SEARCH AND RESCUE MAGAZINE

SPRING 1974

Contents

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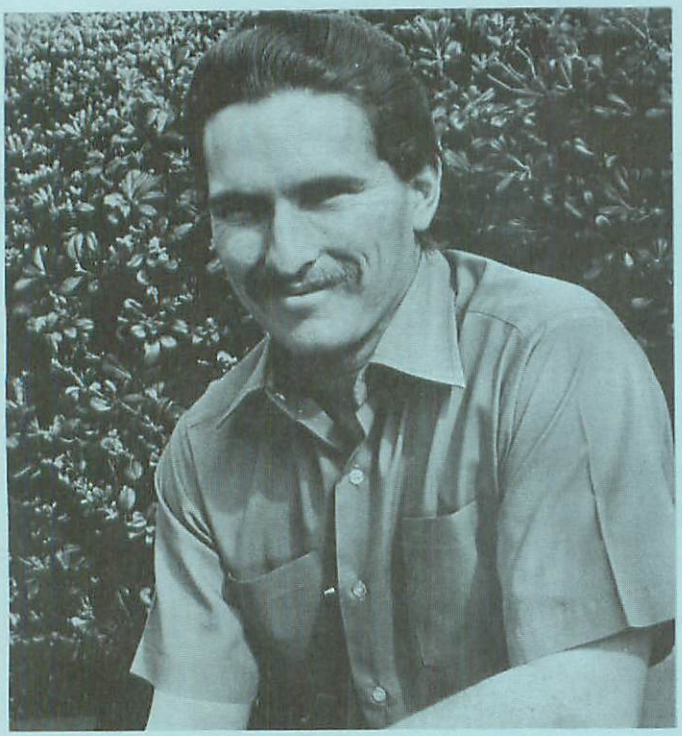
EDITORIAL



Dennis E. Kelley, Publisher
SEARCH & RESCUE MAGAZINE

Volunteer search and rescue in America is at the crossroads. Unless positive steps are taken by volunteer groups and associations, much of what is volunteer now, will be paid professional within just a few years.

To say that the victim would suffer from such a change is highly unlikely, and in fact, superior emergency care seems probable in a surprising number of areas.

Some of the reasons for this prophesized change to paid professional follows:

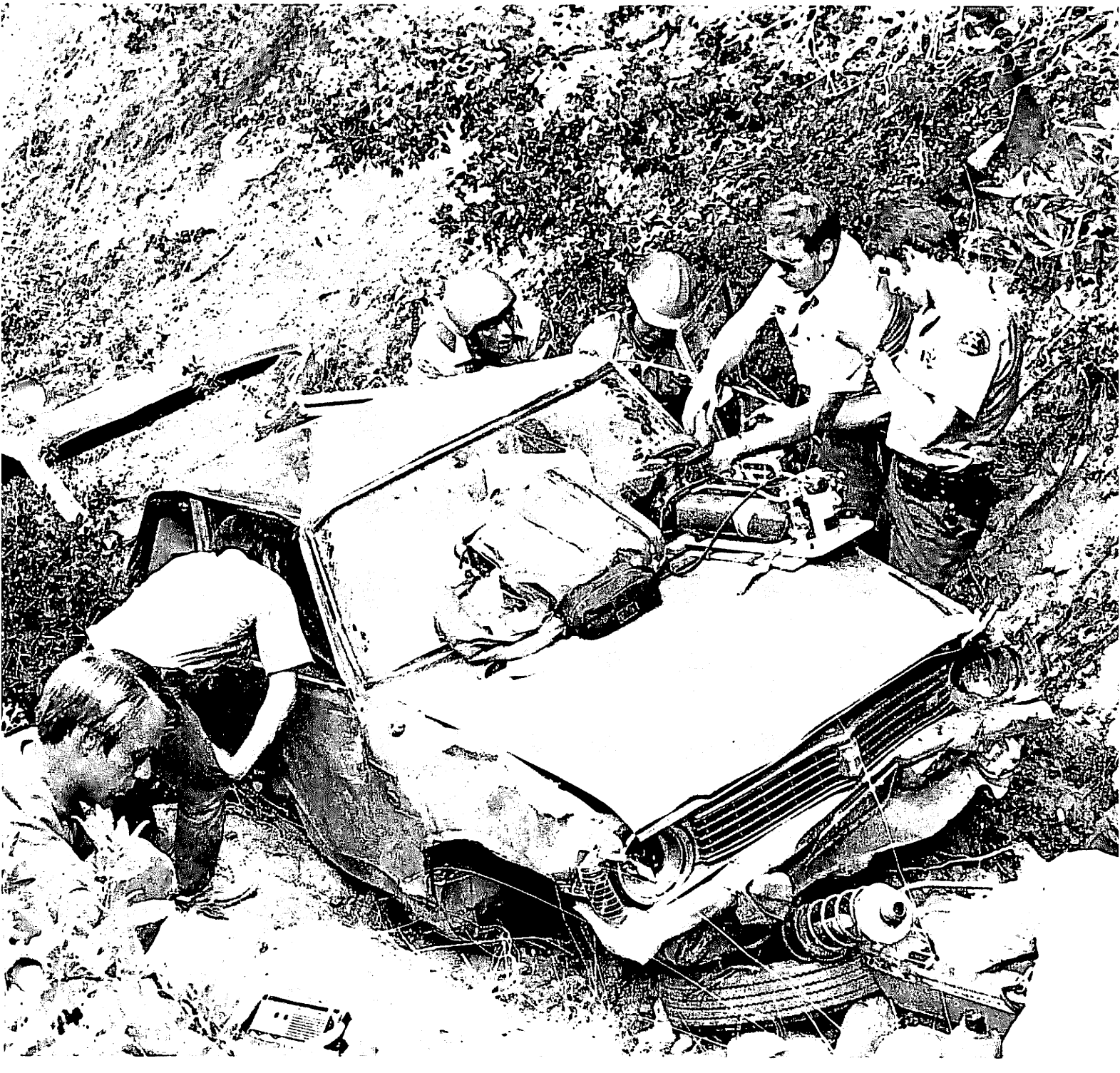
a. Competition for SAR missions.
b. Demands for SAR proficiency are up.
c. SAR efforts and sacrifices by a few go unappreciated by most fellow SAR team members.
d. The modern paid public servant has an agressive attitude about his job.
e. SAR is good public relations, and local public agencies already have the legal responsibility.
f. There will always be a subtle friction between volunteer and paid SAR professionals.
g. A volunteer takes the food out of the mouth of an unemployed man's family.

What volunteers must do to prevail in this publisher's opinion, and not go the way of volunteer fire fighters is:

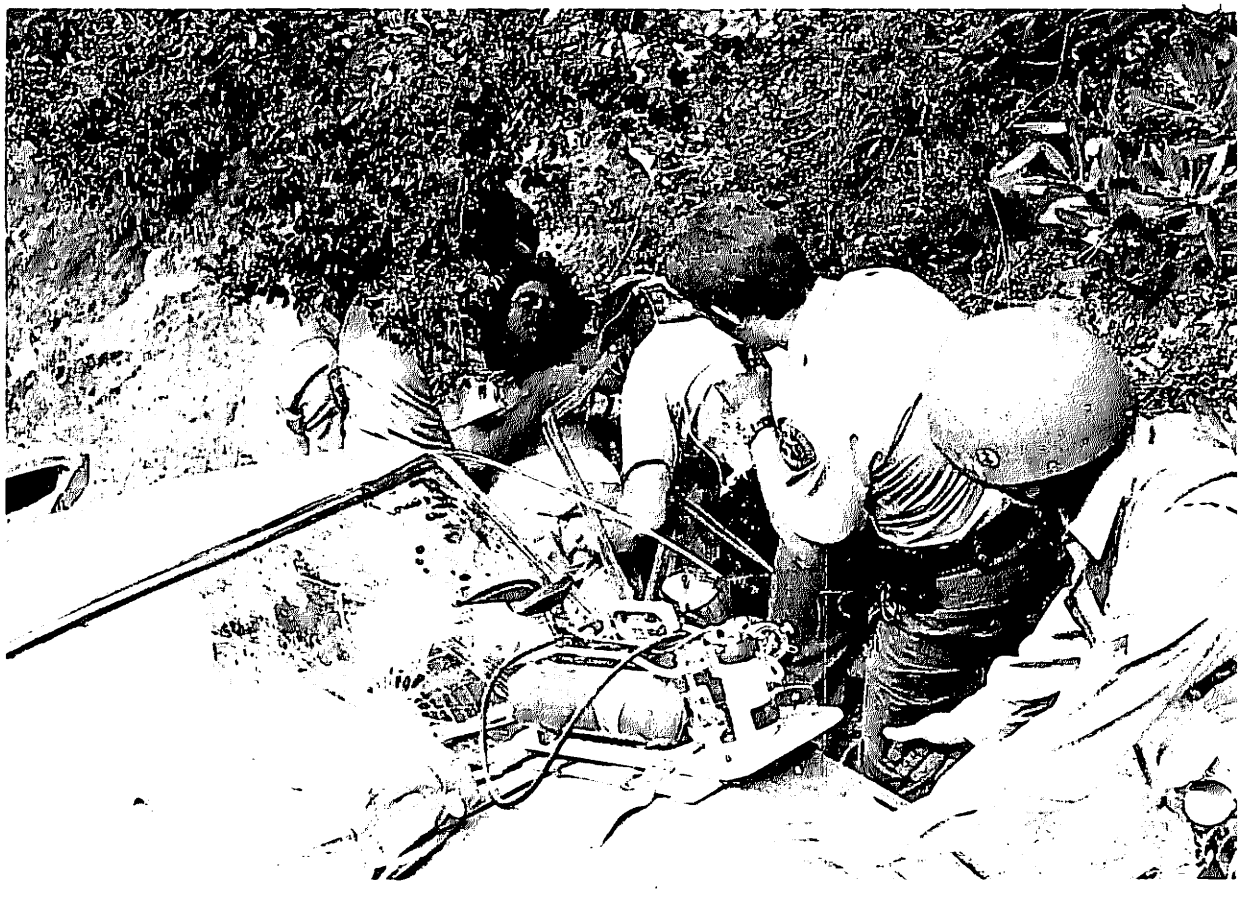
1. Preach and practice victim's needs first.
2. Organize fellow SAR groups and organizations to equally share SAR operations.
3. Strive for greater team proficiency and competence.
4. Lobby aggressively for victim's needs at all levels of press and government.
5. Simplify public service with individual specialization, such as, scuba, paramedic, mountain rescue, search, etc.

Volunteer SAR is truly one of the finest free public services in modern history. Don't let this great American heritage fail and disappear because of the emotionalism inherent in volunteerism.■

Driver survives 500-foot plunge



DR. ROBERT BELLIN OF THE LOS ANGELES COUNTY SHERIFF'S DEPARTMENT EMERGENCY MEDICAL TEAM ADMINISTERS AN IV TO THE VICTIM, 37 YEAR OLD GEORGE CANNATA.



USING A PORTABLE STRETCHER AS A BACKBOARD, RESCUERS EASE THE VICTIM CAREFULLY FROM THE WRECKAGE.

ABOVE: RESCUERS FROM THE MONTROSE SAR TEAM, THE LOS ANGELES CO. SHERIFF'S EMERGENCY SERVICES DETAIL AND MONTROSE STATION, L.A. CO. FIRE DEPT., CALIF. HIGHWAY PATROL, U.S. FOREST SERVICE, AND VALLEY AMBULANCE CO. PARTICIPATED IN THE EVACUATION.

RIGHT: NOTE FIELD USE OF SOFT PLASTIC IV CONTAINER.

LEFT: LOS ANGELES COUNTY SHERIFF'S AND FIRE DEPARTMENT HELICOPTERS WERE AVAILABLE FOR THE RESCUE.

ABOVE: HELICOPTER RESCUE CUTS TRIP TO THE HOSPITAL TO MINUTES, INSTEAD OF HOURS.

BELOW: CLEAN-UP TIME. NOTE TRUCK WINCH WAS USED TO BRING LITTER UP PRECIPICE.

AS A WITNESS RELATED, "ONE MINUTE HE WAS IN FRONT OF US, THE NEXT HE DISAPPEARED." "I LOOKED OVER THE SIDE AND THERE WAS A LARGE CLOUD OF DUST." THE WITNESS CALLED THE U.S. FOREST SERVICE, WHO IN TURN NOTIFIED THE LOS ANGELES COUNTY SHERIFF'S DEPT.

RESCUERS LATER FOUND THE VICTIM STILL STRAPPED IN HIS SAFETY BELTS SOME 500 FEET DOWN FROM THE ROAD EMBANKMENT. AT THE HOSPITAL, THE VICTIM GEORGE CANNATA, WAS TREATED FOR A NOSEBLEED AND ABRASIONS.■

NATIONAL ASSOCIATION
AND
SEARCH OR RESCUE COORDINATORS

ANNUAL SAR CONFERENCE

NATIONAL ASSOCIATION OF SEARCH AND RESCUE COORDINATORS CONFERENCE DELEGATES

L-R: LOU MURPHY (NEVADA & HOST), BOB HILL (CALIF.), JOHN OLSON (OREGON), HAL FOSS (WASHINGTON STATE & NASRC PRES.) JAMES LORD (NEW YORK), L. E. FITZGERALD (ARIZ.), AND PAUL KOENIG (UTAH & NASRC SECRETARY).

The atmosphere of the 5th annual conference of the National Association of Search and Rescue Coordinators (NASRC) was reflected by the impromptu declaration of LTC Fred Mills that the U.S. Army would not stand on ceremony when there was an emergency public need. The spontaneous ovation greeting LTC Mill's declaration seemed to represent the desires of all the conference attendees, not to let the prevalent national adversity interfere with the public service of U.S. SAR.

The three day conference, November 30 and December 1 and 2, 1973, was timed perfectly with an energetic snow storm that several times caused momentary blackouts. Lou Murphy, representing the host state of Nevada at Carson City's Ormsby House, surely exceeded his authority with a friendly and warm welcome to all attendees. Lou was a tremendous host by any standard.

A two part NASRC business meeting was held with Hal Foss, NASRC President, chairing the precedings. One part was held at the beginning of the conference and the other at the closure. The absence of Blair Nilsson, NASRC Vice-President and Colorado State SAR Coordinator, because of recent heart trouble, was felt by all. We missed you Blair! Unoffical NASRC business meeting minutes follow.

Motion to revise the association name to "National Association of Search and Rescue Coordinators". Change constitution and by-laws to add an advisory council of governmental and volunteer SAR organizations representatives. This council will provide technical and administrative SAR expertise to the State delegates. It was porposed that future NASRC conference formats should have a one day business meeting twice a year, and that at one annual business meeting, additional days shall be devoted to seminars and workshops. The solicitation of technical papers was also discussed.

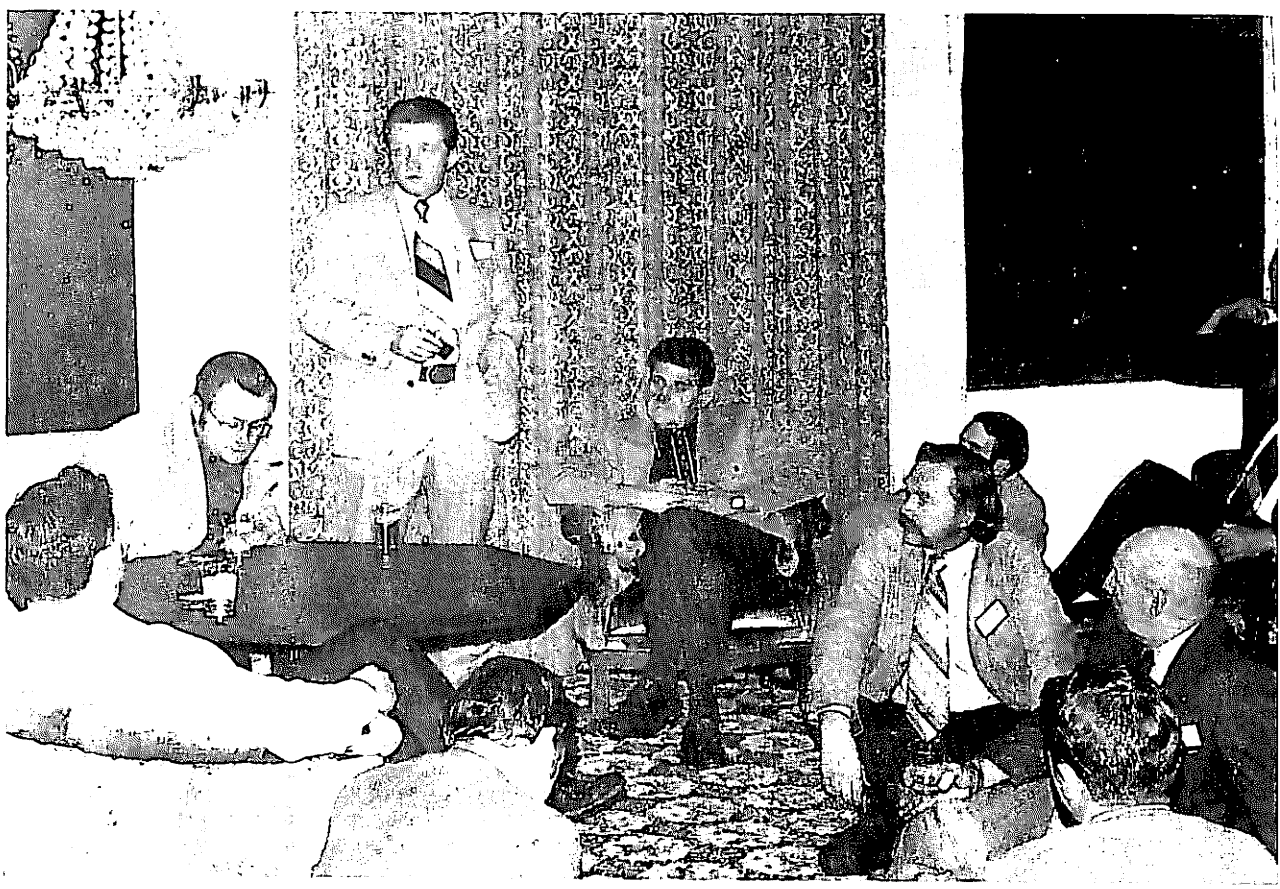
Delegates discussed acquiring "Search and Rescue Magazine" published by Dennis Kelley as the offical or sponsored organ of the NASRC.

CONFERENCE REGISTRARS; MARY STODDARD, NELLE HASTINGS, PATRICIA TYNDALL AND STERLA STRONG. (and Rick LaValla)

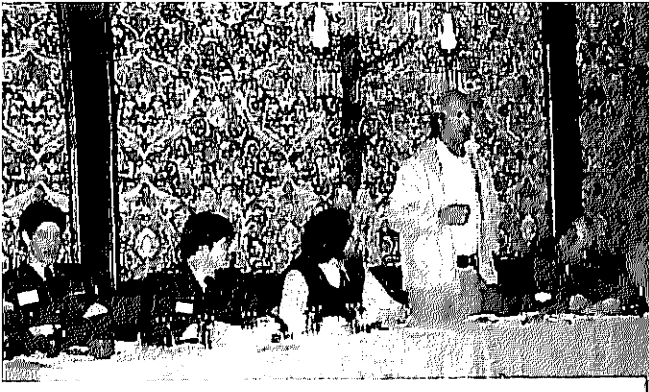
FIRST SESSION, FRIDAY MORNING.

MORNING SPEAKER, CMDR. CARLTON MEREDITH, OFFICER IN CHARGE, NATIONAL SAR SCHOOL.

GENE FEAR, SURVIVAL EDUCATION INNOVATOR, LECTURES SPECIAL SURVIVAL EDUCATION SEMINAR IN ROOM 901.



BOB HILL, CALIFORNIA SAR COORDINATOR, CONDUCTS FIRST CALIFORNIA SAR MEETING.



SURVIVAL EDUCATION PANEL; L-R: SGT. TERRY HENRY (U.S.ARMY), LT. MAURY MUSSA (U.S.ARMY), TIM KNEELAND (INT. FOR SURV. ED.), RICK LAVALLA (WASH. STATE DES.), GENE FEAR (SURV. ED. ASSOC.), AND COL. 'RED' YOUNG (CAP).

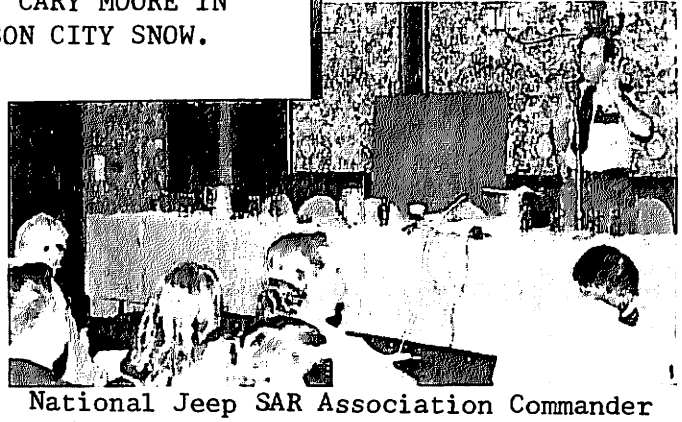
ORANGE SHIRTED SAN DIEGO CALIFORNIA MOUNTAIN RESCUE TEAM MEMBERS: WES REYNOLDS, LOIS MCCOY, AND RON CARLSON, TEAM PRESIDENT.

One highlight of the conference was the invasion of the Ormsby House by George and Kimi Uchida and the "Imperial Army". A cursory inspection of the gaming tables revealed an invasion victory.

BILL WADE, NPS ALBRIGHT TRAINING ACADEMY.

LTC. CARY MOORE IN CARSON CITY SNOW.

Explorer SAR was well represented by Don Wilson, Western Region ESAR Chairman, Grant Smith and Jon Wartes. The new ESAR display was very impressive.



National Jeep SAR Association Commander LaVoy Lewis reviewed the years events and discribed pertinent coming meetings, seminars and conferences of the assoc.

AVIATION PANEL:

L-R; LCDR BRANDT BECK (U.S.NAVY), RALPH MCGINNIS (ASST. ADM. OREGON AERO. DIV.), CPT. HARDY WILLIS (FAA SPEC. STAFF ASST. SAR), ART NEUMANN (NTSB WESTERN AREA SUP.), AND BILL HAMILTON (ASST. DIR. WASH. STATE AERO. COM.).

The 1974 NASRC conference will be held Dec. 6,7 and 8 in Portland, Oregon, and the President will investigate matter of NASRC incorporation.

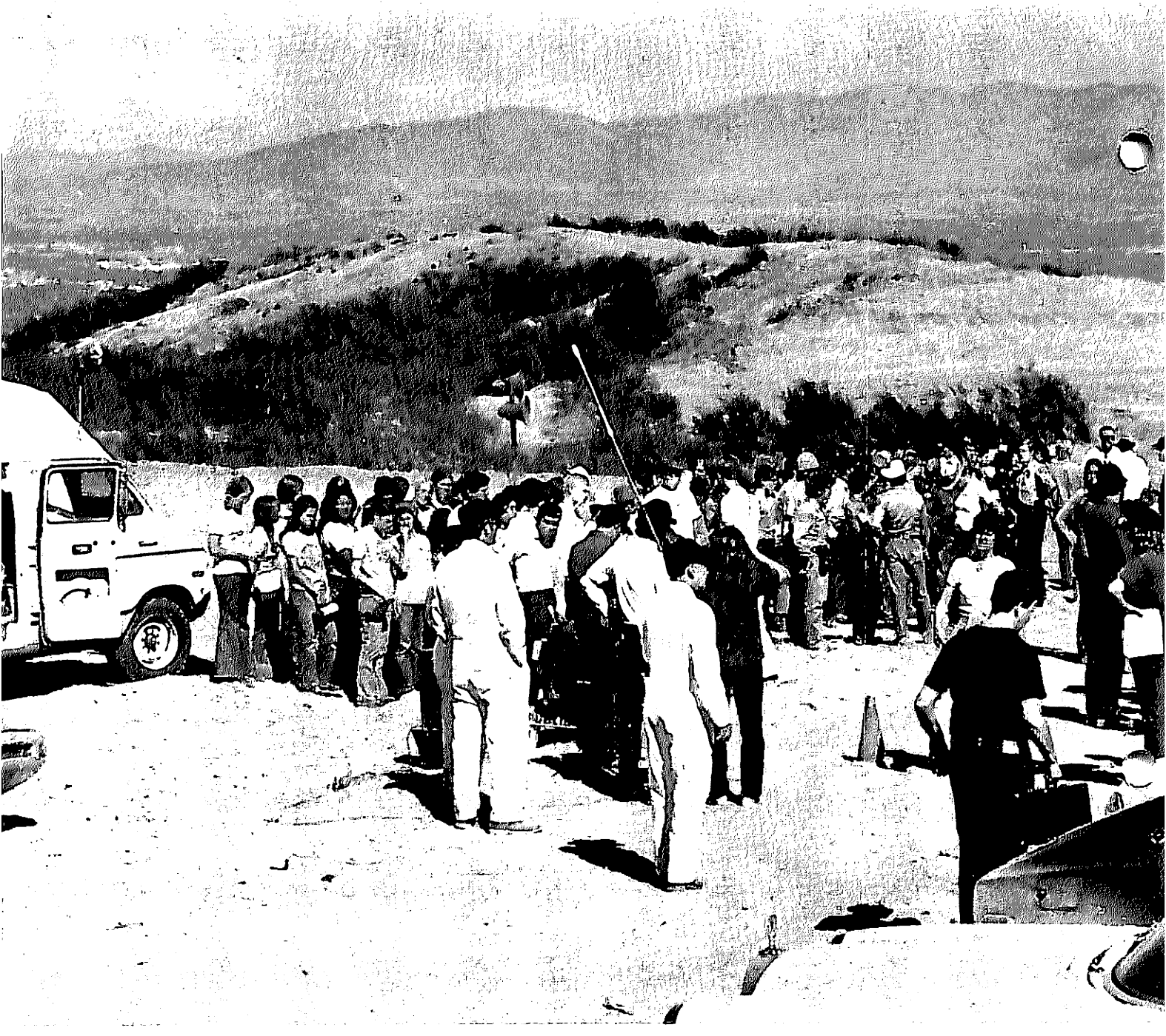
Ormsby House room 901 proved to be a busy and exciting point of SAR activity. Bob Hill, California State SAR Coordinator, drew upon a forminable array of visiting Calif. personnel to conduct the first California SAR meeting. Prominent participants were Ventura County Sheriff Bill Hill, Mountain Rescue Association; Executive Secretary Vance Yost and Vice-President Minor Harkness, Fresno County Sheriff SAR Captain Bill Young, Alameda County Assistant Sheriff T. L. Houchins, Plumas County Undersheriff Dave Wingfield, San Diego Mountain Rescue Team President Ron Carlson, and many others too numerous to mention.

Topics discussed were; the fuel shortage for volunteers and their workman's comphensation, as well as the next Calif. SAR meeting tentatively scheduled for Spring of 1974. Bob Hill should be congratulated for taking the initiative in this important activity for Calif. search and rescue.

Another exciting special session of room 901 was the survival education presentation by Gene Fear, Tim Kneeland and Rick LaValla. This lively session gave attendees a preview of the frontiers of survival education in the nation. Rick LaValla addressed the state-of-the-art and Tim Kneeland gave a very humerous presentation of survival priorities. Gene Fear, the father of modern day survival education, lent his great prestige to the session by clarifying and emphasizing salient points.

Over 40 different types of SAR agencies were represented, including 20 states and Washington D.C. Attendance was over 175 and represented this Nation's SAR elite. The next annual conference holds promise of being a greater success.

Details on the National Association of Search and Rescue Coordinators can be obtained from your state SAR coordinator or from NASRC, P.O. Box 8100, Salt Lake City, Utah 84108 USA. ■

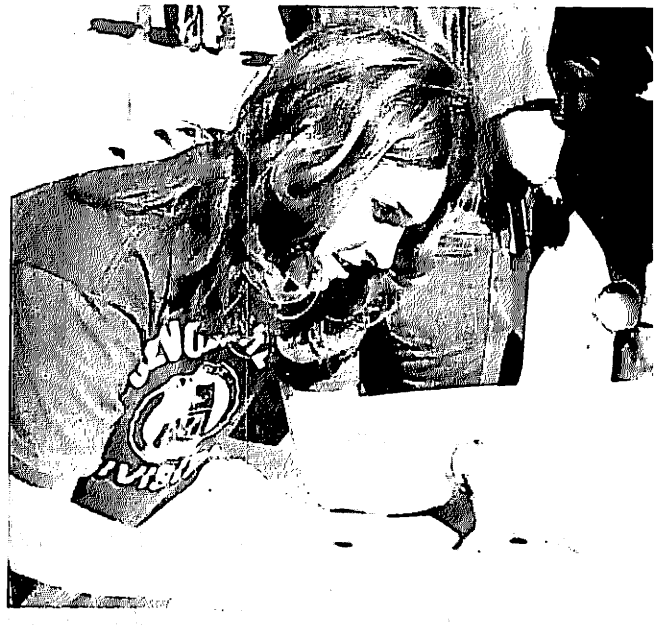


SIMULATED PLANE CRASH

BRIAN KINCADE
OF THE CITIZENS EMERGENCY
MOBILE PATROL, LEADS THE
BRIEFING OF THE SIMULATED
PLANE CRASH DISASTER
SEARCH UNITS. IN THE
BACKGROUND CAN BE SEEN
THE SAN FERNANDO VALLEY.

LEFT:
LEN SHARP, CEMP OPERATIONS
LEADER AND KEITH ANDERSON,
LAPD DEVONSHIRE DIV.,
COMMUNITY RELATIONS,
IN EXECUTIVE COMMITTEE.

BELOW: NANCY ODORIZZI,
SEARCH P.R.



ABOVE:
TOM WILLIAMSON, CEMP
PUBLIC RELATIONS OFFICER.

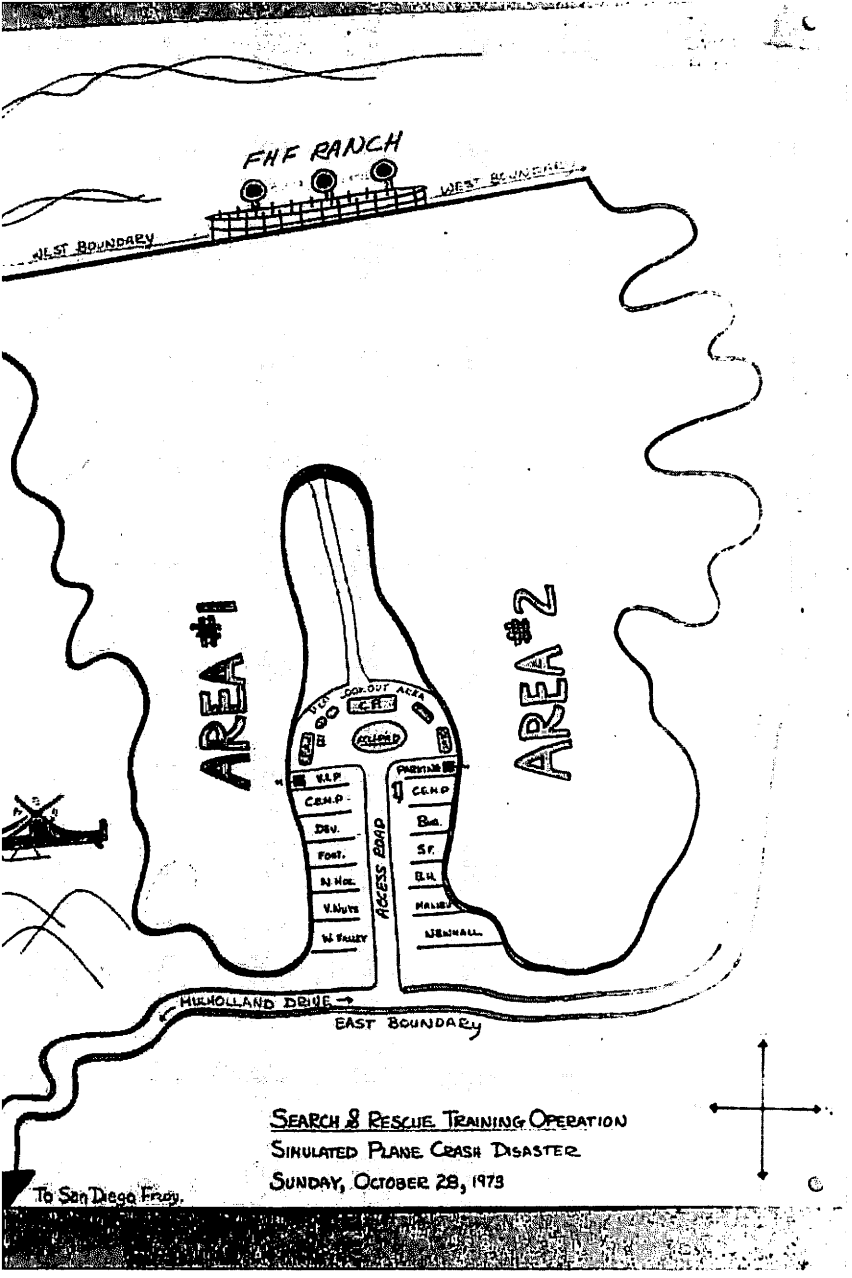
LEFT: ESAR REPS.
HAROLD MORRELL,
JIM BUTLER, AND
KEN AXELROD.

ABOVE LEFT AND RIGHT: SEARCH SWEEP PREPARATION AND EXECUTION.

LEFT: REAL PARAMEDIC EVACUATION FOR HEAT EXHAUSTION VICTIM.

BELOW LEFT: PRACTICE VICTIM EVAC.

BELOW RIGHT: L-R VICTIMS; DEBBIE HUNT, IRMA FIERRO, DORIA ARPAIA, AND RICHARD ROBINSON.



TOP:
SEARCH COORDINATOR,
KRIS SCHUESSLER OF THE
LOS ANGELES POLICE DEPT.,
DEVONSHIRE DIV.,
COMMUNITY RELATIONS.

LEFT: DISASTER LAYOUT.

An integrated SAR simulated plane crash disaster was conducted by the Devonshire Divison of the Los Angeles City Police Department (LAPD) in the Malibu Hills of Southern California, Sunday, October 28, 1973. The volunteer Citizens Emergency Mobile Patrol (CEMP) assumed operational responsibility for this exercise to enhance Los Angeles' capability to handle a major disaster.

Participating organizations in this simulation exercise which contributed over 200 persons were; LAPD Law Enforcement Posts from Devonshire, West Valley, Van Nuys, Foothill, and North Hollywood. Burbank and Beverly Hills City Police Dept. Law Enforcement Posts as well as the Los Angeles County Sheriff's Dept. Law Enforcement Posts participated. ESAR Posts 322, 156 and from North Hollywood were also involved.

The planning and organization of this simulation exercise was exceptional. Detailed operating procedures and a search layout contributed to an effective and interesting simulation exercise. The spontaeous addition of a simulated bomb scare also enhanced the exercise.

The adult advisors in this simulation exercise should be commended for this effort in behalf of the youth of Los Angeles. Local TV and press was quick to mention this outstanding effort by the LAPD and CEMP for the community.■

HEATED OXYGEN HYPOTHERMIA TREATMENT

DR. COLIN HUTCHISON DISCUSSES THE IMPLEMENTATION AND USE OF THE HEATED OXYGEN HYPOTHERMIA TREATMENT SYSTEM DEVELOPED IN SCOTLAND.

Our Scottish cousins have created a device that will not only revolutionize accidental hypothermia or exposure treatment, but even perhaps the whole area of wilderness cold environment emergency medical care. The device presented here can provide a quick quantity of heated oxygen for the central rewarming of a hypothermic victim. The exceptional features of this device that make it so applicable to SAR are its cheapness, portability and ease of utility by non-medical personnel.

Dr. Colin Hutchison of the Montrose Search and Rescue Team in Southern California has built this heated oxygen hypothermia treatment device with the help of Dr. Kurata of the North Glendale Hospital, Anethesia Dept. who supplied many components. In our interview, Dr. Hutchison was quick to amplify the simplicity of this unique device in construction, operation and application.

This device truly seems to be universally applicable to all SAR organizations, regardless of their medical capabilities. It has even been suggested that this heated oxygen hypothermia treatment device should be effective in the treatment of cold environment trauma shock. However, the final assessment of this application will have to lie with the medical profession and their research.

Dr. Hutchison also emphasized the minimization of heat loss in the construction of the device. The heat drain of the frigid environment is excessive on the thermal generation of the CO_2 - soda lime chemical reaction unless precautions are taken. Polystyrene foam in the carrying box construction enhances this effort.

Other salient features of this important device are detailed in the following reference.

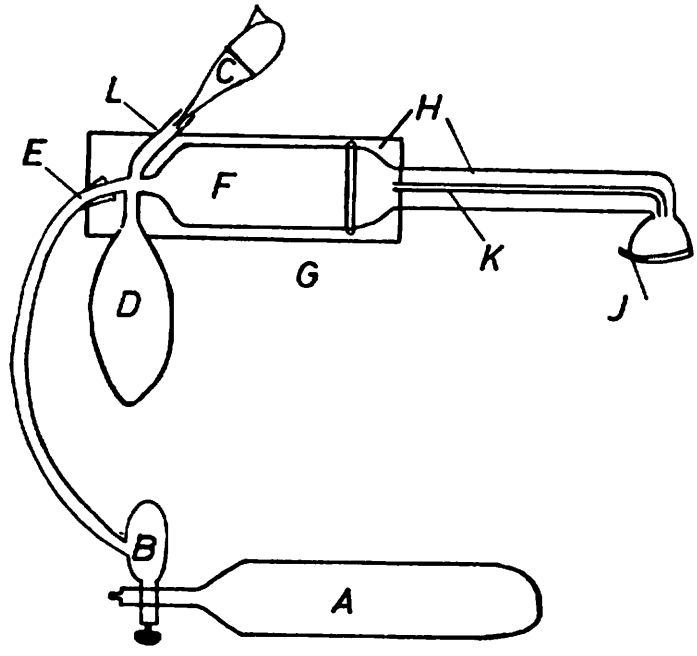
Accidental hypothermia: an apparatus for central re-warming as a first aid measure by E.Ll. Lloyd, N.A. Conliffe, H. Orgel, and P.N. Walker. Scottish Medical Journal 1972, 17:83. ■

THE FOLLOWING EXCERPT IS FROM THE SCOTTISH MEDICAL JOURNAL REFERENCED IN THIS ARTICLE.

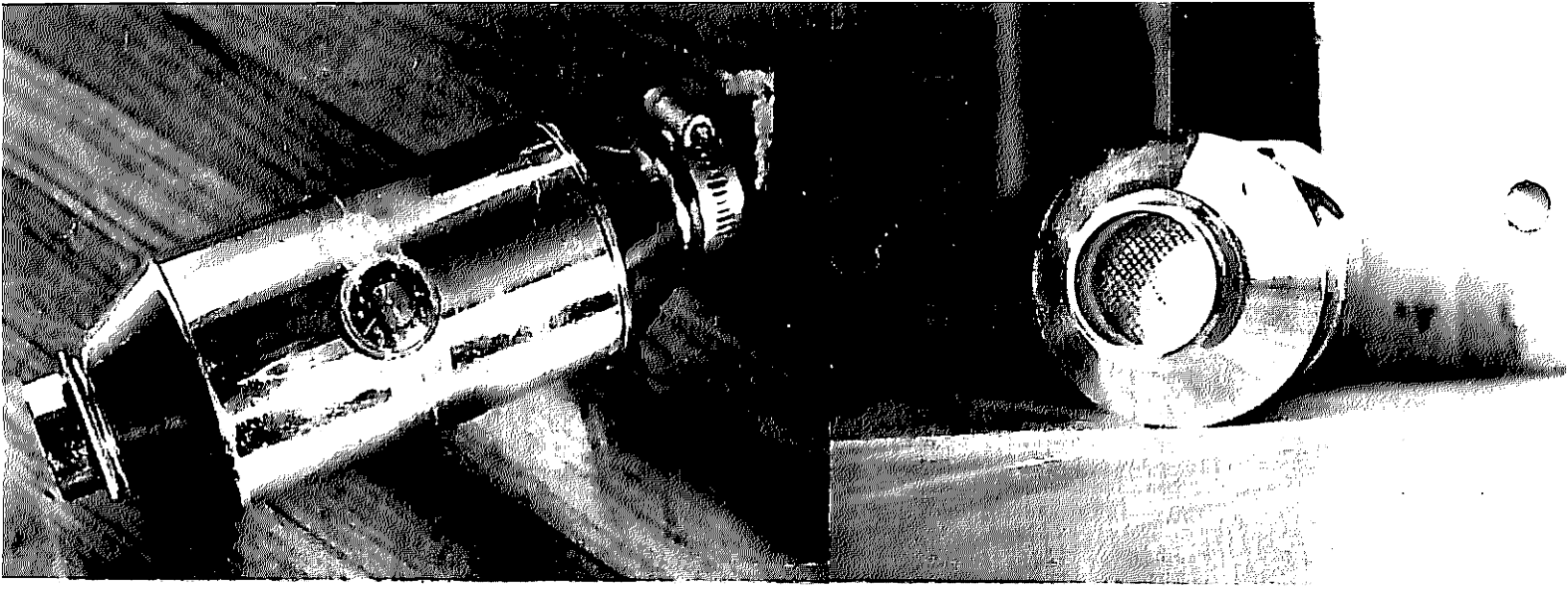
Instructions for use. The oxygen cylinder (A) is opened and the face mask (J) or mouth piece strapped to the patient's face. The patient is allowed to breathe for 2 minutes till the reservoir bag (D) starts to fill (this is to ensure that an air-tight seal has been achieved round the mask and to flush the circuit with oxygen). The corkette (C) is then activated till the sparklet cylinder of CO_2 is empty. After 5 minutes the corkette is reloaded, with a fresh sparklet cylinder, and again activated till empty. In severe conditions a third sparklet is required to reach adequate temperatures.

The apparatus is arranged with the canister (G) below the level of the face mask (J). Thereafter the only attention required is to ensure that the air-tight seal is maintained between the face and the mask and check that the oxygen cylinder does not run out. After each hour a further sparklet cylinder should be activated to maintain the heat level of the canister. The standard Waters canister used has a safe endurance of 6 hours if used as above.

The filling of the Waters canister with soda-lime should follow accepted anaesthetic practice, *i.e.* to maintain an even pressure on the granules an ordinary nylon pot scourer is inserted before the end of the canister is screwed back into place. The soda lime should be replaced each time the apparatus is used.

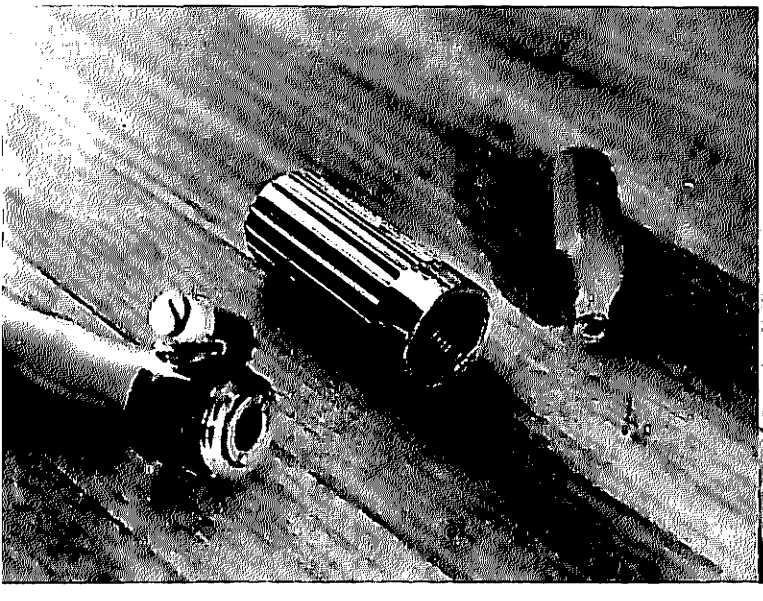


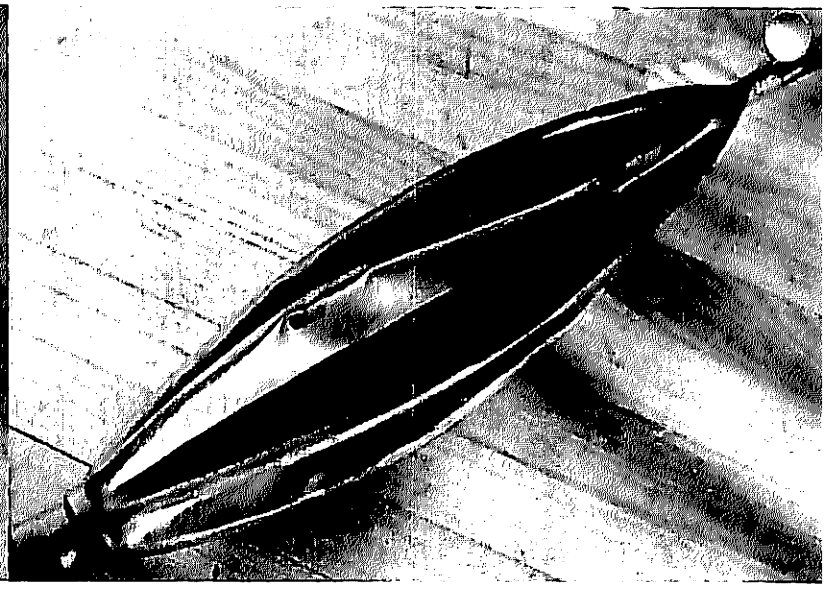
Diagramatic representation of portable rewarming apparatus. A Oxygen cylinder. B Demand reducing valve. C Corkette (Sparklets Corkmaster)—with the distal portion of the needle removed and connected to the gas inflow limb of E. The oxygen supply is connected to the normal outflow part of the assembly. D 6 litre reservoir bag. E Normal Waters valve assembly with the Heidebrink valve removed and the reservoir bag connected. The arrangement is necessary to transmit the inspiratory negative pressure to the demand valve B. F Soda lime. G Waters canister. H Insulation—expanded polystyrene in the box and air in the delivery tube. J Face mask or mouth piece and nose clip as used by mine rescue or skin divers. K Double lumen delivery tube. The inner lumen is the respiratory tube while the outer is closed off and acts as insulation. The length of the tube is not critical since any build-up of CO_2 due to the dead space would be beneficial in protecting the heart from the effects of hypothermia. L Rubber tubing to give a flexible mounting for the Corkette C.



ABOVE: SODA LIME CANISTER AND THERMOMETER.

ABOVE: END OF CANISTER SHOWS NYLON PAN SCRUBBER USED TO HOLD SODA LIME.



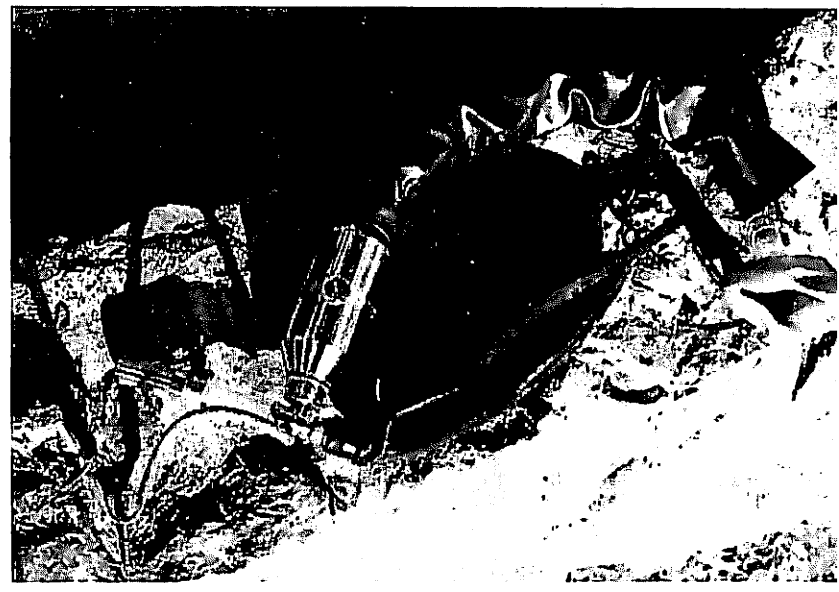


ABOVE: CO_2 CYLINDER IS SHOWN WITH MANUAL RELEASE.

ABOVE: BELLOWS OR RESERVE BAG.

LEFT: COMPLETE SYSTEM IS SHOWN WITH THERMAL ISOLATION AND CARRYING BOX. OXYGEN TANK AND EXTENDED FACE MASK ALSO SHOWN.

BELOW: SIMPLICITY OF SYSTEM SHOWN.



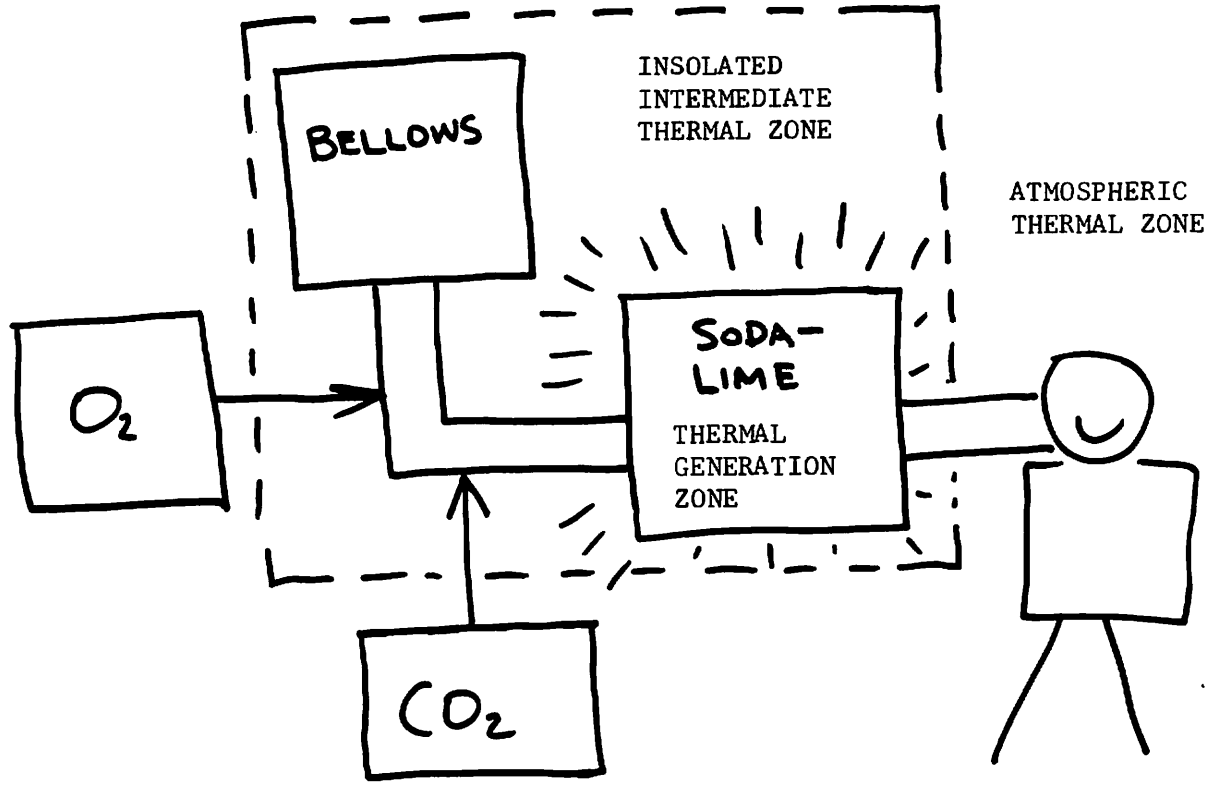


DIAGRAM ABOVE ILLUSTRATES THE PRINCIPAL OF THERMAL BARRIERS IN ACHIEVING EFFECIENT WARMING OF THE VICTIM WITH HEATED OXYGEN.

MOUNTAIN SEARCH FOR THE LOST VICTIM

CHAPTER 2

PART 2 OF 2

In the interest of advancing the state-of-the-art, MOUNTAIN SEARCH FOR THE LOST VICTIM is being serialized in SAR magazine. One chapter each issue is presented here for your consideration. It is appreciated that most readers only scan an article, but I ask that all readers study this text for its appropriateness to your situation and activities. Your comments will be appreciated because I wrote the book to be universally applicable to all search situations. However, because my experience has been restricted to only one area of the country, there is some question of the reality of this goal. I am requesting help in this regard.

Copies of this book are available from the author, at $ 3.95,

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Montrose, California 91020
Phone (213) 248-3057

MOUNTAIN SEARCH FOR THE LOST VICTIM

Contents

2.2 DIRECTION OF TRAVEL IN VICTIM MOBILITY

The "aloneness" phenomenon associated with being lost and alone in the wilderness can shake the average person's confidence and induce panic. This phenomenon has been examined in detail in the laboratory with studies of sensory deprivation. (2)

These studies were concerned with the effects on human behavior of reduced environmental stimulation. Included in the studies were observations by philosophers, mystics, prisoners in solitary confinement, explorers, and shipwrecked sailors of the significant changes in behavior of individuals exposed to isolation. These changes include hallucinations, delusions, panic, distorted perception, and deterioration of thinking and reasoning.

Sensory deprivation in the wilderness involves the loss of sights and sounds with which the victim has been familiar, consciously or subconsciously. These associations include other humans and all the common attributes of civilization. The wilderness is completely devoid of the usual stimuli of civilization and, therefore, may produce the symptoms of isolation and sensory deprivation. The degree to which a person is affected by this lack of familiar stimuli varies, of course, with the individual.

The correlation between reports that lost youth tend to travel uphill and sensory deprivation is a possibility, although present statistical support is lacking. (3) This correlation is based upon the need for the victim to associate himself with literally anything. That is, a person travelling downhill sees little except sky, trees, brush, mountains, and generally monotonous scenes (Figure 2-2).

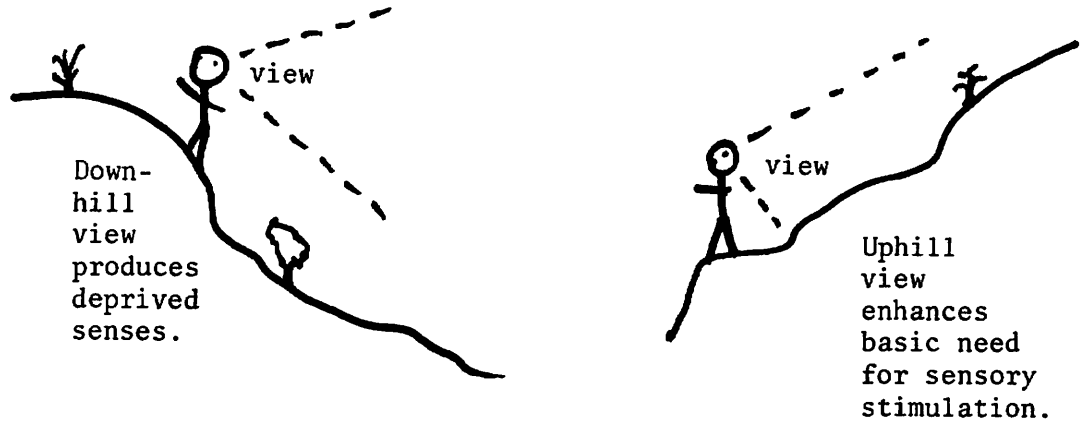


Figure 2-2: Victim Travel, Up or Down?

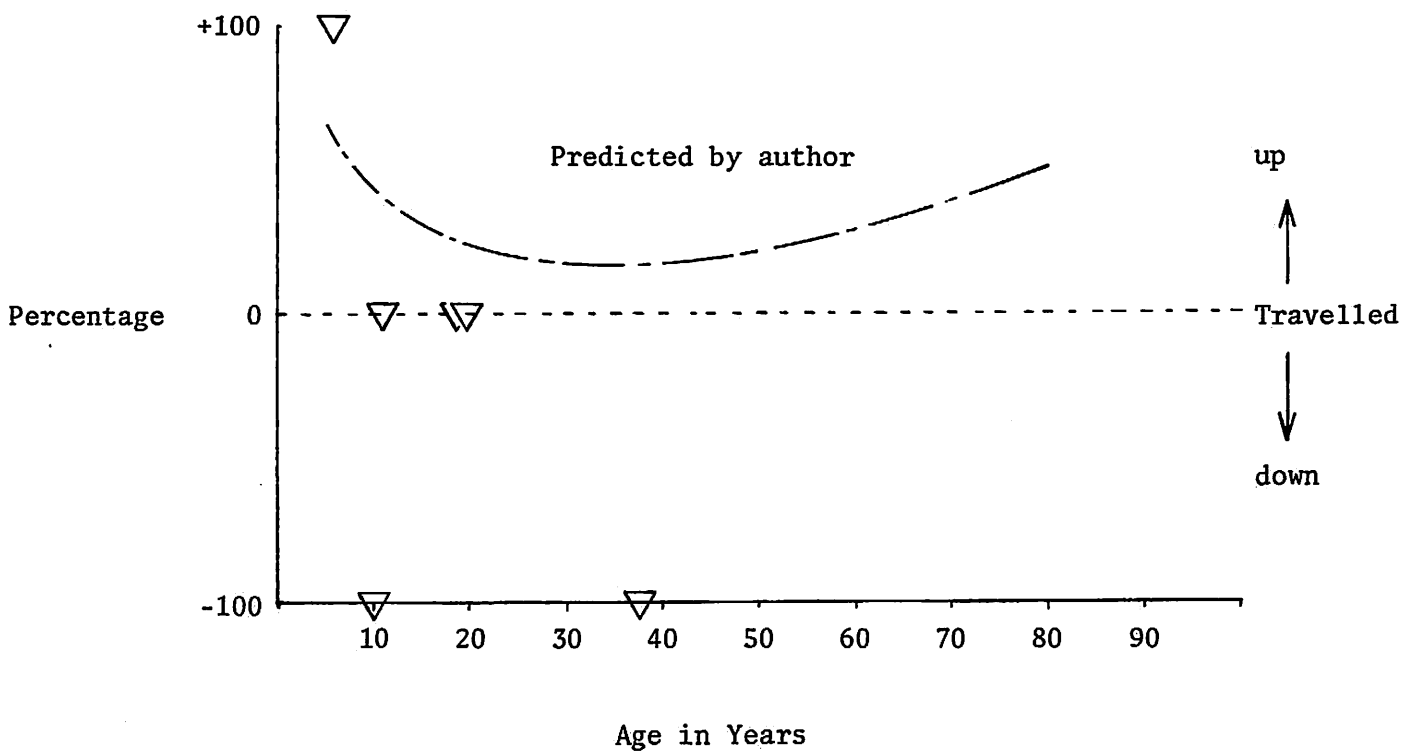
On the other hand, a person climbing uphill, can look at the ground in front of him and see rocks, dirt, grass, branches, etc. All of which can be felt and associated with by the victim. Consequently, uphill travel contributes to one's security by fulfilling basic needs for touch and sight.

Another report related to victim travel indicates that they often follow animals. Specifically, it was reported that lost children consistently followed a friendly herd of deer. This is in keeping with the notion presented here that the victim will try to associate with anything identifiable. Therefore, game trails, should be thoroughly investigated, particularly during periods of animal activity in the early or late hours.

Figure 2-3 depicting direction travelled by age up or down, illustrates a method of predicting victim behavior. Data are lacking, but the dashed line is my expectation of victim behavior. (4)

For victims who can keep their cool, familiar sights such as the lights of a city can provide the motivation to seek safety. A case involved a lost eleven-year old boy who traveled eight miles across incredible terrain in five days, attempting to reach the lights of a city 20 miles below. (5)

Figure 2-3: Direction Travelled by Age; Up or Down



2.3 EXPOSURE: TIME FRAME FOR SURVIVAL

In almost all searches the victim must be found within a given amount of time or he will not be found alive. This time frame for survival is a function of the individual, his resources and the environment. The start of time frame for survival begins when the victim enters the hostile environment.

Experience dictates that there is less than 0.3% chance that the missing victim will die of exposure directly.* However, the initial effects of exposure are so subtle that it is a likely contributor in many wilderness accidents. In addition, because of the vulnerability of children, exposure is a key factor in the strategy of major searches for missing children.

Figure 2-4 describes the range of days for fatal exposure or hypothermia. The chart depicts the limits of victim hypothermia survivability in days for a given temperature. A victim is defined here as a 25-year old male wearing one clo-unit of clothes (equivalent to a man's suit). Information of this type is useful to searchers in establishing manpower requirements to find victim alive, and in setting goals and cutoff time. These are elaborated upon later in the book.

The subject of victim exposure is approached here by considering the following factors:

1. hypothermia
2. windchill
3. wetchill
4. water immersion
5. dehydration
6. other factors

Please note that physiologists will not commit themselves on a definite time frame for survival or fatal exposure period because individuals vary so greatly. In view of this, the charts following on exposure must be applied with good judgement realizing the inherent weakness in attempting to predict human performance.

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* See Appendix II.

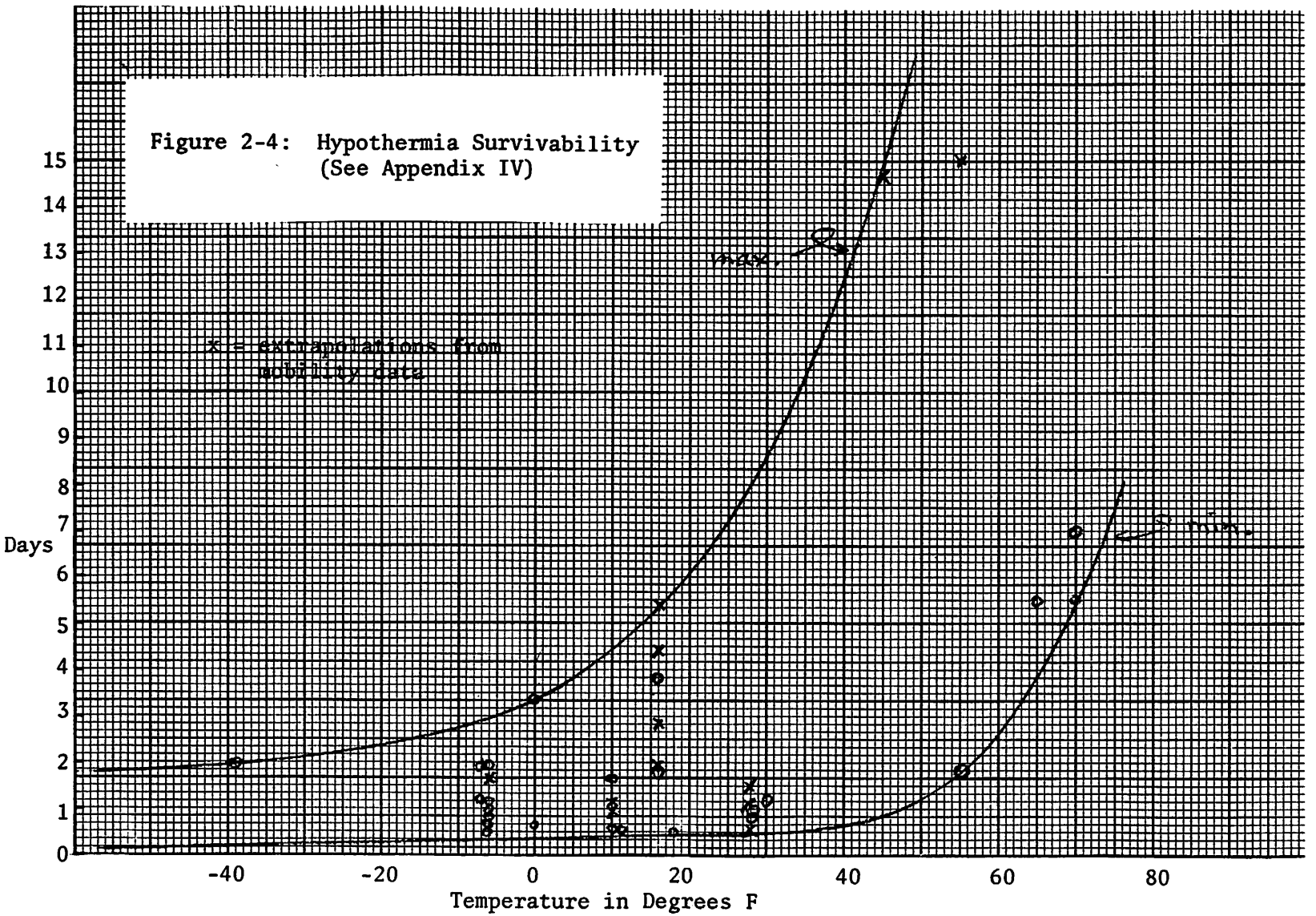


Figure 2-4: Hypothermia Survivability
(See Appendix IV)
x = extrapolations from
mobility data
max.
min.
Days
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
-40
-20
0
20
40
60
80
Temperature in Degrees F

2.3.1 HYPOTHERMIA

Hypothermia, or lowering of the body temperature through exposure, has been recognized as the subtle killer of the mountains. The effects of hypothermia on man are shown in the Figure 2-5.

The drop in the victim's body temperature due to exposure begins with the extremities: hands and feet. When the body temperature drops to the lower nineties, the higher mental processes are impaired. This means that the victim's usefulness to himself and to those trying to help him is marginal.

At 90 degrees the victim is in a stupor, and in the high eighties the victim is unconscious. By the time the victim's body temperature has dropped to the midseventies, the chances for revival are usually irreversible.

Sixty degrees is the lower limit from which a human has recovered. My own experience with hypothermia quickly brought home the subtle nature of hypothermia symptoms. Specifically, the following symptoms are deceptive in their seriousness:

- o General slowdown and clumsiness.
- o Complaints of exhaustion, cold, strange pains, but desirability to be left alone with predictions of momentary recovery.
- o Visible personality change to depression.

It must be appreciated that death has followed hypothermia symptoms in a matter of a few hours in severe wetchill conditions.

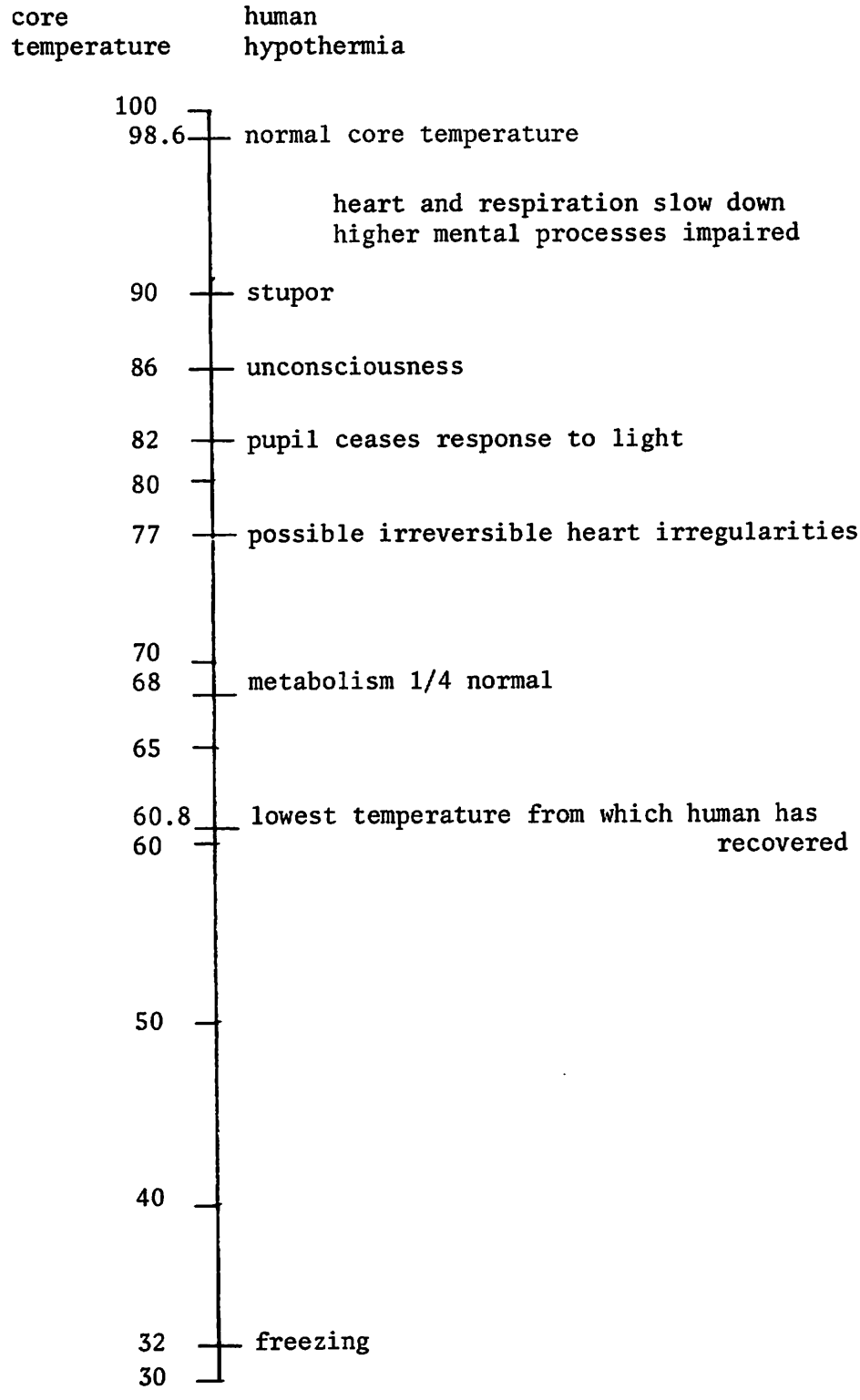


Figure 2-5: Hypothermia (From R. J. Hock and B. G. Covino, 'Hypothermia', Scientific American, March 1958)

2.3.2 WINDCHILL

Windchill is the negative effect on human survival as a result of wind velocities added to the stressing effect of low temperatures. Generally, the effect of wind is aggravated by the fact that most victims are improperly clothed. Windchill is a popular representation of a complicated psychophysiological phenomenon using an algorithm of relative temperatures based upon wind velocity.

The method proposed here for evaluating victim time frame for survival is to determine the relative temperature based upon the wind velocity in the following chart (Table 2-IX). This relative temperature can then be used directly with the previous hypothermia survivability graph. (6)

My own experience with windchill was tragically dramatized one night searching for 5-children, ages 10 to 15, missing on an all day excursion into the snow. The air temperature that night was above freezing, but the wind velocity on the ridges would nearly gust you off your feet. By the time the children were found, the 10-year old was dead and three other children were suffering from varying degrees of frostbite and hypothermia from which all survived.

That and other foul weather operations has taught me the significance of proper head gear. Of all clothing worn for protection against windchill, the wool stocking cap face mask used in conjunction with wind pants and hooded jacket is probably the finest. This head and face protection gives immediate comfort and more importance, reduces heat loss the best. My cap has a dicky to protect the neck also.

Table 2-IX: Windchill (From U.S. Air Force Manual 64-3, See Appendix I (6))

COOLING POWER OF WIND EXPRESSED AS "EQUIVALENT CHILL TEMPERATURE"																						
WIND SPEED		TEMPERATURE (°F)																				
CALM	CALM	40	35	30	25	20	15	10	5	0	−5	−10	−15	−20	−25	−30	−35	−40	−45	−50	−55	−60
KNOTS	MPH	EQUIVALENT CHILL TEMPERATURE																				
3 - 6	5	35	30	25	20	15	10	5	0	−5	−10	−15	−20	−25	−30	−35	−40	−45	−50	−55	−65	−70
7 - 10	10	30	20	15	10	5	0	−10	−15	−20	−25	−35	−40	−45	−50	−60	−65	−70	−75	−80	−90	−95
11 - 15	15	25	15	10	0	−5	−10	−20	−25	−30	−40	−45	−50	−60	−65	−70	−80	−85	−90	−100	−105	−110
16 - 19	20	20	10	5	0	−10	−15	−25	−30	−35	−45	−50	−60	−65	−75	−80	−85	−95	−100	−110	−115	−120
20 - 23	25	15	10	0	−5	−15	−20	−30	−35	−45	−50	−60	−65	−75	−80	−90	−95	−105	−110	−120	−125	−135
24 - 28	30	10	5	0	−10	−20	−25	−30	−40	−50	−55	−65	−70	−80	−85	−95	−100	−110	−115	−125	−130	−140
29 - 32	35	10	5	−5	−10	−20	−30	−35	−40	−50	−60	−65	−75	−80	−90	−100	−105	−115	−120	−130	−135	−145
33 - 36	40	10	0	−5	−15	−20	−30	−35	−45	−55	−60	−70	−75	−85	−95	−100	−110	−115	−125	−130	−140	−150
WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT.		LITTLE DANGER					INCREASING DANGER (Flesh may freeze within 1 minute)						GREAT DANGER (Flesh may freeze within 30 seconds)									
		DANGER OF FREEZING EXPOSED FLESH FOR PROPERLY CLOTHED PERSONS																				

2.3.3. WET CHILL

Accidental hypothermia resulting from wetchill is the most dangerous and commonly fatal victim weather hazard in wilderness areas. Essentially, wetchill involves the wetting of the victim in cold weather with the presence of wind. The result is a 83.4% decrease in the victim's ability to survive with even moderate winds because of the resultant wicking effect of the victim's body heat.

The gravity of wetchill is best illustrated by the number of fatal case histories involving accidental hypothermia and wetchill at seemingly mild temperatures of 35 to 50°F. (7) The victim with soaked clothes and subjected to winds at these temperatures will find himself in immediate danger of terminal exposure due to hypothermia.

It has been my personal experience that dehydration tends to play a role in wetchill hypothermia of an unknown degree. Perhaps the osmosis effect of soaked clothes, the drying effect of wind, and the general undesirableness of drinking cold water in a freezing environment contribute to a subtle dehydration problem that also restricts the victim's body circulation, i.e., hypothermia.

The graph showing wetchill survivability (Figure 2-6) dramatizes the dangerous effect on a wet victim in winds.

A word or two about the wicking affect mentioned in the first paragraph above is appropriate before continuing. There are two detrimental clothing conditions created by wetchill.

First, insulation in clothing is basically dead air spaces. Wet clothing has these dead air spaces filled with water. The water circulates because clothing is not a rubber wet suit and water can freely flow through the material removing body heat to the outdoors.

Secondly, the evaporation or vaporization of a fluid reduces the temperature of that fluid. The agitation of the water in your wet clothing by the wind and the fact that the porous nature of clothing increases the surface area of the water and promotes evaporation. This increased evaporation cools the water on your skin even more. Hence, the heat of your body is wicked away to the outdoors as a candle wick carrys fuel to the flame. Scientifically, it has been established that some wet clothing has so little insulating capability left in a breeze that you might as well be naked. Note that wool is the best of the common clothing materials when wetted.

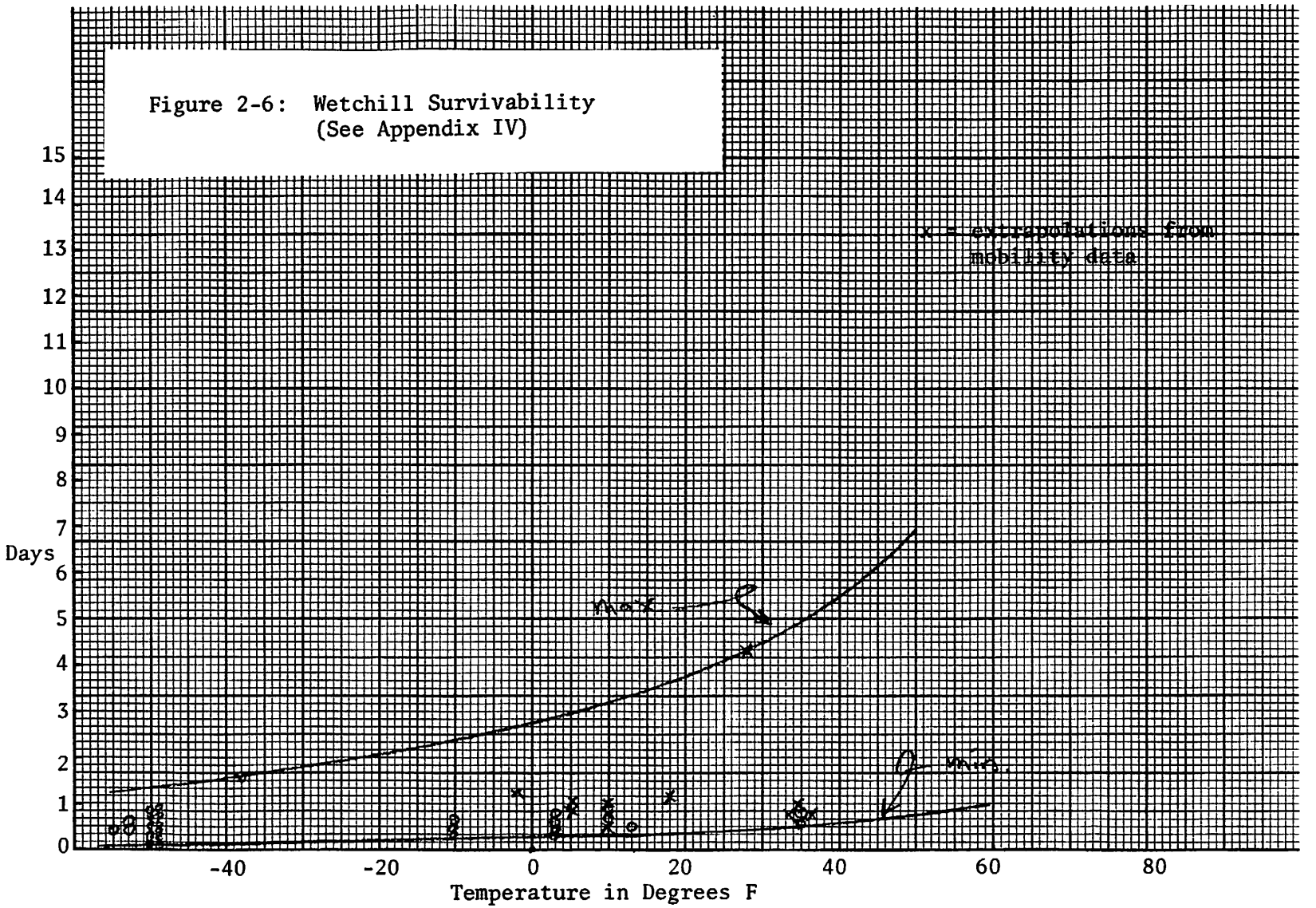


Figure 2-6: Wetchill Survivability
(See Appendix IV)

2.3.4 WATER IMMERSION

The possibility of victim water immersion can bring rapid fatal results if the water temperature is low or the exposure duration long. For this reason, searchers must treat frigid waters, such as streams, lakes, and marshes, as significant local hazards of immediate danger to the victim.

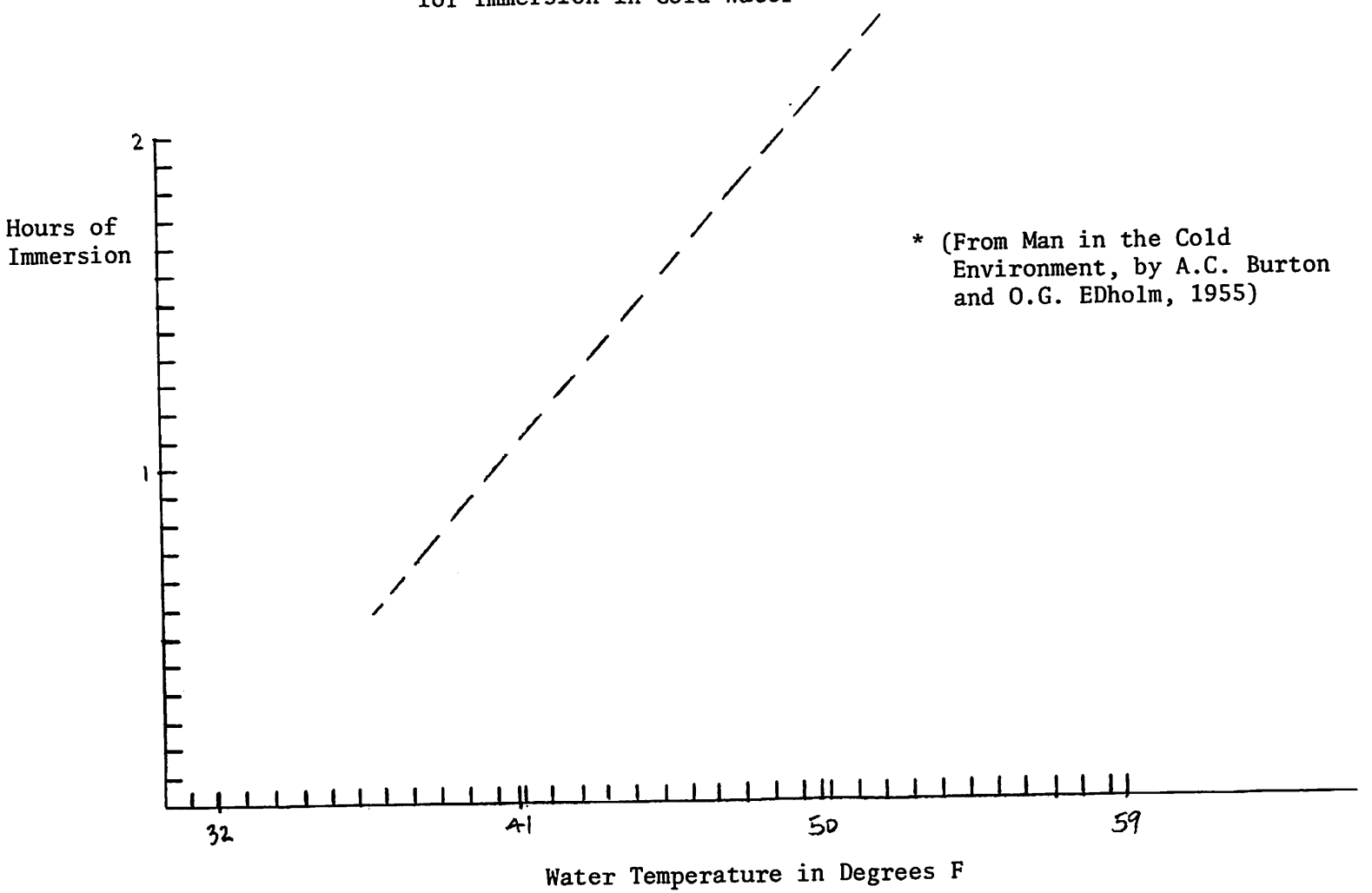
The numbers provided in the accompanying chart (Figure 2-7) illustrate the critical nature of water immersion. Note the estimate that immersion for one hour at 40°F will kill 50 percent of men immersed. At 43°F, 50 percent survival time would be approximately 75 minutes. (8)

The seriousness of water immersion is dramatized by a search involving the Riverside Mountain Rescue Unit of California as reported in their March 1969 monthly newsletter.

". . . Mrs. Cheryl _____, Age 74, had wandered away from her husband in . . . Following a lengthy search by her husband and friends, she was reported missing . . . At dawn, Sugar (bloodhound) was refired and really pulled down the trail with most of us in pursuit, spread out to detect tracks, or, "There she is". . . She was on her back, (in the 53°F stream water) her skin pale white . . . We had slipped off her soggy slacks (she had already removed her other clothes, as people of any age so often do in their final moments of life), then placed her in the (sleeping) bag, and began to carry (evacuation) to the road. During the litter carry, Cheryl began to lose color and stopped breathing twice (each time Walter [Walker] tilted her head back and opened her jaw to restore breathing . . . We figure Cheryl was in the 53 degree (Fahrenheit) water about two hours maximum and would have perished within the next hour . . ." That day another Mountain Rescue Association (MRA) team successfully rescued a victim in dire need.

The point is that water immersion can accelerate a dangerous situation into a terminal condition. An interesting problem associated with this water immersion case history, and with all hypothermia resuscitation in general, was the respiration stoppage apparently caused by the classic drip in victim body temperature in rewarming. The difficulty in reversing hypothermia in the field is a major consideration of the rescuer because of this phenomenon. A unique warming blanket using hot water has been successfully employed. (9)

Figure 2-7: Average Survival Time
for Immersion in Cold Water*



* (From Man in the Cold Environment, by A.C. Burton and O.G. EDholm, 1955)

2.3.5 DEHYDRATION

My personal experiences give me a definite appreciation of how quickly dehydration can occur. Without water, a victim's mobility can be reduced to zero very quickly. Dehydration, like many other common concerns by man, tends to become confused by folklore and heresay.

A fable in point is the conservation of water. It has been determined scientifically that you are just as well off drinking your fill of available water as you desire it, rather than trying to deprive yourself by conserving it. In addition, though traveling by night and resting by day in the shade will extend your performance by 230% it is even better to remain immobile for a survival longevity of 260%. The following graph (Figure 2-8) depicts various levels of performance. (10)

The prediction of the availability of water is dramatically related to an intimate knowledge of the search area, victim mobility and victim gear such as a canteen.

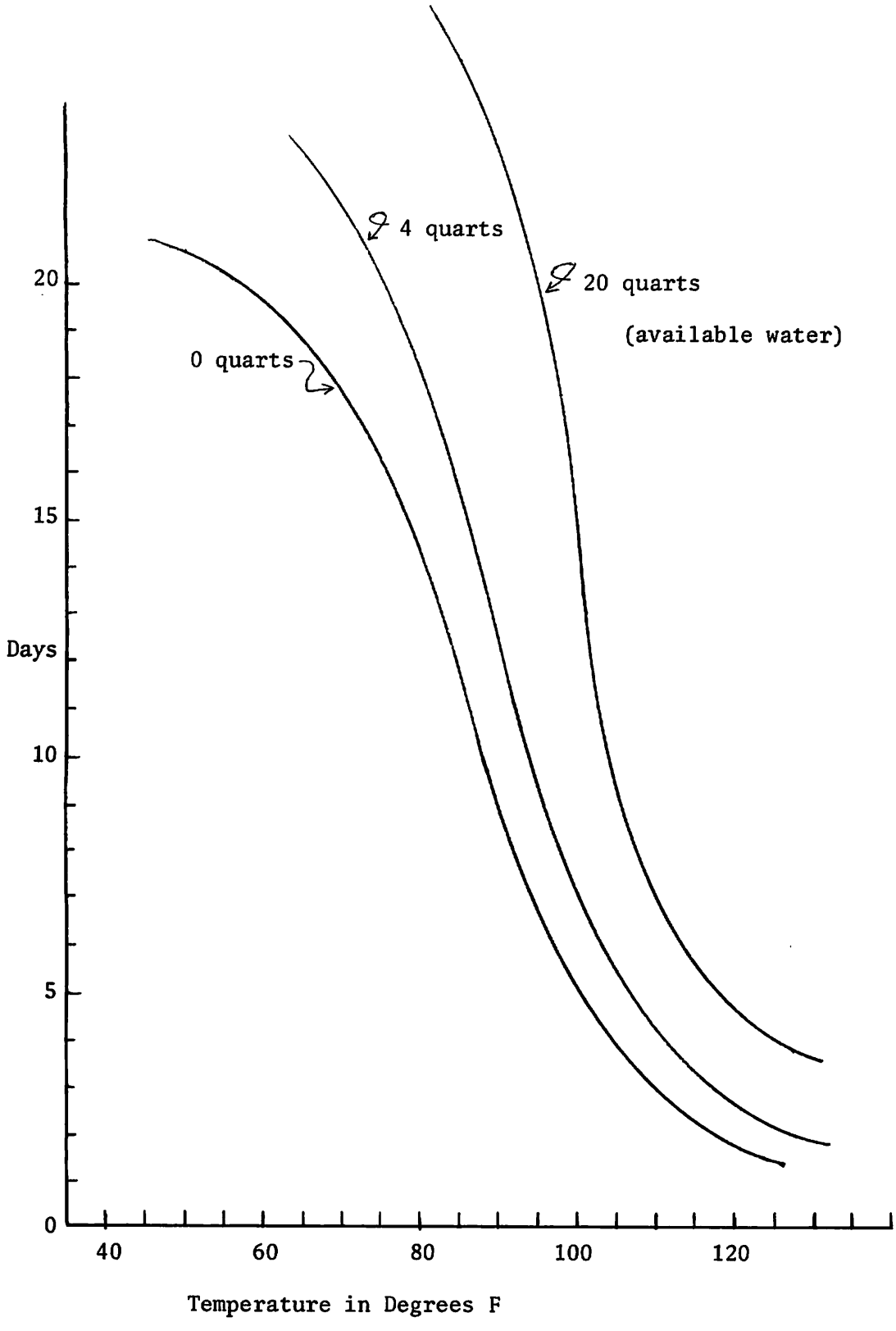


Figure 2-8: Dehydration Survivability
(From E.F. Adolph, Physiology of Man in the Desert, 1947, page 279)

2.3.5 OTHER FACTORS

The influence of age and sex as a factor in victim survival is provided as a percentage of maximum performance in the following chart (Figure 2-9). The ability of women to survive better than men is well popularized, but the chart corresponds to the author's experience.

Also included here is a chart (Figure 2-10) representing a breakdown of missing victim's ages for both sexes.

There are undoubtedly numerous other factors which affect the performance of the victim to varying degrees. These factors are presently considered beyond the scope of this chapter because of the incomplete data available to the author, with the exception of age and sex.

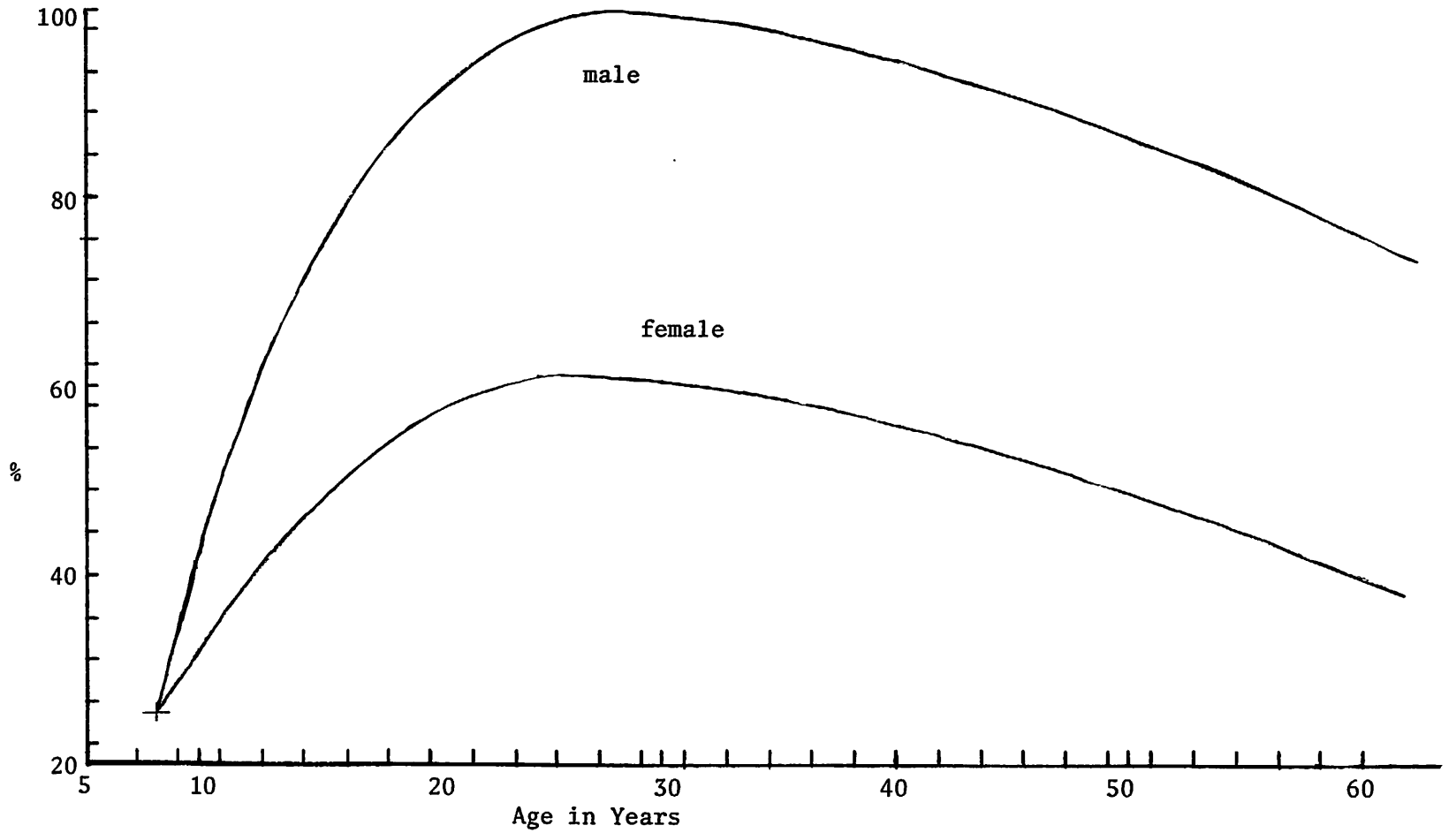
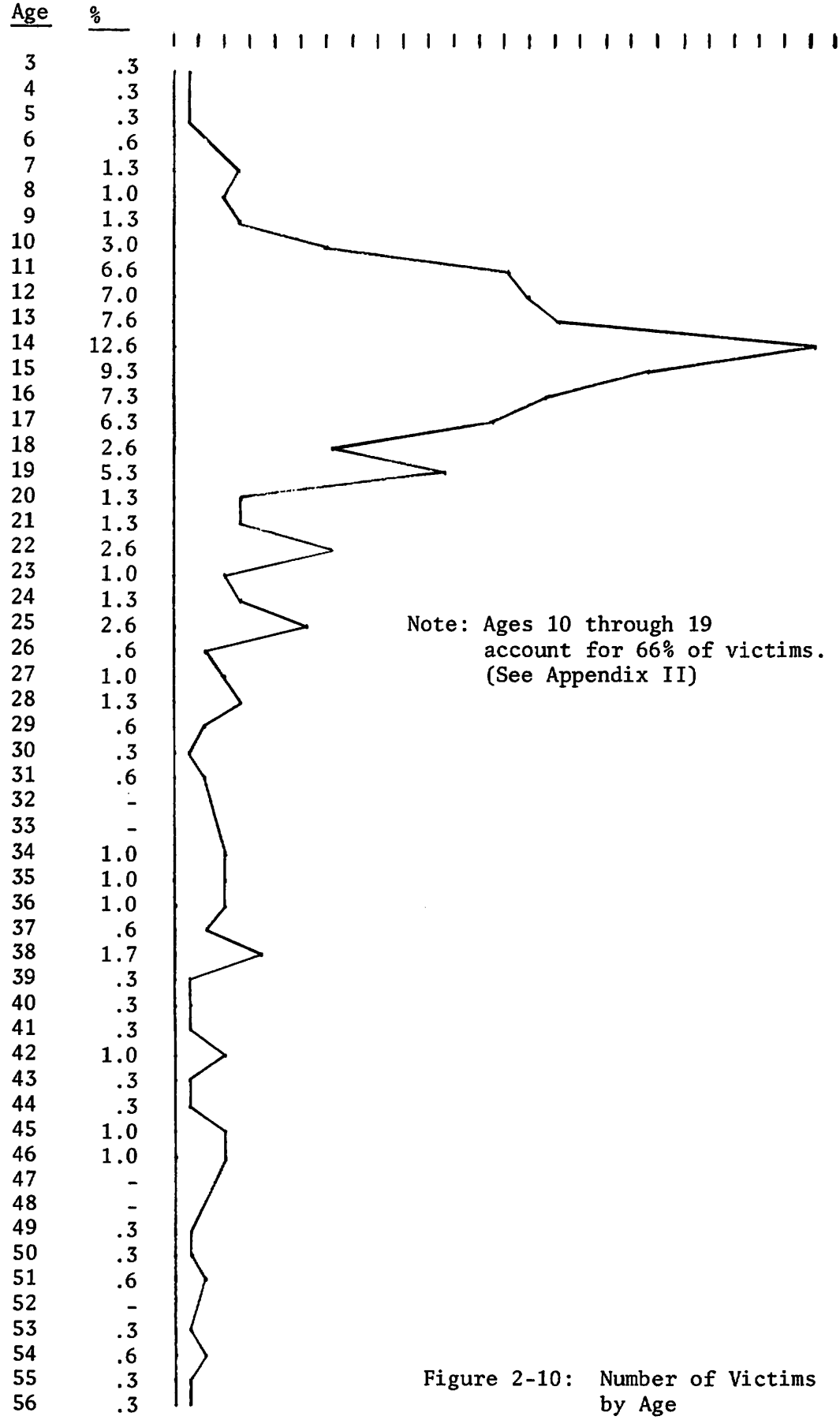


Figure 2-9: Physical Performance by Age and Sex (From Physiology of Strength by Theordor Hettinger)



Age	%
3	.3
4	.3
5	.3
6	.6
7	1.3
8	1.0
9	1.3
10	3.0
11	6.6
12	7.0
13	7.6
14	12.6
15	9.3
16	7.3
17	6.3
18	2.6
19	5.3
20	1.3
21	1.3
22	2.6
23	1.0
24	1.3
25	2.6
26	.6
27	1.0
28	1.3
29	.6
30	.3
31	.6
32	-
33	-
34	1.0
35	1.0
36	1.0
37	.6
38	1.7
39	.3
40	.3
41	.3
42	1.0
43	.3
44	.3
45	1.0
46	1.0
47	-
48	-
49	.3
50	.3
51	.6
52	-
53	.3
54	.6
55	.3
56	.3

Note: Ages 10 through 19 account for 66% of victims. (See Appendix II)

Figure 2-10: Number of Victims by Age

NEWS AND RUMORS

BAD NEWS: We recently received a letter from New Zealand informing us that L. D. (Bill) Bridge, an international figure in mountain rescue and author of one of the first books on mountain SAR (MOUNTAIN SEARCH AND RESCUE), died of a heart attack while working on a SAR exercise November 4, 1973. Bill was well known for his program of mountain SAR and his influence will be a great loss to all involved in SAR.
(From Blair E. Nilsson, Colorado SAR Information Bulletin)

SOUTHERN CALIFORNIA

FISHING HUNTING NEWS

George Lobaugh, editor
340 Bayside Village (714) 675-4156
Newport Beach, California November 10, 1973

Sheriff Ernest A. Carlson of El Dorado County in the Sierra east of here, said he will bill the county of residence of anyone who becomes lost and whose rescue causes expense for his office.

He made the announcement after the county board of supervisors adopted a resolution authorizing him to list expenses for searches and rescues in an attempt to collect two-thirds of everything over the first $100 spent in the emergency situations.

Under the program, County Auditor Amelia McAnnally will send out the bill to other counties following approval of the expenses by the board of supervisors.

In a recent year, the sheriff's department participated in 56 rescues involving 1,500 man-hours of deputy time, along with about 7,500 man-hours by other agencies... none of which has been recovered.

"This is an unfair burden on the taxpayers of this county," said William E. Fleck, a Shingle Springs taxpayer.

Glendale News-Press,
Monday, Oct. 8, 1973

Rescuers need rescuing

NIAGARA FALLS, N.Y. (AP) — Three young persons and a baby were stranded waist deep in swift-flowing water about 700 yards upstream from Niagara Falls for 2½ hours Sunday before being rescued.

Before they were helped to safety, a helicopter crashed, a patrol boat and their craft were lost to the cataract and six would-be rescuers wound up in the water.

Police at the Niagara Frontier State Park gave this sequence of events:

The outboard motor on a small boat conked out while Lee Sweitzer, 21, Jerry Land, 20, Joanne Horn, 21, and her son Michael, 1½, all from the Buffalo area, were cruising the upper Niagara River.

The boat drifted downstream toward rapids near Goat Island, and the passengers climbed out into waist-high water. They stood in one spot, not daring to move toward the island 150 yards away for fear of losing their footing in the current.

Their boat was swept over the crest of Niagara's Horseshoe Falls.

Park police took off in a sightseeing helicopter to attempt a rescue. But when one of the boaters grabbed the aircraft's skid as it hovered over them, the helicopter went out of control and crashed into the river.

The helicopter pilot and two police officers climbed out of the craft and, with the four others, clung to the wreckage for support.

Park authorities then sent a police powerboat out, but its outboard engine failed as the boat neared the group.

Two officers from the patrol boat made their way to the 'copter, but a third officer, the last to abandon the boat, was caught by the current. He drifted about 100 yards closer to the falls before being pulled ashore by a "human chain" of fellow police.

The boat went over the brink.

Finally, the end of a heavy cable was hurled to the nine in the water. They anchored the end to the helicopter, and inched along the line to shore.

★ Los Angeles Times
Tues., Oct. 23, 1973—Part I 25

Youth Killed in 150-Foot Fall at Yosemite Park

From a Times Staff Writer

YOSEMITE NATIONAL PARK — A 17-year-old Portola Valley youth fell to his death while climbing below the Lower Yosemite Falls, park rangers reported Monday.

Mark Weaver was scaling rocks at the seasonally dry falls Sunday afternoon with his brother, Thomas, 14, and a friend, James Stillman, 15. Mark slipped and plunged 150 feet to rocks in a pool below.

A ranger ground team and a helicopter carrying a medic arrived, but the youth died before he could be lifted out.

Disaster practice in Littleton, Colorado for radiological monitoring training mission. Chief Stan Bush briefing two patrol officers on monitoring pattern for simulated crash of plane carrying radioactive material.

The California Region of the Mountain Rescue Association has adopted an offical sole designation for SAR personnel because of the popularity of VIBRAM soles. The port and starboard wings of the heel center star on the VIBRAM sole should be removed completely as shown in the photo. This sole designation should be performed on both boot soles as it helps separate the victim from other rescue personnel while tracking. Ab Taylor of the Border Patrol came up with this suggestion.

MRA INTERNATIONAL RESCUE CONFERENCE AT MEXICO CITY

We'll fly to Mexico City on Saturday, March 30th, and will stay at the Alameda Hotel (Western International) and will have Saturday night, Sunday, Monday and Tuesday to play tourist in one of the world's most exciting cities. We can visit Pyramids of the Sun and Moon, the Shrine of Our Lady of Guadalupe, the bullfights, the Ballet Folklorico, the University of Mexico City, the Museum of Anthropology. On Wednesday morning we go up to Passo de Cortes (Pass of Cortes) in a pine forest at 12,000 feet between Isti and Popo. There is a large hut located here which is available to us, and day climbs can be made of either of these volcanoes. Friday evening and Saturday will see a Mountain Rescue Conference with the local rescue groups who are highly organized. We return to Mexico City on Saturday night and fly home on Sunday, April 7th.

The air rates quoted here are excursion fares. You can depart any day, return any day, individually, and can stop over at no extra charge at Mazatlan, Puerto Vallarto and Guadalajara. These rates are maximum. The more people we have the lesser the fare will be.

Air fare, round trip,	Seattle to Mexico City	$252.00
	Los Angeles to Mexico City	$186.00
	San Francisco to Mexico City	$220.00
	Phoenix to Mexico City	$204.00
	Denver to Mexico City	$197.00
Hotel - 5 nights, including tax transfer, daily American breakfast, half-day city tour, welcome cocktail, Tequila cocktail at Hotel Majestic's Colonial Terrace, Rooftop pool		
	Double occupancy	$ 71.05
	Triple occupancy	$ 57.90

We're still working out the financial costs of food and transportation to and from the mountain.

(For details, contact Mountain Rescue Association President, Paul M. Williams
143 Fifth Avenue North
Edmonds, Washington 98020)

Terry Greer of the Southern Kern County SAR Scuba Team apparently drown while on a body recovery mission near Bakersfield, California. The accident occured in an aqueduct siphon in which the flow had been stopped to permit Terry Greer and another diver to search. The exact cause of the accident is unknown, but the coroner's report indicated that Terry Greer suffered a head injury that caused unconsciousness.
(From Sargent Bob Dennis, Kern County Sheriff's Dept.)

Los Angeles Times Wed., Oct. 3, 1973—Part I 19

Russ Rescue American in Sea 8 Hours

HONOLULU (UPI) — The Navy announced here Tuesday that Ens. Michael R. Long of San Diego was rescued by a Russian trawler after he fell overboard from his U.S. naval vessel in the South China Sea Friday.

Officials said Long, 28, was standing watch aboard the Blueridge, an amphibious command ship, Friday morning when he fell overboard without a life jacket, about 150 miles southwest of Manila.

A search by 18 U.S. Navy ships and several aircraft found no trace of him.

Monday the U.S. Embassy in Moscow was notified that the Russian Trawler Kursograph had pulled Long out of the sea about eight hours after he fell overboard.

Long was transferred back to the Blueridge Monday night after it met the trawler.

Officials said Long was reported in good physical condition but was suffering sunburn.

SURVIVAL OUTLINE by Dan Hensley

I. Duration
   A. Supposition
      1. 72 hours or less.
      2. Able to fend for self.
   B. Odds on.
      1. If both mental and physical needs are met, therefore ceases to be a survival situation.
      2. All partially met. 80% survival rate.
      3. Any one area not met. Chances decrease 50%.

II. Mental Aspect
   A. PMA (positive mental attitude.)
      1. self.
      2. others care.

III. Physical Aspect.
   A. W.W.C.
      1. Wind kills.
      2. Wet.
         a. sweat.
         b. outside elements.
      3. Cold, 48° or less.

IV. Mental and Physical.
   A. Positive oral satisfaction.
      1. Self encouragement out loud.
      2. H_2O - 10 days (max).
      3. Food - 26 days (max).

V. Affirm and improve.

Gas Sent for Cars Stalled in Mexico

Los Angeles Times
18 Part I—Sat., Dec. 29, 1973

TIJUANA, Mex. (AP)—Emergency gasoline was sent Friday to rescue Mexican and American motorists reported stranded along the newly opened transpeninsular highway.

Roberto de la Madrid, director of tourism for the state of Baja California, said at least 50 cars were out of gas along remote stretches in the territory of Baja California del Sur.

The emergency gas shipments were authorized Thursday afternoon and from large storage tanks at Mazatlan and Guaymas, he said. The fuel was expected at Santa Rosalia, Mulege, Guerrero Negro, Loreto, Villa Constitucion and Cabo San Lucas.

40 Los Angeles Times ★
Part I—Wed., Dec. 26, 1973

Pair Invent Device to Help Prevent Bends

SCHENECTADY, N.Y. (AP)—It started as a lunch-hour idea and developed into a nine-ounce computer-like device that can be worn on the wrist.

Two General Electric Co. scientists here have developed a water-powered computer to tell scuba divers where to make a decompression stop while surfacing. The computer-type device then automatically programs the rest of the ascent from deep waters, so divers can avoid the "bends," a decompression malady.

The device was invented by Dr. Marcus P. Boroum, 39, and Dr. Lyman A, Johnson, 32. Both are scientists at the G.E. Research and Development Center and scuba diving enthusiasts.

The new underwater device is not yet available commercially. But GE's Techology Marketing Operation is discussing license agreement with several manufacturers, a GE spokesman said Thursday.

The two inventors estimate a production model could be made to sell on the market for about $100.

The two scientists were tackling a problem that has frustrated other companies and government laboratories for nearly a decade, a GE spokesman said.

"The problem really was to find the correct mathematical analog for a precise calculation of the decompression schedules," the inventors said.

Los Angeles Times
Sat., Dec. 15, 1973—Part I 11

Private Planes Get Reprieve on Locator Device

WASHINGTON (AP)—The Senate Friday voted to delay for six months the deadline for all private planes to be equipped with emergency locator transmitters.

The transmitters trigger automatically when a plane crashes. They are designed to lead searchers to the wreckage.

The deadline was extended to June 30, 1974, after Sen. Peter Dominick (R-Colo.) said so many plane owners had delayed installing the devices that manufacturers could not meet the demand.

Los Angeles Times
28 Part I—Fri., Dec. 14, 1973

Ski Worker Dies in Blast

A Mammoth Mountain ski patrolman was killed Thursday when a hand charge he was using for avalanche control accidentally exploded, Mono County sheriff's deputies said.

The victim, Marvin Ray Critton, 35, and another patrolman were working above Chairlift 5 during a storm when the blast occurred.

Critton was throwing the explosive charges by hand to dislodge excessive snow in order to prevent avalanches, a U.S. Forest Service spokesman said.

Deputies believed he was holding the charge when it exploded. There was no immediate explanation of what caused it to blow up.

The second patrolman, who was not identified, was some feet away and did not see the explosion.

The National Park Service will conduct a course "Managing the Search and Rescue Function" at the Albright Training Academy in Grand Canyon National Park, Arizona, May 6 - 10, 1974. Though primarily for National Park Service employees, there will be room for 10 - 15 interested individuals from other government agencies or from search and rescue groups. The course is designed for those with the on-the-scene responsibility for conducting the various aspects of search and rescue operations. Search operations will be emphasized. Interested persons or groups should contact Bill Wade, Albright Training Academy, P.O. Box 477, Grand Canyon, Arizona, 86023; telephone (602)638-2691 for more details.

A introductory presentation on 'WILDERNESS SEARCH FOR MISSING PERSONS' has been given by Dennis Kelley to the following California groups;
Orange County SAR Team,
San Diego Mountain Rescue Team,
High Desert Rangers of Lancaster,
Explorer SAR Posts 156 and 322, and
California Emergency Mobile Patrol.
(Thank you all for the hospitality, DEK.)

CALENDAR

1974 February 11-15
New York City - NATIONAL SAR SCHOOL FOR SAR COORDINATORS. C.F. Meredith, Commander - National SAR School, Governor's Island, NY., NY. 10004

1974 February 16-18
Ellensburg, Washington State - WINTER SURVIVAL SEMINAR.
Hal Foss or Rick LaValla, Washington State Dept. of Emergency Services, 4220 E. Martin Way, Olympia, WA. 98504 (206) 753-5255.

1974 March 30 - April 7
Mexico City - MOUNTAIN RESCUE ASSOCIATION INTERNATIONAL RESCUE CONFERENCE.
Paul M. Williams, 143 Fifth Ave. North, Edmonds, WA. 98020

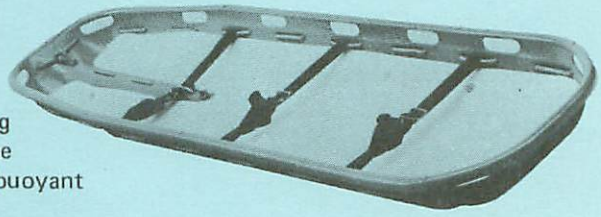
1974 May 6-10
Albright Training Academy - MANAGING THE SEARCH AND RESCUE FUNCTION.
Bill Wade, Albright Training Academy, P.O. Box 477, Grand Canyon, AZ. 86023 (602) 638-2691

1974 June 15-16
Boise, Idaho - MOUNTAIN RESCUE ASSOC. SPRING BUSINESS MEETING.
Vance Yost, MRA Exec. Sec., P.O. Box 428 Mountain Center, CA. 92361

THE THOMPSON CARRIER

The Thompson Carrier is a superior rescue litter for two reasons: Material and Design.

The Material: High density polyethylene. This plastic is extraordinarily tough and durable. It will withstand the most rigorous use that rescue personnel can give it. The Carrier has great resistance to abrasion and impact forces. The rescuer can slide it with ease over the most difficult surfaces – rocks, sand, snow, debris – without damage or hanging up. The Carrier can be dropped from a helicopter at significant altitude without affect.



High density polyethylene is impervious to moisture and chemicals, and it is nonconductive. It will not rot, rust or corrode. Special additives in the resin formula make the Carrier highly resistant to the effects of sunlight. The Carrier can be cleaned easily with a damp cloth. It never needs painting because the orange color is molded into the material. X-Ray pictures may be taken through polyethylene without disturbing the picture. The Carrier is buoyant and will float evenly in water rescues.

The Design: The design gives the Thompson Carrier rigidity and proper contour for the comfort and support of the patient. He is protected by the smooth solid walls from sharp objects that will penetrate ordinary litters. These walls will also reduce the chill factor in exposed helicopter flights. The Carrier is easy to handle. It won't hang up on protrusions, and it will slide easily along with the rescuer no matter how tough the going. The 3/8" nylon rope that is laced around the upper edge provides an infinite combination of tie-down points to secure the patient properly. The four "corner" hand holds provide strong sling attach points for hoisting the Carrier in cliff or helicopter rescues.

The Thompson Carrier is designed and built to give you many years of completely maintenance-free service.

Specifications:

High Density Polyethylene	Color:	Rescue Orange
3/8" Nylon rope	Weight:	25 pounds
Stainless steel hardware	Dimensions:	Length 86"
Three 1½" straps with quick buckles		Width 24" – Depth 7"
Full length non-absorbent flexible foam half inch pad	Average wall thickness:	.250"
	Price:	$85.00 f.o.b. Corona del Mar, Calif.

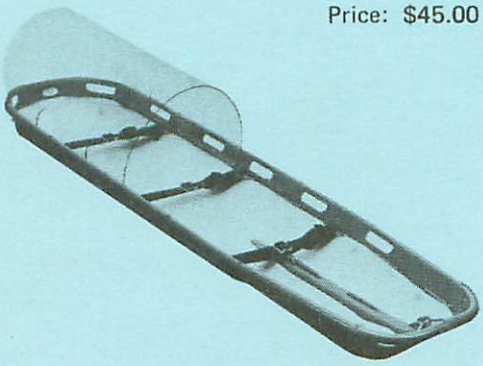
SHATTERPROOF HOOD

The Thompson Hood will contribute immensely to the safety, comfort and peace of mind of your patient.

It is clear, shatterproof and light in weight. The rescuer has easy access to the patient, and can observe him at all times during the rescue.

The hood can be installed or removed from the Carrier with ease in a few seconds. It does not interfere at any time with your rigging or handling of the Carrier during cliff rescue operations.

Price: $45.00



THOMPSON CARRIER – – TWO PART

Price: $145.00

The two part (breakdown model) is identical to the one piece Carrier except for the breakdown feature. It is rigid, virtually jam proof and easily and quickly assembled. All connecting hardware is stainless steel.

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