day is on hand and not stored ¾ mile away. Things like pipes and pipe fittings, steel pegs, rails, fishplates, track bolts and dogs, sleepers etc. If you are running late he might arrange for an OC Man (Owner's Charge, ie weekly paid underground labourer) to bring your dynamite in, or leave you a spare electric loco so you can carry your blunt steels back to the shaft at the end of your shift.

On again with the drilling and whilst my mate goes out to the 360 level magazine for the powder, I finish the round by reaming out the holes from 1¼" diameter to 3" diameter using a special drill steel and bit.

Now is a good time to try and explain in layman's terms how a blast works. Too many books on mining assume some prior knowledge and one of my two readers might be a complete tyro. Consider drilling a single hole in a rock face to a depth of 8'. You charge it up, fire it and the hole acts as a gun barrel, with all of the blast and powder being shot out of it and just a little rock braking off at the mouth. What a waste of time and material. However, what if that hole had another, considerably larger (3" dia), one drilled parallel to it and only a couple of inches away? Before the blast had a chance to blow out of our hole, as in the first instance, it would have broken sideways along its length into the larger hole close by. The blast would (or should) have also blown the fragmented rock out into the tunnel. We now have a slightly larger diameter hole than we started with and by repeating this with four other holes we have created a hole 8' deep into the face by 12" or 15" square. This is the cut:- originally 9 holes drilled parallel, one of them reamed to 3" diameter and 5 of the 9 holes blasted. We carry on the cycle by blasting holes further away (eg the squaring holes, side holes, crown hole etc) until the entire round is broken. There are numerous other cuts that one can use, though the above was generally used at South Crofty. It is a parallel hole cut, as are the Greenland cut, the Taby, the 3 section, the 4 section, the spiral, the double spiral, the Coromant and the old fashined burn cut. Other sorts include the wedge cut, drag cut, draw cut and stoping cut, all used at Crofty years ago. Accuracy of drilling is possibly the greatest mining skill and never more so than when drilling the cut.

Still on the subject of how the blast works, we must consider how much powder to use in the hole. I mentioned sintering previously and this is what can happen. The first few holes you blast are very close together and if you use too much explosive, the heat generated in them is so great that the rock debris is turned to dust and some of it re-welds itself back into a sort of soft, reconstituted, rock before it has a chance to be thrown out of the cut. Miners call this 'Freezing up'. You can, however, put as much powder as you like in the outer holes, though it would be a waste if the cut doesn't break.

My mate is back by now with the powder - a case + 50 which is 210 sticks and a weight of 65lbs. We've drilled 28 holes and I intend to blast 24 of them, so I put the appropriate number det in the mouth of each hole (no mistake that way) and we start charging up. The outer holes will have 9 or 10 sticks of powder each and we use spacers to bring the charge right to the mouth of each hole. Spacers are merely 8" long sticks of 'firewood' about ¾" diameter so you can space sticks of powder one from another whilst not stopping the blast from propagating. However, in the cut, bearing in mind the previous remarks about freezing up, I use only 6 sticks of powder per hole and lots of spacers (eg. Primer - Spacer - Stick - Spacer - Stick - Spacer etc). We must bring the charge to the mouth of the hole or something called a 'bullring' may occur. I dislike mentioning this as the memory is still raw, but suffice it to say that I once had a 10' round which bullringed. It took two more days to clear up the mess. Shudder!

Before wiring up, my colleague turns off the air and water and we unbolt the taps that we've been feeding our machines through. We then add new pipes, replace the taps and turn the air and water back on again. Then we build a little edifice of spare pieces of timber to protect the taps and fittings against the blast.

Now its time to wire up. Each hole has two wires hanging out of it and we twist the bare ends together, det to det, in series, to join them all up. 24 dets means 23 joints - count them- before testing the circuit with an ohmeter. The resistance should be around 40? but its not critical up to about double that. We join the two spools of connecting wire which we brought down this morning and run them out with us as we quit the end, pausing only to crack the air tap on so that it helps blow out the fumes for our night shift. We run the wires back to the firing cable and join them up, then wander back to the croust seat until it is time to blast. There is no need to erect a barrier nor post a sentry as this is a dead end and nobody can get mixed up with the blast unless they pass us. At 2pm we go back to the end of the firing cable, test again, connect the exploder, wind up and press the button. Its back to the shaft now, to be hoisted to surface about 2.30pm.

The foregoing is a long-winded way of repeating what I said in the second sentence, isn't it? You go underground, drill and blast and come up again.

Now, a few relevant jottings which may be of interest. The machines were each lubricated by an 'oil bottle' snapped onto the air line and holding a pint or two of oil. The system was total loss, so up to half a gallonof oil was blown along with the air through the exhaust ports during the shift. Some of this oil atomised and mixed with the water vapour to form a mist which we called 'funk'. You could hardly see the face sometimes and we were usually covered in oil.

Each machine has a water needle running through the middle - merely a long tube with a washer brazed on at one end. It delivers water through the drill steel to supress dust. At one time Holman's were charging £4 each for water needles which was why Crofty started importing them from South Africa at £1 each. No remarks on British industry, please.

Track (rails which locos and wagons run on) was rated at 30lb, 40lb etc. This means that it weighed 30lb or whatever per yard run and the gauge when laid was 22". Tunnels were driven at a gradient of 1 in 100 which meant that, conveniently, a set of track could be laid flat and then lifted 2" at the front end. In a wet drive the water would show you how level it was, much better than a spirit level. We also, on occasions, used short pieces of GWR which was 120lb track. Guess where it came from! This was used when extra strong support work was needed, maybe in bad ground.

You may remember the Pay and Income policies of the Heath and Wilson governments, which sought to restrict wage increases. South Crofty was one of the six firms mentioned by name in parliament who had ignored these restrictions. It was said that we had not so much broken the pay code as driven a coach and horses through it.

Finally, apropos nothing at all, I offer Crofty miners' views of the other two major mines. We respected Geevor miners ability in granite but thought that their techniques were rather old fashioned. Some people call the St Just area 'Deliverance Country' after the film. Wheal Jane men were known as 'mud miners' - their country rock is killas, not granite - or 'Wheneyes' (when I was at Wheal Jane…..). I do not wish to know what they thought of us!

My thanks to anyone who has read this article without their eyes glazing over!

Ysbryd y Mwynwyr ~ Spirit of the Miners

Some news just in - Ysbryd y Mwynwyr ~ Spirit of the Miners - or the Ceredigion Uplands Mining Heritage Initiative - a Ceredigion County Council project has had funding approved by the Welsh European Funding Office (WEFO) with support from the European Agricultural Guidance and Guarantee Fund (EAGGF). Their immediate plans are to advertise for a Project Officer to run the project and the key fund that supports it.

Those of you with interests in the mining history and archaeology of mid-Wales should now see a change in attitude to the surviving mining features in the area . The project focuses on the mining landscape as an asset for community based tourism not something to be swept away and buried.

More details will be available as the project develops - with one or more NAMHO organisations represented on the steering group.

THE NEXT NEWSLETTER

I'd like to get another issue of the Interim Newsletter out before the AGM in March but much will depend on how much free time I have at my disposal. It would help if material can be forwarded to me in digital form by e-mail before the end of February.

Peter Claughton - <P.F.Claughton@exeter.ac.uk>