

OMNIBUSS-5

& Expedition Report

OMNIBUSS

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Exchanges welcome:

EDITORIAL

As yet another edition of Omnibus rolls off the presses (via the Union bar) you might think that, as it is a yearly journal, this edition is rather premature. There is of course a reason for this (or is it an excuse!) The last issue was late as usual but the early publication of this one has more than made up for this. As the reader will see it is mainly an expedition report but also contains some other articles of an interesting general nature.

This is my third year (possibly the last) as editor and it is to be hoped that the quality of presentation has improved during this time, including my spelling. As this is not a newsletter but a journal the aim is to produce original material on general caving topics along with new exploration. Yet again this has been achieved but there is a noticable lack of original exploration in the British Isles. In fact there seems to be a general lack of interest in any long term project so what are we going to put in Omnibuss 6?

A good deal of effort has gone into this edition and more people than normal have helped both in the production and the writing of articles. I would like to thank all those people who have contributed in any way. The task of editing this edition was slightly different from usual in that it is mainly a report of our 1973 expedition. Rather than just waiting for any articles to appear on the editor's desk it was a matter of setting out the basis of the report then telling individuals to write on various topics. This means that I am entirely to blame for the layout of the report and its general content. The basic format of the report was based on the general layout of a number of similar reports on expeditions to Spain.

Anyway I think I have said more than enough, except that I hope you enjoy reading the rest of the report even if you thought the editorial was a load of waffle.

A.S. HALL

Secretary's Report

Since the production of Omnibuss 4 the society has gone through a great deal of change in enthusiasm, activity and membership.

During the post-exam period and during the vacation enthusiasm and activity was at an all time high with a large number of trips to both South Wales and Yorkshire culminating in late August with an expedition to the La Hermida aread of the Picos de Europa in Northern Spain.

During our first visit to this area which lasted for 20 days a start on exploring the area as made finding various caves some of which would be of particular interest to the cave diver. Of course the most interesting cave was found on the last day of the expedition.....Another expedition is in the course of being organised for next summer.

Throughout the Autumn term there were a number of crises which might have been the end of a lesser club. It became clear to all that the number of enthusiastic "lunatic fringe" members had become sadly depleted during the last two years with the result that general caving morale had been lowered somewhat. Secondly the Guild took it upon themselves to cut the grant by 50% for some unknown reason and finally our greatest problem was that of getting some sort of reasonably cheap transport to get Club members to the various caving regions of Britian.

Different solutions have been tried but none have been more than partially successful, the cost of meets tending to put off the budding caver and dissuading the enthusiast from going "club caving" too often. This situation seems unlikely to improve unless we, with other interested societies, could coerce the Guild to provide some sort of transport for the outdoor societies. Various clubs that belong to the Athletics Union are provided with free transport to matches. Perhaps the Union outdoor pursuits societies should benefit in this way too.

Now to more mundane matters....The amount of club tackle has remained fairly static over the last few months with new belays being made and new rope purchased to replace tackle that had been lost or worn out. We have recently purchased some new cells and hope to fit a generator in the mine both to charge cells and provide lighting for workshop facilities.

I am relieved to say that the Sychryd Valley survey has finally been published and recently some club members have been around a promising new area at Cefn yr Ystrad near Pontsticill. Various life-members are still active in Yorkshire especially at Dead Dobbin Pot. In addition Whippington Brook Sink in the Forest of Dean has been dug on many occasions.

Thanks are due to all those people who have helped the Society in the last year, especially:

Those life-members whose support on some of the meets was invaluable.

All those people who instead of drinking were driving.

Those people who did not go to Spain but helped overhaul 5284 FD otherwise known as "the Landrover" whose overhaul was surely the longest and most frustrating in club history.

I would also like to thank Mike Weeks and all those virginal helpers at the bread and cheese.

Finally I would like to congratulate that 1.95 legged wonder who is in his third year as editor of Omnibuss and deserves some sort of special praise.

Bob Daunton (Hon. Sec.)

COMMITTEE 1973/74

El Presidente.....M.F. Cowlishaw

Secretary.....R.G. Daunton

Treasurer.....M. Weeks

Tackle Master.....A.S. Hall

Librarian.....P.G. John

Sixth Committee Member.....M. Darville

September 1973 Expedition to the LA HERMIDA Area of
the Picos de Europa, Northern Spain

RESUMO

La siguiente narrativa es un resumen del trabajo espeleológico que fue realizado por Birmingham University Speleological Society durante su expedición a la región de La Hermida en los Picos de Europa, España Setentrional. Los nueve miembros de la expedición, la base del desfiladero del Río Deva fue totalmente explorada, para procurar cuevas. La mayor cueva encontrada en el desfiladero es una cueva de más de 300 metros de largo, con formaciones bellas, y una corriente de agua. Esta cueva, la Cueva de Fair Share, fue inspeccionada y un plano fue levantado, una copia de lo cual es adjuntada. También, los alrededores de la cueva de 2 kilómetros de largo, el Pozo del Infierno, fueron investigadas detalladamente. En esta área, descubrimos una pequeña cueva que contenía una gran cámara y algunas buenas formaciones.

Pozo del Infierno fue también investigado minuciosamente y numerosas descubiertas interesantes fueron efectuadas. Estas incluyen cortos largos de galerías (100 metros de largo) en la primera parte de la cueva antes de la Sala del Tiu, una profunda grieta que va 30 metros corriente abajo y 150 metros corriente arriba. El sistema es espectacular, pero la entrada es difícil de encontrar, de modo que incluimos una carta detallada y una descripción de la entrada en este relatorio.

Otras áreas también examinadas fueron la área a este del desfiladero, próximo a Linares y Pineres. Ninguna cueva grande fue encontrada, pero algunas áreas de interés son descritas, en el relatorio, una de ellas siendo una fuente en el camino de montaña próximo a Linares. Los valles tributarios al oeste del desfiladero también fueron visitados. Es uno de estos, próximo al pueblo de San Esteban, un gran sistema de cuevas nos fue mostrada por la población local. Debido a falta de tiempo, no fue posible explorar totalmente este sistema, pero contenía grandes galerías y buenas formaciones.

Para concluir, nosotros pensamos que es justo decir que la área merece una otra visita. Más cuevas pueden ser encontradas en la región.

PREFACE

Early in 1972 there was a feeling among a small nucleus of club members that we should have an expedition on the continent. Feelings were mixed about this and Greece was chosen as an objective, enthusiasm was lacking as it was such an expensive objective, thus the plan was abandoned.

In the autumn term of 1972 the idea was resurrected and from the beginning it was decided not to make it an expensive expedition. With this in mind we decided to go to Spain; but where in Spain? We had the choice of the Pyrenees or the Cantabrian Mountains - an extensive choice. On perusing through the various journals in the club library it seemed that if we went to the Pyrenees we would need an enormous amount of tackle with a large number of people - these were beyond our resources.

One lunchtime while sitting in the bar Chris Harvey produced a glossy journal of Nottingham University's recent attempts in the Picos de Europa. It seemed that the caves were not of enormous length or depth, however some were longer and the chances of reasonable discoveries seemed great.

One or two areas caught our attention particularly the area surrounding the village of La Hermida in the Deva Gorge (Prov of Santander). On consultation with Geoff Mathews (C.R.G. Foreign Sec) the editor of the Nottingham journal we found that nobody had explored the area thoroughly though one group SES Talps of the Centro Excursionista del Valles were known to have examined the area, having discovered Pozo del Infierno, then the largest cave in the Picos de Europa, along with a number of smaller caves in the area. In 1964 Geoff had reconnoitred the area in preparation for the '65 Nottingham expedition but had not considered it of sufficient speleological interest. N.U.S.S. had retreated to the Sierra Cuera nearer the coast where the landscape was not so rugged but with greater caving potential.

In the environs of La Hermida and its gorge hardly any work had been done on an intensive scale and the SES Talps journal seemed rather sketchy. On examining a 1:50,000 map the dry valleys around the gorge along with the gorge itself seemed interesting. As Poso Infierno was in one of these valleys itself, we hoped to find something equally as significant in the others.

Expedition Members

Recruitment of people to go to Spain was limited. People in their third year of their course could give no assurances that they could go as they said justifiably that they might have jobs by the time we were due to go. The time chosen was from the 28th August - 26th September as this gave people time to raise the money needed. The Life Members of the society were unenthusiastic possibly partly due to the September timing. Consequently only those people in their first or second years along with Andy could say positively if they could go or not. Fortunately there were enough experienced cavers who wanted to go to make the expedition viable.

R.G. Daunton	(Secretary)
A.S. Hall	(Tackle Master)
M. Weeks	(Treasurer)
M.F. Cowlishaw	(Catering Officer)
P. Jones	(First Aid)
G. Petrides	
M. Neal	

Later a friend of mine Zareh Balekjan from Brazil decided he wanted to go to Spain for his holidays. He was to come with us as far as La Hermida, but on arrival he was so impressed by the scenery that he remained with us for the duration of our stay in the area. Also the weather was so hot that he did not feel inclined to travel around Spain by bus. The rest, of course were pleased, as Zareh, speaking Portuguese could talk to the locals about the "Cuevas" for us and apart from one or two minor misunderstandings with the locals at Potes we had no linguistic difficulties. While we were at La Hermida we were joined by

Bill Collis a friend of Mike Cowlighter from O.U.C.C. who are well known for their work in the Picos, so in the end there were nine of us at La Hermida.

Planning

As has already been said we had decided to go in September - unfortunately ruling out some people. It was clear that the expedition would be a small one and we could not hope to make more than a reconnaissance of the area, hoping that a future expedition would be worthwhile.

Our great problem was transport, bearing in mind that our reconnaissance would involve a great deal of travelling unlike some expeditions which have a definite objective in sight. We resolved to buy or hire a landrover or van. We eventually bought between ourselves a delapidated S.W.B. Landrover for £275 and proceeded to renovate it, a job that took much of the summer term and half the vacation, during which time the engine was totally stripped and reconditioned and all other mechanical parts overhauled. Just before we went to Spain the hood disintegrated on a gusty trip down the M6 on the way back from the the Yorkshire Dales, costing us more money. We think that eventually over 1000 man/hours were spent on the vehicle before it sent to Spain, but in the end all this work payed off as the only trouble we had in Spain was one flat tyre.

The original idea was for everyone to travel in the landrover taking with us a trailer to carry the gear. Various people objected to this and said that instead of a trailer we should take an extra vehicle and after the sums were done were found that it would not cost much more, but at the same time be much more convenient. The problem was solved when Martin agreed to take his Mini. In hindsight it would probably have worked out cheaper if we had had a small van to carry the gear with everyone else coming out on a student flight or train.

Another exasperating problem was to get permission from the relevant Spanish authorities - a very slow, confusing bureaucratic process that took a great deal of time. We eventually got one lot of permits a fortnight before we set off. The procedure for getting permission seems to be changing all the time and I recommend that anybody wishing to cave in Spain should contact the B.C.R.A. foreign Secretary about a year before you wish to go.

A word of warning:- if you are caught without these permits you are liable to be arrested by the Gardia Civile and possibly have your equipment confiscated. Within this context an incident happened to us which may be of interest to others intending to go to the area. Having obtained all the necessary permits we arrived in La Hermida and obtained a convenient campsite close to a hot spring, the river and a safe water supply. Even so the site obtained was in a National Park, within the village limits and next to the road all of which is illegal under Spanish law. We assumed that as we were an official expedition we were safe but after being there for a week the police arrived and told us to leave by the following day. We managed to secure a new site further in the village but hidden from the road so we were not seen by the police when they visited the village every day, arriving on the bus from Potes.

Maps

Small scale maps of Spain are fairly easy to obtain. One of the most useful motoring maps is on a scale of 1:200000 and produced by Firestone or Michelin. Anything on a bigger scale than these means acquiring the various Spanish military maps.

The largest scales available covering the whole of Spain are the 1:200,000 and the 1:50,000 'Mapa Militair de Espana'. The latter one of these is the most useful for speleological purposes but unfortunately it is out of print with no plans for reprinting. A limited supply of these maps is obtainable from the Spanish Geological Commission. A 1:200,000 geological map is obtainable from the Commission. In general however we found that the geological map of the area was of limited use for our purposes, also some inaccuracies in the mapping were detected. A 1:50,000 geological series is planned to compliment the revised topographical series some time in the future.

Various other maps of the Picos de Europa are available but only cover the high Picos massif. These are the 1:50,000 tourist map and the 1:25,000 Spanish Alpine Club map. These are obtainable from the Geological Commission, most of the others can be obtained from Stanfords in London, although delivery may take 4-6 months.

Bob Daunton

Sponsorship Acknowledgements

The organisation of the expedition was done on a shoe-string budget but the goods and financial aid obtained from various sources was of great help in setting us off on the right footing. We would like to thank for their help the following people:-

Financial Aid:

Guild of Graduates and Students of Birmingham University	...	£120
Joseph Lucas Co., Limited.	...	£ 10

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H & T. Kirby, Limited.	

Introduction to the Speleological Areas Examined

The village of La Hermida lies on the Rio Deva, which forms the eastern border of the High Picos. These mountains which are situated in the provinces of Santander, Ortiago and Asturias, Northern Spain, are mainly formed of Carboniferous Limestone and go up to nearly 9,000 ft. They can be divided into three massifs of which the western has been most closely examined.

Our own investigations were carried on in and around the Deva gorge (Desfiladero de La Hermida) and the area can be subdivided into a number of sectors, which are dealt with individually below. If the accompanying map is studied it will be seen that these areas have been divided up taking into account relief, roads, geology and concentrations of cave sites. The order is not significant in any way but each area was examined over a period of days.

Deva Gorge (Southern section)

The limestone gorge is broken into two sections by a belt of highly folded palaeozoic sandstones and shales which cross the Deva around the village of Lebena, 5Km south of La Hermida. The short southern section of the gorge between Lebena and Cillorigo Castro provided us with one area of study and a number of caves. (Fig. 7).

This part of the gorge was first visited within a few days of our arrival in the area, while we were on our way to Potes for provisions. On our return, we stopped off at obvious looking cave entrances. The first one we looked at proved to be exciting, but three of us were not able to get very far with a can of lighter fuel and a box of matches. This is a rather spectacular but short-lived form of lighting, not to be used on long trips.

The cave itself had a strong draught which blew out a match and a stream could also be heard. Later in the evening the cave was fully explored when we returned with ropes and ladders which proved unnecessary. Leaving the tackle at the entrance we crawled for a few feet towards the sound of a stream. After a slide down a bedding plane we made contact with the stream and set off in an upstream direction. Within less than 100 ft. after traversing around some pools and ascending a water chute the stream appeared to sump, but a way on to the right was found. This involved a short crawl which led into a deep pool (where Mike W, got a bit wet). After crossing the pool we climbed up a shingle bank and found ourselves in a sizeable chamber with two ways on.

At the far end of Cairn Chamber it is possible to chimney up a rift into a large steeply ascending gallery along which progress is possible for a few hundred feet or so to a Terminal Chamber (Bat Chamber) with roots and moss in the floor and walls. This passage is richly decorated along its entire length as can be seen from the accompanying photographs. (Figs. 1, 2 and 4).

The alternative passage out of Cairn Chamber continued on at floor level, below the rift and eventually splits into a number of descending bedding planes. The bedding plane to the right led down steeply with water coming in through narrow fissures. To the left of this passage a tight crawl of some 20 ft. led to a low bedding plane with water descending from the right down a water chute. Off to the left of Cairn Chamber a rather tight passage provides a short cut back to the entrance passage.

On follow up trips into this cave it was surveyed and photographed, also a number of features of the cave were examined. Mike's deep pool was found to be an under water continuation of the large passage which led into it. The main water of the cave entered here via a large deep sump at one end of the pool, an

obvious place for cave diving. Various solutional holes above the sump were examined but none provided the hoped for bypass over the sump.

Another entrance to the cave was found in the cliff vertically above the original one. This entrance was first discovered from inside the cave, as it led off from the chamber just inside the entrance. This section of the cave was heavily inhabited with bats, which proved a distraction when we were surveying.

The original entrance lies in a depression at the East of the gorge road approximately half way between the 417 and 418 Km stone markers. From the depression a tunnel leads under the road and out into the Rio Deva below. It would seem therefore that the present entrance is a flood resurgence. This point was given more weight when we located the likely resurgence on the river bank slightly north of the cave. It is an immature looking resurgence and it is doubtful whether it could take the full flow of melt water during the spring. An attempt was also made to locate the upper end of the old part of the cave on the surface but it was not found probably due to the dense vegetation cover.

It will be apparent both from the accompanying survey and this report that the passages in the cave may be divided into two types. The Upper Series which leads down through Cairn Chamber into the upstream sump is a large old richly decorated phreatic passage of the type one would expect in such steeply dipping limestones. (Fig. 2) Much of the rest of the cave consists of relatively recent and active bedding and joint passages. The present stream(s) have utilised the older passage via the upstream sump and it would seem that a dive at this sump would probably give an easy continuation in an upstream direction to this cave. From the area map it can be seen that a large area of limestone lies behind the cave to the east of the Deva. It would seem from the amount of water issuing from the resurgence that this cave drains most of the limestone block to the east.

Another part of the southern section of the gorge was looked at on a number of occasions. This area was first approached via the tributary stream which flows through Lebena. As the stream passes over a limestone shale boundary it was an obvious place to investigate, although along the stream we found no resurgences or other speleological features. However further careful investigations may pay dividends. On returning to the village we asked if there were any caves in the area. Two different people were consulted and they both told us that there existed a cave on the southern side of the valley, Cueva de Mara. We were given instructions as to how to find the cave and in addition we were told that it was a big cave and that once a party of cavers had been there: also one of them had fallen down a pothole in the floor. According to our informants the entrance to the cave was "large and by a tree".

The next day we investigated the area succeeding in finding only two grot holes, one of which was used as a goatshed, (Map Reference 5275 9564). We looked further afield but found nothing of interest except a large number of trees. On returning to the

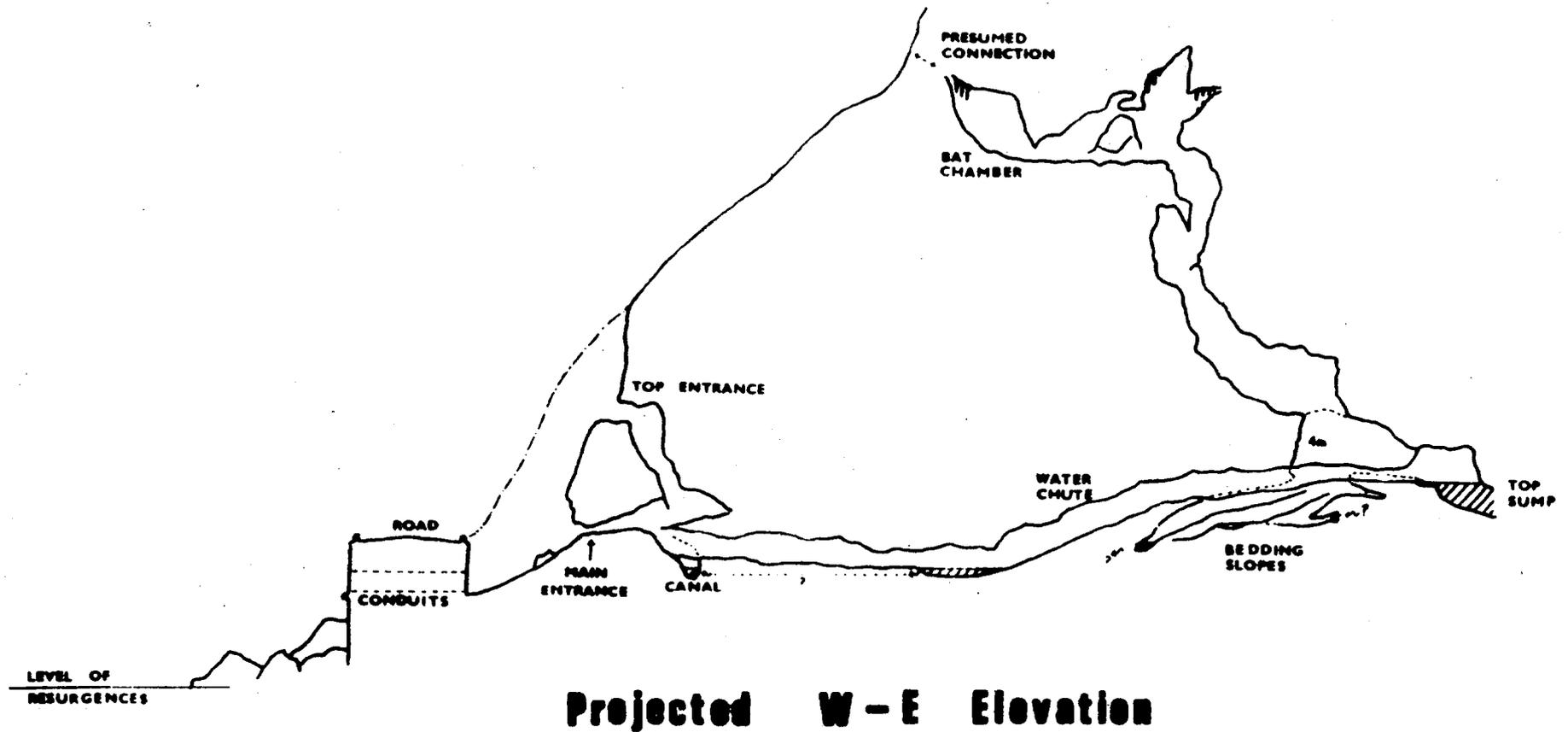
CUEVA DE FAJAS Y H. 98

DESFILADERO DE LA HERMIDA, SPAIN

BUS S Survey 9/73 by M F Cowling & P G John

VERTICAL RANGE 40m, LENGTH 280, GRADE 5b

Scale 0 10 20 30 metres



Projected W - E Elevation

CUEVA DE FAYAR HERRERA

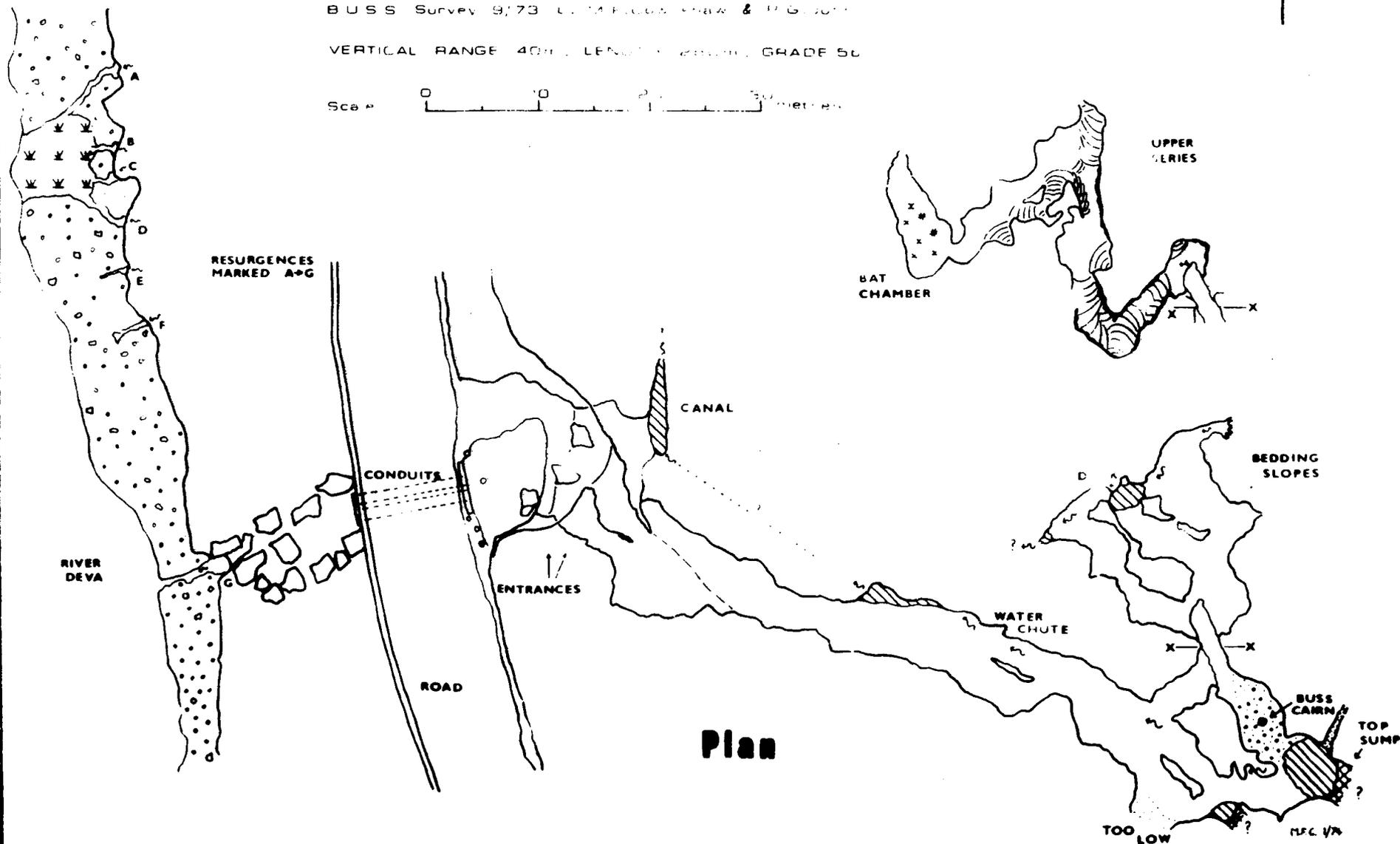
DESFILADERO DE LA HERMILA, SPAIN

B.U.S.S. Survey 9/73 L. M. FLORES CHAV & H. G. JONES

VERTICAL RANGE 40m. LENGTH 2500m. GRADE 5%

Scale 0 10 20 30 metres

TRUE NORTH



valley via the small gorge at (4271 9567) we literally fell over a goatshed cave that at one time had obviously been a resurgence. This unfortunately was blocked a few feet in but looked easily diggable.

Andy Hall & Bob Daunton

Deva Gorge (Northern section)

The northern part of the gorge runs south from Panes almost to Labena as far as kilometers stone 420, a distance of over 11Km. Virtually all of this was covered on foot in the search for caves. As one drives along the gorge numerous cave entrances can be seen but very few of these, in our experiences will go any great distance as they consist of solutional chambers produced before the gorge was rejuvenated. In fact a number of them would be impossible to get at without major mountaineering tactics.(Fig.6)

Near the southern end of La Hermida an interesting cave was explored on our first day in Spain. The entrance is at the base of the cliff above a spring used for drinking water. A 4m ladder pitch leads into a well decorated passage which runs south parallel to the cliff for about 20m through waist deep water to a very clear sump. This was dived for about 4m without finding any airspace. From the calcite at water level it would appear that the water level does not alter very much even though this cave lies some 25m above the river. Coupled with this is the fact that the water supply never dries up, as the cave is presumably connected to this spring a large reservoir must exist behind it.

A number of interesting resurgences were examined along the whole length of the gorge. Proceeding south from Panes the first of these was noted by Bill at 5253.9674, on the west bank. This has a broad entrance followed by a pool and a climb over boulders, where the stream is lost, into a narrow high winding passage. The water gets deeper until eventually a sump is met which is at least 8m deep. The whole cave is about 20m long and seems an ideal place to dive. Another large resurgence lies about 200 south of this on the eastern bank about 100m north of the bridge. The large entrance at river level leads over a pool which can be by-passed through a number of complex abandoned phreatix tubes. Either of these routes eventually reaches a large chamber with a stream passage going for a few metres to a large sump. A high level passage exists in the chamber and goes over the sump but closes down after about 20m.

Just outside the southern limits of La Hermida a multiple resurgence was noted. The upper part of this was explored for a few metres along a low crawl but became too tight. A large cave entrance in the cliff above on the other side of the road was reached after a silly climb using a piton and slings but the passage closed down almost immediately. This was quite typical of a number of resurgences and associated caves we found along the whole length of the gorge.

A short phreatic cave was explored by Mike C and Bill. This is situated on the west bank of the river near Km stone

number 422 at grid reference 5273.9598. This consisted of a descending phreatic tube, fairly well decorated and with a fill of bones and sand. A number of side passages formed another four entrances to this 100 long cave.

To sum up with regard to this part of the gorge it is fair to say that any major finds at river level will probably only be found by diving. Many of the resurgences noted but not described here are of an immature nature due to the rapid down-cutting of the gorge. Most of the cave entrances explored on the river banks closed down almost immediately.

A.S. Hall.

From the map another possibly interesting area is a large dry valley which joins the Rio Deva at 5254.9662. In summer this valley is completely dry and according to the maps of the area the only signs of cave development is a small resurgence where the people from the local farms do their washing. The farmhouse is about $\frac{1}{2}$ Km from the spring but this would seem to be the only reliable water supply in this area. We did not explore further up the valley due to lack of time but from looking at the map there may well be interesting features in that direction.

Bob Daunton

Pozo del Infierno Region

The most important cave in our area is Pozo del Infierno. This 2Km long system is in the northern part of the gorge at 5231.9637. This system is associated with a number of other caves which are described below. Pozo Del Infierno was discovered by a local shepherd who showed it to SES Talps and explored it as far as Tubo del Viento. SES Talps then explored beyond this point and extended the system beyond the sump which was by-passed via a climb. They later produced a survey of the whole system. In 1972 Lancaster University Spel Soc went into the system but from their account in LUSS 3 it is obvious that they had very little prior knowledge of the cave as they did not even find the second half of the cave beyond the sump.

In all, 6 trips were made into this cave by various parties. During these trips virtually all the known cave was explored, and many small extensions were made - these included a 25 metre pitch. In addition a very good possibility for a major extension was seen, though time did not allow this to be followed up.

Position of the Entrance

The entrance took us several days to find due to the hazy directions in the literature we had, and therefore I think detailed directions would be useful:

After crossing the small bridge at Coto del Infierno to a parking area (note the resurgence just by the bridge - small passages above the road may be explored for some distance), take the path through the undergrowth at the far end away from

the river. This strikes straight up the hillside almost immediately - very stony and steep - and then bears right (approx. South) towards a tree. At this tree the path once again goes straight up the hill through gorse bushes before bearing right again. It then skirts round the top of the dry valley which leads down to the resurgence at Coto del Infierno and reaches a sort of miniature saddle. Having had a rest in the breeze at this point, the ardent caver should then continue round the hillside at a slightly lower level (sorry, no distinct path) to where the entrance lies in small defile below one of the few trees in sight. The entrance itself is quite large, several metres across, and may be positively identified by the name in red paint just above and inside the entrance.

The whole walk can take anything from one to three quarters of an hour, depending on clothing, temperature, etc. If you are masochistic enough to wear a wetsuit and its hot weather, take a water bottle! (See Fig.6)

Brief description of surveyed (previously known) cave

From the entrance a steep 60 degrees ramp is descended (short handline helpful) down into the first of a series of impressive large chambers. The formations in these chambers are very fine indeed, some being quite huge. Many are mud-coloured. On the left at the bottom of the ramp a slope with unusual gour pools leads to a chamber which together with its ancilliary passages is a most interesting area. The Main Route continues on past a series of passages on the left to the second Ramp (handline very useful). Straw stalactites in the left hand series of passages have their lower ten cms. covered in mud, this together with other evidence shows that these passages have at some time been invaded by a slow moving river of mud which did not break the straws and has now been almost entirely washed out. Highly unusual.

Beyond the second ramp a couple more large chambers lead to a strongly draughting descending passage, the Wind Tunnel. At the bottom of this, and after relighting carbide lamps, a scramble up and over boulders and flowstone leads along a stony passage to the water chamber. This is crossed by a stream which comes from a clear green pool on the right. The stream disappears down through boulders and may be followed for quite a distance before the boulders become impenetrable. Upstream an obvious by-pass to the sump leads to a fine small stream passage which may be followed up cascades to a choke. (Anyone 14cm. wide could get through - M.F.C.)

The sump may be free-dived downstream to avoid the by-pass.

A fairly easy climb up an inlet in the water chamber leads to what for convenience we called P.d.I. 2. This part of the cave contains chambers even larger and more finely decorated than those already crossed. In Talps Gallery a six second reverberation time was noted. Exceptional by any standards underground.

The other side of the choke in the streamway may be seen downstream in the first large chamber. Upstream the sump pool may be passed by climbing round the left up to the large passage above. The stream may be followed over deep potholes and sharp rocks to a region apparently only briefly visited by the Spanish surveying team - some parts had evidently only been visited by one person, and most of our extensions were made in this area.

BUSS Extensions

The first extension of note that we found was a small tube off to the left of the passage leading to the water chamber. This led to the top of a pitch. A cigarette end and packet testified that someone had been this far previously, but the pitch had apparently not been descended. Accordingly the two Mikes ab-seiled down. The pitch proved to be a steeply sloping rift, well endowed with loose boulders, and 25 metres deep. At the bottom a fair sized chamber was found. This had been formed by the collapse of the lower part of one side of the rift.

Through the loose boulders comprising the floor in the centre of the chamber the roar of a stream could be heard, probably either partly or wholly composed of the stream in the water chamber. This boulder pile could probably be dug, and a large passage would most likely be the reward for some effort here. After thoroughly exploring this chamber and some side passages, we prussiked up the rift exploring each end during the ascent.

At the top of the streamway in P.d.I. 2, some 300 metres of new muddy solutional passages were explored by the two Mikes before a complex system of pools and small climbs were found. At this point a very promising way on was noted - just beyond the area where the ground was marked by one set of foot-prints. Only time prevented this being explored as no obstacles were evident for some distance upstream. A further visit would almost certainly yield new passages.

A few minor pushes were made in other parts of the cave without notable results.

Conclusions

This is a very fine cave, with considerable potential both upstream and downstream. Anyone caving in the area would be well advised to pay the system a visit. It really is worth the climb up the hillside.

There are one or two good dry camp-sites in the cave if anyone was to try a major push in the cave or wants to re-survey it. It is possible that we may do that ourselves.

Mike Cowlshaw



Fig. 1

Fig. 1 The Angel's Wing
in the Upper Series of
Ceuva de Fair Share.



Fig. 2

Fig. 2 A climb up flow-
stone in the Upper
Series of Ceuva de Fair
Share.



Fig. 3

Fig. 3 Wall stalactities
in Ceuva de Asta.

Fig. 4



Fig. 4 Cluster of mini-
stalagmites in Ceuva de
Fair Share.

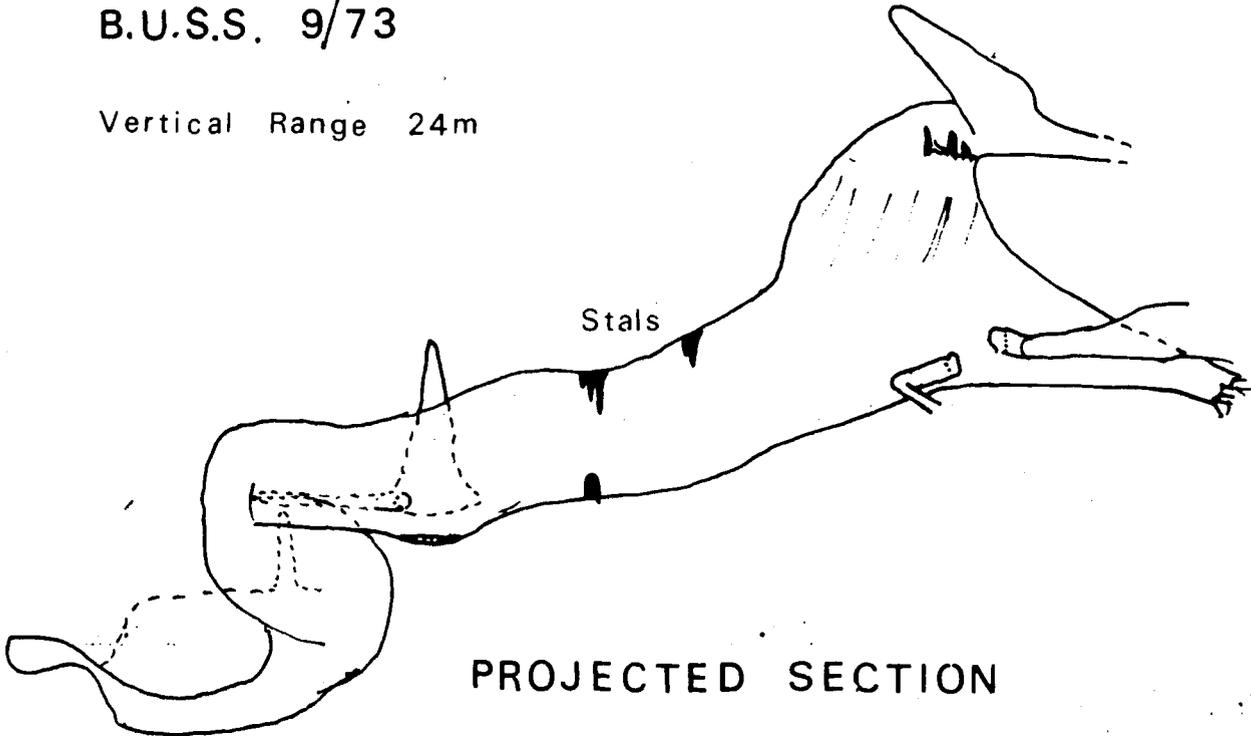
CEUVE DE ASTA

Grade 5b

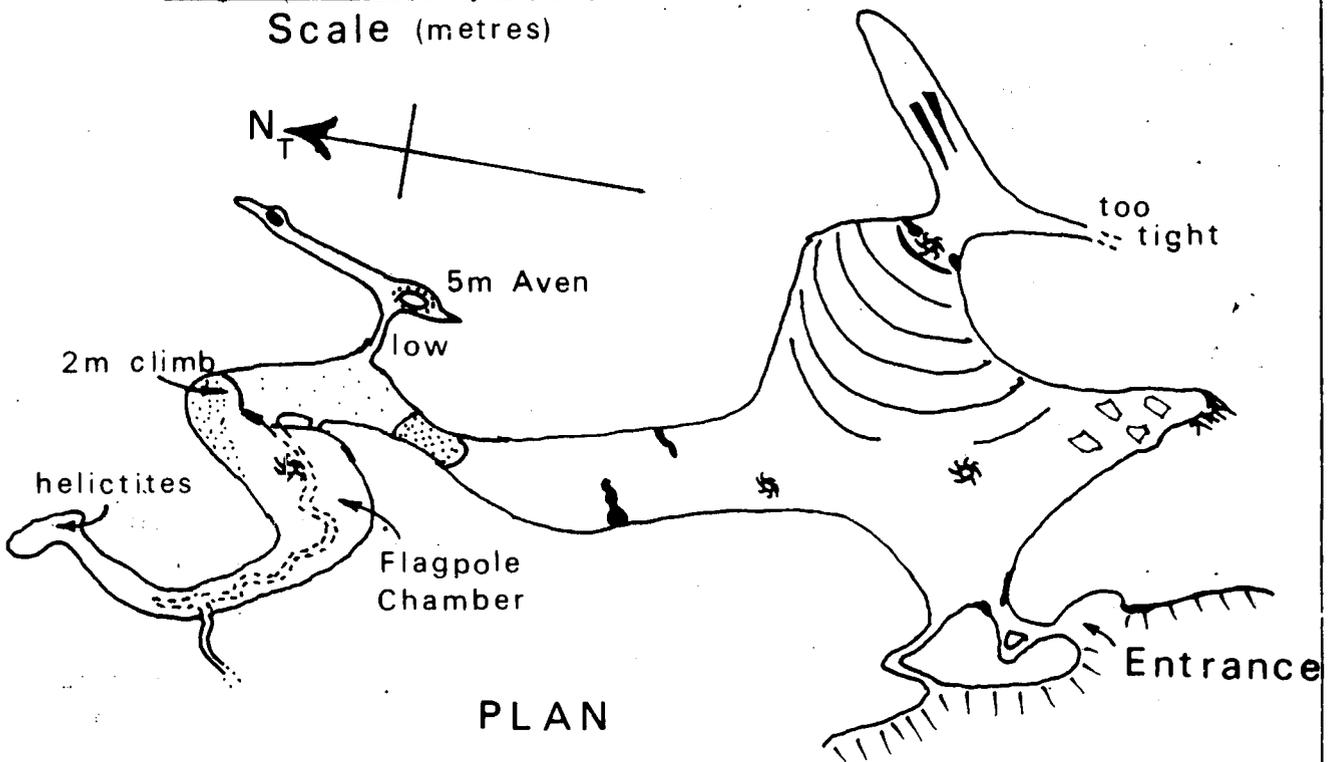
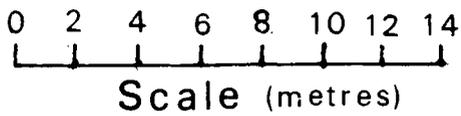
Surveyed by A·Hall, G·Petredes.

B.U.S.S. 9/73

Vertical Range 24m



PROJECTED SECTION



PLAN

Ceuva de Asto

This cave was found during the search for Pozo del Infierno and at first it was thought to be Ceuva de Cadua. The best way to approach the cave is to take the path up to Pozo as described above as far as the miniature saddle mentioned above, then instead of turning right turn left over exposed limestone and traverse round the south face of the hill which lies at the top of the valley which leads down to the Coto del Infierno. Proceed round the base of the hill past a cave shelter used as a goatshed and down a steep slope for about 50ft. The entrance is small and involves a short crawl followed by an awkward squeeze. The squeeze gives entry to a high chamber with liberal amounts of speleotherms. (See survey)

Two ways on are possible out of the chamber: the main way leads downwards at the lower part of the chamber along a low wide passage which is well decorated. This eventually develops into a high rift passage after passing over a rather unusual dried out rimstone pool. At the end of the rift passage a 2.5 metre climb leads down to a small chamber in the centre of which is a 2 metre high stalagmite which is only 2" wide and resembles a flagpole. The way on continues at the other end of the chamber along another winding rift passage until a small chamber is reached. This chamber has some well developed helictites on the walls. The roof of the lower rift passage is occupied by a narrow vadose trench along which it is possible to traverse over the top of the Flagpole Chamber back into the upper rift.

The other way out of the Entrance Chamber leads up the very smooth steep flowstone slope. This gives access through a stal barrier to a short inclined passage which becomes too tight.

Although this cave is only short it is well decorated. It seems to be formed at the base of a hill of reef limestone where it makes contact with the underlying upper carboniferous base rocks which have been overthrust at this point. Thus the cave is mainly due to solution. The rainwater has percolated through the limestone forming the large chamber. Even so it is difficult to account for the vadose passage in the lower part of the cave which leads one to suppose that this was once part of a bigger system.

Ceuva de Cadua, length 300m, is situated about 50m north of Pozo del Infierno and was explored by only one member of the expedition as we did not expect to make any extensions to it. Several small passages not recorded on the SES Talps survey were explored. One of these passages leads through a low crawl to the surface via a small hole thus forming a third entrance.

A.S. Hall

San Estaban Valley

The rather insignificant village of San Estaban lies 4 Km North west of La Hermida on a left bank tributary of the Deva. A recently improved track leaves the main road at Rumenes and goes along the north bank of the stream which leads up to the

village. Unfortunately we did not visit the area until the last few days of our stay in Spain. Much of the valley below San Esteban is not on limestone and thus was not closely examined. On our first visit to the area we walked about two kilometres up the valley above the village but nothing of interest was found, except a few small rock shelters.

After this first visit we met a villager from San Esteban in a bar in La Hermida. Although he was rather drunk he managed to tell us of a large cave near his village and offered to show us where it was on the following day. The next day saw the two Mikes, Andy and Bill at San Esteban and the villager David Lopez was soon located. He seemed surprisingly fit after the previous night's activities and was busy working in the fields. After we had dined at his house and helped him carry maize around the fields he took us up a steep path, which eventually became steeper through a lot of undergrowth to a point 1 Km south west of the village where the cave, Ceuva de Los Jarres, was situated. (N.B. the walk to this cave is far worse than that to Pozo del Infierno.)

The cave lives up to its expectations and is in fact the longest cave found on the expedition being in the region of 1500 ft long, with a number of passages not fully explored. The entrance is small but develops immediately into a large passage running north-south (see sketch survey.) The main passage is in the region of 10m square. The main route went on over boulders for about 100m to a large chamber where a number of ways on were noted. The main passage went on to the left in a southwest direction. After about 100m a collapsed area was encountered with a number of ways on through loose boulders. This collapsed chamber was looked at only briefly but easy digging would probably provide a way on.

The second way on from the chamber involved a climb up a narrow rift full of loose rocks. The two Mikes managed to overcome this obstacle and were rewarded by finding a medium sized chamber which was fairly well decorated. Exploration continued on up a large spiral passage which ended in a 25m slope covered in flowstone with grottoes on both sides. This section of passage being about 200m long was of similar scale to the rest of the main passage. The third way on from the chamber led down through boulders but was not followed for more than 20m. Meanwhile Andy and Bill went back along the entrance passage to examine two climbs which went off to the east of the main passage. The easiest of these was ascended and an inclined bedding plane passage followed for 30m. At the end a pitch was located. This would seem to be the top of the other climb. The whole of this series was richly decorated especially one bedding chamber which was full of straws.

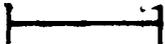
The accompanying rough survey was made using a compass and pacing, but no photographs were taken. On exiting from the cave we noted its position in relation to the village (village on map bearing of 53 degrees). The entrance of the cave lies high up on the west bank of a tributary stream. This stream seemed to have a number of sinks and possible cave entrances in the river bed but due to lack of time we were not able to have a closer look. David Lopez told us that (or at least we think he did) the water did sink in the stream. He also pointed out a place near the village where in winter a stream could be heard through cracks in the rock. To sum up this valley is one of the most interesting in the Deva gorge area.

A.S. Hall.

CEUVE DE LOS JARES

Near SAN ESTABAN

Grade 1

Scale -  20 metres

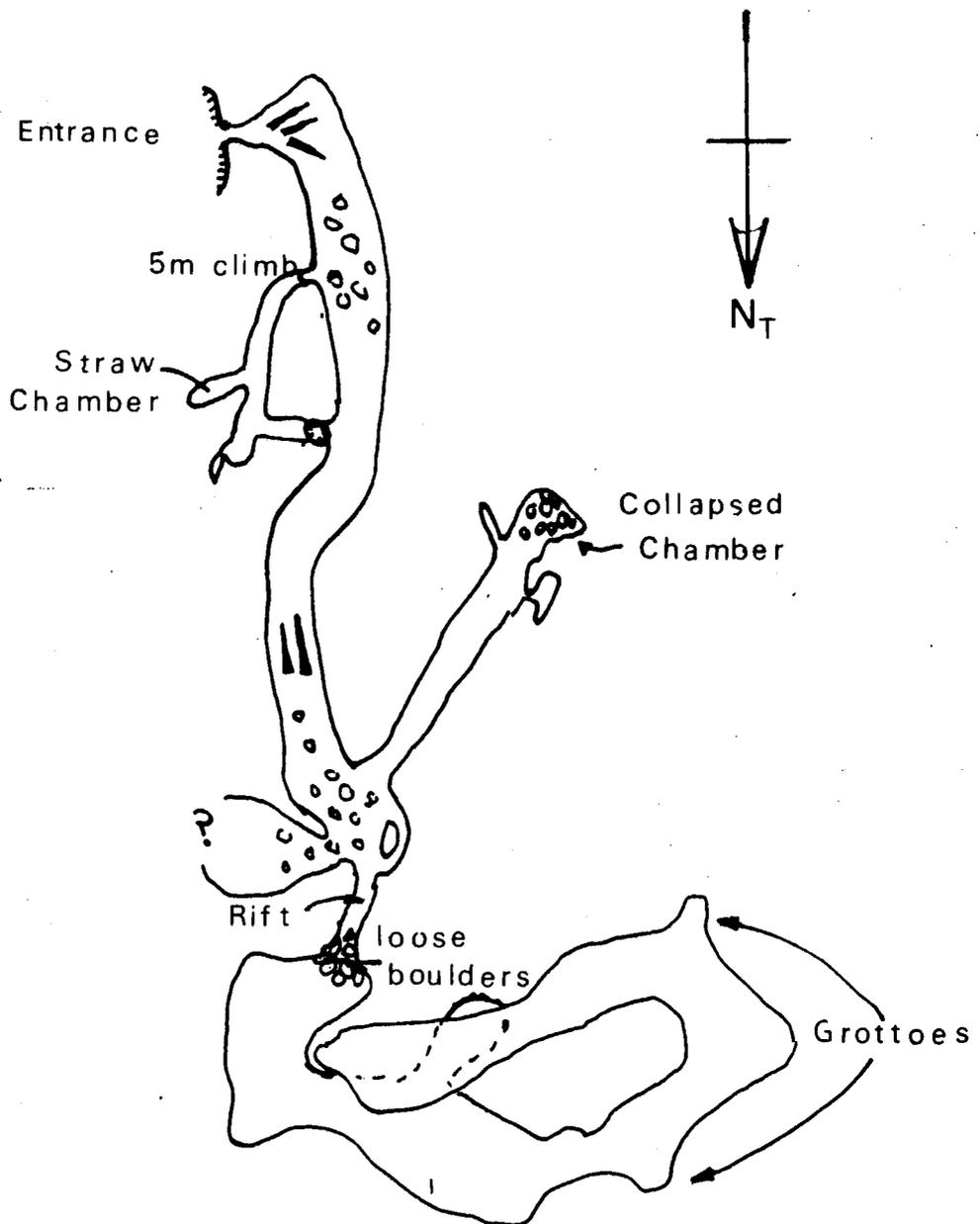




Fig. 5 General view across the gorge, looking W, showing natural arch in central background.

Fig. 5

Fig. 6 Looking N. down the gorge from near Ceuva de Asta.



Fig. 6

Fig. 7 Southern section of gorge near Lebena with vertically bedded limestone in the background and cultivated sandstone foothills in the foreground

Fig. 7



The Beges Area

Beges lies to the west of La Hermida at an altitude of about 500m. Access to the area is just about possible by landrover though dangerous with large exposed drops in places. The valley that leads from La Hermida to Beges has some small grotts in it and in the opposite wall of the valley can be seen some more cave entrances. To get to these however would involve a major mountaineering exercise.

The area around Beges does not seem to have much to offer the caver though there is a cheese store cave at Beges, Cueva de Sotarrana, Length 500m and about 500 metres above the village at El Dobrillo there is a solutional shaft 160 metres deep. We only made two short visits to this area due to lack of time so we cannot say we investigated the area in any detail.

An area of interest however is the Rio Cennera which flows from the direction of the Pico de la Aurora and is quite a large stream even in summer months. Investigations in this area may give great dividends.

Bob Daunton

Rio Urdon Gorge

The gorge about which little was known previously, as regards speleological potential, was visited by various members of the expedition on three or four occasions. The Rio Urdon is a small stream about 3-5 metres wide entering the Rio Deva by the La Hermida H.E.P. plant about 2 Km north of the village. Considerable abstraction takes place some distance upstream from the power station and water flows in a more or less horizontal canal along the side of the valley. By the time it has reached the downstream end there is sufficient head for the water to flow through a pipeline down into the power station. Due to the abstraction the dryweather flow in the Urdon is much less than it would normally be and this facilitated the exploration of the stream for resurgences, to a certain extent.

The first task in the exploration was to try and locate a known cave, Cueva de Resplenda. This had been described by SES Talps as being close to the pipeline and near to the river, which meant that it could be anywhere within an area of about 2 square Kilometres. An extensive search of the southern side of the gorge of the Urdon above the power station was made but failed to reveal any proper caves, the nearest being a goatshed cave about 10 ft. long.

The Urdon river was explored upstream from the power station for about 3 Kilometres. No resurgences were observed and no caves were found near the stream. The limit to which the stream was explored was to a still deep pool with vertical sides rising to about 50ft. on the north side and 100 on the south. This would seem to indicate rapid downcutting at this point. This dark and sheltered place where the chatter of the stream suddenly ceased had an eerie foreboding atmosphere about it and it was a relief to get back to the sunlight and friendly sounds of the main gorge.

A Although seemingly devoid of interest from the speleological point of view, the Urdon gorge was attractive in that there was a rich variety of mosses and plants by the stream. The Urdon appeared much clearer than the polluted Deva and trout were plentiful.

The village of Tresviso is situated to the north of the Urdon at an altitude of about 1000 metres. Access to Tresviso is by a steeply winding mule track with exposed drops in places. Because of the hot sun and a hangover the village was not visited, but the approaches to it were. A hopeful sign is that according to the geological map the peak "La Mesa" is capped with sandstone and possibly there may be surface runoff in the area. Another hopeful sign is that the village is famous for its cheeses and as all cavers in Spain know, where you find cheese you find caves.....(they are used as cheese stores.)

P.G. John and R. Daunton.

Linares and Pineres

This area is approached by a well surfaced track which leaves the main Panes-Potes road at La Hermida and climbs eastwards over Upper Carboniferous beds. Immediately north of this track runs the northern boundary of these sandstones and the main limestone outcrop. A number of speleological sites were found in close proximity to the track and the geological boundary. The first of these is situated at the roadside near the base of a dry valley $\frac{1}{2}$ Km east of Linares (5280.9617). It consists of a large choked resurgence used for local water supply. Numerous entrances at resurgence level and in the cliff above were investigated but we were only able to gain a few feet into a large unstable choke. With a lot of effort entry would probably be gained to an extensive system as this resurgence would seem to drain a large area. The area above and behind the resurgence was examined but nothing of any significance was discovered.

Another cave entrance was examined near Pineres. This again was close to the L'st/S'st boundary and consisted of a short passage running parallel to the track at 5285.9610. The passage was less than 50 ft. long and became too tight at both ends. Beyond Pineres the track runs mainly over sandstone with intensely cultivated areas at either side, but at one point a dry valley is encountered. This valley runs in a south west direction down to the village of Cicera and at 5305.9604 a line of deep dolines occur along the line of the dry valley. One of these had a small stream sinking in it but the cave entrance was heavily silted.

We looked further along this track towards Lafuente but much of the limestone in this area was thinly bedded with shale bands. The village of Lafuente was visited (its name means fountain) but due to lack of time the area was by no means examined thoroughly. This in fact goes for the whole of the area around Linares and Pineres. This area would seem to hold a large amount of potential as there is a large area of limestone to the north, which is probably drained by the streams which originate on the sand stone around these two villages.

A.S. Hall.

First Aid Report

Fortunately, the contents of the first aid kit were used only to a limited extent during the expedition. The basis of the kit was an ex-army first-aid kit to which was supplemented a lengthy and expensive prescription, supplied by Dr. Dickenson of the University Health Centre, along with a large amount of fly-repellent supplied free of charge by Boots also anti-septic cream and Band-aid plasters.

We were olucky in that no member of the expedition sustained no more than very minor injuries, above or below ground. Scratches, small cuts, grazes and blisters were treated with liberal applications of anti-septic cream, although we had penicillin tablets just in case. It became common practice for everyone to wear rubber gloves while caving, due to the fact that the caves had very sharp rock on which it was too easy to cut ones hands, along with large quantities of bat dirt. We had been recommended by Dr. Dickenson to use DF 118 tablets for the suppression of pain in the event of an underground accident, but they also proved useful for the relief of hangovers.

Much of the contents of the prescription was used very little. We had been warned that we were likely to be plagued regularly with stomach upsets, but this only occurred on one occasion, when all expedition members were affected, but did not lead to any vommiting or diarrhoea. Perhaps the cause was a bad sample of local sausages. We took great care to steralise all drinking and cooking water using sterilising tablets.

Fly-repellant was a neccessity during the hot weather in the first half of our stay. Boots liquid type repellent was found to be rather more effective than the jelly type, which did not seem to do much good.

All in all, the first-aid kit coped more than adequately with the (perhaps minor), problems met with.

P.G. John

Tackle Master's Report

The expedition was, for it small size, very well equipped with 500 ft. of ladder and 1,000 ft. of rope, together with a collection of belays, rawlbolts and pulleys. It was rather ironic that we only used a total of 50 ft. of ladder during our three week stay in Spain, but a good deal of the rope was used for various climbing and prussiking projects. The rawlbolts, pitons and pulleys were not used much as there was a plentiful supply of natural belays.

A good deal of personal abseiling and prussiking equipment was taken by some members, as it was hoped to send out long range exploration groups to locate and descend some of the mountain potholes of the area. This was never achieved due to the lack of time and the extreme ruggedness of the terrain. Even so, these techniques were useful in a number of occasions, especially in Poso del Infierno. We have used the now well know gear produced by Clogwyn Climbing Gear with reasonable success.

For surveying we used the well known Suunto compass and clinometers, which we have previously found to be very accurate and Grade 5 is claimed for our surveys. Also used were Fibron tapes supplied by Rabone Chesterman Ltd., free of charge.

Our main lighting during caving trips was provided by carbide lamps fitted with large reflectors, while Oldam type lead-acid accumulators were used on longer trips, as reserve lights. These were charged once a week in the village bar. We took plenty of carbide with us (28 lbs.) and the spent carbide proved useful fly-repellent in the camp-site lavatory.

A.S. Hall.

Catering Report

Due to lack of space, the amount of food brought from Britain was kept to a minimum. This was intended for use while travelling to and from Spain as most of it was dried and easy to prepare. While actually in Spain we aimed to use the local food.

One of the main types of meal brought from Britain was the large catering size packs of Batchelors curries, which at 60p a time makes a quick cheap meal for eight people. Various other standard dried foods were obtained along with mixed nuts and raisins for caving trips. Complan was donated to us as an invalid food and though it was never needed for this purpose, several tins were consumed by those who liked it, as it provided a valuable source of protein and vitamins. All water used for any purpose was sterilised using tablets which were donated to us. This was probably the main reason that we suffered no stomach upsets of a serious nature.

After about a week living on British food, it was decided that it was time to be more adventurous, so we tried some of the local diet. The local variety of canned baked beans and sausages are not to be recommended for human consumption, but our neighbour the village pig seemed to enjoy them!

Due to our small budget which we had to keep, ordinary meat was substituted with pilchards and sardines. Along with spanish pasta these became great favourites for breakfast, dinner and tea. Another enjoyable meal was sardine paella. Waste disposal problems were solved by feeding the pig who became the expedition mascot. She seemed to have an enormous appetite. This also improved our relations with the locals. All that remains is to thank our sponsors for all the food that they supplied.

G. Petrides

Financial Report

Using information from previous expedition reports I attempted to estimate the cost of the expedition and, on the whole, I was fairly accurate. The largest increase on previous years was of course in the price of petrol which luckily I had allowed for. I had not however allowed for large appetites, an under-estimation of some 30% (even though

we lived on pasta and sardines for two weeks). One noticeable item missing from the expenditure is personal insurance. This large sum was saved due to an error in making out the cheque and consequently, unknown to us we were uninsured for the latter part of the expedition. Even so, insurance of other kinds (AA 5-star, green cards, bail bonds, etc.) came to a massive £65.00

M. WEEKS.

STATEMENT OF ACCOUNTS

INCOME

	£
Guild of Students	50.00
Guild of Graduates	70.00
Lucas Electrical Co.	10.00
Each members contribution	45.00
Passenger & translator	39.00
Sale of surplus goods	23.05
TOTAL:	<u>£507.05</u>

Plus numerous donated goods.

EXPENDITURE

<u>Transport</u>	
Land Rover	
Purchase and Overhaul	378.04
Estimated selling value.	<u>350.00</u>
Loss	<u>£28.04</u>
Tax, Insurance G card	86.55
Petrol	71.00
Spares Kit	4.40
5 star travel	12.50
Hovercraft	27.00
	<u>£201.45</u>

Mini:

Wear and tear	9.06
Petrol	30.00
Bail bond & G card	10.00
5 star travel	11.50
Hovercraft	28.20
	<u>£88.76</u>

TOTAL EXPENDITURE: £496.32

GENERAL EXPENDITURE

AA membership.	7.50
Maps	8.15
Kitchen utensils	4.91
Dried Food	20.76
Other Food	75.00
First Aid Kit	9.75
Postage	1.95
Carbide	2.40
Camping Sites	12.00
Pre ex. petrol	10.80
Photography	4.32
Misc. items	21.00
	<u>£178.07</u>

Income	507.05
Expenditure	<u>496.32</u>

BALANCE: £10.73

Liquid Refreshment Officer's Report

No liquid refreshments were taken with us to Spain, we intended to purchase these as we needed them. Our first encounter with foreign (or not so foreign) brews and concoctions was in France where we espied a "Watney's Red" sign. Gordon being the generous fellow that he is, offered to buy the first round. In return for about $\frac{3}{4}$ pint of warm froth, Gordon offered a large French banknote and was surprised when he got some cheap looking aluminium discs in return. Some quick calculations were done and we found that it was about twice as expensive as in a London "clip joint". We resolved never to touch Watney's Red again. As we got further south the liquid refreshments improved although we never got to know any French beverages with any degree of intimacy.

When we arrived at La Hermida we sampled the numerous bars in turn. Eventually we stayed at the "Restaurant Paquin" where in the first week we drank gallons of "cervasas" and "vino tinto" which costs 7 pts. and 2 pts. respectively. As time went on, various liqueurs were sampled with varying amounts of success. Possibly the most virulent was coffee cognac which like the local beers was found to be an excellent laxative.

Towards to end of the expedition the most potent local brew was introduced to us by some local senoritas at the Potes fiesta: "Aguardiente" which was kept in unlabelled bottles underneath the counter, only three people were foolish enough to try this on a large scale and only two managed to drink it down in one. Mike Cowlshaw being rather the worse for wear one evening, drank one down in one, but unfortunately it came up in three much to the amusement of the locals.

Towards the end of the fiesta young Gordon, still thinking of the expensive Watney's Red, succeeded in drinking 25 vino tintos in 2 hours, though the adjudicator at the incident couldn't be absolutely relied upon as he was slightly enebriated as well.

At our last but one evening at La Hermida we made for the Panes fiesta which was a dismal failure compared to that at Potes. Martin drank half a bottle of wine and then decided to return to the Restaurant Paquin; Martin who happened to like driving fast down the gorge "forgot" there was a bridge halfway to La Hermida which meant that we nearly had an unwanted swim in the Rio Deva. Back at the bar in La Hermida all seemed set for a good evening and the locals watched with amusement as we helped a shepherd, David Lopez, get rather drunk. We then left in the early hours, certain people having to be carried back to the camp site.

BOB DAUNTON

Speleo-Geomorphology in the Desfiladero de La Hermida

The Picos de Europa, having peaks over 2600m above sea level, was repeatedly glaciated during the Quaternary. The glaciation markedly reshaped the major and minor landscape features. After the end of the Ice age solutional activity molded the landscape with the development of karren and various types of sinkholes and dolines.

Three major stages of cave development were noted during our stay in the area from the caves we visited:-

1. Pre-glacial development of a large complex system of passages probably well below the water table. As a general rule these were large passages of the type found in the entrance series of Pozo del Infierno and Ceuva de Fair Share Upstream Series.
2. This was followed by large scale glaciation of the area and a lowering of the water table. This meant that calcite deposits could develop in these phreatic passages and in fact they are all marked by large formations. Little cave developments went on at this time, as it has been proved that snow and ice derived water has much less ability to dissolve limestone than rain water.
3. The lowering of the water table continued during and after the interglacial periods, when many of the phreatic passages were left suspended in the cliffs above the the present gorge as natural arches. (Fig. 5). At the same time the large amount of running water around meant that vadose systems could develop and of course these, where ever possible, utilised the existing phreatic passages.
4. The present stage reached is that the gorge is still rapidly cutting down and thus lowering of the water table so that the present resurgences are of an immature nature, in a number of cases. It would seem that as most of the glacial cover has been removed by erosion no major sinks have developed on the limestone, most of the water in the caves being absorbed by direct solution through the limestone during the high winter and spring rainfall. Therefore it would seem unlikely that the only way to gain access to some of the systems which must exist in the area is via solutional shafts which are known to exist higher up in the mountains.

It is interesting to note that in this area large systems have developed on vertical or near vertically bedded limestones of complex geological structure which have been subjected to two successive periods of orogenesis. The views expressed above are only based on my observations in the area and I would be pleased to hear from anyone else who has knowledge of the Picos, especially in the La Hermida area.

ANDY HALL

Conclusion

As can be seen from the proceeding account we managed to cover a good deal of ground during our short stay in Spain. Considering that this was the first time we had been to the area we were well rewarded with the discovery of a number of interesting caves and extensions to known cave passages.

I think it is important to note that the main way to get to know an area of this type and find caves is to get friendly with the locals as they tend to know most if not all of the cave entrances in the region. In fact we certainly would not have found Ceuva de Los Jarres without the help of David Lopez.

Of course it goes without saying that we are hoping to return in the summer of 1974 at which time we should have enough to keep us going for at least another three weeks based on our discoveries in 1973. Both Pozo del Infierno and Ceuva de Los Jarres can almost certainly be extended, while diving at at least six sites would almost certainly lead to important discoveries.

There is no doubt that in these days of expensive transport costs the Picos is the only area which is reasonably accessible where discoveries can be easily made without elaborate planning or expense. In fact it can cost as little as £50 for a month's 'holiday' which is cheaper than anything available from "Clarksons".

Any more details of the expedition are available from the address given at the end of the journal.

ANDY HALL

Muses of a Caver

In respect to specific caving goals, the value for effort coefficient threshold places explicit performance limits on the concept of caving for all. Hence a large portion of interperson co-ordination and communication maximises the probability of project success and minimises the cost and time required for the evolution of specifications within a given number of man-caving hours. As a resultant implication the independent functional principle is further compounded when taking into account the sophisticated hardware in use underground today. However, incorporation of additional mission constraints requires considerable self analysis and drunken discussion to arrive at the conclusion that this discourse is merely a space filler inserted in desperation.....

MFC

WHO'S WHO

- Who filled Andy's lilo with gas?
- Who stopped doing B & C after only 4 weeks?
- Who 'took' some cave photos with no film in his camera?
- Who doesn't get his "Fair share"?
- Who has got a pretty face?
- Who hasn't been caving since Spain?
- Who never does the washing up?
- Who found Dowber Gill a bit too much?
- Who is the pig's friend?
- Who still hasn't been down Dead Dobbin?
- Who fancied his chances in Spain?
- Who said he didn't puke but really did?

Things Electronic

Constant Current Charging.

The advantage of constant current charging is that the method can significantly reduce the charging time of a battery as well as ensuring that the cell is fully charged without exceeding the safe charging rate. This is mainly applicable to Lead-Acid cells as of course Alkaline cells are far more tolerant of high currents anyway. This method however carries the risk of overcharging if the cells are not taken off charge (manually or automatically) at the appropriate time. With Lead-Acid cells the charging time is reduced from about 15 down

to $10\frac{1}{2}$ hours (these figures of course depend on the condition of the cells - regrettably often poor in caving circles).

With these points in mind a regulator was designed and built for constant current charging up to six cells. This was a feedback controlled regulator with a novel voltage compensating circuit. The eight components required cost less than a pound in toto. A few tests still need to be made on the prototype before I am prepared to publish the circuit.

Equipotential Surveying.

(The reader is referred to the proceedings of the B.S.A., September 1969 for a description of the basic method for detecting underground cavities by equipotential surveying).

I have designed and built various generators and resonant receivers for the basic mechanics of this job. Results 'in the field' have been most encouraging. Again one of the main specifications is low cost and complexity. Research is being done with the aid of a friend at Oxford University into methods of simplifying the process of actually carrying out the survey. Computer simulation of Limestone topology is being used. I hope to publish a full report on equipotential surveying later this year.

I should be very pleased to hear from anyone who is doing any work in this or closely allied fields.

MIKE COWLISHAW

The Transport Problem

During the last two years society membership has been declining slowly, whereas in general the number of active cavers in Britain has increased. Why is this? The answer is simple. The fresher member when he realises that an average weekend can cost him around £5 will go caving only occasionally and when the time comes to buy wet suits he shies away losing the dubious delights of caving for ever.

The enthusiast on the other hand will fork out his money and disappear into the nether world only to find that two thirds of the way through term he has no money left. Apart from increasing students' grants how are we to solve this problem?

Living where we do transport is obviously our main cost. How can we possibly hope to reduce the bill. There are many "solutions" to this problem but all have very obvious drawbacks. Firstly there are only one or two people in the club who own their own transport and they may not wish to go on every meet. Secondly most members are under 21 and we have to rely very heavily on one or two life members as far as hiring transport is concerned. Anyway the result is expensive.

Another possibility that reduces costs, is hitching, however most people are not prepared to do this. Also once you have arrived by this method you still have the problem of getting to the cave entrance. Fortunately B.U.S.S. has a large amount of tackle and possibly an extension of the Yorkshire tackle store could be put into practice in S. Wales which is easy to get to by the above method. If a tackle store was established at S.W.C.C. or W.S.G. we could hitch to Wales, though we would have to confine ourselves to trips near to these huts.

Last term transport subsidies for meets were proposed. This would have been possible had we not had our grant halved on top of the £50 we still owe to the Union. In the long term it seems that the only solution possible is to subsidise hired transport by up to 50% which will cost upwards of £50 per year. Unfortunately it is not the Guild's policy to subsidise transport costs, so it seems that we have a vicious circle; we lose members so our grant is cut, in turn we cannot afford to subsidise meets and hence we lose more members.

A lot of Union money goes to the Athletic Union which in turn subsidises various team's transport to and from matches. Is the Speleological Society very much different from clubs which receive money from the Athletic Union? In future to gain access to this money must we resort to "competitive caving", i.e. who can bottom Penyghent Pot in the fastest time. Is this so very much different from "pot bashing" that so many people seem to be doing nowadays?

Alternatively we could 'persuade' the Union to subsidise transport costs of outdoor societies. This would be very difficult to achieve as the other outdoor societies receive far larger grants than us. I am sure for example that the Mountaineering Society do not spend their £220 on equipment only, when they are able to have coach trips to Snowdonia.

This term I am hoping to see some Union bashing in the interests of all Society members. Your support would be greatly appreciated - life members could write to the Permanent Secretary, the rest just turn up at that Finance Committee Meeting.

BOB DAUNTON

Caving in Devon

To many cavers, caving in Great Britain means Mendips, South Wales, Derbyshire and Yorkshire, and they would extend their caving by trips to Ireland, the Pyrenees, and other exotic places. However, there are in Britain a number of smaller caving areas, such as Portland, NorthWales, the Forest of Dean, Furness, Sutherland and Devon.

The Area

Devon's caves are found almost entirely in Devonian limestone, which is older than the Carboniferous limestone of the main caving areas. The main outcrops occur to the South of Dartmoor, from a few miles West of Exeter to the coast at Torquay and thence westward to Plymouth. The limestone is overlain by the Old Red Sandstone, which is responsible for the characteristic colour of emerging cavers.

The Caves

The village of Chudleigh is on an outcrop of limestone much frequented by novice climbers, but it has attractions for cavers too. Clifford's Cave has several hundred feet of passage, and was extended and surveyed by E.U.S.S. in 1965/66.

Some miles to the South of the A38, between Totnes and Torbay, is Afton Cave, known also as Afton "Red" Rift. This cave has a long and sporting entrance rift and a fairly extensive passage beyond. Limited extensions were made by E.U.S.S. in the mid 1960's.

There is much limestone around Torbay, but unfortunately the caves have long been commercialised. Kent's Cavern in Torquay, before its conversion for tourism, yielded much valuable archaeological information.

Between Ashburton and Buckfastleigh, not a tyre-burst away from a nascent dual-carriageway section of the improved A38 is Pridhamsleigh Cavern, arguably Devon's most sporting cave. The entrance is at the bottom of a huge and spectacular recess in the cliff face. The cave is a maze of interconnecting passages, most deep in mud. The wet-suited explorer is delighted to encounter the first well, which may be traversed across or swum through to reach the second well. Both wells have been dived by various persons, but without success. The lake, which has remarkable acoustic properties, has also attracted divers, and in 1970 a party from DSS passed successfully into Pridhamsleigh II. Freedivers beware, the sump is 40 feet long and 80 feet deep!

Buckfastleigh is Devonshire's Priddy (but it has not got the Hunters). In Crest Hill DSS have their caving HQ, which is available for accommodation for visiting clubs.

Near the church is a deep hollow, now used as a rubbish tip. A concrete pipe in the midst of the debris (it can stink on hot days) leads down to the entrance of Baker's Pit. This is another major Devon Cave, having extensive passages, "pretties", and requiring a great variety of caving techniques. In 1970 PCG found a large extension from the lower series, much to the dismay of their rivals, DSS.

Baker's Pit is audibly (and for a short time was directly) linked to Reed's Cavern. This cave's entrance is in a disused quarry on the other side of the limestone hill. It has much passage, the famous "Little Man" formation, and the notorious "Micron" squeeze. Trips in the cave must be led by leaders

approved by the William Pengelly Cave Centre, who control the quarry. The quarry also contains Joint Mitnor Cave, which is rich in archaeological and speleobiological material.

The limestone around Plymouth has several caves, perhaps the best known being Radford Cave.

An anomolous cave is to be found near Westleigh, close to the Somerset border. Perry's Pot is unusual in being formed in Carboniferous limestone, and it contains a pitch of 75 feet, respectable by the standards of the main caving areas.

There are many disused mines in Devon, and these attract a certain kind of speleologist. However, the mines are becoming increasingly unsafe.

The Clubs

The main groups active in Devon are Exeter University S.S., Devon S.S., Seal Hayne College S.S., Plymouth C.G., and the local outward bound school. Junior leaders turn up in force now and then, and there is some activity in the small holes of North Devon.

The Future

No one expects major discoveries to be made in Devon, but the recent extensions and small caves uncovered by road improvements suggest that there is more to be found. About two years ago DSS were digging a sink at Denbury but as far as I know this has yet to go.

Devon's caves, although not large, certainly provide enjoyable caving, and should be visited once, even if never again. The major caves could be visited during a weekend, which could coincide with some function such as the E.U.S.S. dinner. How about it in 1975 B.U.S.S.?

MERVYN DARVILLE

Some Ideas on Objective Numerical Cave Grading

This article describes how an objective grading system for caving trips could be devised and discusses the value and limitations of such a system. For simplicity the word "Cave" is used to imply all forms of subterranean systems.

The present methods of cave grading consist of very broad categories - either descriptions such as Super Severe, or "numerical" grades as used in Northern Caves Vol. 1. These systems, though generally agreed to be adequate as far as they go, are basically subjective and in any case convey very little information to the user. In addition, complex caves are not usually of consistent standard, and attempts to classify separate series under general headings can be very misleading

when complicated trips including several sections of a cave are made.

Many of these disadvantages can be overcome by using a "piece by piece" system of grading whereby a numerical figure is attached to each major section of a cave in such a way that some simple mathematical operation can be used to combine these to give a meaningful result for a given trip.

A further necessary refinement is to ensure that an objective, or mainly objective, method is used to grade each section of cave, i.e. that several people grading the same piece of cave (under similar water conditions) will arrive at the same score - within a certain tolerance limit, say 5 percent. There are of course many practical difficulties in achieving this, and these I shall discuss in due course. The main problem perhaps is allowing for high or low water conditions.

The comments above mainly concern the sporting side of caving. A truly objective system of grading such as has been outlined would be by nature informative, and hence would be useful in many more general or scientific fields. Besides people love to play around with figures and the system would allow direct comparison of caving trips. On the other hand it is unlikely that a system simple enough to be used by the "average" caver would have much application in that the other important field, Rescue, except perhaps where a cave is unknown to the rescue team, - as is rarely the case in this country.

A generally accepted detailed grading system would be of especial use if printed on surveys - surveys at present give little indication of the general severity of a passage except that they show major obstacles. A suitably orientated system of scores associated directly with each section of cave on the survey would almost completely obviate the need to refer to a separate write up - only short notes on access are required and these could well be included on the survey.

There are of course disadvantages to the proposed system, other than the practical difficulties of implementation, a major one being that anything such as has been described, (even if it eventually boils down to a couple of numbers associated with a given cave) is a further and possibly detrimental increase in what might be called the technological aspects of caving, i.e. an added complication can often be harmful in that figures can be misunderstood (or misprinted) with undesirable results. Furthermore there is the problem of a basic standard method - a controversial subject. Presumably for a start obstacles and so on could be related to time. For example, descending a given fifteen foot pitch might be equated to $\frac{1}{4}$ hour of sitting around doing nothing.

Probably the best method of achieving an objective grading of a given cave/trip/series/passage is to use a set questionnaire which, although not restricting the grader to yes or no answers, puts fairly rigid restraints on the scores that can be given for a specific obstacle. This is of course necessary in order to maintain the desired level of objectivity - everyone has experienced the way some trips seem very much easier in retrospect, when perhaps early difficult or strenuous sections have been partly forgotten.

Leaving aside the tricky question of relative values of different types of obstacle or passage, there are some fundamental problems, in particular, how to allow for effects of things that might vary from trip to trip: in particular:

Water Conditions - i.e. normal fluctuations in water levels in a cave.

Transient Hazards: Flash floods, loose boulders, rotten props (in mines) and so on.

Size and equipment of different parties.

Relative abilities of parties, with special reference to novices.

After a great deal of thought and experimentation it was found that a single grading score could not be manipulated to allow for all these different effects. Analysis shows that three or four scores are required for an approximately ideal representation. This is too complicated for the applications discussed above, and so the compromise solution of two scores was investigated. This was found to be a great improvement on relying on a single score. The two figures would be:

- (a) General obstacles and the effect of time etc., and
- (b) Water and Transient Hazards i.e. a sort of "exposure risk" figure.

It is clear that variations in the size of parties could be catered for by carrying out some standard adjustment to score (a). Similarly the effect of wearing Dry Kit in a cave could be allowed for by manipulating score (b). The effect of novices in a party could be calculated by adjusting both scores.

It should therefore be possible to start off with a pair of scores based on a party of four, wearing wetsuits, and then use these scores to provide one with a revised grading if for instance one was about to descend a wet cave in Dry Kit. The complications to this basic idea are of course endless, and should be kept to a minimum. Even if this sort of exercise is not indulged in, the basic scores would enable direct comparison of widely differing sections of cave.

As a side issue, an extremely graphical method of displaying the two scores is to plot one against the other on a sheet of graph paper. In the cases where I have tried this for various trips, this was found to be very informative and showed at a glance the relative importances of the two scores. (The distance from the Origin (The point (0,0)), was found to be analogous to the conventional ideas of cave grading).

The above has pointed out the main features of the grading system I have devised, I hope with sufficient justification for each feature. I shall now summarise the above and make some comments on the practical details:

A questionnaire would be devised for scoring. It should be equally applicable to short lengths of passage, and to whole caves or trips. In particular, scoring the constituent parts of a trip and adding up the individual totals should give nearly identical results to scoring the trip as a whole.

The questionnaire would be divided into two parts: the first, general technical and other difficulties; the second, water and transient hazards. The scores resulting from these two parts would be the final basic scores for general use.

The first part (obstacles) would be scored fairly rigorously, e.g. 3 points for 100' flat out crawl, 1 point for a quarter of an hour underground, etc. The problems here include definitions (of severities of climbs etc.) and the assumptions one has to make, such as the use of lifelines and so on. Single Rope Techniques would not be adequately catered for - one would probably have to assume that prussicking up a pitch would score the same as using a ladder. The movement of tackle would be allowed for under the scoring for a pitch. The actual form of each question in the questionnaire, and the relative scoring of each type of obstacle, would be matters needing a fair amount of discussion. I have arrived at a form of questionnaire which gives reasonable results (with some surprises) but which has got vast potential for improvement.

The second part (water) would be more difficult to prepare a questionnaire for. Water obstacles such as ducks or sumps and the time one is wet can be scored in the same way as dry obstacles, but transient effects and hazards would be more difficult, and usually require better knowledge of a cave than be picked up in one trip. Every effort would have to be made to try and make the scoring objective despite the problems. It might be possible to estimate flood risk by taking into account the probable number of flash floods in a year, and also allowing for the danger of such floods. E.g. Little Neath River Cave II is fairly safe, whereas many northern caves can be extremely dangerous.

Other points which could be taken into account are loose boulders, and complexity of the cave where this could cause a potentially dangerous mistake in route finding.

I hope the above is reasonably clear. To round off and give the feel of a bipolar grading system, here are some scores that I have calculated using my rather primitive questionnaire.

	Obstacles	Water etc.
Stoke Lane Slocker	30	44
Penyghent Pot	99	57
P8	28	14
Rhino Rift	49	5
Dan-Yr-Ogof (to Green Canal)..	35	32

Notes: One of these was scored from a guide book description (R.R.); a couple of others have been scored by friends, with nearly identical results.

MIKE COWLISHAW

REVIEWS

Someone said we ought to have some reviews, so here are a few:

MOLDYWARPS SPELEOLOGICAL GROUP Jnl. No.6

A well produced journal this, with eight surveys and an impressive quota of well written exploration reports.

Although of somewhat limited scope in that the majority of cavers in the country will never visit most of the caves described, the journal makes interesting reading. Articles of more general nature would have been an improvement.

E.U.S.S. NEWSLETTERS, Vol. IX Nos. 1 and 2; Vol. X No.1.

These contain more of general interest than might be expected for newsletters - the articles include photography, microbiology and hardware. Unfortunately, no subject is treated in great enough depth to be of any more than passing interest to the serious speleologist. I hope further Newsletters will further develop the ideas put forward in these articles.

(P.S. The movement of a certain EUSS member to BUSS seems to have been followed by a drop in the number of articles....)

L.U.P.C. NEWSLETTER SPRING 73

Entertaining articles on LUPC's activities in 72/73 (and the Berger 1971), together with a (rather long-winded) article on adapting a flash-gun for underground use make this newsletter interesting reading.

L.U.S.S. JOURNAL Vol. 1, No.3.

As we have come to expect, this is a superbly produced journal - in fact the best I have ever seen. Impeccably drawn surveys and diagrams add to the high standard.

The journal is packed with articles of interest - surely every caver can find their own pet subject somewhere in the 104 pages.

The Area Survey of East Kingsdale and Scales Moor is very comprehensive and will undoubtedly remain the standard reference work on this part of the Yorkshire Caving Scene for many years to come.

The scientific and technical notes are very well presented though M. Gascoyne does not seem to have proof "read" the diagrams in his article: - one diagram is incomplete, and the large circuit could not work as shown (a multivibrator will not oscillate without a loop gain greater than unity!).

Finally, the Expedition Reports. These, as might be expected are well documented and illustrated. However, two years seems a long time to wait for the 1971 expedition report. (Some points would have been useful to us had the report been published before our 1973 Expedition to Spain).

I would echo the words of the editorial and hope that this journal is maintained at its exceptional standard.

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WANTED

Any caving journals, newsletter and surveys in exchange for Omnibuss to enhance the B.U.S.S. library.

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Guild of Students Union,
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