

SPRING 1976

SEARCH AND RESCUE

AND



MAGAZINE

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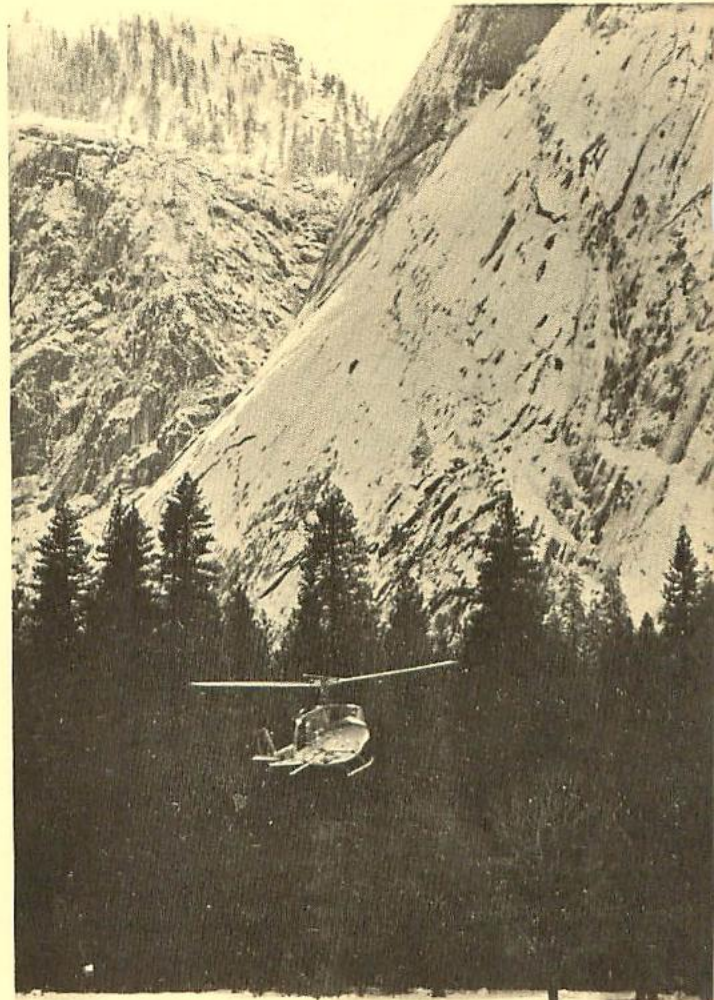
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NASARC EXECUTIVE MESSAGE

JOHN OLSON
NASARC 1st Vice President
Oregon State SAR Coordinator

MEMBERS AND FRIENDS OF NASARC:

It appears that the National Association of Search and Rescue Coordinators is at a crossroads that will affect the future of our organization. There has been a great deal of discussion about what NASARC is and what it should be.

To me the most important stated purpose of NASARC is to serve as a medium for the exchange of information. Unfortunately, we have not always been successful in this area. Comments, criticism and rumor lead me to believe that the general membership is disillusioned with NASARC. I offer you several suggestions that might help cure our ills.

First, I suggest that we all examine our respective organization to determine why we are a part of NASARC and what we want from NASARC. This examination should take place at every level of membership in NASARC. You should then submit your suggestions through your State SAR Coordinator to NASARC or to members of the Board of Directors for those States without a SAR Coordinator. In this way the Board of Delegates and Advisory Council can be made aware of your suggestions and ideas. I guess I am saying we should become more closely tied with our grass-roots membership.

My next suggestion is, that if you live in a State that has a weak membership you should offer your services to strengthen your State's membership. For those States who have no SAR Coordinator I suggest that you contact the necessary officials to recommend establishment of the position. It seems to me that internal pressure is a much more positive approach.

If NASARC is to be a "clearing house" for the exchange of information we must show expansion and growth. We can accomplish this in two ways: First, expand east of the Mississippi River for additional State and individual members; and second, we should involve additional membership in our local areas to lend additional strength to States who are already members.

The National Association of Search and Rescue Coordinators has come a long way toward consolidating and coordinating many individual efforts. We have grown rapidly and will continue to do so. I hope we can continue to exchange ideas that will help save lives. It has been said that if you have an idea and I have an idea and we exchange ideas then we each have two ideas. I believe we can and should act as the coordinator for the federal, state and local volunteer groups and individuals. Together we can serve the needs of our fellowman and fulfill the motto of the National SAR School, "Always Ready That Others May Live."

NOTICE TO CONTRIBUTORS!

**INPUTS AND CONTRIBUTIONS FOR
SUMMER 1976 ISSUE**
must reach Search and Rescue Magazine by

MAY 1, 1976

LETTER TO THE EDITOR

"I very much enjoyed your Fall issue, especially the article, 'The Changing Face of Baja California.'

"However must call you on your captions on page 23. This was a case of taking a casual look, without knowing the facts.

"What you call 'old sign' is about two years newer than the 'new sign.' These mission signs were put up by a local branch of the Institute of Anthropology and History from Ensenada. They were hand-painted, and placed up in 1975. Unfortunately the paint wasn't the best and it would appear that this one was struck by a car. I do think that this group deserves praise for signing these remote places that SOP overlooks."

Sincerely,

Walt Wheelock, publisher
La Siesta Press
Box 406, Glendale, California

(Ed.: Walt Wheelock is an outstanding authority on Baja California and his La Siesta Press the source of many fine books on Baja hiking, climbing and travel.)

ACKNOWLEDGEMENTS—

LOIS McCOY
MARION CHRISTNER
DIANNE STERN
PHYLLIS KOCHAVI
BONNIE SIDWELL

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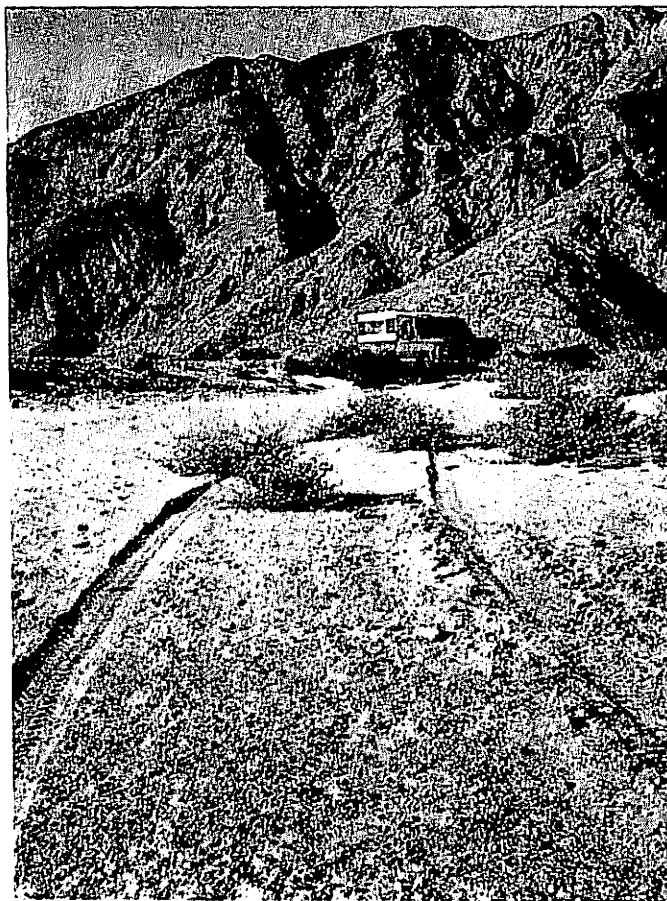
VEHICLE TRACKING

by GAR SALZGEBAR

Coyote Creek Ranger District

Anza Borrego Desert
State Park

California State Park



Vehicle track identification is achieved with wheel base measurements and graphic tread descriptions.

Vehicle tracking is the art of trailing a vehicle using only the imprints it leaves on the ground. When a vehicle is in violation of our rules or is overdue from an outing, vehicle tracking may come into play. The following techniques may assist you in tracking.

When you wish to measure tire track statistics, the most accurate measurements will be taken from where the front and rear tracks go straight. Tracks that are turning will throw off your measurements. The wheel base width is the distance from the center of the left tire track to the center of the right tire track. The most common wheel base width measurement will be taken on the rear tire tracks. However, if the vehicle has backed up or turned around it may also be possible to measure the front wheel base width which is not always the same as the rear.

Following is a list of wheel base widths. These measurements are taken from the center of the left rear tire to the center of the right rear tire. These measurements are given for standard tires on standard vehicles with the exception of V.W. or Corvair dune-buggies. Because of tire sizes, reversed rims, weight loads, etc., recognizing standard vehicles through wheel base width measurements is to give you an idea of the size of the vehicle for which you are looking.

- 48" Jeep (1972)
- 49 Older Jeeps
- 50 Jeep Commander, Land Rovers
- 53 V.W. Bus, V.W. Buggy
- 54 Datsun p/u, V.W. Buggy
- 55 Toyota Land Cruiser (1970)
- 56 Scout, V.W. Buggy (most common)
- 57 Toyota Land Cruiser (pre-1970), Bronco, Scout (1972), old square woody Jeep wagons
- 58 Wagoneer, Bronco (1973) 58½" rear, 60" front
- 60 Corvair Buggy
- 61 Scout (1973)
- 62 GMC 4x4, ½ ton p/u
- 63 International p/u
- 66 Blazer, Inter. p/u 4x4, Chev. (1970) ¾ ton p/u 4x4 70" front.

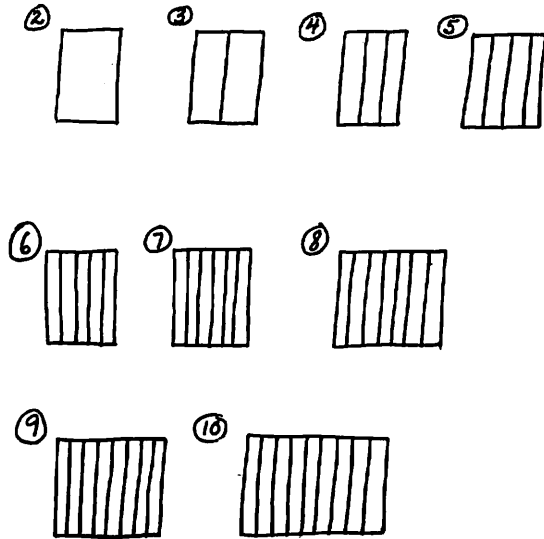
The tire track width is the distance from the left side of the outermost deepest impression of a vehicle tire track. Find the clearest, most visible portion of each tire track and measure that part which is deepest in the soil. Be sure to measure each tire track if possible. Occasionally one of the four tires will be an odd ball and a different measurement and/or tread design will occur. Also, the front tires may be a different size than the rear tires, as in dune buggies.

Grooves are the portion of the tire track pressed into the soil. Ridges are the portion of the tire track not pressed into the soil and therefore raised in comparison to the grooves. Whether you measure ridges or grooves is not important as long as you are consistent. This section and the sketches which follow this article are based upon ridge measurement. The distances between the tops of the straight ridges, from center to center, are probably the most easily used. Be alert for any single tire that doesn't match the others. Note any worn, new, cut, unbalanced or badly aligned tires in a given position.

The direction of travel may be positively determined by finding a place where the vehicle turned around or backed up and crossed its own tracks. Obviously the tracks on top are the last made.

Another direction indicator is a trail of dirt tracks on a paved road made by a vehicle going from a dirt road to a paved road. The vehicle is going in the direction of the dirt tracks left on the pavement.

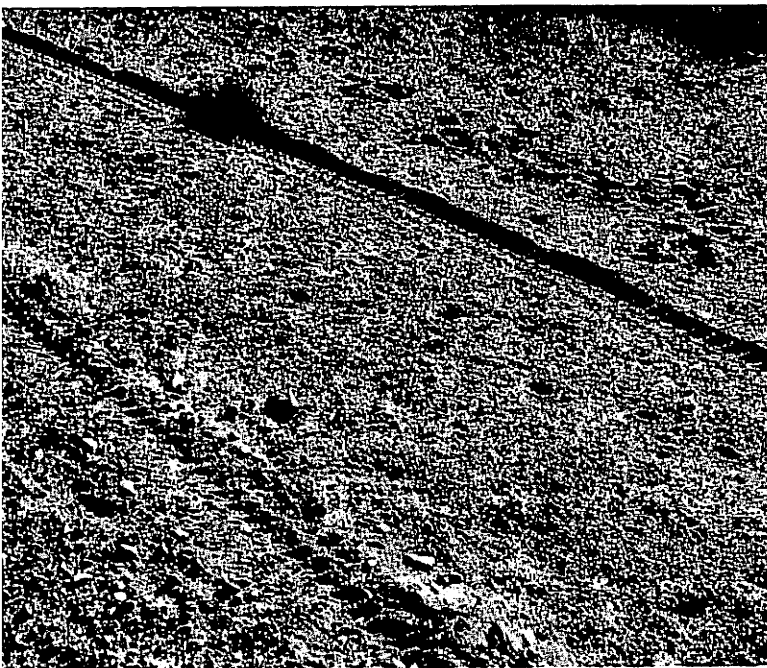
STRAIGHT LINE



NOTE: Straight Zig-Zag treads may be indicated by the number of zig-zag lines and a "Z" following the number to indicate zig-zag.



The photo illustrates a 4x4 vehicle going away from the camera that stopped rolling and leaving tire tracks and began to power through the deepening sand.



This photo demonstrates the ease of vehicle tracking in parts of the desert.

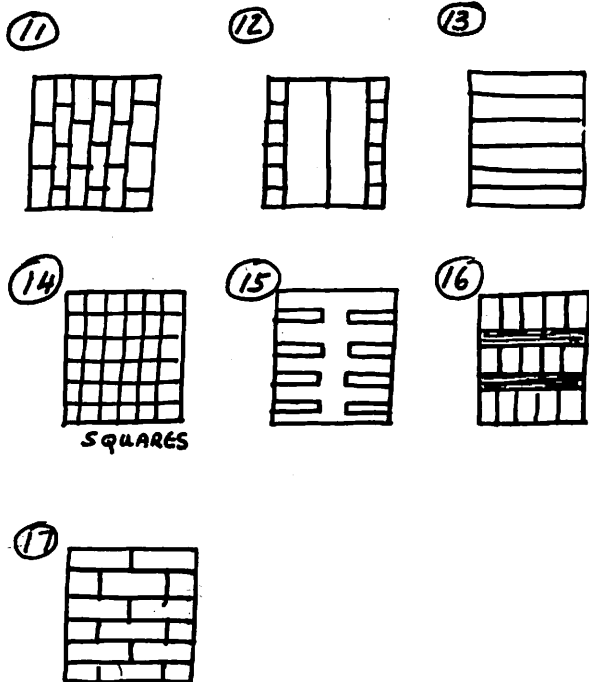
When the direction of travel cannot be positively determined it might be predicted. For instance, if two vehicles pass each other traveling in opposite directions, they will generally pass to the right. If an object is in the middle of the road, most vehicles will drive to the right of it.

Notice on which side of a road the vehicle tends to drive. At standard speeds the vehicle will tend to stay to the right. If the tracks you are following are easy to read, see how it feels going around several corners while driving directly on top of the tracks. If it seems that your vehicle wants to cut across the tracks instead of following the tracks around the corners, there's a chance that your vehicle is traveling in the opposite direction from that in which the tracks were laid.

If a vehicle is traveling through brush, bent branches will generally point out the direction. Leaves will fall on the side of the bush toward which the vehicle has traveled.

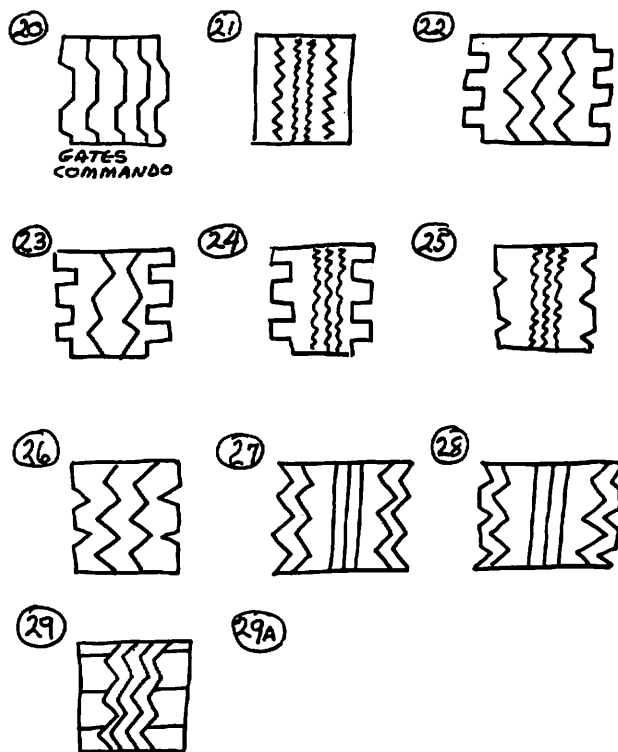
Depending upon the types of terrain the vehicle is driving through, deduction may provide a clue to the direction of travel. If the vehicle is traveling in rough terrain and there is a boulder(s), bluff, wash or other type of obstacle in the path of the tracks, the tracker can walk to both ends of the obstacle. At either end the tracker should look at the tracks and ask himself, "If I were driving the vehicle in this direction would I have taken the path that the tracks lead or from this position, is another route obviously better?" If, from that position, another route is obviously better then it's probable that the vehicle is traveling in the opposite direction.

COMPLEX LINES



SQUARES

ZIG-ZAGS



The age of tracks may be determined by the number of tracks crossing over and/or on top of the tracks of the vehicle you are following, and your estimation of the number of vehicles in the area. Obviously knowing the approximate hourly vehicle use pattern of the road would be most helpful.

Also slight moisture in the soil will make newer tracks darker than older tracks.

If the soil in the track print is beginning to fall apart the track is older, while a well defined print is probably newer.

Rain, rock slides, blows and/or other natural phenomena may also help indicate the age of tracks just by your knowing when this type of action last occurred and what the condition of the tracks are in relation to these occurrences.

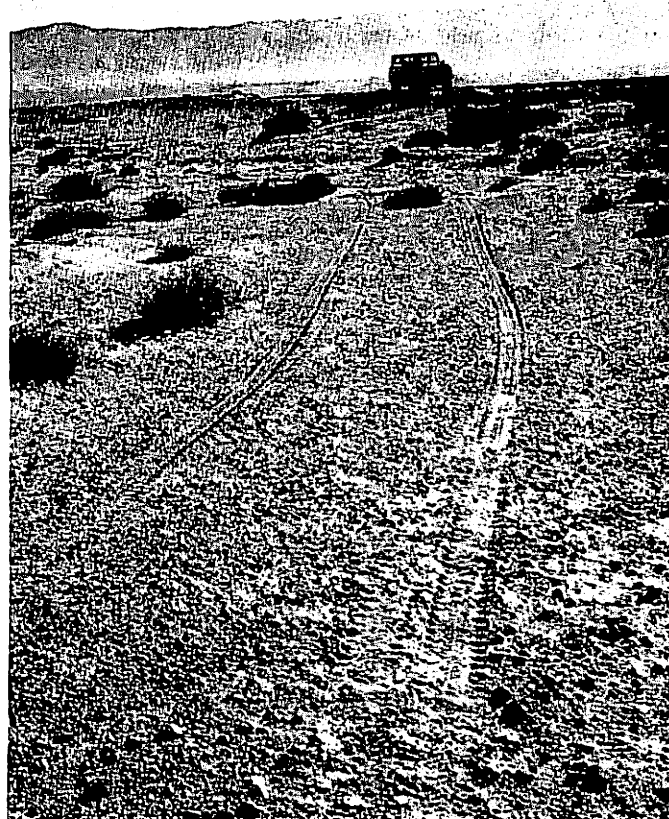
Animal tracks may help by just noticing the density. If there are a few animal tracks over the vehicle tracks you are interested in then the vehicle tracks were probably made that day. If there are lots of animal tracks over the vehicle tracks you are interested in then the vehicle tracks were probably made at least the day before.

While on a search you should be aware of what types of vehicle tracks are on the ground to determine if you're following a unique type for the day or if there are that type all around the area.

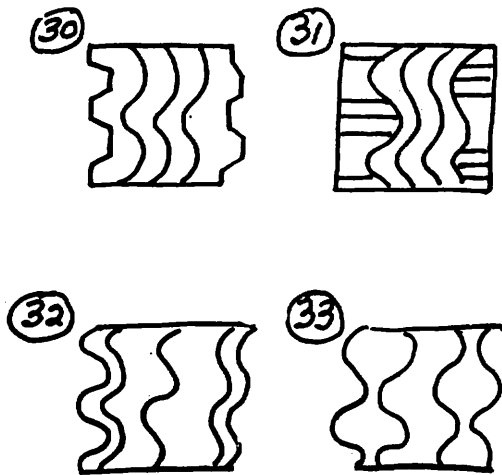
Keep an eye out for other vehicles' tracks that might be with the vehicle you are looking for. Record their tracks if this is a possibility. If there are several vehicles traveling together they may or may not all have the same type of tracks, but it's rare that they will all have the same statistical measurements. The more vehicle track statistics recorded the greater the odds of your being sure you find the right vehicle(s) later.

If you have established the direction of travel and wish to follow them, but too many other vehicles have run over the tracks to follow directly, travel in the direction of the tracks and watch each junction to see if the tracks turn off the road. Side roads will generally have less traffic and the tracks you are looking for may be better exposed. Each successive road or turnoff will present clearer tracks until the vehicle is either found or lost.

Note in this photo that the (rear) trailing tires cover the front tracks.



ESSES



You are limited by popular track patterns. Dune buggies may leave a straight line type of track, known as flotation tires, or a multisquare pattern track. Some four wheel drive vehicles may use the Gates Commando type tread design. Jeep CJ5s or Toyota Land Cruisers each have a factory standard tire and if you have more than one of these types of vehicles in your area, odds on tracking the right one are greatly decreased. Be aware of your most popular track patterns and learn what the reliability of each pattern may be.

When a set of tracks requires following, the easiest way to remember them is to have a notebook of sketches of previous tracks which you've found in your area. Each track pattern should be numbered so you can record the track pattern number with your other statistics on another piece of paper. The patterns at the end of this article are a good start.

A general rule in recording statistics is to do so in a descending order. The usual descending order for this subject would be: wheel base width, tire track width, ridge width. Occasionally in patterns such as #14 in the accompanying sketches there may be more or fewer squares than indicated in the sketch pattern and this should be noted. According to this example the wheel base width might be 56", the tire track width 8", the ridge width 1", with a row of 8 squares. All of this information may be simplified into this:

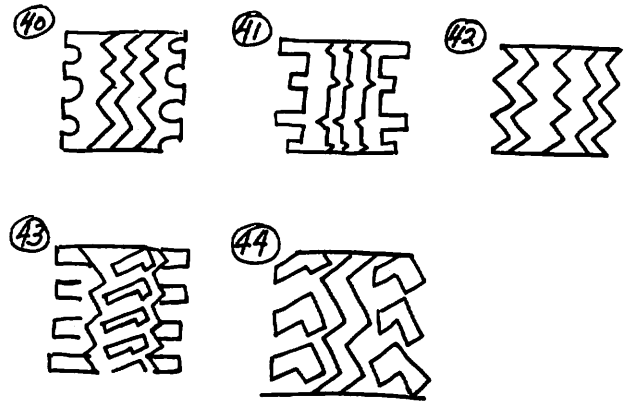
#14,56,8,1,8sq.

If it is possible to measure the front tracks your statistics might look like this:

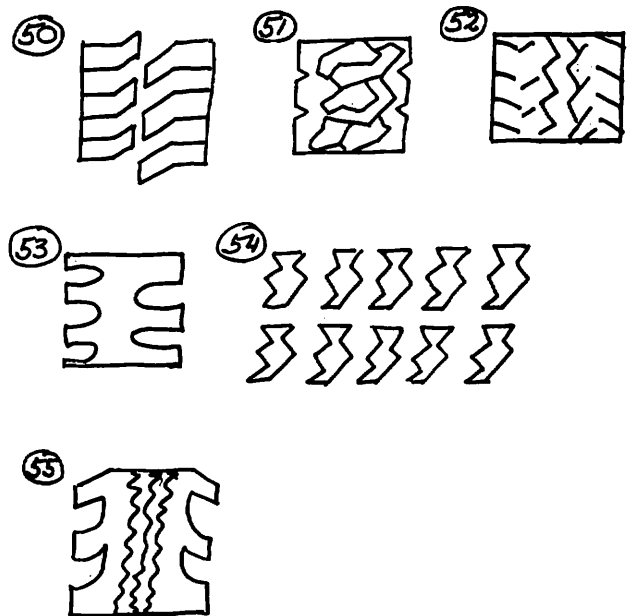
#14,56,8,1,8sq.#4zz,54,4½,¾

The front tire pattern has four rows of zig-zags, has a 54" wheel base width, a 4½" tire track, and ¾" between the ridges. Also, considering the 56" rear wheel base and 8" tires, and the 54" wheel base and the narrower 4" tires this vehicle is probably a V.W. dune buggy. It would be helpful to also note any irregularities in the tires such as any worn, new, cut, unbalanced or badly aligned tires in a given position.

COMPLEX ZIG-ZAGS



COMPLEXITIES



Your odds of finding the correct vehicle depend on the number of similar vehicles and tires in the area. If you have five identifying factors you probably have the right vehicle! *EXCEPT* when you are working with a factory or popular tire on a commonly found vehicle. (See section on "limitations.")

1. Measurement of the rear wheel base width.
2. Measurement of the front wheel base width.
3. Measurement of each rear tire track width.
4. Measurement of each front tire track width.
5. Rear tire ridge measurement.
6. Front tire ridge measurement.

The following factors are useful for standard tread patterns and common vehicles as well as for all other vehicles and/or tires in the area.

7. Single tire which doesn't match the other three.
8. Worn spot or cut in a given tire.
9. Unbalanced or poorly aligned tire in a given position.

REMEMBER. Tracking vehicles is a tool. If abused you will have a broken and useless tool. ■

ESTABLISHING SEARCH AREAS

by **ROBERT J. MATTSON**

MAJOR ROBERT J. MATTSON comes from Columbus AFB, Ms. where he was the local base rescue detachment commander. As a rescue crew commander he has participated in numerous rescue missions. In addition to his helicopter experience, he has flown the MAC Line around the world, and he also has a navigator rating with over 2000 hours in various aircraft. Major Mattson is a graduate of the National SAR School.

This process of gathering data is one of the most important in any search effort and should **NEVER** stop. **DIG! DIG! DIG!** for more and more information!!!

INITIAL SEARCH PHASE — Early in any mission the Search and Rescue Mission Coordinator (SMC) is faced with the problem of assigning a limited number of resources to search areas. Frequently, this decision must be made based on little information which is sometimes contradictory and may be unreliable. Because of the urgency of the situation he may be compelled to start the search even if he would rather wait for additional information or properly trained specialized personnel (trackers, dogs, etc.). At this time the best search areas are probably around the last known position and along the most probable routes. I firmly believe, and statistics will bear me out, that you will find most of your survivors during the initial search effort and the SMC should attempt to cover as much area as rapidly as possible. During this stage of the mission you are looking for the cooperative survivor, one who will signal or respond to your presence, and for obvious crash sites or anything unusual which may lead us to the survivors. Therefore, it is appropriate to use a wider track spacing than you would for an unresponsive victim or for a hidden crash site. At this stage of the mission information is changing rapidly and things are happening just too fast to really take the time to establish formal search priorities and probably the best tool you have for establishing priorities is good old fashion "**common sense**" and the experience of those initially on scene. A review of the studies conducted by the National SAR School on aircraft crash location and/or the analysis of travel patterns of lost persons by William Syrotuck, may be of some assistance and guidance. But, please don't forget to use your "**common sense**."

Sometime during the first day or night the SMC is going to think about what he or she is going to do next and it is at this point that the second phase of search area planning is entered.

SUBSEQUENT SEARCH PHASE — When planning for subsequent searches the SMC must take into account **ALL** of the facts and consider all of the assumptions that are pertinent to the case. One method of distilling the information into a useful product is to start a list of possibilities and fact as they come to your attention. This list should be started at the time of initial notification and items such as possible routes, weather, difficult terrain, probable reaction of the individual to various possibilities, historical pattern of others lost in the area and anything else that might have a bearing on where the survivors may be found should be added as discovered during the initial phase. These items will be brought out by the many individuals who will be involved in the mission during the initial phase and because of the confusion inherent in the initial response, the valuable information is sometimes overlooked. If the SMC has this list he can be confident that **ALL** of the information that was available to him will be considered when establishing subsequent search area priorities.

(continued next page)



Establishing search areas for either a missing aircraft or a missing person generally can be divided into two phases, the initial search phase and the subsequent search phase. Underlying both phases is the unending quest for information which starts with the initial notification. Continually information which may or may not help in finding the survivors will be received and must be actively sought, and every piece of information must be reviewed and placed in perspective; asking the following questions may be of assistance:

*Is the information **RELEVANT**? Will the information be of any assistance in helping find the survivor?*

*Is the information **TIMELY**? Did the lead occur at a time that is within the realm of possibility?*

*Is the information **RELIABLE**? Look at the reporting source for sincerity and motivation.*

*Is the information **COMPLETE**? If not, do what is necessary to gather complete information and your efforts will be rewarded by a shortened search and an increase in the number of lives saved!!*

ESTABLISHING SEARCH AREAS—continued

When the SMC is ready to plan for the next search he should consult his list and discuss the information with others who are experienced, knowledgeable and/or involved in the search effort. Additional items will most likely be added at this time since it is probably the first time that all of the major participants will get together. Next, the possible routes, positions and areas where the survivors may be found should be listed and, after a thorough discussion of each possibility, each person should be asked to assign a percentage of probability to each item; the list should total 100%, and to get the consensus you simply take the average.

EXAMPLE:

PERSON	"A"	"B"	"X"	"Y"	TOTAL	CONSENSUS
ROUTE 1	40	50	50	40	180 ÷ 4 =	45%
ROUTE 2	30	30	20	40	120 ÷ 4 =	30%
POSITION A	20	10	20	10	60 ÷ 4 =	15%
POSITION B	10	10	10	10	40 ÷ 4 =	10%
TOTAL	100%	100%	100%	100%		100%

It is best to do this privately (i.e., secret ballot style) because it will insure that even the meeker individuals will be able to express their opinions without being intimidated by the more vocal members of the group. If the consensus is gathered verbally, you will probably end up with the opinion of only one or two aggressive individuals and may run the risk of polarizing the group toward conflicting ideas which may detract from the efficient operation of the search. Additionally, since everyone is involved in the decision-making process they will be more inclined to support the final decisions made by the SMC, which will re-

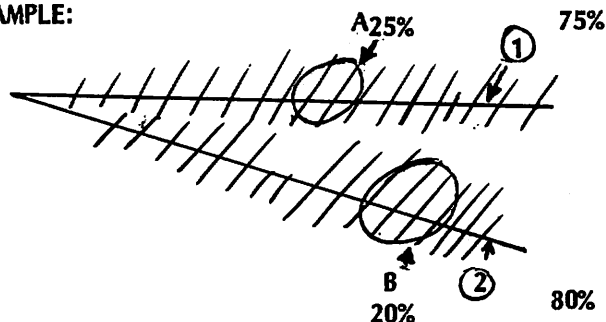
sult in a more efficient operation. Most people find that assigning a numerical value to the various possibilities is a very challenging task. This is probably the first time that they have been forced to evaluate each possibility on its merits and compare it to the others; hopefully, the process will result in a realistic appraisal of the situation. Two rules go along with this technique:

1. NEVER SEARCH PLAN BY YOURSELF
2. NEVER DISCARD INFORMATION

The first rule will be obvious once you try this method! There will be no two lists of probabilities the same, since we all have some preconceived ideas and no matter how hard we try to be objective we still tend to favor one line of thought over another. We must have help in overcoming our narrowmindedness, since we do not *KNOW* where the survivors will be found and we are in no position to tell anyone that their ideas are right or wrong. The second rule is similar to the first, since we do not know where the survivors are how can we say where they are not (if the location is within the realm of possibility)? Granted, we have had our reasons for discarding information in the past but these "far out" leads could better serve us if they were included in our search plan with very low probability (i.e., 0.5%, 1% or 5%); occasionally, one of these leads will be just what is needed to take advantage of new information and you will have it before you and not long forgotten. Please keep an open mind, don't discard any possible information and keep everything in perspective. Always remember: **If you *KNOW* where the survivors are, why are you searching!!!!!!?????!!!!**

When the process is complete, which should take only 10-30 minutes, the SMC has the consensus of the most informed and experienced personnel available and he should be able to use this consensus to help him establish search area priorities for the next search. A method of getting a visual picture of the consensus is to draw each possibility on a map or overlay and to shade each possibility according to its probability percentage.

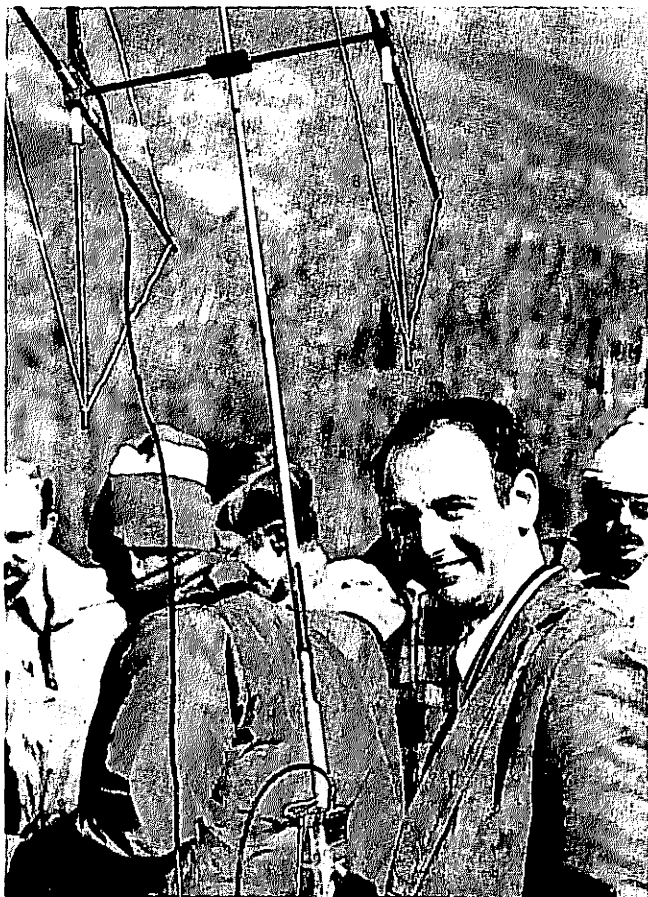
EXAMPLE:



NOTE: From this graphic you should find it easy to establish search area priority. (The slash lines along the track lines represent navigation errors). The first priority seems to be in area "A," the second could be where routes "1" and "2" overlap and the third might be lead "B."

This consensus may be used to establish search priorities and the SMC can be confident that he is assigning search units to the highest probability areas first, within the limitations of weather, terrain and capability of the personnel/equipment. This is the beginning of optimal search planning, but, many more variables must be considered before the most efficient and effective search can be planned. However, since most survivors are recovered before any significant grid searching is accomplished I feel that these procedures can be of assistance.

Keep everything in perspective!! Keep an open mind!! And remember: **IF YOU KNOW WHERE THE SURVIVOR IS, WHY DON'T YOU PICK THEM UP????!!**



MAJOR MATTSON instructing in ELT locating at Grand Teton SAR Seminar earlier this year.

COMMENT AND NEWS

by RICK LaVALLA

Washington State SAR Coordinator

The new explorer search and rescue grid searching manual entitled, *Team Member and Team Leader Training Manual* by Jon Wartes is now available. This 80 page manual is intended for use by explorers taking ESAR training. Its contents include: Searching Techniques and Evacuation; Equipment Food and Clothing; Wilderness Navigation; Communications; Helicopter Procedures; Hypothermia; Desert Search; Team Leader Training. Copies of this manual are available by writing to: Western Region ESAR, 1111 NE 195, Seattle, Washington 98155. Cost is \$1.50 for BSA members and \$2.50 for others.

I have seen a new innovative survival guide designed to fit in your wallet. The eleven cards are printed on water resistant, tear resistant paper and enclosed in a plastic container. This guide covers all the basics with the totally unprepared person in mind. These guides could be sold by SAR units as a fund raising project with a 12th blank card available that could be printed with SAR information. Write to Wallet Guides, P.O. Box 2947, Everett, Washington 98203, for more details.

The Colorado Division of Wildlife, 6060 Broadway, Denver, Colorado 90216, publishes a comprehensive *Snowmobile Rescue Manual*. I understand single copies are available for free by writing to them.

The Council For Survival Education, P.O. Box 13117, Ft. Carson, Colorado 80913, is still a good source for survival education materials. Five dollars will buy you a membership.

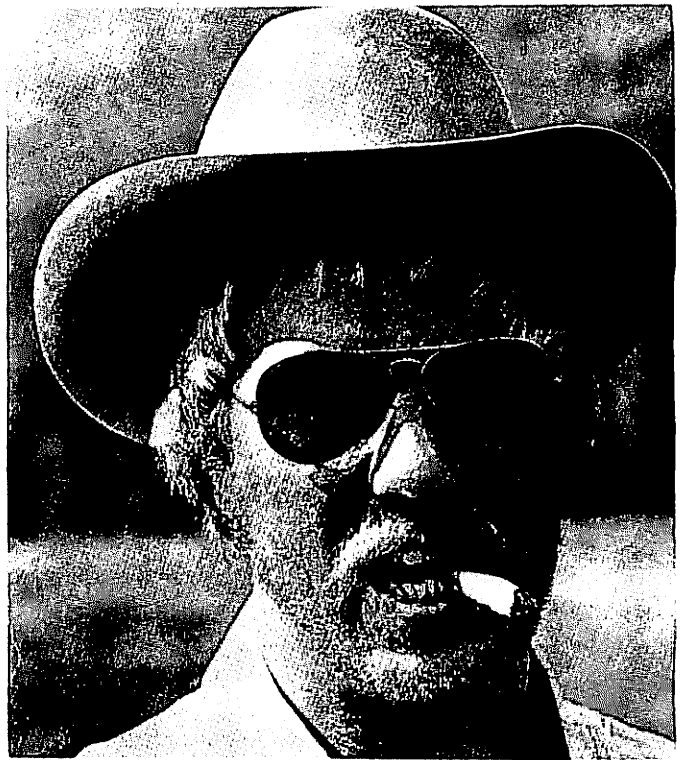
The MASARC training committee is busy designing curriculum, training aids, and a land SAR manual. This group desires your input. (editorial comment: committee is probably a poor word choice because distance and size of the committee really prohibits committee functioning as per Webster. Does anyone out there have a better word?). Write to me if you would like a copy of the table of contents for the proposed Land SAR Manual. Your input and interest will keep you on the training group's mailing list.

Free publications: "*Helicopter Operations and Personnel Safety*," "*Stormy Weather SAR for ELT's*," "*Preventive SAR*," "*SAR Cost Accounting Guide*," "*Man in the Heat*," "*Exploring Energy*," Write to me for copies.

Write to Western Region ESAR for a copy of their publications flyer.

Further editorial comment: At the NASARC conference Gene Fear received the National Hal Foss SAR Service Award for his efforts in preventive SAR education. The national recognition of saving lives through education was long overdue. I firmly believe the answer to the majority of SAR problems is preventive SAR education which should be a vital part of emergency preparedness educational programs in all states. The NASARC survival education committee, Council for Survival Education and the SAFE Education Chapter will assist to the extent of their resources all efforts in preventive SAR.

What is new, innovative, or happening in your area? The key in updating SAR techniques is sharing ideas. We want your input. Send anything (we will print it) to Rick LaValla, 4220 E. Martin Way, Olympia, Washington 98504.



RICK LA VALLA

WASHINGTON STATE SEARCH AND RESCUE OPERATIONS - 1969-1975

Following is a listing of search and rescue activities in Washington state by category from 1969 to 1975. This data reflects only the activity assigned a mission number according to the records kept by the Department of Emergency Services, Olympia, Washington:

	1969	1970	1971	1972	1973	1974	1975
AIR	12	10	7	17	21	15	24
CLIMBING	15	12	12	29	27	27	30
FISHING	10	16	18	12	9	23	21
HIKING	28	54	41	35	67	44	69
HUNTING	27	29	36	43	79	51	74
MOTOR EQUIP.	8	12	12	13	12	8	19
OTHER REC.	22	18	17	17	27	23	38
NON REC.	54	45	51	63	137	236	109
WATER	31	34	51	69	38	43	47
TRAINING	36	51	63	76	127	194	249
TOTALS	242	281	308	374	544	664	671

1976 Projected Figures: Active Missions.... 500 (est.)
Training 300
Total 800 (Approximately)

We feel that the leveling trend rather than increase of SAR activity recorded by this office is due to the following: preventative education programs and efforts, more rescue than search wherein agencies use their own personnel - activity not involving volunteers or the state office often are not reported; SAVE programs once monitored by the state office as non-recreational missions are now MAST programs and this activity is not reported. This would explain the decrease in non-recreational missions for 1975. Actual Search and Rescue missions (excluding training), incurred a 7.25% increase for 1975 over last year.



SOME months ago, two pilots with about 2000 hours each launched in their SH-3 for a helicopter site at the 6000-foot level in the mountains. Their mission was to pick up troops and equipment and take them to another site.

The flight to the mountainous helo pad was uneventful and, assisted by 20/25-knot winds and a smoke grenade to indicate direction, a routine landing was made.

They boarded five passengers and three cargo containers, a total of 1500 pounds more than their landing weight. In a hover, they pulled 80 percent torque, N_g was 95 percent, and N_r was 100 percent. Meanwhile, the winds decreased to about 5 knots and became variable.

As the HAC began to move off the pad, both engines went to topping power, and N_r slowed to 90 percent. Trouble! There was only one place to go and that was down. Fortunately, the terrain from the pad sloped

down sharply, so they followed the terrain, unable to do anything else. The crewman grabbed the mike and told the pilots that the tailwheel was dragging along the rugged terrain. The pilot fought to keep the helicopter reasonably level, expecting to crash any second. The copilot felt that a nosedown attitude might help, took control, and made the correction.

While descending, the rotor blades began zapping the tops of the brush, very neatly severing everything in their way. At a point where there was some semblance of a level spot, forward movement was finally stopped and the pilot effected a light-on-the-wheels hover. Quickly the crewman was told to offload the cargo and the troops. When the 1500 pounds had been removed, a low profile climb became possible and was executed. Despite a trip of 40 miles over rugged terrain, and a heavy 1-to-1 vibration, the pilots flew to a refuge base,

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MOUNTAINIA

landed, and inspected the damage. *(Why he didn't shut down to inspect damage, rather than traveling 40 miles with heavy vibrations, is a total mystery. -Ed.)*

They found all main rotor tip caps dented and torn, including damage to the blade pockets. All of the tail rotor blade tip caps were likewise dented and torn. The lower UHF antenna mount bracket was smashed. The tailwheel tire sidewall was torn, and the main landing gear fitting was bent. Later, engines were removed and inspected for possible FOD.

In retrospect, the power available was sufficient to hover in ground effect, but obviously nowhere near enough to fly. When they lost the ground cushion, they were unable to transition to forward flight. The pilot failed to use proper technique. *(That's an understatement! - Ed.)*

Apparently, the only planning that had gone into the flight was a dry run a week before. The conditions of this near disaster were identical to those of the last dozen high-altitude/mountainous area fiascoes that have occurred to Navy and Marine pilots the past few years. Several articles on high-altitude helo operations have appeared in Safety Center publications since both of these pilots finished flight training, and the NATOPS manuals have all sorts of goodies to assist a pilot if he'd only read and heed.

Let's review the basics. For openers, we'll repeat the mountain flying truism: Meteorological conditions — wind, weather, and turbulence — are constantly changing. You might have 25 knots of wind one minute and the next minute they're calm.

The old head, wise to nature's whims in the mountains, expects the worst, allows plenty of extra margin, and is happy if conditions aren't as bad as he anticipated. Winds at higher elevations are seldom calm for long. They're usually strong, gusty, and shifting. If safe flight depended on a full 25-knot wind, maybe the operation should have been reviewed and a lighter load taken on.

Flying helicopters in mountainous areas is treacherous and calls for special pilot techniques. Most Navy helo accidents in mountainous areas are caused solely by poor pilot technique — as was this incident — resulting from the pilot's general lack of knowledge, planning, or experience in this phase of flying.

The keys to safe flying in mountains are: *knowledge, planning, concentration, training, and experience.*

NATOPS manuals contain multiple illustrations, schematics, diagrams, power charts, and recommended techniques to successfully counter mountain wave actions, wind flow patterns, and nonpreferred approach paths. There are admonitions to maintain airspeed. There are cautions about getting behind the power curve. Perhaps the most important section is on power available versus power required, HIGE/HOGE information, and density altitude determinations.

Read again the paragraph above about the old head. You use all available information and make all determinations on the conservative side. It's far better to know you can land or hover at 8500 feet DA, and then find out your DA is only 6000 feet, than the opposite.

If after all your careful planning there's still some doubt, make two trips with lighter loads rather than one near max gross. Any pilot can learn enough, ahead of time, to enable him to fly successfully in mountainous areas with a high degree of safety. ◀

INFLYING

RIVER CROSSING

by **BILL MARCH**

River crossings may in some circumstances be one of the greatest hazards to be met while backpacking in wilderness areas. They should be regarded as emergency procedures which should only be used when 1) the river has been well reconnoitered and a suitable ford has been found, 2) the potential danger can be safeguarded by using a climbing rope and 3) the alternatives to crossing are more hazardous than the crossing itself. When planning a backpack trip careful consideration should be given to the possible river crossings involved. This is especially important in the spring and early summer when water runoff is normally much higher than usual. The ability to cross a river safely is only acquired through observation and practical experience and the purpose of this article is to provide basic guidelines which may be used to build a firm foundation of technique.

There are many types of rivers and streams to be found in wilderness areas. They vary in nature and in flooded conditions according to their source, the topography of the country through which they flow, and the distance from their source. They can be broadly summarized into three major types.

1. Rivers with beds containing large boulders, some submerged and some visible with the current varying greatly from place to place due to turbulence and obstacles. These are young immature rivers found high in mountain areas and can present serious problems if they are flooding.

2. Rivers where the banks and bottom are shingle and the water is not flowing so fast. These are more mature streams and are found lower down in the larger valleys or in mountain valleys with local base levels, e.g., the rivers flowing into lakes or over silted up lake beds.

3. Rivers where the water is deep and slow flowing. These are normally more mature rivers found in the lower valleys where the gradients are gentle.

Each kind of river will require a different approach but in every case the selection of a satisfactory ford is of critical importance. A river may be impossible to cross at one place and yet be quite possible to ford a short distance away. In addition a crossing point can easily change from a safe ford to a dangerous or impossible crossing with a rise in the water level.

The decision to cross or not to cross depends upon an individual's assessment of the total situation. The color of the water, a shifting bottom, the width of the river, the speed and volume of the water are all factors to consider when deciding to cross. It is inadvisable to attempt to cross a river in which boulders can be heard rolling and trees or logs are being swept along. If no satisfactory ford can be found it may be better to make a detour upstream and find a high level route above the river. If the river is obviously in flood and you have time available it may be best to mark the water level and wait, especially if the weather is fine and there is little prospect of rain. The river may fall quite rapidly exposing a suitable ford. In areas with extensive snow pack or glaciers in the head water the streams can be expected to be lowest in the morning after a cold night and highest in the afternoon with the melt water of the day's heat.

When the river has to be forded it is advisable to spend some time in finding the easiest and safest crossing place. It is best to examine the river from a high vantage point where it is easier to ascertain width, speed, turbulence,



The safest way to cross a river.

obstructions and in clear water, the nature of the bottom. The form, slope and material of the river bank may give a clue to the nature of the river bed. The best crossing is on a firm bed of shingle or gravel. Large rocks, smooth slabs, sand, mud and high banks should be avoided. The area selected should be free of obstructions, submerged or otherwise which may snag the rope and the outflow below the ford should be reasonable. Care should be taken when considering crossing silt or sand at the edge of a glacial stream or glacial terminal lake as it may be quicksand. If the river is clouded with glacial floor (ground pulverised rock) look out for submerged boulders and rocks. Sometimes the headwaters of these rocky mountain streams are possible to cross dry shed by boulder hopping or by utilizing stable log jams. In any event great care should be taken to avoid long jumps with heavy packs as a slip could prove dangerous. Care should also be taken if it is very cold as the rocks may be glazed with ice, even under normal condition logs and boulders can be slippery and slimy, especially when wet.

The force of moving water, even if it is not broken and white, is considerable and the speed should be determined by throwing a small stick into the water and noting its rate of movement. Never underestimate the velocity of shallow water. When one is reading river water and attempting to find a crossing point a knowledge of water hydraulics and river behavior are extremely useful.

1. When a river widens the water is more likely to be shallow and slower flowing.

2. When a mature river increases its gradient there is often a shingle bar running diagonally across the river above the change in grade.

3. When a river gradient is checked it often widens and runs in braided channels that are often easier to cross than the main stream.

4. The bends of rivers are poor places to cross as the water is usually deeper and more strongly flowing as the outside of the bend and the outside bank is often steep and undercut. The water between the bends of the river is more likely to be shallower and less powerful.

5. When a river is deep but slow-flowing in pools a crossing can be made by swimming.

6. The main flow of the river is where the biggest V of water points downstream. This will be the most powerful section of the current and the most difficult to cross. If there are ripple formations pointing upstream they indicate a submerged obstacle at the apex of the V.

BILL MARCH is an international authority on Mountain Rescue who has recently accepted the position of Director of the British National Mountaineering School.

7. The effect of obstructions on the river flow should be clearly understood. Obstructions or rocks projections above the water level should be avoided as it is possible to be pinned against them by the force of water on the upstream side. On the downstream side behind the obstruction there is always an eddy current running upstream and this is often a good place to rest.

When the obstacle is deeply submerged then the water surface will be broken by large standing waves gradually diminishing in size as one moves downstream. The largest waves upstream marks the position of the obstruction. These haystacks are indications of fast deep water and an irregular river bed. Although spectacular they are not particularly dangerous.

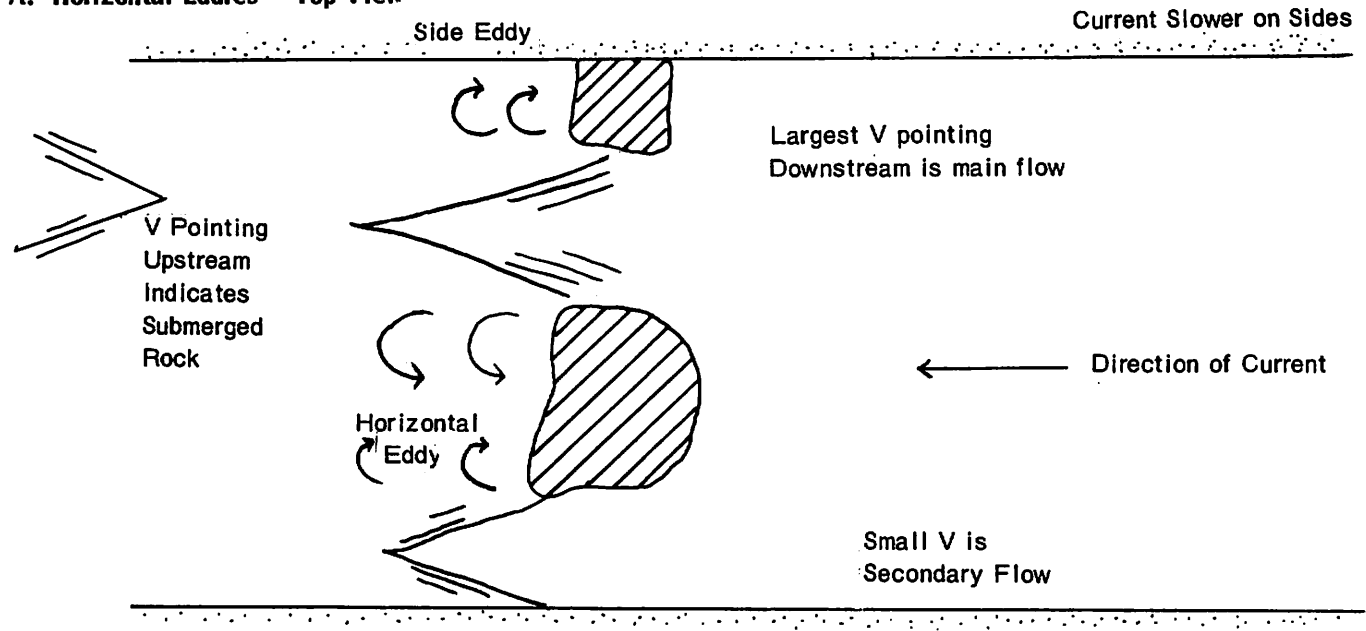
When the obstacle is large and just below the sur-

face a small waterfall may form and a strong vertical eddy flows upstream on the downhill side of the obstacle. This is called a stopper or hole and is capable of trapping and drowning a person who has been swept into it, especially if the obstruction extends across the entire width of the river. These holes and falls are to be avoided at all costs because of the great difficulty in escaping from them. To rescue someone trapped in a hole one should throw a rope with a bowline loop tied in the end and pull the person out downstream. In the event of a rope not being available it is possible for the trapped person to take a deep breath and dive to the river bottom where he should theoretically be swept out downstream by the water current running along the river bottom.

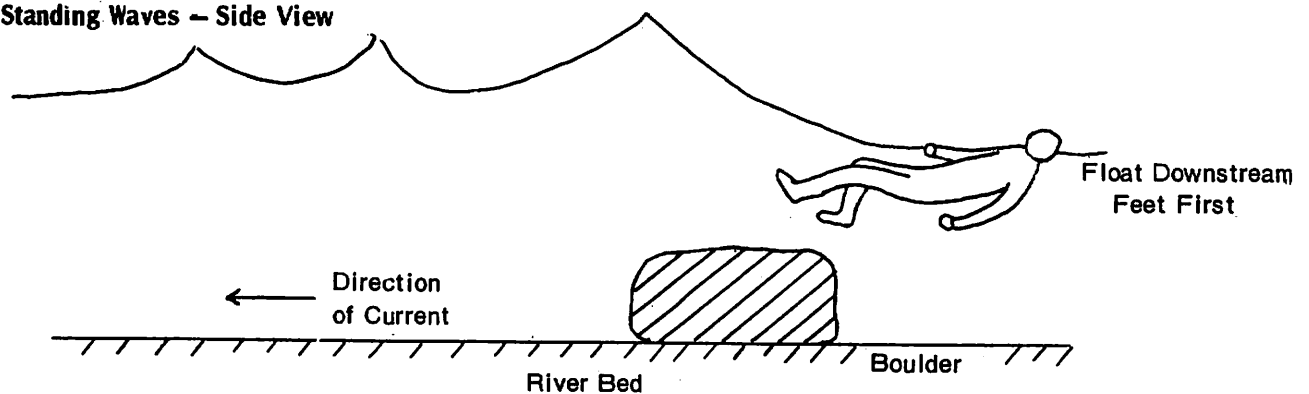
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READING MOVING WATER

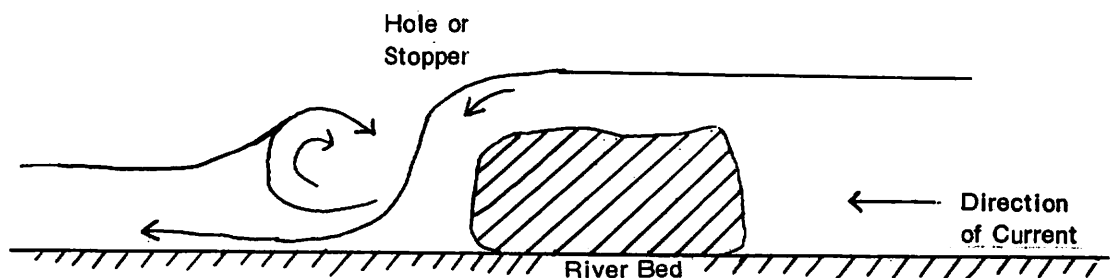
A. Horizontal Eddies – Top View



B. Standing Waves – Side View



C. Stopper – Vertical Eddy – Side View



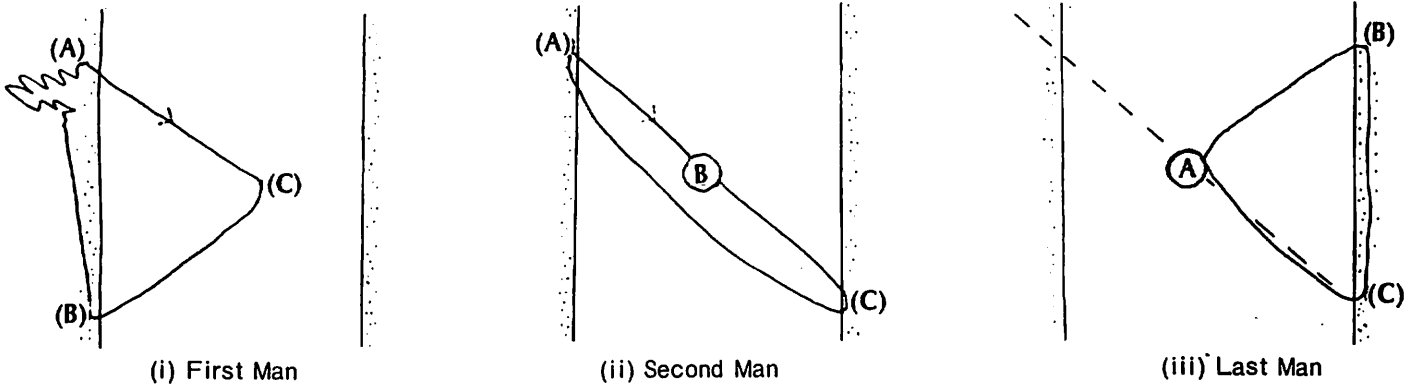
RIVER CROSSING (cont.)

CROSSING WITH A ROPE -

1. CONTINUOUS LOOP SYSTEM

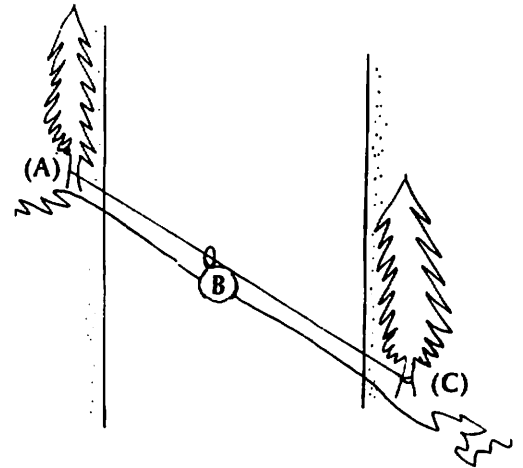
Once a decision has been made to cross a river a technique or method must be chosen. The best way to cross a river is to use a rope to safeguard the people crossing. An exception to this rule is when there is a danger of the rope snagging on a rock in the river. If the rope snags the person crossing may be held under the water and his rescue may be impossible. In diagram 1 a continuous loop system is used - the leader C ties on in a loop passed high under his armpits and sets off across the river supporting himself on the upstream rope held by A. A is not tied into the rope but may be protected by a sling tied to a tree. Downstream a third person, B, also not attached to the belay rope

passes the rope through his hands as C crosses. In the event of C losing his footing and is swept away A pays out and B pulls in C, always remaining downstream. If you try and pull a man onto the bank from upstream of him he will be dragged under. When C reaches the far bank he slips out of the loop and pays the rope through until it is passed to B on the other side. B then steps into the loop and crosses over diagonally downstream being belayed by A and C - if he slips A pays out and C pulls B in downstream. The last man, A, crosses supported upstream by B and pulled in by C if he falls in.



2. CROSSING USING A FIXED ROPE AND SLING AND CARABINER

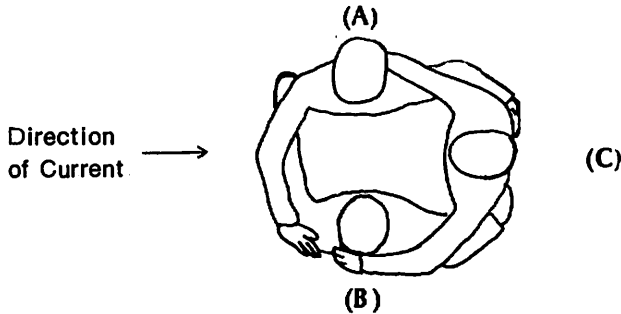
An alternative method of getting a party across when high banks or trees permit a single rope to be stretched tight across the water. The leader C crosses as described previously and one rope is rigged across the river as a fixed line - the people crossing use a sit sling and clip into the fixed line with a carabiner. The second rope is used to pull him across the river. The last man dismantles the fixed line and crosses in the same manner as the first. This method does require two ropes, carabiners and slings. Before any method of roped river crossing is attempted a clear system of calls and hand signals should be agreed upon especially as the noise of the river usually makes conversation difficult between those on opposite banks.



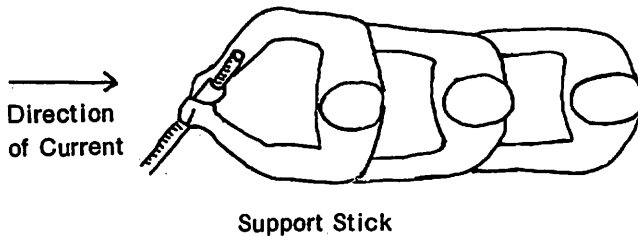
CROSSING WITHOUT A ROPE

If a rope is not available then other methods must be used but the greatest care should be executed. In such circumstances the following methods have been used successfully:

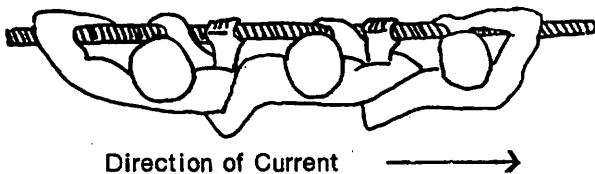
1. **Triangle of Support Method** — involves three people facing inwards with arms firmly linked, heads close together and feet apart. The lower man, who is also the heaviest, must face upstream and only one man should move at a time. In this way the two stationary men can support the man who is moving.



2. **Line Astern Method** — The line action method is for three or more men standing one behind the other giving each other support by holding onto each other's waist belts. First the front man moves, then number two, who should be the heaviest and finally the third man until the party is one line again. In very heavy water every member of the group moves at the same time.



3. **Line Abreast Using a Pole and with Arms Interlocked** — This method is for three or more persons to stand in line abreast side to the current with arms interlocked and holding onto a long tree branch. Everyone moves together giving each other mutual support.



All three of these methods should be used with great care.

When it is considered that a river is fordable there are certain fundamental rules and precautions which should be observed. Keep your boots on as they protect the feet from injury and provide a more secure placement reducing the possibility of a slip or stumble. Socks can be removed and carried in the pack to keep them dry while anklets or gaiters will stop shingle being worked into the boots. On no account should a crossing be attempted without boots as the feet will numb quickly and may be bruised easily against boulders. Baggy trousers will offer greater resistance to water flow and should be removed. If the water is very cold then woolen long johns will provide some protection for the lower body without offering resistance to water flow.

The rucksack should be kept on with the waist belt undone in order that it can be removed easily in the event of the person losing his footing. The extra weight of the pack increases stability in fast shallow water. In slow deep water the pack will be a source of flotation if saucepans are inverted and clothes and sleeping bags are packed in sealed polyethylene bags. If the pack has a bivouac extension this should be securely fastened to trap air and increase buoyancy. When swimming a slow deep river the pack should be floated in front of the swimmer and used as additional buoyancy.

When crossing a river never face downstream as the force of the water will push against the back of the knees causing the legs to buckle under. It is better to stand sideways on the current with the hips angled diagonally towards the opposite bank so that the current exerts a force in that direction. This 'ferry glide' effect assists in conserving energy and makes the crossing easier. Only move one foot when the other is firmly placed and shuffle rather than take big steps. Do not cross the legs and keep them apart adapting a stable braced position. A stout stick is very useful as a third leg and allows two point contact when moving, i.e. move stick, then left leg, right leg, repeat. The stick should be used as a support on the upstream side.

A river crossing may chill those involved, especially if it is a glacial melt water stream and it is advisable to step out and change into dry clothes and have some hot food and drink before proceeding. This is more likely if crossing in waist deep or deeper water. If you lose your footing and are swept away, keep calm, jettison pack and float feet first downstream. Keep your feet up to fend yourself off rocks and swim across not against the current to try to gain an eddy or slower water out of the main flow. On no account allow yourself to be swept up against log jams or fallen trees as you may be trapped and drowned by the force of the water pushing you under.

In conclusion remember that river crossing is hazardous practice which should not be undertaken without a full consideration of all the factors involved and a thorough consideration of the area. Far better to make a detour or a change of route, or a retreat than risk a life in a dangerous river crossing. Always give serious consideration to the possibility of river crossings when planning your backpack trip itinerary. ■



Sherpa using stick for support crossing a tributary of the Khali Gandaki in the Dhauligiri Himal.

NORTHWEST BLOODHOUNDS SEARCH AND RESCUE

by LENA REED



Northwest Bloodhounds Search and Rescue became a dream in my mind five years ago; when my daughter, then living in Grand Forks, North Dakota, told me stories of the criminals trailed and lost children found by the bloodhounds of her friends there, Vince and Cathy Brey. At about the same time there had been a few sad cases in this area of children lost and dying in the forests while picnicking or hiking with their families. We wondered why there were no bloodhounds in use in this area of heavy forests, where they could certainly be of special service.

That led to our purchase from the Breys of Boomerang of Dakota; then a charming eleven-week-old package notable for long ears, big feet, and skin like a loose sack. A year and a half later he was an American and Canadian show champion, and a proven mantrailer; an ability he has repeatedly demonstrated. He is also the sire of Cascade's Ranger.

Northwest Bloodhounds is organized as a non-profit, volunteer organization. We are registered under the Office of Emergency Services in the State of Washington; and are available on call from them or any law enforcement agency in the states in which we have membership. We will go to outside states too, but would expect that our expenses be paid in those cases. We don't charge for our services. If those involved wish to make voluntary contributions to the club, we do need money for operating expenses and communications, and contributions will be welcomed. If a team drives over one hundred miles to reach a search site, a sheriff who wishes to gas up the vehicles for the return trip will receive the blessings of the Great Bloodhound in the Sky. In this time of inflation and gas shortages, we must face the cold hard fact that we can be only as noble as we can pay our way to be. There's quite an investment in just the \$200 to \$500 that a bloodhound puppy costs.



COL. HOOVER LEADS DAVE ANDERSON ON THE TRAIL

For the benefit of those who have never worked with bloodhounds, we would like to lay out a little information about what they can and can't do. First of all, they can't read your mind. They are scent hounds, trailing the scent of a person who is identified to them. That means when a hound arrives at a search, there must be a scent article to let him know whom he is to find. This should be some unlaundered bit of clothing worn by the missing person. It could be bedclothing; if possible, we like to take the bloodhound to the bedroom of the missing person and let him sniff around where the scent is strong. And please — be sure there isn't a cat on the bed when he comes in.

If the hound can't be brought to the victim's home, whoever selects the scent article should protect it from contamination by other scents. Pick it up with a pair of tongs, a fork, or a pliers, and put it into a clean plastic bag. Don't take an item from the laundry hamper, where it has been confined with the clothing of the rest of the family. If the search is away from home, or a criminal case where the escapee was not thoughtful enough to leave a scent article, but where there is a footprint which is known to be that of the wanted person, the hound will start from that. He will start from a car abandoned by the escapee. However, be sure you protect the trail from cross-scents if a single footprint is all you have — and don't add your own. A classic example is the sheriff who "protected" the footprint from the rain by putting his coat over it. By the time it rained through that for a while, you can figure out whose scent was on the ground. It would have been far better uncovered. Bloodhounds have trailed men whose trails had been rained on for several days, or covered by six inches of snow. They have trailed through water, where the scent clung to the marsh grass.

A bloodhound can't provide a miracle every time. Damp, cool weather holds the scent; hot, dry, dusty weather loses it fast. Wind disperses it. Pollen, as going through a hayfield, or dust, can quickly clog a hound's sensitive nose. Then maybe they're like people, and some days simply don't feel as sharp. We don't know all the answers, and they can't tell us. I do know that if someone is lost on foot, outside the city, a *trained* bloodhound is your best chance of finding him. Bloodhounds have trailed through the city too, but concrete doesn't hold the scent for long, and industrial and auto air pollution multiply the problem. The record for following a cold trail was set by a hound who successfully followed a trail over 14 days old. The record in length was 138 miles. But please — call immediately. Don't try to set a new record. The victim may not live that long.

When a handler brings a bloodhound to a search, he will want first, that scent article; and second, to know the last place the victim was seen. He will take his hound there, and from there on, it's up to the bloodhound. *He* decides where to go. You don't call him off and say, "I want you to search the area across the road instead." A bloodhound trails the scent of that one person who has been identified to him. He may be as much as two miles from the actual track; the scent may drift due to wind or rising air currents. If the trail curves and the scent is

(continued next page)

NORTHWEST BLOODHOUNDS—continued

hot enough, an experienced hound will cut across the curve, following the scent where it is strongest. He does not follow footprints; bloodhounds have been known to trail persons who have travelled in slow-moving, open cars along country roads, or babies who were carried and didn't touch the ground at all.

Northwest Bloodhounds hopes to be a central organization for owners of trained trailing bloodhounds who wish to work in search and rescue. If there is a scent article, and a trail, one hound usually does the job. We do not yet have many fully trained hounds in the club, but many others are in training. For this reason, at present, any number of members available in the area may answer the call. Later, we expect to send the closest two teams to a search, with others on standby. We are encouraging membership of persons who do not own hounds, but are

interested in working with them. Our preferred team would consist of two men and one hound. The second man would handle the radio and compass, and serve as a relief to the bloodhound handler on a long search. It would also provide protection in case a searcher should become injured, or a victim is found in need of prompt assistance.

I am the secretary of the club, and can be reached for information at 10705 Woodland Avenue, Puyallup, Wash. 98371. If needed for a search, we can be reached through the Department of Emergency Services in Olympia, Wash.; or a law officer who has a CD number can call us directly at the following numbers: Kent, Wash.: 206-631-0296; Puyallup, Wash.: 206-845-8039; Tacoma, Wash.: 206-584-3311. In Idaho, call 208-772-5027. Montana and Oregon are not yet completely organized, but calls can come through us at the Puyallup, Washington number. ■



SEARCH AND RESCUE BLOODHOUNDS – CASCADE'S RANGER, left, AND HIS SIRE, CH. BOOMERANG OF DAKOTA with LARRY THOMPSON and CLYDE REED

FLIGHT FOR LIFE

ST. ANTHONY HOSPITAL SYSTEMS EMERGENCY AIR SERVICE



by **GEORGE L. SEATON** Director of Operations

General and Procedural Information:

The Flight For Life program was designed to provide the best possible emergency medical transportation system in the Denver Metropolitan area, throughout Colorado and the Rocky Mountain Region. Many types of serious trauma, that which occurs on the highways, in mountainous terrain, as well as in industry, makes an emergency air service a critical part of the patient's chance for survival.

The vastness of the Colorado and Rocky Mountain Region creates isolation for many communities, making modern medical care feasible only when fast efficient transportation and expert medical care enroute to a well equipped hospital is readily available.

The helicopter, because of its unique capabilities for flying into congested and inaccessible areas becomes the focal point of the emergency transport operation. However the Flight For Life Program also provides fixed-wing pressurized aircraft flights beyond 150 air miles to any city in the country at a very nominal cost to the patient.

The service provides for the immediate response by an emergency medical team going to the patient via aircraft, starting intensive therapy at the site of the illness or injury and, once stabilized, the patient is then returned as rapidly as possible to the Denver hospital of their choice.

Flight Nurses specially trained in critical care medicine accompany every flight. A physician is present on all flights where the need is indicated. Each mission is reviewed with regards to medical care delivered to the patient.

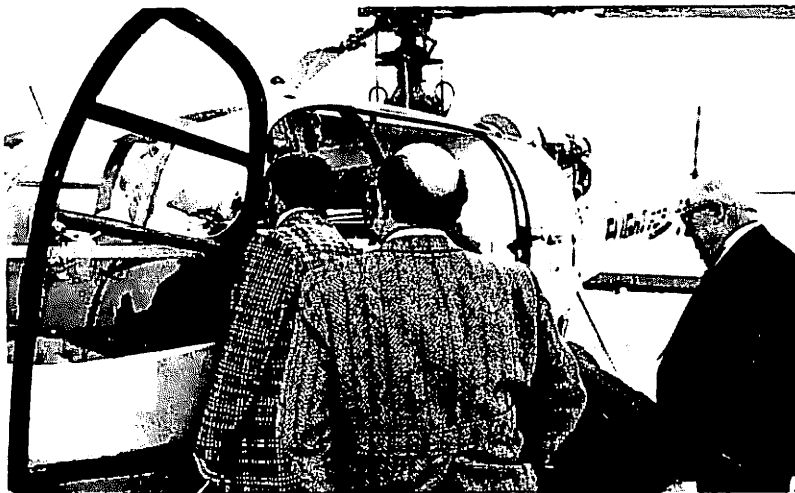
Emergency medical equipment including electrocardiographic monitors, oxygen, defibrillator, suction apparatus, endotracheal intubation equipment, intravenous fluids, transport isolettes, and emergency drugs are all carried on the helicopter and fixed-wing aircraft. In effect, the Emergency Room is carried to the patient for immediate treatment and care.

Medical guidance for the Emergency Air Service is under the direction of a Critical Care Coordinating Committee which sets the principles of care during emergency transportation as well as the emergency department, intensive care units, coronary care unit, and recovery room at St. Anthony Hospital Systems. Physicians of every speciality are members of this committee and direct the medical care in these critical areas. Physicians from other hospitals in the Denver area also act as consultants to this committee, again emphasizing the community aspects of the service.

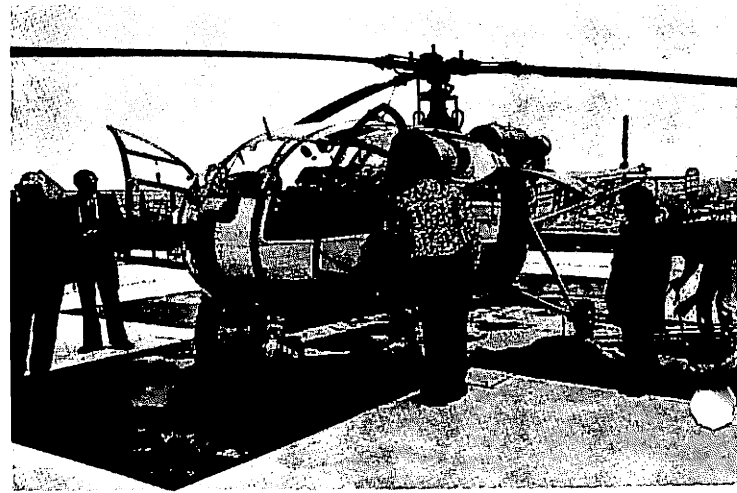
In coordination with the New Born Center at Denver Children's Hospital a team composed of a nurse and a physician, experienced in the care and transport of the newborn, is dispatched by helicopter or fixed-wing aircraft to the distant hospital requesting such service. Once there, the team institutes intensive care for the newborn in distress. Once stabilized, the infant is transferred to the New Born Center in Denver.

The St. Anthony Emergency Air Service began operations October 12, 1972. A total of 2,656 flights were completed between October, 1972, and January 10, 1975, including 452 fixed-wing flights to 55 cities in 20 different states.

(continued next page)



GEORGE L. SEATON, (far right) DIRECTOR OF FLIGHT OPERATIONS FOR ST. ANTHONY HOSPITAL, OVERSEES FLIGHT PREPARATIONS.



DEDICATION VISITORS LOOK THINGS OVER

FLIGHT FOR LIFE—continued

Flights have been made into more than 135 Colorado cities, towns and communities serving doctors in more than 60 hospitals throughout Colorado.

Emergency flights have been made to all the major ski areas in Colorado and many mountain rescue flights were made in 1973 and 1974 at the request of Mountain Search and Rescue Groups.

The Emergency Air Service operates 24 hours per day with two Alouette Helicopters available for immediate launching.

Response will be made upon a request by any doctor, nurse, hospital, law enforcement officer, fire department member, mountain rescue team member, ski patrolman, safety officer, construction foreman, or any person responsible for obtaining the service.

Calling For Service:

Call St. Anthony Hospital in Denver, phone (303) 825-9011 and ask for the Emergency Air Service. The PBX operator will immediately transfer your call to the Helicopter Dispatcher. Identify yourself and furnish brief information which will be requested concerning the medical condition of the patient or patients, location of the patient, weather and helicopter landing facilities. The helicopter normally will be in the air and on its way within four (4) to five (5) minutes following completion of your call. Direct calls can be made into the Communications Center (Helicopter Dispatcher) by calling (303) 573-5653 or 573-9740.

Daytime Flights and Landings:

The Dispatcher will make adequate inquiry concerning your location. In the Metropolitan area he may ask your location in relation to major streets, boulevards or highways. In smaller communities and rural areas the location may be defined in relation to major highways, landmarks, schools, churches, rivers, mountain peaks, towns, parks, or other appropriate directions.

A landing area should be 60 feet in diameter, with no overhead wires, poles or tall trees closer than 100 feet from the center of the landing area. A vacant lot, athletic field, school yard, or park area may be used. A street or highway may be used provided traffic and crowd control is available during landing or take-off.

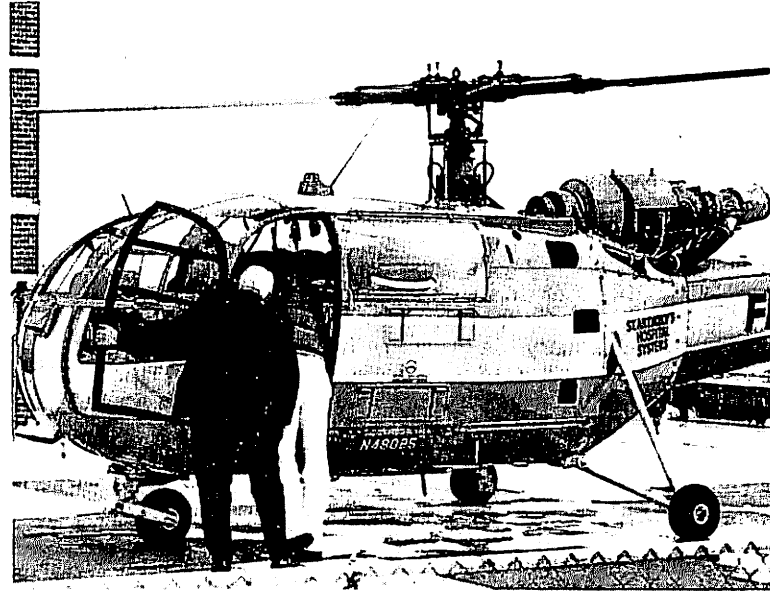


FLIGHT NURSES BUCKLE-UP AND STOW GEAR.
ONE IN WHITE PANTS IS A MALE FLIGHT NURSE

Spinning rotors are the most important hazard. The helicopter should not be approached until the pilot indicates it is safe to do so. Never approach the helicopter from the rear as spinning tail rotors are extremely hazardous.

An orange colored smoke bomb may be used to mark a snow covered landing area — use when the helicopter is within one (1) minute of landing.

Overhead rotating red, amber or blue lights on emergency units or red highway flares near the landing area are quite satisfactory for day or night landings.



GEORGE SEATON, FLIGHT OPERATIONS DIRECTOR (white hair),
SHOWS OFF HELICOPTER

Night-Time Landings:

The area for night landings should be 100 feet in diameter with no overhead wires, poles or tall trees within 150 feet of the landing area center. Major obstructions should be reported to the dispatcher when making the call for service, in order to alert the pilot.

Parks, vacant lots, athletic fields, parking lots and school yards may be used by facing two vehicles 100 feet apart, with their headlights illuminating the landing area. Headlights should be extinguished twenty (20) seconds prior to the helicopter touchdown to prevent pilot night-blindness.

Overhead revolving emergency lights or red highway flares are quite adequate for night landings. Illuminated streets or highways may be used if traffic and crowd control is provided.

Weather:

Helicopter flying restrictions occur during hail storms, heavy snowing or rain causing zero visibility and strong gusty winds over 50 knots. Helicopter navigation requires a minimum of ½ mile visibility. Snow shoes attached over the landing gear wheels preclude any problems in powder snow landings.

Response Time:

After receiving a request for service helicopter lift-off is normally four (4) to five (5) minutes, including two (2) minutes for engine warm up and brief pre-flight preparation. Mild weather, flight speed is normally two (2) miles per minute. Distance is computed in air statute miles which is considerably less than highway mileage.

(continued next page)

FLIGHT FOR LIFE—continued

Helicopter Capability:

The Alouette III Helicopters used in the Flight For Life Program were manufactured in France specifically for high altitude flying in the Swiss Alps. They have an 875 H.P. jet turbine engine de-rated to 575 H.P. which provides ample spare power at high altitudes.

Altitude capabilities are 20,000 feet with 4,800 lbs. gross load. They can ascend and descend vertically into any landing area.

Maximum speed is 130 MPH; cruising speed 115-120 MPH. A flying range of 300 miles without refueling.

Load configuration is — pilot, nurse, doctor and two (2) patients, with all necessary medical equipment.

Fixed-Wing Flights:

In addition to the helicopter service St. Anthony Emergency Air Service provides a fixed-wing service to those hospitals in towns and communities having airport runway facilities or airstrips and ground ambulance transportation necessary for the patient transfer.

In January, 1974, a new twin-engine pressurized NAVAJO aircraft was placed into service. This is an all weather radar equipped aircraft capable of flying at 29,000 feet altitude at 260 mph speeds. Fixed wing flights are encouraged for all trips over 150 mile radius. The Navajo is ready for take off from Stapleton International Airport within 20 to 30 minutes after receiving the request for service. All ground ambulance transfers of patients to hospitals in Denver are arranged by the St. Anthony Hospital Dispatchers.

The Navajo aircraft can transport two (2) adult patients or three (3) infants in transport Isolettes with a nurse and doctor or two (2) nurses and all emergency equipment.

Lear Jet aircraft flights will be arranged for extremely long distances and when greater flying speed is a critical factor.

Mountain Rescue Flights:

The initial request for service is the same as for other flights with the exception that the pilot must have specific information of a possible landing site near the patient. The Dispatcher will ask specifically concerning the terrain, weather conditions and altitude.

If the terrain does *not* allow a helicopter landing, but would allow "hovering" at five (5) feet or less off the ground, the following procedure will be used:

- a. A Flight Nurse and equipment will be delivered to the patient site to begin necessary treatment.
- b. The patient should be loaded onto a helicopter stretcher or a Stokes Litter.
- c. Four rescue team members, if available, should be crouched, two on each side of the patient, at the pick up point and wait until the helicopter hovers into position. (All loose material such as blankets or fly-away items should have been removed from the area or secured before the hovering action begins.) Goggles, if available, should be worn by rescue workers.
- d. After the helicopter hovers into position, the nurse and a rescue team member should climb aboard the aircraft to assist in loading the patient and in delivering the patient to a ground ambulance or to transfer from a Stokes Litter to the aircraft stretcher, if the patient is then to be delivered by helicopter to a hospital.

If a patient site is not suitable for a helicopter landing or hovering until the patient is loaded, the patient will have to be moved by rescue teams to a suitable location.

The helicopter may be used to shuttle rescue team members up and down a mountain side to effect a rescue.

The St. Anthony Emergency Air Service will transport patients to any hospital requested. Ground ambulance transportation required in Denver in conjunction with a helicopter flight will be arranged by the St. Anthony Dispatcher.

(continued next page)



ST. ANTHONY HOSPITAL'S ALOUETTE III HELICOPTER HAS ALTITUDE CAPABILITIES OF 20,000 FEET.

FLIGHT FOR LIFE—continued

Communications:

The St. Anthony Flight For Life Communications Center operates 24 hours per day and has the following radio capabilities:

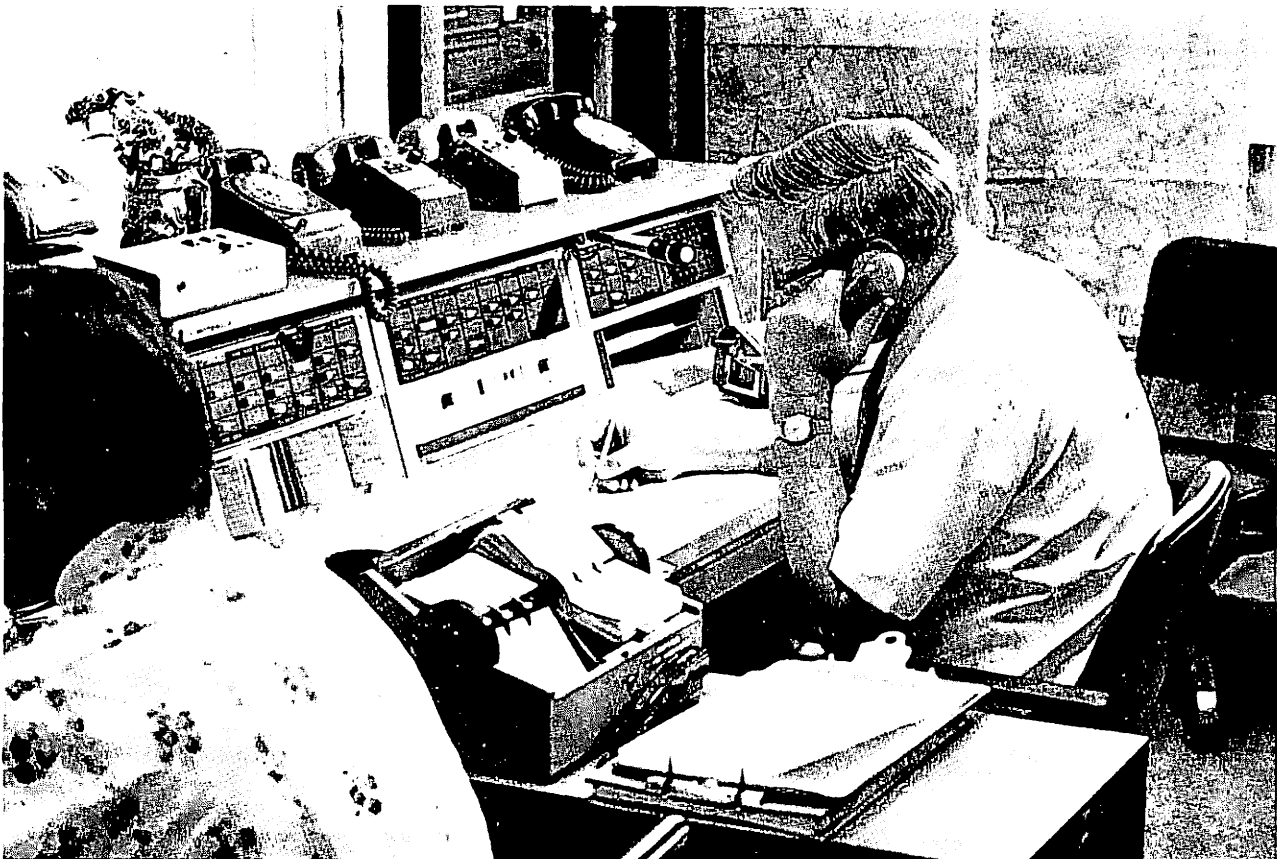
- 123.1 Air to ground frequency (Pilots to Dispatcher)
- 122.9 Back-up frequency to 123.1
- 450 Business frequency (Back-up to 123.1)
Colorado State Patrol, Channel 3, statewide
- 155.340 Colorado State Emergency Medical frequency
- 45.08 Jefferson County Sheriff and numerous Fire Departments
Denver Police Department
Denver Fire Department
Bancroft Fire District
- 38.40 & 38.50 Civil Defense frequency
Colorado State Citizens Band (24 Channels) (St. Anthony on Channel 9)
Lakewood Fire Department

The system also maintains "hot line" telephone service to various Denver hospitals and law enforcement agencies.



FLIGHT NURSES ALL READY FOR A MISSION

(continued next page)



FLIGHT FOR LIFE COMMUNICATION CENTER AT WORK

**FLIGHT FOR LIFE—
continued**

EMERGENCY INFORMATION

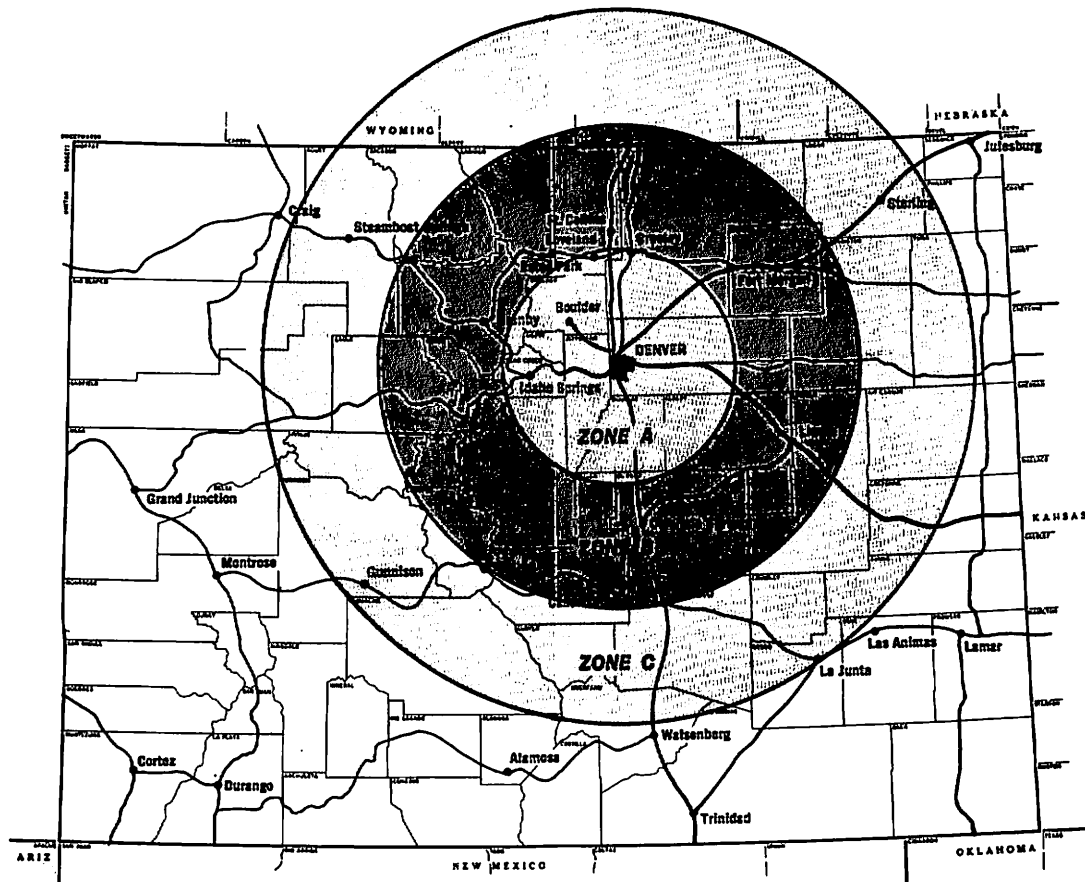
—CHECK LIST—

PHYSICAL SITUATION

1. EMERGENCY LOCATION
2. LANDING AREA
 - (A) LOCATION
 - (B) HOW MARKED
 - (C) ALTITUDE
3. TERRAIN — OBSTACLES
4. VISIBILITY
5. WEATHER CONDITIONS
6. WIND SPEED — DIRECTION
7. TEMPERATURE
8. SPECIAL CONDITIONS — INSTRUCTIONS

MEDICAL SITUATION

1. EMERGENCY DATE - TIME
2. REQUESTING PERSON - AGENCY
3. NUMBER OF PATIENTS
4. TIME FACTORS — DEGREE OF EMERGENCY
5. CONDITION OF PATIENTS
 - (A) I.V.
 - (B) TRACHEOSTOMY
 - (C) E.T. TUBE
 - (D) CAST
 - (E) TRACTION



Who may request service?

- Physicians
- Hospitals or clinics
- State and local law enforcement officers
- Search and rescue teams
- Voluntary ambulance teams
- Fire departments
- Ski patrols

**FLIGHT TIME FROM
ST. ANTHONY HOSPITAL**

Location	Distance Air Miles	In-Flight Time*
Zone A	1 to 50 miles	from 32 sec. to 27¼ min.
Zone B	51 to 100 miles	28 min. to 54¼ min.
Zone C	101 to 150 miles	55 min. to 121 min.

* add 3 to 8 minutes for preflight preparation.

For distances beyond 150 miles, our fixed wing aircraft is recommended, both for time and economy.

FLIGHT FOR LIFE—continued

ST. ANTHONY HOSPITAL EMERGENCY AIR SERVICE ACTIVITY CHARTS:

1974	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
ABDOMINAL PAIN	2		1	2		2	2	3	2	1	1	1	17
BURNS		3	1	1			3	5					13
BLOOD CLOTS	1		1	2	2	3	1	1		1	2	2	16
CARDIAC	11	10	16	12	17	9	19	15	18	14	10	25	176
CANCER			1				2			1	1		5
HEMORRHAGE	1		2	1	5	4	4	6	2	4	2	5	36
O.B. AND MISCARRIAGES	1	2	1	1	4	3	2	1		1	1	1	18
OVERDOSE	2	6	5	6	2	9	6	11	8	6	3	9	73
POISONING	1		1	1	3	3	9	3	2	1	3	8	35
PREMATURE INFANTS	11	12	12	10	20	24	17	31	34	26	17	19	233
PULMONARY	4	1	2	6	8	4	3	8	3	9	7	5	60
RENAL (KIDNEY)	2							1	1	1	2	1	8
SEIZURES	4	2	4	5	5	2	7	6	4	1	6	7	53
STROKES	1	1		1	1	1		1	1	1			8
TRANSFERS FOR SURGERY	3			1	2	1	3	1	1	2	1		15
MEDICAL DIAGNOSIS UNKNOWN	2	8	6	10	7	6	15	8	7	9	9	6	93
AUTO, BIKE, TRUCK, AND AIRCRAFT	18	21	25	13	46	47	47	39	44	36	40	35	411
BOATING AND DROWNINGS						2		1					3
EXPLOSIONS			1										1
FARM AND RANCH													0
GUN SHOT WOUNDS (ASSAULTS)	3	3	2	7	2	6	6	5	4	7	2	8	55
HOME	7	8	6	7	6	8	8	10	6	10	6	8	90
INDUSTRIAL		3		2	6	3	10	3	4	11	6	2	50
MOUNTAIN RECREATIONAL	15	5	10	2	6	7	18	16	7	2	2	14	104
MONTHLY TOTALS	89	85	97	90	142	144	182	175	148	144	121	156	1573

1973	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
ABDOMINAL PAIN							3	2	5	2	5	2	19
BURNS					1		5	3		2	2	1	14
BLOOD CLOTS	1	1							2	1			5
CARDIAC	10	15	4	4	11	10	10	8	16	11	3	15	117
CANCER		1	2	1									4
HEMORRHAGE			1	1		1	2			1	1	2	9
O.B. AND MISCARRIAGE					1	1	3			1	1	1	8
OVERDOSE		1	1		1	3	8	6	5	6	3	3	37
POISONING		2	1		1	2	3	2		3			14
PREMATURE INFANTS	6	11	18	3	11	10	22	19	15	17	12	14	158
PULMONARY	5	2	4	1	3	1	3	4	8	7	8	12	58
RENAL (KIDNEY)						2		2	1	3	1		9
SEIZURES		1					2		2	9	4	2	20
STROKES		1					4	1		2	1	1	10
TRANSFERS FOR SURGERY							3	7	2	3	4	3	22
MEDICAL DIAGNOSIS UNKNOWN		1	3	5		2	3	10	7	2	1	3	37
AUTO, BIKE, AND TRUCK	5	5	6	5	16	23	53	51	36	36	17	26	279
BOATING AND DROWNINGS						1	3	1	1				6
EXPLOSIONS						1			1		1		3
FARM AND RANCH		2				2	5	4	2	3			18
GUN SHOT WOUNDS			1			2	1	1	3	4	3	4	19
HOME	2		2			3	5	11	13	11	8	10	65
INDUSTRIAL		1	3		1	2	6	2	3	1		1	20
MOUNTAIN RECREATIONAL	4	9	4	3	2	5	10	12	2	1	1		53
MONTHLY TOTALS	33	53	50	23	48	71	154	146	124	126	76	100	1004

1972 — In October there were a total of 13 calls, 24 in November and 33 in December for a total for the three months 70 emergencies handled, with the following totals:

- | | | |
|-----------------|---------------------------|-------------------------------|
| 2 — Blood Clots | 1 — O.B. and Miscarriages | 2 — Medical Diagnosis Unknown |
| 16 — Cardiac | 1 — Overdose | |
| 1 — Cancer | 5 — Poisoning | 17 — Auto, Bike and Truck |
| 2 — Hemorrhage | 14 — Premature Infants | 1 — Farm and Ranch |
| | 7 Pulmonary | 1 — Home |

NEWS AND RUMORS

RESCUE HOAX RISKY

MARBLEHEAD, Ohio (AP) — What does a hoax do?

It caused four Coast Guardsmen to drag out a 44-foot search boat in winter storage here and then plow it through ice up to four inches thick for 2½ miles to reach open water.

And then came more than 50 hours of searching in bitter cold by boat and helicopter for a distress call that had no on in distress.

"Just a routine search," is all that Coast Guardsmen at this station will say officially about the call that kept them out on icy Lake Erie for more than 10 hours Christmas night.

But privately, Coast Guard officers have expressed considerable unhappiness over the hoax, and government agents point out that if caught the hoaxer faces a possible prison sentence and a \$10,000 fine.

The "routine" set in motion by the frantic distress call picked up by ham operators involved dispatching a helicopter over the lake in foggy weather as well as sending two search boats out, a 180-foot buoy tender in Detroit and the 44-foot search boat.

"There was ice all over the lake, and yes, it was a cold night out there," said one Coast Guardsman.

Seas fortunately were not heavy, with waves running about two feet in the search area off Pelee Island.

The distress call, in amateurish Morse code, reported a 25-foot cabin cruiser with 10 persons aboard in trouble off Pelee. The caller first told his ham operator contacts that the boat was sinking, but later said the leaks had been stopped, although the boat had no power and was dead in the water.

Coast Guardsmen said they were suspicious because of the vague information furnished on the boat's identification and other details but continued the search because, as a Coast Guardsman said, the distress call had to be treated as legitimate until it could be proved otherwise.

Even when direction finder fixes by the Federal Communications Commission suggested that the calls actually were coming from the Zanesville, Ohio area — about 100 miles south of Marblehead — the search continued on the chance that the direction finder erred and the distress calls, which started coming in again Friday, were real.

Finally, after 50 hours, the Coast Guard called off the operation.

BLOWN OFF TANKER DECK, SURVIVOR SAYS

TOKYO— A Spanish seaman Tuesday told how he and another crewman were blasted off the deck of the Norwegian supertanker Berge Istra and survived nearly three weeks on a life raft in the Western Pacific.

The two are the only known survivors of the 32 crew members aboard the iron ore-carrying supertanker, which went down immediately after a series of three explosions.

After they were found by a Japanese fishing boat on Sunday, the U.S. Air Force resumed searching for survivors, and one aircraft Tuesday reported sighting a liferaft near where the two were picked up, 550 miles south of the Philippines.

But the markings on the dark yellow life raft could not be made out and a ship was enroute to the scene.

One of the survivors, 41-year-old Imeldo Barreto Leon, provided the first detailed account of the last moments of the Berge Istra.

Speaking by radio through an Interpreter ashore in Japan, Barreto Leon said he was one of five men painting on deck when the 227,556-ton vessel sank on December 30. He said that one man had gone below deck to get some cans of paint when the first explosion occurred. The ship then listed severely and a second blast followed about 15 seconds later.

The men were trying to launch a life raft when a third explosion wracked the vessel about 30 seconds later, he added. He said the explosion propelled all five men into the water and the vessel disappeared.

He was unaware of what had happened to the other men when he spotted a life raft about 10 yards away surrounded with objects from the ship. Barreto Leon said he swam to the life raft,

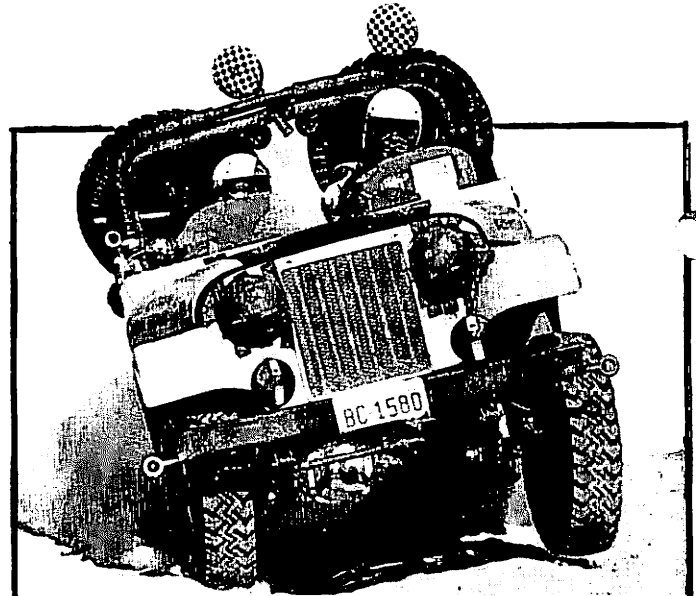
and then spotted the other survivor, Estisanto Terrodom Lopez, and pulled him aboard. He said Lopen appeared dead with head and leg injuries. He regained consciousness after Barreto Leon administered artificial respiration, then he treated Lopez and washed his wounds.

The two men then collected food from the Berge Istra floating in the water. During their nearly three weeks on the life raft they quenched their thirsts with rain water.

Barreto Leon said he waved a red flag and clothes when he sighted the fishing boat two days ago. The Japanese fishing vessel that rescued them was heading for the Palau group of islands east of the Philippines where the survivors will be flown to Okinawa by a U.S. Air Force plane.

COPTER SPOTS LOST SCOUTS

Night Vision Goggles allowed two Los Angeles County Fire Department helicopter pilots to spot four Reseda Boy Scouts and their adult leader lost in the darkness in the Lake Hughes area. The helicopter, piloted by Jan Vincent and Rick Cearly, dropped down near the Burnt Peak Motorway and picked up Larry Cronk, 36, scoutmaster of Troop 10, and scouts Elvin Larrs and John Mann, both 13; Roy Holcomb, 11, and Erick Moore, 15. The five were reported missing when they failed to keep a rendezvous with another group of scouts after an all-day hike.



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NEWS AND RUMORS

\$250,000 = A HUMAN LIFE

At a recent Washington D.C. meeting of our government's Inter-agency Committee on Search and Rescue (ICSAR) it is rumored that the U.S. Coast Guard Representative announced that it was using a dollar figure of \$250,000 as a nominal limit for Search and Rescue effort expended for a human life.

ELT SIGNAL LEADS TO RESCUE

HQ MILITARY AIRLIFT COMMAND, Scott Air Force Base, Ill. — A civilian pilot survived a recent crash in the mountain wilderness of eastern Arizona primarily because of the signal broadcast by his emergency locator transmitter (ELT).

The ELT was all that he had going for him when he crashed. He had not filed a flight plan; he had no family or friends expecting him at any special time; the crash was at the 9,000-foot level on Mt. Baldy into a stand of tall trees and would not have been detected without the ELT.

The man suffered a compound fracture of one leg and spent more than 50 hours in the wreckage in sub-freezing temperatures before being hoisted off the mountainside by an Aerospace Rescue and Recovery Service helicopter.

His own efforts to treat his injuries and protect himself from the cold were credited with keeping him alive until rescuers could reach the scene, but the ELT was what prompted a search and led searchers to the scene.

The ELT, triggered by the crash impact, began transmitting its pulsing signal immediately and continued to function for more than two days. A commercial airliner flying over the area a few hours later reported the signal to Albuquerque Center. Control-

lers passed the report to the Air Force Rescue Coordination Center at Scott Air Force Base, Illinois, which coordinates all aviation search and recovery efforts in the Continental United States.

Bad weather prevented the immediate launch of search aircraft, but once airborne, they located the site within five hours in rugged terrain with no guidance except the ELT transmissions.

Because the wreckage was located on the side of Mt. Baldy in a stand of tall trees at an altitude of about 9,000 feet, the survivor was inaccessible at that time to ground parties and police helicopters which had no hoist and no place to land for a pickup.

Early the next morning, Christmas Day, an UH-1N "Huey" twin-engined helicopter from the 48th Rescue Squadron, Holloman Air Force Base, New Mexico, hovered over the crash site, lowered a para-rescueman on a hoist and lifted both men out to safety. The survivor was taken to nearby community hospital for examination and later transferred to a Phoenix hospital for further treatment.

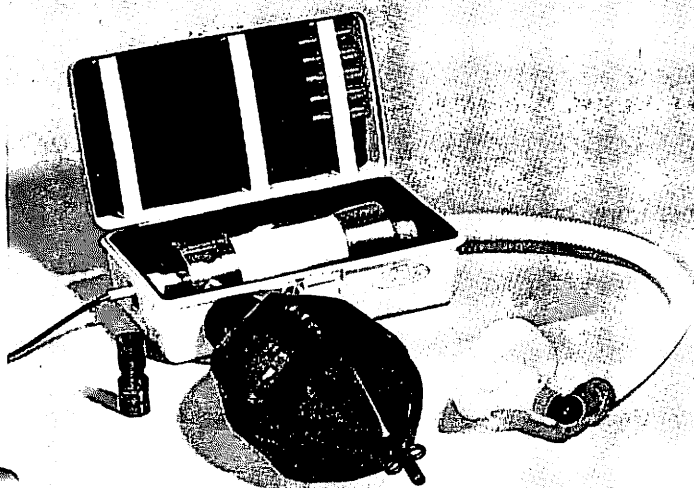
The mission illustrates the importance of having an ELT aboard aircraft flying over rugged or isolated terrain. The pilot was on his way to visit a friend in Wisconsin and did not file a flight plan, so no one had reason for concern if he did not arrive at his destination on time. With no search when he was overdue, the ELT signal was the only clue that he was in trouble — but that was enough.

Problems with false activations of 3)5s have brought the equipment considerable criticism from the aviation community, but even the fact that 99 per cent of last year's ELT reports did not involve an emergency cannot offset the fact that some of the remaining one per cent spelled the difference between life and death for crash survivors.

With appropriate care and awareness on the part of aircraft operators, the number of false ELT activations could be reduced considerably, increasing the confidence of rescue forces that when an ELT signal is received, someone really needs help. ◀

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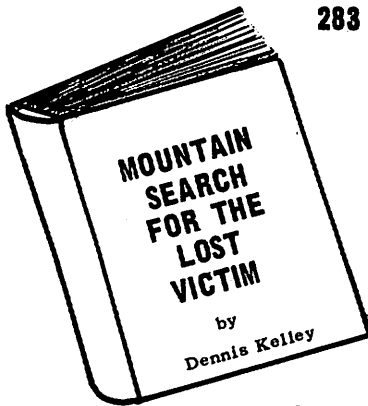
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by DENNIS KELLEY

283 Pages



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 3. Responsible Agency
 4. Strategy
 5. Tactics
 6. Base Camp
 7. Searcher
 8. Training
 9. Contingency Analysis
- Appendix (includes extensive bibliography and an index)

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CALENDAR

MARCH 29-31

THE FIRST NATIONAL EMERGENCY MEDICAL SERVICES SYSTEMS SYMPOSIUM
Century Plaza Hotel, Los Angeles, California
Contact: Helene Denney
Los Angeles County Department of Health Services
313 N. Figueroa St., Los Angeles, CA 90012 (213) 974-8297

APRIL 7-10

CALIFORNIA FIRE RESCUE PARAMEDIC ASSN. ANNUAL CONFERENCE
Monterey, California
Contact: Bob Loewen
Anaheim, CA. 92803

APRIL 8-10

JOINT NASARC BOARD AND SAR ADVISORY COUNCIL MEETING
Scott AFB, Illinois
Contact: Lois McCoy, Executive Secretary, NASARC
P. O. Box 2123, La Jolla, CA 92038 (714) 276-7228

APRIL 23-24

THE 6th ANNUAL EMERGENCY SERVICE PERSONAL FITNESS AND HEALTH SYMPOSIUM
San Diego, California
Featuring follow-up papers on the following subjects:
Prevalence of Coronary Heart Disease, Risk Factors, Physical Fitness Appraisal in Police and Fire Fighters, Exercise Programs for Emergency Services Personnel.
Contact: Jim White
University of California at San Diego, Dept. of Physical Education
La Jolla, CA 92093

APRIL 30 - MAY 1-2

WASHINGTON STATE SAR CONFERENCE
Central Washington State College
Contact: Rick LaValla, SAR Coordinator,
Washington State Department of Emergency Services
4220 East Martin Way, Olympia, WA 98504 (206) 753-5255

MAY 10-12

INTERNATIONAL JOINT DHEW-NATO EMS CONFERENCE (NASARC EMS SAR WORKSHOP)
Baltimore, Maryland
Contact: Lois McCoy, NASARC Executive Secretary
P. O. Box 2123, La Jolla, CA 92038 (714) 276-7228

MAY 13-16

NASARC TRAINING COMMITTEE MEETING
Melling Ranch, Baja California, MEXICO
Contact: Lois McCoy, NASARC Executive Secretary
P. O. Box 2123, La Jolla, CA 92038 (714) 276-7228

MAY 29-30

IDAHO STATE JEEP SAR ASSOCIATION CONVENTION
Salmon, Idaho
Contact: John Wilson, Commander Salmon SAR
P. O. Box 868, Salmon, Idaho 83467

JUNE 10-13

NATIONAL JEEP SAR ASSOCIATION NATIONAL CONVENTION
Grants Pass, Oregon
Contact: Dave Miller, Commander, NJSARA
6742 North 43rd Ave., Glendale, AZ 95301 (602) 937-2061

JUNE 26-27

MOUNTAIN RESCUE ASSOCIATION, SPRING NATIONAL MEETING
Vancouver, British Columbia, CANADA
Contact: Vance Yost, MRA Executive Secretary
P. O. Box 396, Altadena, CA 91001 (213) 357-4918

AUGUST 5-6

UNIQUE SURVIVAL OPPORTUNITY#2
U.S. Air Force Survival School, Fairchild AFB
(near Spokane, Washington State)
Contact: Rick LaValla,
Washington State Department of Emergency Services
4220 East Martin Way, Olympia, WA 98504 (206) 753-5255

September 9-12

NASARC 8th ANNUAL CONFERENCE
Cheyenne, Wyoming
Contact: Lois McCoy, Executive Secretary, NASARC
P. O. Box 2123
La Jolla, CA. 92038 (714) 276-7228

October 22-23

NATIONAL MAST CONFERENCE
Olympia Hotel, Olympia, Washington State
Contact: Rick LaValla SAR Coordinator
Washington State Department of Emergency Services
4220 East Martin Way
Olympia, WA. 98504 (206) 753-5255

(SEARCH & RESCUE MAGAZINE invites listings of meetings associated with Search and Rescue. Please send to: **CALENDAR**, Search and Rescue Magazine, P. O. Box 153, Montrose, CA. 91020)

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The following prices are effective as of January 1, 1976:

SEARCH AND RESCUE MAGAZINE

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