COGOL DEI VECI Valstagna (between Padova and Trento).

03.11.88.

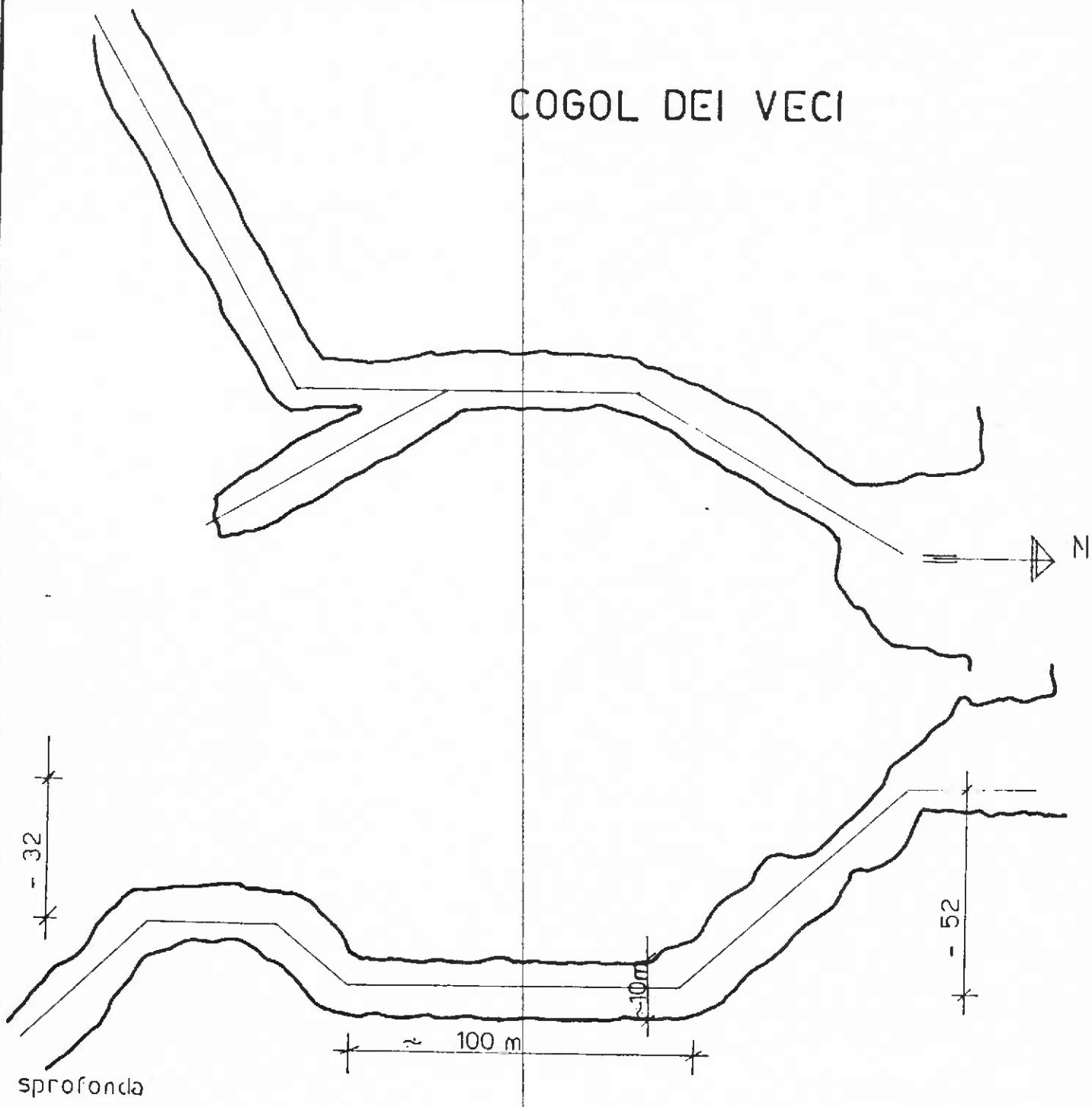
DIVERS: RL Carter, JN Cordingley, several Italian divers.

This resurgence is part of the Grotto Di Oliero (show cave) system. It produces over 20 cumecs in flood and consists of a single huge entrance chamber occupied by a lake. From the near edge of the water the floor slopes steeply down to a large tunnel at an average of 50m depth. We followed this to a point some 300m from base, in vis. of about 6m. The maximum depth was 53m. By swimming around it was possible to establish that in places it is about the size of the Peak Cavern entrance - rather an impressive site. RLC used four tanks and JNC used three. On this dive most of the Italian divers only used two tanks and therefore stayed nearer to the entrance. The water was rather cold and by the time our decompression was over we were decidedly chilly, even in drysuits.

Close by is the Cogol Dei Siori also called the Grotta De Parolini, a short active resurgence leading to another huge sump. We didn't have time to dive this, but it could provide an interesting project for the future (though co-operation with the local cave divers would be essential).

The first 300m is all shallow from where it descends gradually to 50m depth at 600m from base. A large passage continues unexplored. A few kilometres to the north is another huge resurgence called Elefanta Bianca explored to 100m depth by the Swiss.

COGOL DEI VECI



SECONDO LA SPIEGAZIONE DI MASSIMO E SERGIO I GRADI E LE PROFONDITA' SONO GIUSTE LE DIMENSIONI SONO STATE ESEGUITE A OCCHIO

GORGAZZO SPRING

04.11.88.

DIVERS: RL Carter JN Cordingley

On the last day of the sump rescue conference at Gorizia we grabbed the chance of another dive at Gorgazzo by setting off before breakfast. Both divers used 3 very well filled cylinders each along with RN Exceptional Exposure Tables as a back up to dive computers. On the inward journey RLC took many photographs as far as the ledge at -40m, where we parted company.

JNC set off down the shaft first, being photographed as far as -50m. Continuing, he descended to a depth of 77m. From this point in perfect visibility it was possible to see the base of the shaft at a depth of 93m. He started his ascent, passing RLC on his way down to -70m. Both divers met up again at -65m and continued upwards. The camera was collected from -40m (along with Russell's depth gauge which had been left behind as it didn't go deep enough), and more photographs were taken. After picking up the stage tanks we moved out into the open pool to begin the decompression. The dive was eventually ended after yet more photography (both of us posing next to the underwater statue of Jesus). Both divers again surfaced with gloves stuffed full of coins. After this memorable dive the final "decompression stop" (i.e. lying in the sun after dekitting) was made with the aid of liberal quantities of wine and grappa!

The instruments carried on this dive were calibrated for use in sea water so a correction factor was later used to allow for the less dense fresh water. The depth reached was actually 85 m (or about 280 ft), one of the deepest dives ever made by British cave divers breathing compressed air.

A PROGRESS REPORT ON PROVISIONS FOR CAVE DIVING RESCUE IN GREAT BRITAIN

BY RUSSELL CARTER AND JOHN CORDINGLEY

(the lecture presented on behalf of the B.C.R.C. on 31.10.88)

ORGANISATION

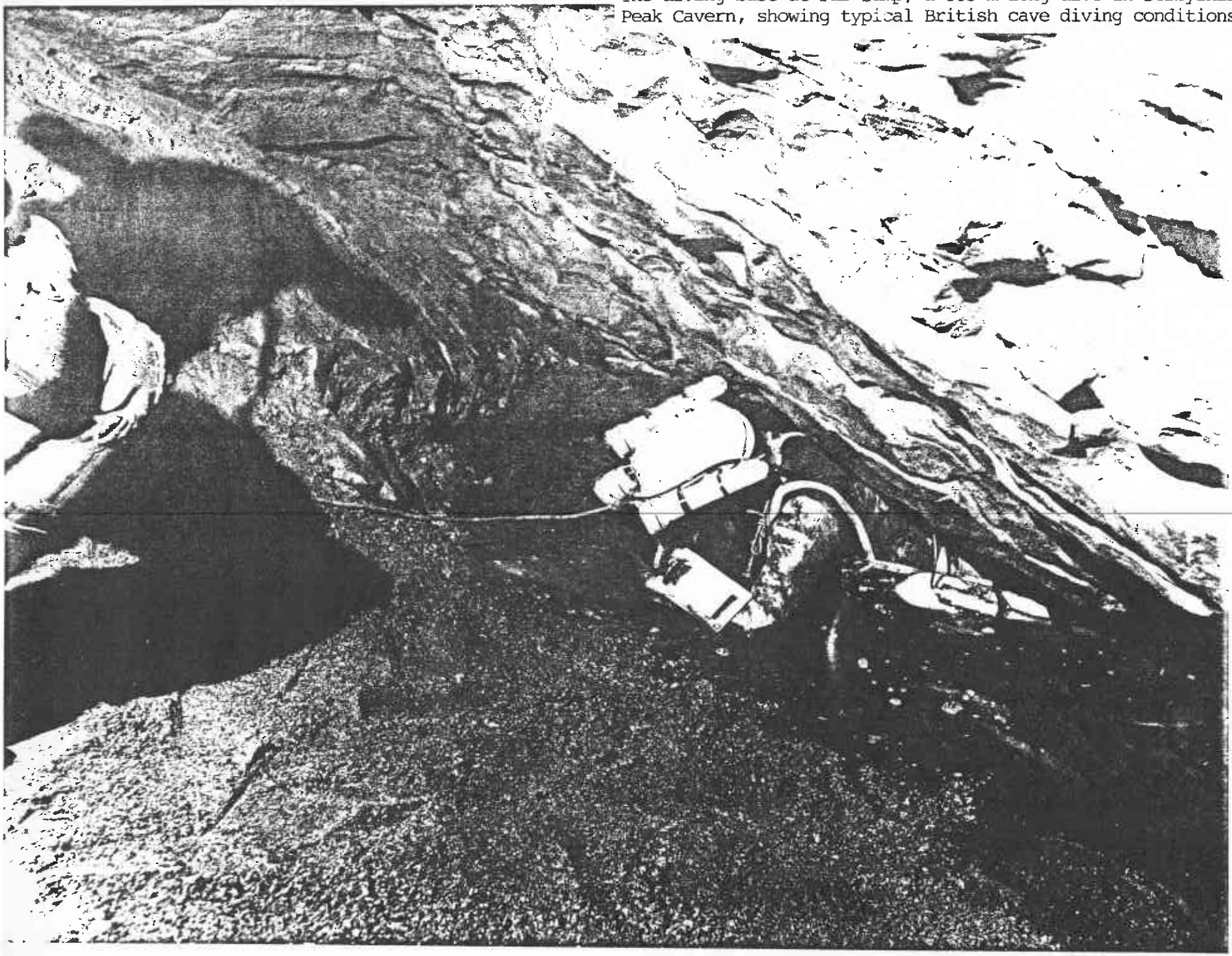
Virtually all cave divers in Britain are members of the Cave Diving Group which is the oldest amateur diving organisation in the country. There are about 200 members but probably less than 50 are active cave divers. Thus our first problem could be finding enough divers to participate, should there be a major rescue. The Cave Diving Group has no constitutional role in cave rescues and if divers volunteer their services to cave rescue teams they do so as individuals. We have 13 separate cave rescue teams, all of which are represented on the British Cave Rescue Council. This body should be the initial contact for anyone who requires information about cave rescue in Great Britain. The secretary is Brian Boardman, 8 Yealand Avenue, Giggleswick, Settle, North Yorkshire, Great Britain. Unfortunately most of our active members prefer to spend their precious free time involved in cave diving projects and many are reluctant to train in conventional cave rescue techniques. Another problem is therefore that not all cave divers who are on the call out lists of their cave rescue teams are competent in basic cave rescue techniques, even though they may be very skillful divers. A third problem is that cave diving conditions in Great Britain are often very difficult with frequently bad visibility, many underwater restrictions and an increasing number of deep and long dives being made in remote locations. All of our main caving areas have long sumps with extensive dry passages beyond in which conventional caving accidents are a real possibility and we are concerned that there are several of these from which we could probably not rescue a victim alive.

Therefore in 1985 2 British cave divers took part in the successful international meeting at Dijon, France to learn about the progress made in other countries in the field of cave diving rescue and to offer any useful ideas. We returned to Britain and organised 2 meetings of our own in June 1986 and May 1988 (see references 1 and 2).

For the first time cave divers and cave rescue teams were brought together at national level to work jointly on the serious problem of how to rescue injured persons through long and difficult sumps. The first meeting mainly served to highlight the main aspects of this serious problem. However at the second one some practical training of cave divers in basic cave rescue methods was done and various encouraging reports were given on the useful work undertaken to tackle the problems which had been identified at the first meeting. Although these large scale national gatherings have proved to be beneficial we have found that the most useful way to make progress is for small groups of cave divers to approach their local rescue teams and work with them to prepare for major incidents in their own area. Without fail the non diving members of cave rescue teams have been most willing to offer help and this co-operation at local level has significantly improved our level of preparation for a serious cave diving rescue. However there are still many problems to be overcome and we British do not consider ourselves to be experts in cave diving rescue! In fact we would be very pleased to receive constructive criticism on the following comments.

A BRIEF SUMMARY OF EXISTING ARRANGEMENTS AND TECHNIQUES

One thing we can claim to be fairly good at is getting the rescue personnel to an incident quickly. Our call out arrangements are very simple which has proved over the years to be a big advantage. All rescue work in Great Britain is the responsibility of the police. Once alerted they are able to call on a large variety of resources and specialist teams. In the event of any cave rescue the police immediately contact a local cave rescue team controller who then takes charge of the operation. This system has developed over the years out of the excellent co-operation between cavers and the police in the past. Another big advantage we have is that cave rescue team members are all unpaid volunteers. Thus we experience no financial difficulties which could delay or influence the course of a cave rescue. Victims are never charged for the services of a cave rescue team but many do make donations of money after having been rescued.



The diving base at Far Sump, a 385 m long dive in Derbyshire's Peak Cavern, showing typical British cave diving conditions.

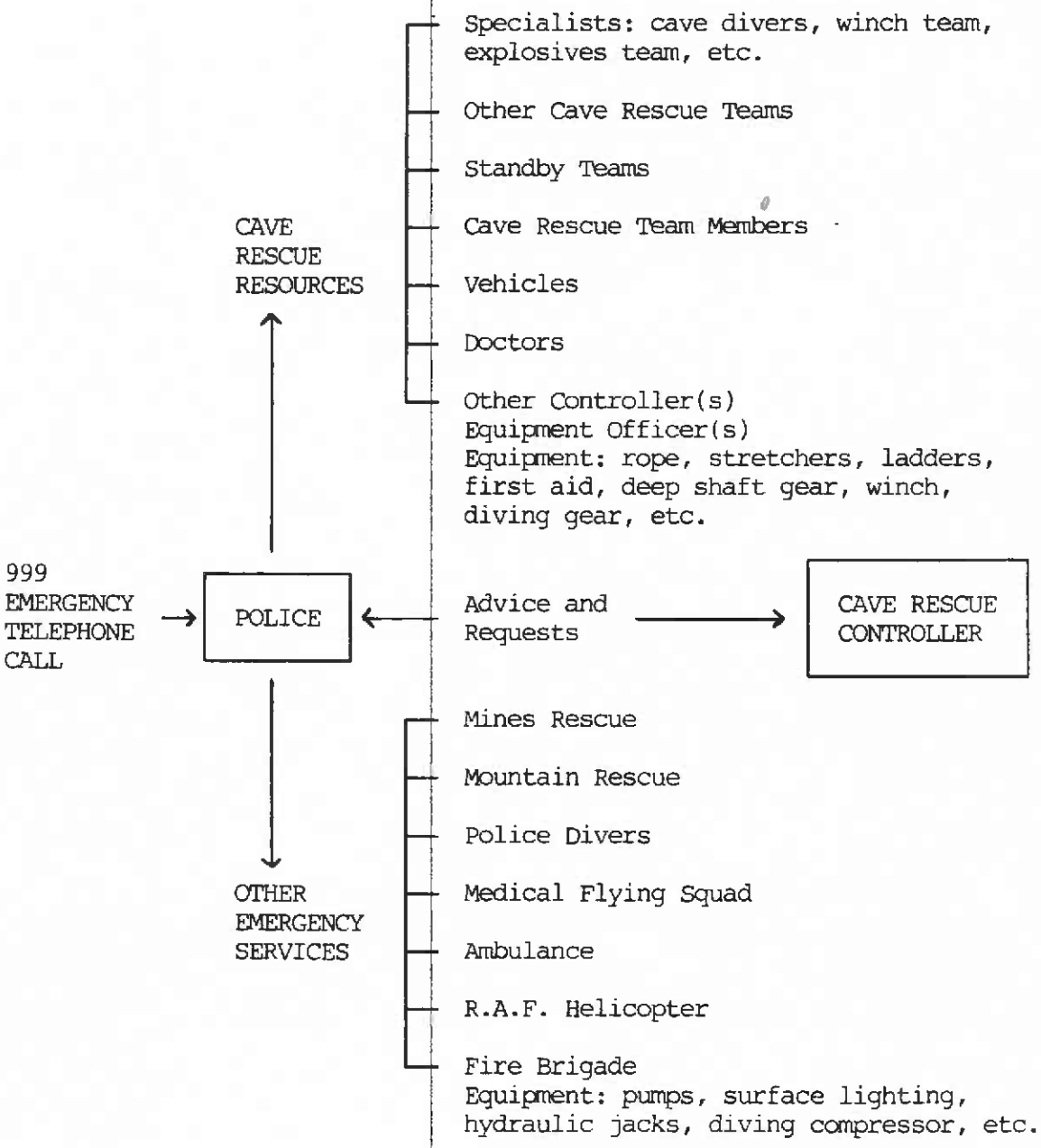
This, along with help from the police with equipment (eg loan of radios or vehicles etc) means that cave rescue teams can be self-financing, particularly as they often hold fund raising events which are closely involved with the social side of being a cave rescue team member.

Once a cave rescue controller has been contacted he is able to call on various personnel, according to the nature of the incident. A diagram showing the resources available to one team, the Derbyshire Cave Rescue Organisation, would be typical of most British teams (see figure 1). The cave rescue controller can request a wide range of services, one of which would be the local group of cave divers who have trained with the Derbyshire Cave Rescue Organisation in the past. An agreement exists that with cave diving rescues the cave divers attending have the final say in what can or cannot be achieved by them. In practice there has always been excellent co-operation between the cave divers and the cave rescue team members, mainly due to their having trained together previously.

When the injured victim has been located in a dry passage beyond a sump there are several immediate problems which must be solved. Perhaps the most important is that the victim will almost certainly be very cold. Water and air temperatures in British caves are typically 6°C - 9°C and the usual clothing worn when caving beyond sumps is the same wetsuit that was used to pass the sump. Even if a victim has only minor injuries the cold will very quickly render him unable to help himself. We have found that a very useful device for conserving or restoring the victim's body temperature is "The Little Dragon" warm air apparatus, in combination with temporary thermal insulation (eg a thick fibre pile sleeping bag). The Little Dragon works on the principle of an exothermic reaction between carbon dioxide (from a portable cylinder) and medical "soda lime" (NaOH) in a simple heat exchanger to warm up the air breathed in by the victim. The device is compact, light in weight, robust and inexpensive. It is made by Mike Mitchell, Heating Maintenance Ltd., 1 School Lane, Stavely, Kendal, Cumbria, Great Britain.

FIGURE 1:

Summary of Derbyshire Cave Rescue Organisation Call Out



It is also important to establish speech communications from beyond the sump direct to the surface. We are fortunate to have access to an excellent speech system called the "Molefone". This works by magnetic induction involving no wire cables and so allows instant contact with the surface. It's disadvantages are high cost, maximum rock penetration of 150 - 300 m (depending on local factors), interference by the proximity of mineral deposits (eg in veins or lava beds) and the impossibility of self manufacture. However it has generally proved to be one of the most effective communications devices for cave rescue teams. Further information can be obtained from Bob Mackin, Cave Rescue Organisation, Clapham, Via Lancaster, Great Britain. A cheaper alternative is the "Ogofone" which can be home made at less cost by those with skill in electronics. Details of how to construct this device are given in reference 3. Further help can be obtained from John Cross, 17 Holden Avenue, Aston On Trent, Derbyshire, Great Britain.

Until recently it was thought that the best way to get the victim back through the sump (once his injuries have been treated) was to strap him to a stretcher and use a full face mask etc, whilst towing him out. Most cave divers would now agree that it is much better to use splints and local anaesthetics on the affected limb and if possible allow the victim to dive out himself, using his own equipment with which he is familiar. He can be supplied with larger cylinders and better lights etc, and should be attended by other divers (following him to give him the best chance of good visibility). We have available some very good splints made of foam neoprene with internal metal struts which can be bent to the required shape. Combinations of these splints can be used to immobilize any part of the body except the spine and head. They are available from "Rescue And Medical Equipment", G & W Bonser, Vale View, Black Rock, Avergavenny, Gwent, Great Britain. A specialized spinal splint which is very good is also available from this address. These splints have proved to be so versatile that it is unlikely that we will resort to using a conventional cave rescue stretcher very often in future.

Another specific problem which has come to light is the difficulty of using any breathing apparatus if facial injuries have resulted in broken teeth. Exposed pulp cavities are thermally sensitive and if several teeth are broken a conventional demand valve cannot even be held in place. The "Dentanurse First Aid Kit for Teeth" has recently become available and provides the answer to this problem. It contains lightweight dental instruments and a 2 part cement containing an anaesthetic agent. Teeth can be stuck back together for the dive out or the cement simply applied as an anaesthetic paste. It is available from Dentanurse UK Ltd., Unit 7, Old Forge Estate, Peterchurch, Hereford, HR2 OSD, Great Britain. The price is £6.95 plus post and package.

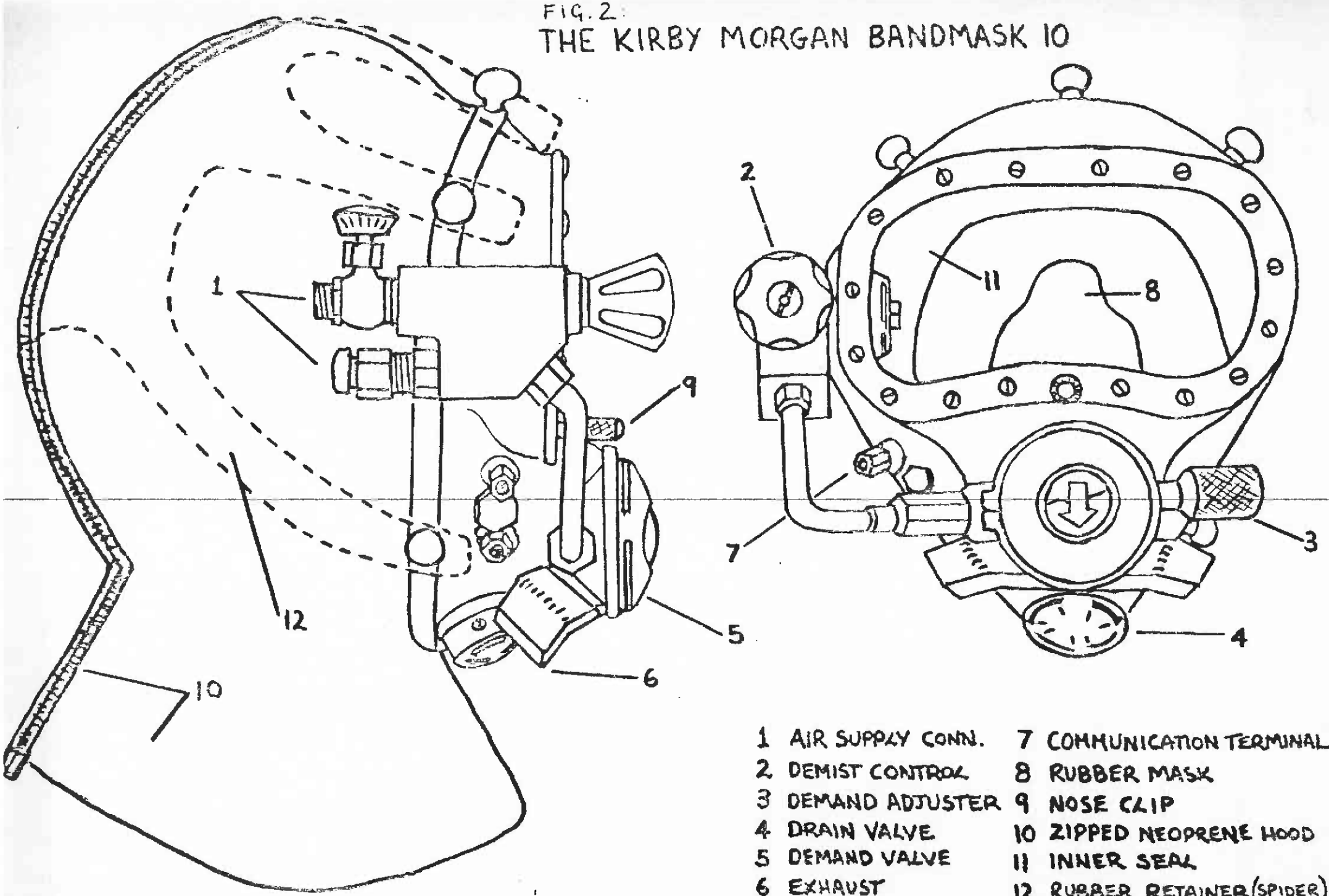
THE USE OF FULL FACE MASKS

In the event of serious facial injuries or if a victim is a non-diver and unwilling to use normal demand valves it is necessary to use a full face mask. Such equipment would also be appropiate if there is a possibility that a victim may lose consciousness on the dive out. Theoretically such a victim should never be immersed in water but certain situations requiring urgent action may justify the risks involved. One of the most suitable full face masks is the Kirby Morgan Bandmask 10 (see figure 2), designed by Bob Kirby and Bev Morgan and manufactured by the US Divers Co. This has 2 main parts: the front ABS plastic main frame with demand valve and visor and the hood and seal assembly. The 'bandmask' gets it's name from the stainless steel band which holds these 2 parts together.

The neoprene hood is fitted with a zip fastener at the back of the head to which is connected a soft foam inner face seal designed to pull into the mask to avoid "squeeze" in the event of a hose or one way valve failure. The demand regulator is fitted to the front of the main frame and is supplied with breathing gas via the side valve assembly. This regulator is unaffected by the free-flow device and is supplied with breathing gas at up to 12 bars above ambient pressure. An adjustment knob ('demand adjuster') is included

FIG. 2.

THE KIRBY MORGAN BANDMASK 10



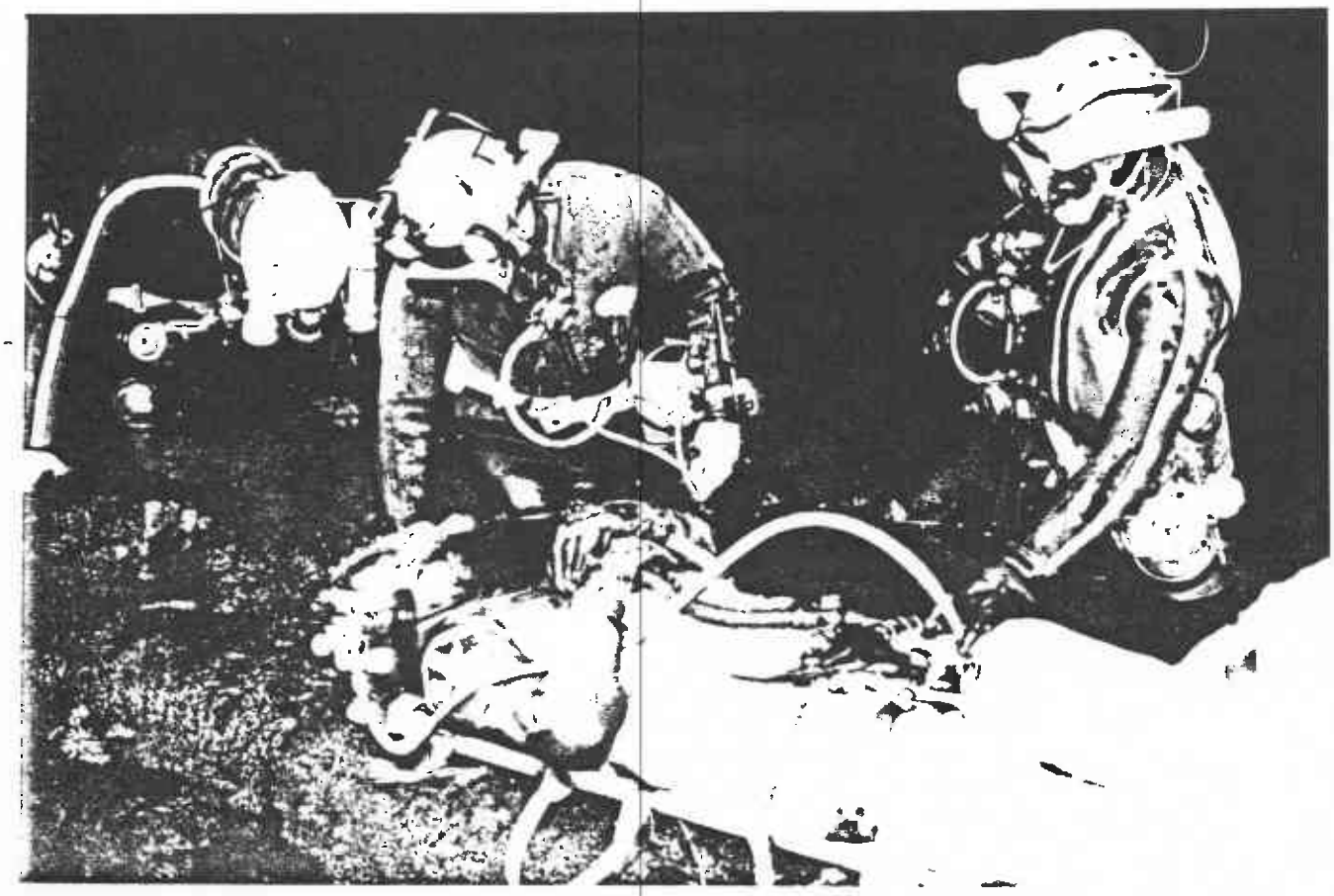
1 AIR SUPPLY CONN.
2 DEMIST CONTROL
3 DEMAND ADJUSTER
4 DRAIN VALVE
5 DEMAND VALVE
6 EXHAUST
7 COMMUNICATION TERMINAL
8 RUBBER MASK
9 NOSE CLIP
10 ZIPPED NEOPRENE HOOD
11 INNER SEAL
12 RUBBER RETAINER (SPIDER)

to alter the breathing resistance according to depth, which can also be set for free gas flow. Breathing gas is delivered inside the mask within a soft "oro-nasal" inner rubber mask. This is designed to reduce carbon dioxide (CO_2) build up by eliminating un-necessary dead space. Because there is no conventional mouthpiece breathing may be either via the nose or mouth. This is an important feature for non divers who use the mask as such "natural" breathing promotes greater confidence than with using a standard demand valve.

A nose blocking device operated externally through the main frame is fitted to allow pressure equalization within the ears. It is possible to remove this, block the orifice and use a nose clip instead. However if this is done the inner mask becomes less stable and prone to be deformed. Breathing gas is supplied to the demand regulator via the side valve assembly. This is a manifold with 2 gas inlet ports. In normal use (in commercial diving) one port would be connected to the main gas supply via an "umbilical" hose. The second port would be connected via normal first stage regulator to a back-mounted SCUBA cylinder ("bale out bottle") for emergency use. The surface supply inlet connector incorporates a one way valve allowing gas into the mask but preventing a reverse flow or suction in the event of equipment failure. The emergency inlet port is operated by a hand wheel to allow access to the reserve gas supply. The side valve assembly also has a free-flow valve which activates the internal faceplate demister. It is operated by a handwheel to the front of the side valve assembly. The Kirby Morgan Bandmask has a second exhaust valve situated under the chin on the main frame to expel any water which may enter the mask. The mask may be used with either wet or drysuits and is held firmly on to the face by the rubber head harness known as a "spider".

Various adaptations to the Kirby Morgan Bandmask have been made in Britain to facilitate it's use in a cave rescue situation. An adaptor has been made to allow a normal demand valve hose to be fitted to the main gas inlet port so that the mask can be supplied with gas from 2 separate SCUBA cylinders. Also fitted to the interstage

The Kirby Morgan Bandmask in use on an early training exercise in Wookey Hole, Mendip.



hoses are "Hanson" snap-fit connectors. These allow depleted cylinders to be replaced by rescue divers whilst underwater. The mask must be used with 2 identical first stage regulators fitted with over-pressure/non return valves to prevent damage to the mask should a first stage fail and the interstage pressure rise too high.

On fitting the mask to a victim before diving a few problems can be encountered, particularly if a victim has neck or back injuries. It is difficult to fasten the hood zip and the "spider" whilst keeping the head immobile. This problem can be overcome if rescue divers have practiced fitting the mask carefully beforehand. Whilst the mask is being fitted and pre-dive checks made it is preferable to change the cylinder which the victim has been breathing from for a new full one just before entering the water. In this way he begins the dive with 2 full cylinders. There are no real problems in using the mask on a victim who is strapped into a stretcher and if necessary the Kirby Morgan Bandmask hood will just fit over the victim's own hood. In the water the victim is best trasported in a head up face down position as the mask works better this way and any small leaks of water or body fluids will drain away via the exhaust valve. We have also experienced a few problems in controlling the buoyancy of the victim when being towed. The mask tends to make the head float whilst the negative buoyancy of large cylinders (and a stretcher if used) can make the feet sink, especially at depth. An adjustable buoyancy life jacket (buoyancy compensator) can be fastened anywhere to the victim (close to the "centre of gravity"). This helps to overcome the buoyancy problem but can make the profile of the victim greater which is a disadvantage in many confined British sumps. Another problem is the large volume of breathing gas which the mask can consume especially if the regulator is on free-flow and if the demist facility is frequently used. Constant monitoring of gas consumption by rescue divers is vital so that depleted SCUBA cylinders can be changed well before their supply to the mask is exhausted. This excessive gas consumption was the cause of a serious accident in a recent training exercise with the Kirby Morgan Bandmask. Full details are given in reference 4, together with details of how to avoid similar problems in future.

We have also found it to be desirable to make provision for speech communication between the victim, one of the accompanying divers and the diving base. Much work needs to be done in this area but we have had some success with a "Ducset" system purchased second hand from an ex-military surplus store. This works on the principle of a rope with internal electric wires connecting the victim and attendants with base. The main disadvantages are that the maximum range is only 120 m (the length of the rope) and that the rope must be taken in from base as the victim moves. We are currently working on a system requiring no wires which is likely to be based around the well-proven "Molefone" principle.

SUMMARY

In conclusion, British cave divers do not consider themselves to be experts by any means when it comes to rescuing injured colleagues from beyond flooded sections of cave passages. The ideas listed above have been developed in the context of British sumps, where diving conditions are often different from those in other countries. There can be no hard and fast rules about the right and wrong ways to perform a cave diving rescue. Individual circumstances will demand different specialized methods in each case and those cave divers who are unfortunate enough to be called to the scene and expected to perform miracles will have to decide what action is most appropriate. They must make such important decisions on the basis of their own experience and judgement of the particular problems inherent in the situation. Cave divers should contemplate the consequences of a poor decision made as a result of not having spent adequate time and thought in preparing for cave diving rescues in their own local area. Sump rescues are at the extremes of cave rescue techniques and if not well handled may well kill the victim. Thus all cave divers have a responsibility to get involved in sump rescue developments as a fundamental part of their basic training.

REFERENCES

1 "Proceedings Of The First British Sump Rescue Symposium", in "Cave Science" (Transactions Of The British Cave Research Association) 1987, volume 14, number 1, pages 7 - 30.

2 "Sump Rescue Symposium", in Cave Diving Group Newsletter number 88, (1988) pages 7 - 14.

3 R. Williams and I. Todd, 1987, "Caves And Caving" (Bulletin Of The British Cave Research Association) volume 35, pages 2 - 7.

4 Cave Diving Group Newsletter number 87 (1988) pages 24 - 26 (Report on accident whilst training with bandmask at Wookey Hole).

GENERAL REFERENCES

"Kirby Morgan Bandmask 10, February 1984"
Commercial Diving Division
US Divers Co
3323 West Warner Avenue
Santa Ana
California USA 92702

"Subaqua Scene" November 1988, number 105
Ocean Publications Ltd
34 Buckingham Palace Road
London SW1W 0RE
Great Britain

The Professional Diver's Handbook, (ISBN 0950824208)
Submex Ltd
19/21 Roland Way
London SW7 3RF
Great Britain

APPENDIX 1: PROGRAMME OF EVENTS

INTERNATIONAL MEETING OF CAVE DIVING-TECHNICAL UPDATING FOR SPELEOLOGICAL RESCUE EXPERTS. (with the collaboration of the U.I.S Cave Diving Commission.)

General programme

October 29, 1988 Meeting of delegates attending the conference at San Luigi Institute (Collegio San Luigi - Via Don Bosco n. 48 - tel. 0481/83364)

October 30, 1988 Official opening of the meeting and presentation on the consistency, activity and technique of cave diving rescue in Italy - given by the Commission of the Corpo Nazionale Soccorso Alpino (C.N.S.A.) Cave Diving Section. Translation service.
Projection of the educational film "Cave diving techniques" produced by the C.N.S.A. Cave Diving Commission.

October 31, 1988 Technical presentation by the President of the U.I.S. Cave Diving Commission (Piskula) and of the representatives of the international cavediving rescue. Translation service.

November 1, 1988 Practice in a submerged cave: check of the equipment, of the cave diving techniques and of individual or group rescue techniques.

November 2, 1988 Cave diving practical training.

November 3, 1988 Cave diving practical training.

November 4, 1988 Cave diving practical training.

November 5, 1988 Critical examination of the dives done using the audiovisual records acquired during practice. Translation service. Farewell dinner on the Carso of Trieste.

November 6, 1988 Closing meeting.

PROGRAMME OF EVENTS (ITALIAN VERSION)

INCONTRO INTERNAZIONALE DI AGGIORNAMENTO TECNICO DI SPELEOLOGIA SUBACQUEA PER TECNICI DEL SOCCORSO SPELEOLOGICO (in collaborazione con la Commissione Speleosubacquea de l'U.I.S.)

PROGRAMMA DI MASSIMA

29 Ottobre 1988 Incontro dei partecipanti presso il Convitto San Luigi

30 Ottobre 1988 Apertura ufficiale dell'incontro e relazione sulla consistenza attività e tecnica del soccorso speleosubacqueo in Italia presentato dalla Commissione Speelosubacquea della Sezione Speleologica del C.N.S.A.. Traduzione simultanea in lingua inglese, francese e tedesca.
Proiezione del film didattico realizzato dalla Commissione Speleologica del C.N.S.A. "Tecniche di immersione speleosubacquee."

31 Ottobre 1988 Relazioni tecniche del Presidente della Commissione Speleosubacquea dell'U.I.S. (Piskula), dei rappresentanti del soccorso svizzero J. Bolanz, francese C. Locatelli, inglese J. Cordingley. Traduzione simultanea.

1 Novembre 1988 Esercitazione pratica in cavità sommersa: verifica delle attrezzature e delle tecniche di immersione e di soccorso individuali e di gruppo. (presenza di due interpreti)

2 Novembre 1988 Esercitazione pratica speleosub.

3 Novembre 1988 " "

4 Novembre 1988 " "

5 Novembre 1988 Esame critico delle immersioni effettuate utilizzando documentazione audiovisiva acquisita durante le esercitazioni. Traduzione simultanea
Cena di chiusura sul Carso Triestino

6 Novembre 1988 Scioglimento della comitiva.

Appendix 2:

FRENCH SUMP RESCUE APPARATUS

L' A Z E R O T T E

par Robert LAVOIGNAT

Le transport d'un blessé dans un siphon fait l'objet depuis une dizaine d'années de nombreuses recherches sur les civières humides et étanches.

Si ces dernières peuvent servir pour un blessé léger(fracture d'un membre),il est hors de question de les utiliser pour un blessé grave(fractures multiples, coma, etc). Diverses raisons s'y opposent:

- équilible des oreilles,
- respiration sur un détendeur, etc.

Pour supprimer ces problèmes, j'ai pensé mettre le blessé dans un volume non déformable, à l'intérieur duquel la pression atmosphérique serait maintenue.

Début 1987 ,cautionné par le SPELEO SECOURS FRANCAIS, j'ai réalisé une sorte de petit sous-marin baptisé "L'AZEROTTE".

Ce prototype construit en P.V.C. mesure 0,50 m de diamètre, 2 m de long, et pèse 90 kg à vide pour une flottabilité de 400 l. Vingt gueuses en plomb de 10 kg chacune sont nécessaire pour établir une flottabilité neutre.

Le renouvellement de l'air est obtenu grace:

- à un débit continu d'oxygène (0,6 l àla minute pour compenser la consommation du blessé)
- à un petit groupe ventilation fonctionnant sur accu étanche, fixant le gaz carbonique dans une cartouche de chaux sodée.

L'équipe du SPELEO CLUB de DIJON a réalisé quatre plongées réelles. Limitées volontairement en profondeur et en durée, elles permirent de descendre un "blessé" à une dizaine de mètres durant 30 minutes.

Les quatre plongeurs chargés de mouvoir l'appareil ont parcourus plusieurs centaines de mètres sans problèmes particuliers.

Un film a été réalisé lors de ces premiers essais.

Une plongée fictive de 30 mn, sous la surveillance des docteurs Alain REMY et Bernard GENY permit d'effectuer quelques contrôles médicaux satisfaisants.

Robert LAVOIGNAT
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21310 BEIRE-le-CHATEL
Tél. 80.23.28.07
FRANCE

Appendix 3.

The publication reviewed below was presented at the Gorizia conference:

THE UIS CAVE DIVING COMMISSION MAGAZINE

92 pages, many black and white photographs, price 10 US dollars or 15,000 lire, available from the Editor: Alessio Fabbricatore, Via Fatebenefratelli 26, 34170 Gorizia, Italia, to whom correspondence may be sent in English

This is the first edition of "The Magazine" intended to be of international interest to cave divers The majority of its contents are in English with only a few short sections in French or German. Just over half of this issue is devoted to a lengthy report on the 7th International Camp of Cave Diving, held at Gorizia in August 1987. All the lectures given at that meeting are reproduced, along with a detailed account of the recovery of the body of a drowned cave diver from a depth of 90m in the Gorgazzo Spring. A section on rescue contains an address list of cave divers in Europe who are willing to participate in large scale rescues in other countries and some information about the latest sump rescue developments French-style; a self contained rigid casualty box (i.e. submarine!). There are also small related contributions from Belgium, the USA and Austria.

This is followed by a general interest section with brief articles on cave diving training in Czechoslovakia (with a survey of the Hranicka Abyss), cave diving in Sweden, Rob Palmer's 1987 Andros trip, The Cogol Dei Veci (Italy) and a 117m deep dive at Gorgazzo (also in Italy). There are several book reviews along with another address list of cave divers from various countries. The last section deals with UIS matters including general contact addresses for all member countries, the UIS constitution and an interesting history of the UIS Cave Diving Commission, again with the relevant contact address list for each country.

There is a lot of useful information in the "Magazine" and certainly anyone who goes cave diving overseas should subscribe to it. Those who do most of their cave diving at home in Britain may also find the articles on techniques of some relevance. The next issue (to be published sometime in 1989) will contain a full report about the International Sump Rescue Symposium held in Italy in November 1988.

A GLOSSARY OF ITALIAN DIVING TERMS

accumulatore	rechargeable cells
acqua fangosa/torbida	bad visibility
aria compresso	compressed air
assistenza medica in camera iperbarica	recompression chamber
attaccature	fastenings
atmosfera	atmosphere
autorespiratore	aqualung
azoto	nitrogen
bolle	bubbles
bombola	bottles
bombole ad alta capacita	large bottles
campana	airbell
capo isotermico	thermal underclothing
cappucio	hood
cerchiatura di metallo	metal band (eg bottle band)
ciotoli, ghiaia	pebbles
cinghie	straps
corrente	current
decompressimentro	decompression meter
decongestionante	decongestant
desaturazione	desaturation
elio	helium
embolia gassosa	gas emboli
estensore	snoopy loop
galleria aereo	air filled passage
galleria sommersa	flooded passage
giacca di neoprene su tuta pontonniere	diving wetsuit
immersione profondi	deep dive
immersione senza attrezzatura	free dive
iperossia	oxygen poisoning

2

luce	light
maiale	diver propulsion vehicle
maschera	mask
miscela di gas	gas mixture
muta stagna	drysuit
nodo	knot
ossigeno	oxygen
piombo	lead blocks
pinne	fins
portata	outflow
pressione	pressure
punto d'ancoraggio	belay point
recompressione	recompression
resalita	ascent
riavvolgere	to reel in
risorgiva (valchiusiana)	(vauclusian) spring
sagola	diving line
scarpata d'argilla	mudbanks
scavo	digging
seno nasale	sinus
sifone (attivo/passivo/sospenso)	(active/static/perched) sump
sistema colletore	master cave
sistema ipogeo post-sifone	cave passages beyond a sump
soccorso	rescue
soste di decompressione	decompression stops
speleologia subacquea	cave diving

tabelle d'immersione	decompression tables
telo termico, coperta isolante	survival bag
tempo di sorta	decompression time
tendisagola	line reel
trammogia	boulder choke
transporti	porterage
tubo	snorkel
uscita di basse/alta pressione	low/high pressure port
volta inundata	duck or short sump
zavorra	weightbelt

Appendix 5:

CAVE DIVING RESCUES - KEY POINTS

(Advice given recently to cave rescue controllers
by British cave divers)

1. An overdue diver must be assumed to be alive unless his body is found.

2. If the victim is alive the cold will quickly render him helpless. Get divers in the sump as fast as possible.

3. Although speed is vital, anticipate delays, as all diving operations need to be carried out safely.

4. Always call out more divers than you anticipate will be needed. "Standby calls" lead to long delays.

5. Don't over-estimate what cave divers can realistically achieve. They must be allowed to make their own decisions bearing in mind safety, logistics and available manpower.

6. Get information from divers with recent experience of the sump.

7. Don't encourage divers to do anything dangerous just to satisfy the hopes or wishes of friends and relatives of a deceased person.

8. Diving operations are hampered by redundant "helpers", who should not congregate around the diving base unless needed.

9. Always consider other alternatives to the use of divers - eg pumping, digging etc.