

FALL 1976

# SEARCH AND RESCUE



MAGAZINE

OFFICIAL PUBLICATION OF THE NATIONAL ASSOCIATION OF SEARCH AND RESCUE

**NICARAGUAN SURVIVAL**  
A JUNGLE ADVENTURE

**ALBATROSS ADVENTURE**  
A CARIBBEAN SEARCH

**EMERGENCY TRANSMITTER  
LOCATION**  
SOME ADVANCED CONCEPTS

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Jungle, Pg. 3



Jumble, Pg. 7



**MAGAZINE**

**FALL 1976**

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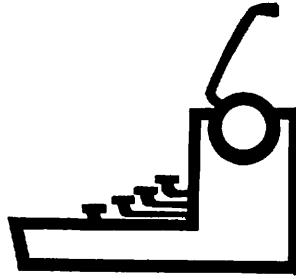
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**MANUSCRIPTS SUBMITTED FOR THE  
WINTER, 1976 ISSUE MUST BE  
RECEIVED BY THE EDITOR  
NO LATER THAN  
OCTOBER 1, 1976**

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## LETTERS TO THE EDITOR

Dear Editor:

I thoroughly enjoyed the last issue of *Search and Rescue Magazine*. Do I sense a change in the wind? Some articles of varied interest still revolving around search and rescue endeavors? This would be my suggestion, but what have other readers expressed?

*You nailed it down! Watch our next few issues, and read on for more.*

\* \* \* \* \*

Dennis,

I just received my Winter issue and wanted to respond to your request concerning what we would like to see in the magazine.

For the most part the magazine, as is, has been very good, I would like to see more articles on actual missions with answers to questions like: How was the mission accom-

plished? What equipment was used? What equipment should or should not have been used? Maybe a critique by those directly involved in the mission.

Also, since most SAR organizations are volunteer and not funded in any way for equipment, etc., how about some articles on how and where the organizations have found that which is necessary for doing the job. Maybe some research by members of your staff on sources in the government where we might go to scrounge equipment.

Possibly something on legislation, past, present and future designed to aid those in volunteer groups such as SAR; i.e., legislation to allow SAR members to deduct mission time at a prescribed dollar rate from their income tax. That should keep you busy for at least five minutes.

Bob Marcon  
San Jose Search & Rescue

*Search and Rescue Magazine, as you may notice in the current issue, is undergoing substantial change. We have included, as you suggest, at least two key articles related to particular SAR operations, and will continue to publish "How To" articles as well. We are striving to make a more interesting magazine for our circulation. As our subscribers and advertising increase, we have substantial other changes in mind, including a wider variety of general interest articles revolving around Search and Rescue, select humor, color photographs, improved paperstock, increased page count, and, possibly, a key article in each issue on Survival.*

*Changes, however, require time and money. We are investigating funding methods, and simultaneously, soliciting new subscribers and advertisers. Anticipating an increase in these two elements, our readers' suggestions will be evaluated for incorporation in the magazine. We greatly appreciate your response.*

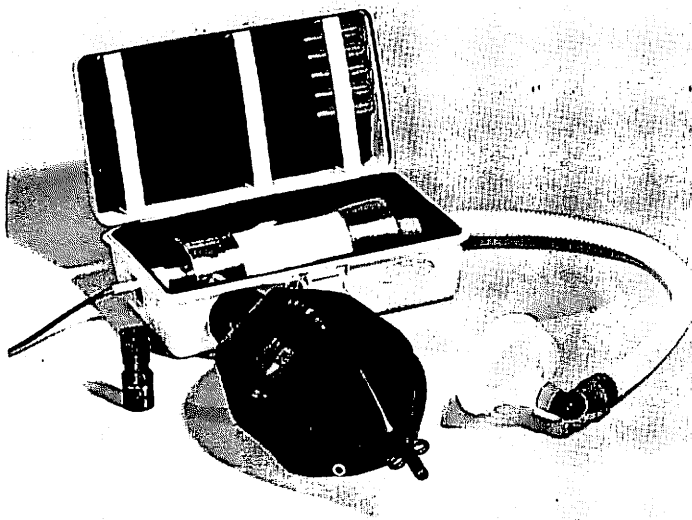
*(continued on page 4)*

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# NICARAGUAN JUNGLE SURVIVAL

S. WICKER-GUERRERO

It all began as a simple adventure — two Americans and a few Nicaraguan guides exploring unknown jungle area in a remote section of southeastern Nicaragua.

In the planning stages, neither Paul Bundick nor Steve Lyon knew that one of them soon would have a close shave with death, stranded in a vast wilderness void of other human beings for almost 11 days.

Here is his story:

One night in late February, Bundick and Lyon, both Peace Corps volunteers, were discussing Lyon's upcoming trip through jungle territory in the most southeastern point of Nicaragua.

Being an avid camper and adventurer, Bundick, a red-haired and bearded man, invited himself along on the trip.

Bundick also made arrangements to travel back to San Juan del Norte, his home base, without Lyon and his crew. He talked with three expert native rivermen who were to meet him on or about March 9th or 10th at Salto Grande, a small waterfall in territory north of San Juan. The hired guides were familiar with the area as they had hunted jaguar there.

Bundick paid the men in advance half of a sum of money to accompany him and they all agreed the rest would be paid when they got back to San Juan. No one, at that time, had any way of knowing that the contact would never be made.

Bundick, Lyon and three other Nicaraguan guides began their trip via boat on March 3rd from El Castillo, a small community northwest of San Juan. Later, on foot, they climbed Cerra del Diablo, a jungle-terrain mountain about 608 meters (1,800 feet) high.

Bundick recalled that none of the accompanying guides read maps, and this soon became a problem.

"The whole trip was kind of a subtle conflict between experienced woodsmen unaccustomed to map reading, but familiar with the territory and people who *could* read maps," Bundick said. He felt the expedition lost a day's traveling as a result of this conflict.

Bundick and Lyon decided the group would continue the trip using compasses. "It was harder walking," Bundick said, "but at least we knew where we were going."

The map they had was modeled from an aerial photograph and failed to coincide with the actual area on foot. Few human beings had previously traveled through that area and traveling was painfully slow. The men had to cut a trail through the thick jungle area with machetes.

On March 9th, the group, according to the original plan, split up in order to cover more territory. Bundick, realizing he had to meet the three hired guides from San Juan on or about March 10th, made his way alone toward the waterfall. He parted company at noon on the 9th of March and was to go without seeing another human being for 11 days.

Without compass or food, Bundick was still not alarmed. He anticipated meeting the guides who would bring supplies, and travel with him back to San Juan. He stayed close to the river, often traveling over slippery rocks and fallen trees. His first night alone he cut leaves for padding and covered sticks with a poncho to make a shelter from the thick jungle rain that fell nightly. At daybreak he broke camp and started walking once again, absolutely certain he would soon meet the guides.

Wearing levis, a shirt and Vietnam jungle boots, Bundick also carried a change of dry clothes, a camera and film, his passport, a Peace Corps living allowance, two sheets, raincoat, insulated foam pad, snake bite kits bound for a clinic in San Juan, his machete and other personal articles. He carried matches in a plastic bag in his pocket but they were ruined when, at one point, he accidentally fell into the river. Bundick arrived near the designated meeting spot about 1:30 in the afternoon of the 10th.

He ditched the pack and explored the area with machete and a whistle he used, hoping to alert the guides that he was close by. He noticed that trails had been cut in the area but they were dry and about five days old. Also, there was no way to tell if they were marks of the hired guides. When he reached the waterfall, there was no sign of a campsite.

"I was sure they were upstream looking for me," Bundick said, his optimism never failing.

He camped that night at a point where two rivers came together, hoping to catch sight of the guides from whichever direction they might come on the following day. He waited on the 11th, but in vain.

(continued on page 19)

# EXECUTIVE'S MESSAGE



**JEFF MONROE**

**2nd VICE PRESIDENT, NASAR**

One thought has crossed my mind many times lately: "Where is NASAR headed?" I remember a few years ago when I joined and became a part of National Search and Rescue, I kept hearing the remark: "Let's get organized." Now that we are organized, what are we going to do?

We have drawn up a Constitution and By-Laws; we have revised and rewritten it several times. The Constitution and By-Laws are growing, but is NASAR? At the present time, our memberships are the only source of revenue to run an organization on a National basis. We need the support of ALL SAR personnel and at least fifty per cent participation by the states in order to obtain a viable organization.

All of you in this SAR business (and it IS a professional business, now) need to sell NASAR at every opportunity. Talk or write to your governors, legislators, government officials and other influential people and tell them what you and NASAR have to offer.

Last year and the year before, there was a suggestion that we become an international association. This is fine, and a good suggestion for the future, but we are not a NATIONAL Association yet by a long shot. We have to come up with a strong organization and develop a solid program to sell. If we are ever to hire an Executive Director and staff, we will need to solicit funds, grants and royalties in order to survive.

We are going to have to have some pilot programs to show where funds will be spent. We have to crawl before we can walk. Fund raising is a full-time job, not just a once-a-year shot. We will have to produce more members and State support before the grants will come.

I don't know what the answers are. Your Board of Delegates need more input. There is a wealth of talent in these fifty states and the sooner we can find out where it is, the quicker we will have a workable organization. A chosen few cannot make NASAR work. Input is needed from everyone.

In closing, I would like to publicly thank those of you who have worked on committees. It is very difficult to have a committee that is spread all over the country, but if you do volunteer for a committee, please help the chairpersons. They do not have the time or money to repeatedly call you to see if anything has been accomplished. When you volunteer for a committee, we assume you are willing to give up some of your time to help.

I hope to see you all in Cheyenne for the best Conference ever. I always learn more than I contribute at these meetings.

Keep up the good work and we will become a strong organization, and, someday, we WILL be International. Keep a Membership Application in your pocket at all times and be ready to sell. We need good salespeople, and who else but the people that do the work can sell the program.

## LETTERS TO THE EDITOR (cont. from page 2)

Dear Mr. Kelley:

In response to your mini-editorial requesting input to *SAR Magazine* I must comment that *Search and Rescue Dogs* by Kenny MacKenzie is a most interesting article. From the narration it appeared that the dogs are quite versatile, being used for summer and winter searches and avalanche. I would like to know if there are any organizations like Scottish SARDA in the United States?

John DiRubbo, Jr.  
Albany, N.Y.

For further information on *Search and Rescue Dogs* contact: Bill Syrotuck, President, American Rescue Dog Association, P.O. Box 123, Renton, WA. 98055 - (206) 937-3460

\* \* \* \*

Dear Dennis:

I was glad to see my article about NW Bloodhounds SAR in the Spring issue. I even got a couple of nice letters from people; one including a donation for the club. The other one just came this past Saturday, and here I'm in trouble, and I hope you can help me.

I was doing the dishes Friday night, minding my own business, when all of a sudden I felt as if someone hit me over the head with a baseball bat. Turned out I had a heart attack, and after lying down a while and getting worse, told my husband Clyde, to take me to the hospital. The next morning I felt good as new and ready to go home, but the doctor told me very severely that I had been on the verge of death when I arrived, and I wasn't taking this seriously enough, and no way were they going to let me out for three or four days.

That day Clyde brought me a letter from a couple in N. Calif. in answer to that article in the *SAR Magazine*. It was typed on bright yellow paper in a bright yellow, square envelope, and the name was one I've never seen before, beginning with P and ending with I, and quite long. It was very interesting, and one I'd like to answer right away. They have a dog a year old and a 9-week-old puppy; and they've been reading a number of books which we don't think, from our experience, give the best advice. We'd like to get right back to them. Clyde can never remember names, anyway, and he was pretty upset over my condition, and I was so full of pills I could have floated off anyway. So neither of us can remember the name or the city. Just pretty sure it was northern Calif. He thinks Oroville, but I'm not sure. I think maybe not that city, but that area.

The next day they moved me to the medical floor from the coronary unit, and later in the evening I started looking for the letter, and couldn't find it. Clyde hadn't taken it home, and none of the nurses could remember it, and were sure they had transferred all my property. They even had the night shift going thru the garbage; but never found the letter.

I wonder if you could locate the probable person from your mailing list? I want to write to them right away. If you can't find them - maybe they read a club magazine - is there still time to put a note in the next issue and explain what happened and ask them if they will write again? I'd be very appreciative.

Lena F. Reed  
10705 Woodland Avenue  
Puyallup, WA. 98371

Hope this will solve your problem. Best wishes for a speedy recovery!

\* \* \* \*



**MOOR & MOUNTAIN** FREE CATALOG

BACKPACKING GEAR      Moor & Mountain  
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The air is still and hangs thick with the humidity so common to a summer day in south Texas. I stand on the ramp looking out over the calm blue water, watching with delight as the sea gulls soar the sky in search of a meal. Their wings outstretched, they float gracefully against the deep blue backdrop of the heavens. In the distance I can see shrimp boats, encircled with swarms of gulls waiting to take advantage of a mistake — a torn net, or perhaps the slip of a hand — causing the catch to be spilled into the warm water of the gulf.

It is Saturday; a day when most family men are home, mowing the ever-growing grass, or watching a ball game on TV. I have the duty this particular day, waiting for the whoopie that can be sounded at any time. The job of the Coast Guard is to save lives, but seldom do people consider the sacrifice of this small group of dedicated professionals until that tragic day when someone is in trouble at sea; sea which resembles a huge sleeping monster, waiting for and sometimes encouraging the mistakes of man.

I am a radioman and SAR aircrewman aboard an Albatross, HU-16E, used for the specific purpose of search and rescue. This awkward appearing, slow flying, grandfather of an aircraft is the most effective means by which we locate a man or life raft in the water. It flies on long-range searches, twelve hours and longer, with a crew of six men dedicated to preservation of human life.

Duty days are spent with a sense of restless anticipation. The remainder of our crew can be seen from the ramp where I stand — some working on cars, some reading, others in the bunkroom catching some sleep. The whoopie does sound: that shrill, penetrating sound that sends every man's heart into overspeed and stirs the adrenalin to a peak. Each crewman is well rehearsed in what is to be done. Within a matter of minutes that old Albatross, like it has done faithfully so many times before, is on the way down the ramp toward the runway. No one knows where we are going, only that someone is in trouble at sea. I'm on the radios, conversing with the SAR coordination center which is giving us the necessary instructions for our search. We are on our way to the Yukatan Peninsula, off the east coast of Mexico, searching for a shrimp boat which is reported taking on water. His bilge pumps had malfunctioned and radio communications had been lost.

We fly for three hours before finally arriving on the scene in the assigned search area and at once we commence our search. Radio contact with our home base is always poor in this area and I work with persistence to report our position to them. Meanwhile, in the rear of the plane, the rest of the crew is in position and the tedious search has started. For those who have never searched over water it is hard to understand the problems involved. Flying at an altitude of 500 to 700 feet, whitecaps look like boats and every piece of floating debris is a potential victim. Fatigue comes quickly and the eyes burn and ache with the strain. The inside of the airplane is hot and sticky and the engine noise almost unbearable. We break out the inflight rations for something to munch on, but, if you have ever had the pleasure of eating K-rations, you can readily see that this is of little comfort.

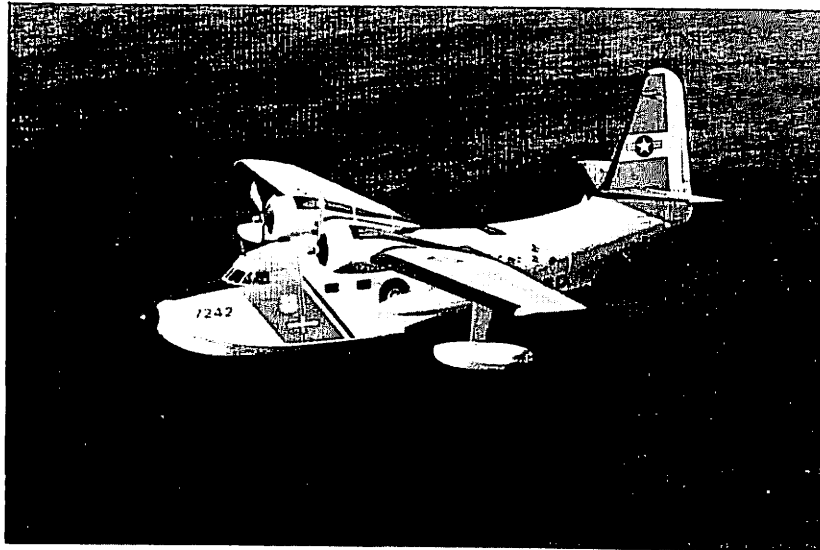
One of the crewmen spots something floating in the water that resembles a life raft. He quickly drops a ten-minute smoke float and alerts the pilot of what he has seen. The plane is banked and back we go, dropping to an altitude of seventy-five feet and slowing to 100 knots. Flying directly over the object, we are disappointed to

*(Continued on page 20)*



## THAT FAITHFUL OLD ALBATROSS

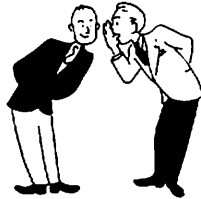
JERRY R. HAGAN



U.S. COAST GUARD PHOTO

That Faithful Old Albatross penetrates the sky once again, enroute to another search area.

# NEWS AND RUMORS



## HUMANITARIAN SEARCH & RESCUE COMPENSATION

A good number of our Border Patrol Officers have, for many years, given of their own time to the humanitarian mission of Search and Rescue. Because their unusual skill in tracking has proved highly successful in apprehending illegal aliens, they have been called upon more and more to use this skill in Search and Rescue. In addition, interest in the use of signcutting in this humanitarian endeavor has grown to such an extent that many of our officers are asked to teach the technique to various rescue teams.

I believe the participation of our employees in this humanitarian effort is deserving of compensation. For this reason I have directed a change in service regulations which will allow the granting of administrative leave for time away from regular duty hours while participating in these rescue efforts. Also, looking to more permanent relief, we are requesting a specific change in the 1978 appropriation language which will allow participation in humanitarian searches to be part of the mission of the Service. Participation in meetings and training sessions involving tracking sign cutting methods and techniques is already permissible under current regulations.

Our Administrative people here in the C.O. are presently working out the details to bring about these changes, and we will keep you informed of the progress.

Leonard F. Chapman, Jr., has been Commissioner of the Immigration and Naturalization Service since November 1973. He is a retired four-star general of the U.S. Marine Corps and has been honored with the Legion of Merit, Bronze Star, Navy Commendation Medal, Distinguished Service Medal, Armed Forces Management Association Merit Award for 1967, Gold Star in lieu of second award of Distinguished Service Medal, and a second Gold Star in lieu of a third Distinguished Service Medal.



**LEONARD F. CHAPMAN, Jr.**  
Commissioner  
Immigration & Naturalization Service

## NATIONAL JEEP SEARCH & RESCUE ASSOCIATION CONFERENCE

On June 11, 12, and 13, 300-plus members of the National Jeep Search and Rescue Association and enumerable wives and children gathered at Grant's Pass, Oregon, for their Yearly Conference, Annual Meeting, and election of officers for 1977.

It was a grand and glorious time with contests and trophies for men, women and kids. The first aid trails for both first aiders and emergency technician levels; the pistol matches which turned into the "real thing" on the convention floor; and the Performance Rally which brought out 106 entries and lots of good Oregon mud.

The American Motors Co. donated a beautiful yellow 1977 CJ-7 Jeep — and guess who won it — our old friend, Don Widdows from Barstow Desert Rescue Squad.

Josephine County Search and Rescue, the host unit, did a fantastic job of organization and hard work. They have already put their name in to host another one — for the Tri-Centennial in 2076.

The newly elected slate of officers are:

- Commander — Ken Blackner . . . . . Utah
- 1st Vice Commander — Brent Lewis . . . . . Idaho
- 2nd Vice Commander — Paul Scott . . . . . Oregon
- Secretary — V. Quenton "Trig" Tregeagle. . . . . Utah
- Treasurer — Mit Yeoman . . . . . Nevada
- Quartermaster — Jim Valentine. . . . . Arizona
- Communications Officer — Cliff Fladstol. . . . . Montana

## TO: ALL STATE NASAR MEMBERS

The National Park Service will conduct a 5-day training session entitled "Managing the Search Function" at Camp George West, Golden, Colorado, September 13-17, 1976. The course is designed specifically for those people who will be on-the-scene and in charge (the boss) of managing a search for a lost person. It is not for those "behind the scenes" coordinators nor for those actually doing the searching. It will concentrate on Search Theory, Strategy, Tactics, Planning and Utilization of Resources.

Though primarily for National Park Service personnel, the course will be open for up to 30 people from outside the NPS. Total class size will be limited to 60. There will be a fee of approximately \$15.00 charged for course materials. Lodging and meals are to be arranged by each participant. There are several motels within easy walking distance of Camp George West.

Questions can be answered by calling Jim Brady — 602-638-2691, after July 15, 1976. Interested individuals should apply to: Albright Training Center, P.O. Box 477, Grand Canyon, Arizona 86023. Do not send money with application letter.

## GIBBS ASCENDERS

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# MEDICAL EMERGENCY TRIAGE TAG

WALTER MURPHY  
ROBERT F. BLODGETT

An aircarrier is reported down, the crash site located and reported. 127 persons are reported on board. Rescue operations are commenced, teams rally, are dispatched, and arrive on the scene. Fire crews labor to extinguish the bulk of the gutted plane. Rescue workers scramble to the cries of the injured. Ambulance crews, guardsmen, police and the ever-present throngs of curious civilian onlookers add to the confusion. Smoke, water, fire, darkness create problems increasing the odds for providing adequate and expeditious treatment of the victims. Now is the time for organization! For a new concept toward this end, read on . . .

Movement of mass casualties from the rescue site to medical facilities, either in the field or more distant, can present complex problems to evacuation personnel. The problem of this movement is often overlooked, however, due to the infrequency of mass evacuation efforts. Continued preparation for this type of disaster is obviously desirable, and a means of organizing, categorizing, and expediting injured according to the type of treatment required has the potential for protecting not only the injured but the rescue evacuation team as well. The Medical Emergency Triage Tag (METTAG) is designed for this purpose.

Mass casualty sites are typically highly disorganized when rescue teams arrive on the scene. Work must commence smoothly and efficiently, and as quickly as possible. Victims must be observed and classified for treatment on a most needed basis. Generally, only gross medical diagnosis and stabilization should be attempted at the scene. The METTAG concept is designed to enhance all these.

METTAGS are simple to store, handle and use; quick and easy to execute and complete; accurate, traceable and accountable; clear and easy to understand. The METTAGS are sealed in moisture-proof packages of 50 to 190 with seamless plastic neck loops attached through metal reinforced holes. The tags have an indefinite shelf life, are water resistant and have no adhesives, carbons or other material to deteriorate or to attract bugs. They are sized and colored for maximum visibility, legibility and manual manipulation, yet they will fit in clothing pockets. The tags fit all mass casualty triage situations. They are constructed of substantial moisture resistant card stock with minimal tear-off perforations to prevent accidental separations.

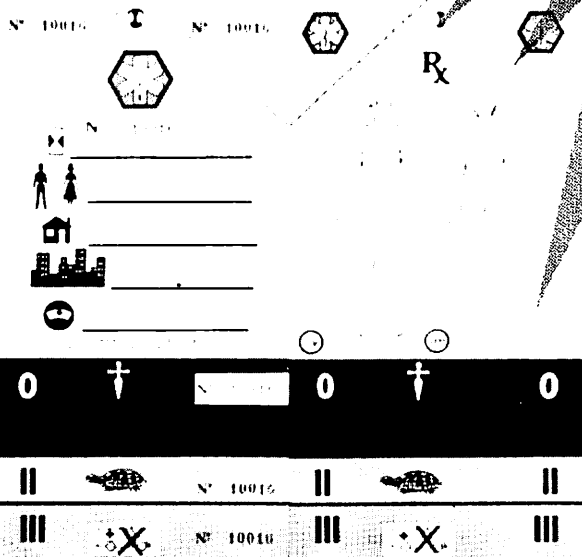
The cards require minimal written information and can be used without any written notation. They are large and explicit enough to be used in the dark with mittens under adverse weather extremes of wind, rain, snow or temperature. The serial numbers are duplicated on all tear-off tabs. This number keys all additional future record requirements and allows quick gross casualty count. The colored tabs may be retained by rescue teams to categorize the severity of the casualties. The use of obvious international symbols eliminates language barriers. The implications of these symbols are reinforced with color codings and numerals.

The concept for use of the METTAG at, for example, an aircarrier plane crash site, envisions disbursing a fixed number of serially-numbered tags to each triage technician. After all patients are triaged, the remaining unused tags are returned and the missing numbers tabulated for a quick determination of the exact number of victims involved and checked against the passenger manifest.

Those performing triage first place the tag around the patient's neck and enter the time on the card. If the patient is conscious, the name, address, city and state is entered, and the technician's name. The patient is examined and emergency treatment given. Injuries are indicated graphically on the diagram on the reverse of the tag. Intravenous and hypodermics performed are noted in spaces provided. The hospital transport priority is determined and the balance of colored, numbered strips is removed from the tag. The tear-off strips are retained by the technician or ambulance driver for additional records. One of the numbered corners of the tag may be used to identify valuables removed from the person, the other should be attached with available means to a stake, traffic cone, seat, or tree to indicate body position for accident investigation crews.

Stretcher bearers may then move patients to the ambulance as indicated by the tagging: Red, priority I first (critical and in need of immediate care); Yellow, priority II (slightly injured and able to await later transportation); Green, priority III (no injuries or too severe to survive); Black, priority O (tags are moved to morgue facilities).

At the hospital, details from the triage tag are transferred to the admittance forms and keyed to the tag's serial number for total record continuity.



# U.S. AIR FORCE SAR TRAINING FILMS



The following is a list of films from the USAF film library pertaining to the SAR field:

16mm Sound

FILM NO.	NAME
SFP 1175A	SAR Mission Coordinator - planning the mission
FR 272	Helicopter in local base rescue, The
SFP 1956	Faces of rescue
TF 1-5102B	Helicopter mountain operation
TF 1-5333	Helicopter rescue operations
FTA 254	What to do in case of fire
SFP 1392	Night on Jack Rabbit Mesa, A
TF 1-5118	Using Water wisely
TF 1-5283	Getting the most out of water
TF 5972	Coordinated fire attack
TF 6176	Aircraft fire and rescue procedures
TF 8203	Practice makes perfect - disaster medical care
FTA 458	Techniques of exhaled-air artificial respiration
SFP 1322	Pulse of life
SFP 1763	To save a soldier
TF 1-8167	First Aid Part 1 - Major wounds and fractures
TF 1-8185A	First Aid for fractures - Introduction
TF 1-8185B	First Aid for fractures - skull, spine and pelvis
TF 1-8189	Control of hemorrhage
TF 6296	Mouth to Mouth, Resuscitation
TF 6555	Save that life
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FS 1-564	Emergency signal mirrors in air rescue
FS 1-2204	Survival procedures - Emergency uses of parachutes
FS 1-2205	Survival procedures - emergency fire making
FS 1-2452	Survival procedures - health and hazards
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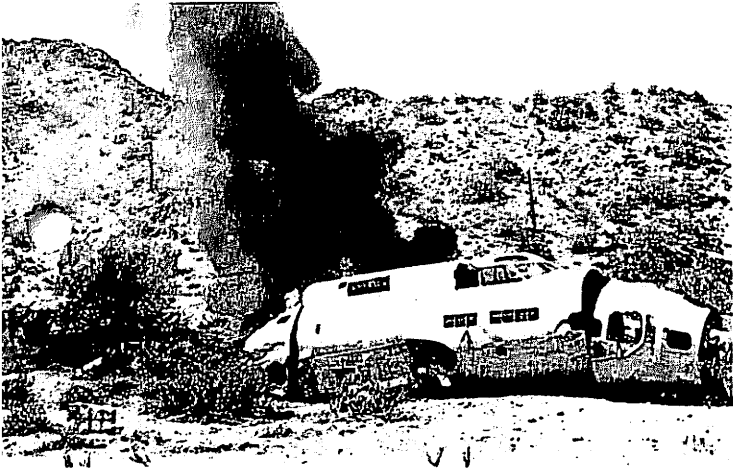


PHOTO BY W. V. KOHLER

Simulated Sunshine Airway's Flight 121 crash scene



PHOTO BY W. V. KOHLER

Maricopa Sheriff's Dept. and Arizona Army National Guard personnel working together in exercise

Public welfare, particularly in times of crisis, is a prime goal of all law enforcement agencies. Continuing practice, as routine as it may be at times, is a requisite to this end. The following article is a direct excerpt from one such exercise.

For this operation, the Maricopa County Sheriff's Department (MCSD), Paul E. Blubaum, Sheriff, was assisted by the Federal Aviation Administration and the Arizona National Guard.

The operation involved search aircraft, mountain rescue, triage and first aid support, air and ground evacuation, crowd control, crash scene security and local hospital participation. The location was Estrella Mountain Regional Park. The Base Camp was located at Litchfield Airport 3 miles south of Phoenix, Arizona.

Sunshine Airways' Charter Flight 121, a DC9 with 120 passengers and crew departed Phoenix Sky Harbor Airport, East on standard departure for Travis AFB, California. While on course to Buckeye omni, the right engine exploded damaging the plane's hydraulic system. The pilot elects to try to land at Luke AFB or Phoenix-Litchfield Airport.

At 1200 hours, Sky Harbor approach control lost the plane from their scope. Sheriff's Department in Phoenix was advised. They, in turn, notified the Search and Rescue Coordinator of the disaster.

A USAF C-130 spots smoke and verifies the location to Phoenix approach and the Paramedics, on board, jump into the crash site.

Search Crews, Evacuation Teams, Paramedics and Security Units were dispatched to the crash site to assist. The rugged terrain made it necessary to dispatch the Mountain Rescue Teams to the crash site and it was decided to evacuate by helicopter.

For this reason, the State Division of Emergency Services was requested to activate the Army National Guard Helicopter Medical Evacuation Teams be dispatched to the crash site. Ambulance companies were requested to have their units as close to the crash scene as they safely could be. While the helicopter transported the critically injured to nearby hospitals, Mountain Rescue Teams and other ground units carried the less seriously injured to the waiting jeeps and ambulances.

The following information was supplied from the MCSD to the National Guard:

1. Crash site location
2. Wind direction
3. Weather conditions
4. Number of medical personnel at scene
5. Landing facilities
6. Radio communications

Additional requested information was also supplied.

Rescue personnel at the scene report that seventy-two persons survived the crash and, further advise, that many of the bodies are destroyed beyond recognition.

The Triage Officer was charged with the responsibility of directing the injured to the proper medical facility, based on the type and degree of their injuries. (Burned victims were transported to Maricopa County Hospital, those with severe head injuries transported to BNI, etc.)

(Continued next page)

## PLANE CRASH !

Cpl. C. L. "SKIP" CARNES

# MARICOPA COUNTY SHERIFF'S DEPARTMENT 1976 ANNUAL SEARCH & RESCUE EXERCISE

## PLANE CRASH (continued from previous page)

The MCSD notified County Health Services of the crash and the resulting fatalities and they, in turn, notified the County Medical Examiner who is responsible for identification and distribution of the deceased to local mortuaries.



PHOTO BY W. V. KOHLER

- 1350 - 1525: Medi-evac Per Schedule attached
- 1420 - 1545: Hospital Test Activities
- 1545: Recall
- 1600: Debriefing



PHOTO BY W. V. KOHLER

## ITINERARY

### SUNSHINE AIRWAYS - CHARTER FLIGHT 121

April 24, 1976

- FROM: Sky Harbor Airport - Phoenix
- TO: Travis Air Force Base, California
- 1152: Take off from Sky Harbor  
Explosion on Board
- 1200: Approach Control loses plane on Radar
- 1202: Maricopa County Sheriff's Department Notified  
SAR Coordinator of crash at Estrella Park
- 1205: USAF C-130 spots smoke and wreckage  
Verifies to Phoenix Approach Control  
Orbits crash site. Paramedics bail out.
- 1208: SAR Coordinator - Dispatches Jeeps and Paramedics. National Guard Helicopters Scramble.  
Horsemen Dispatched to Secure Scene - Seal off road 2 miles down road.
- 1215: Jeeps and MCSD Paramedics arrive at scene  
USAF Paramedics land
- 1220: Radioactive Materials discovered by Rescuers  
Luke A.F.B. Crash Truck Arrives  
County Emergencies Services Notified  
Looters begin to arrive  
Looter confrontation with Security - arrested.
- 1232: Radioactive Monitor Team arrives
- 1234: Horses Secure Scene  
Triage - MCSD and U.S.A.F. Paramedics
- 1300: ANG Helicopters start operations from Papago Park
- 1320: First ANG Helicopter lands at crash site  
ANG Medical Staff aids Triage

Flight Services automatically notified the Federal Aviation Administration, the National Transportation Safety Board and the Federal Bureau of Investigation to assume the responsibility for investigating the plane crash after the injured have been evacuated. Sheriff's Department personnel remained on the scene to assist with security duties at the crash site.

From the time it is evident that there has been a plane crash, people from the surrounding area gather at the scene: looters, curious individuals, etc. These "onlookers" hampered rescue operations, while others removed pieces of the aircraft (such as instruments) which are vital to the investigation. Others disobeyed security officers attempting to secure the scene, and got in the way of medical teams administering aid to the injured. These persons also endangered their own safety and well being due to the possibility of secondary explosions. They were removed from the scene.

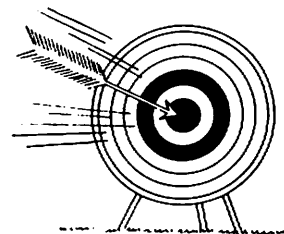
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# TEACH YOURSELF TRACKING, Part II

JACK KEARNEY

For about eight years now I have been involved in the teaching of a standard two day tracking course which consists of salty stories, lies, tales of derring-do, a slide show, and two half-day field exercises of tracking. In addition to this, I have written magazine articles, a training course for Border Law Enforcement Agencies, and 90% of a book on acquiring tracking skills. Throughout all of this I extol the virtues of our step-by-step technique of teaching tracking. My purported purpose for all of this is supposedly to turn out legions of skilled trackers. And surely, to some degree, this will be accomplished. However, this is not my real purpose; my strong underlying crusade is to cause every person who enters a search area to become acutely clue conscious so that they will do more good than damage.

Every person who enters a search area is a potential clue destroyer and as such a potential killer.

As a tracker I know from a good deal of experience how often a good tracker can solve the mystery if he is not preceded into an area by well meaning clue destroyers.

The Border Patrol is involved in law enforcement work; law enforcement work requires investigation; and investigation is dependent upon uncovering key clues. Long ago we discovered that those officers who became our best investigators were the same ones who had distinguished themselves by reaching the pinnacle of tracking expertise.

By casually exploring this correlation and experimenting with our technique of teaching tracking, it soon became apparent that a systematic, disciplined approach to this end led to an extremely keen development of a person's powers of observation.

(continued on page 16)

In the Fall, 1975 issue, Search & Rescue published Mr. Kearney's article, *How To Teach Yourself Tracking Techniques*. In response to re-order requests, Search and Rescue has commissioned the following article dealing with definition of key tracking terms, general philosophy.

Everyone involved in search and rescue work realizes that a search for a lost person is a puzzle to be solved, a problem to be worked out, or, as Dennis Kelley, the editor of Search and Rescue Magazine is fond of saying, a classic mystery.

Problems, puzzles, and mysteries are all solved by finding clues, sorting the good clues from the bad, and fitting the pieces together to form a picture.

Track consciousness is clue consciousness. Tracks are the only clues you can be certain a lost victim will leave behind. They will be by far the most numerous of the clues left behind. Therefore, it is difficult for a person to have an image of himself as a competent searcher if he has made no effort to acquire some skill at finding and analyzing tracks.

People can be taught to be more aware of clues. It is surprisingly easy to increase a person's awareness in a short time by showing him what a clue looks like, and how to "read" the message of that particular clue. Trackers at El Cajon have, for a number of years, been teaching people to become clue conscious under the guise of teaching them how to track.

# LOIS SAYS

LOIS McCOY

EXECUTIVE SECRETARY  
NATIONAL ASSOCIATION  
OF SEARCH AND RESCUE

## WOULD YOU BELIEVE . . . .

. . . . . that "Search and Rescue Methods and Equipment" is the name of a Bibliography with 94 abstracts of technical reports of government sponsored research, development, engineering reports and other analysis prepared by federal agencies, their contractors or grantees.

This bibliography costs \$25 plus a \$5 shipping fee and is filled with fascinating information for the serious search and rescue investigator

It should be re-titled "Let's Not Re-invent the Wheel." In this listing is documented source material on many of the problems we are still talking about today. As a random sampling, here are a few titles:

- Automatic Night SAR System
- An Improved Reserve Battery

- Notes on Search Detection and Localization Modeling
- Analysis of Distress Air Cases in Relation to Crash Position and Intended Track
- Investigation of an Improved Rescue Hoist for H-3 Helicopters
- Implementation Plan for Distress Alerting and Locating Systems

Don't those titles make you wish that you had read these before struggling to solve that last night search or ELT Mission?

The reports are for individual public sale through the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

### HOWEVER —

Would you believe that every one of the above titles addresses the maritime or aviation SAR situation only?

Would you believe that none of the 94 papers abstracted has been written for a land search and rescue application?

Would you believe that apparently not one Federal Grant has been given to address *any* Land Search and Rescue problem?

*Would you believe?*

## SEARCH & RESCUE MAGAZINE INDEX

### FALL 1973

- Washington State SAR Conference
- A Visit with Jon Wartes
- A Child is Lost, by Lena Reed
- Chapter 1 of Mountain Search for the Lost Victim.

### WINTER 1973

- A Rescue Worth Mentioning
- The Use of String Lines for Subject Confinement, Search Area Segmentation, and Grid Sweep Control, by Jon Wartes and Bill Rengstorf
- Mountain Rescue Association Spring Business Meeting
- Fort Jackson Search and Rescue Squad, by PFC Larry Strawther
- Part 1, Chapter 2 of Mountain Search for the Lost Victim.

### SPRING 1974

- Driver Survives 500 Foot Plunge
- National Association of SAR Coordinators Annual SAR Conference
- Simulated Plane Crash
- Heated Oxygen Hypothermia Treatment
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### SUMMER 1974

- Surf Rescue, by Bill Wagner
- 1st National SAR Council, by Blair Nilsson
- National SAR School Graduation Speech
- The Rescue People, by George Sibley
- Part 1, Chapter 3 of Mountain Search for the Lost Victim.

### FALL 1974

- A Tribute to Hal Foss, by Dyer Downing
- Harold A. Foss Obituary, by Rick LaValla
- Land Search Organization, by Lois McCoy
- How State Conferences Began, by Lena Reed
- International Mountain Rescue Conference, by Judy Bechler.

### WINTER 1974

- The Rescue Group Nobody Knows — SAROC, by Lois McCoy
- Search Theory, by Dennis Kelley
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- Caldwell Search
- Utah SAR Seminar, by Paul Koenig

### SPRING 1975

- Federal Agency Roster
- A Visit with Peter J. Pitchess Los Angeles County Sheriff
- 6th Annual National Association of SAR Coordinators Conference
- Mt. Stuart Rescue, by Paul Williams
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- INLAND SAR '75.

### SUMMER 1975

- Rappelling, by Bill March
- Oregon SAR Conferences, by Galen McBee
- NASARC Advisory Council Minutes, by Paul Koenig
- Aerial Reconnaissance in SAR, by Lt. Cdr. Scott Ruby, USN
- National Jeep SAR Association Convention
- Anatomy of a SAR Conference, by Wes Reynolds and Lois McCoy
- LANTSAR '75, by Lois McCoy
- NASARC Awards Program.

### FALL 1975

- How to Teach Yourself Tracking Techniques, by Jack Kearney
- The Dilemma of Helicopter Rescue, by Paul Williams
- Snowmobile Rescue Units in Northeast Support CD, by Vincent J. Tuscher
- The Changing Face of SAR in Baja California, by Lois McCoy
- Northern California SAR Seminar, by Jim Presentati
- Avalanche Recovery, by Blair Nilsson.

### WINTER 1975

- National Association of Search and Rescue Coordinators 6th Annual Conference
- Communications — The Visible Part of Planning, by Lois McCoy
- Emergency Preparedness Bibliography, by Skip Stoffel
- Search and Rescue Dogs, by Kenny MacKenzie.

### SPRING 1976

- Vehicle Tracking, by Gar Salzgebar
- Establishing Search Areas, by Robert J. Mattson
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- Flight For Life, by George L. Seaton.

### SUMMER 1976

- The Rumpelstiltskin Effect, by Lois McCoy
- Safety in Helicopter Operations, by Lt. Com. L. B. Beck, USN
- Search and Rescue in Oregon, by John Olson
- Uniform Map System, by Ev Lasher, NASAR Spring Advisory Council Meeting
- "Go the Second Mile," by Stan Bush
- Basic Living, by Mike Humfreville
- CB Radios for SAR Communications, by Lt. Col. Homer Dillow, USAF.

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# ELT SEARCH

Emergency transmitters may be used in a variety of circumstances to automatically indicate an emergency situation and lead rescue personnel to the scene.

This article discusses new methodology relative to the location of emergency transmitters.

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B. E. Gordon and W. L. Dartanner,  
the authors.



## PROPAGATION OF THE ELT SIGNAL

Although the theoretical pattern of the radiated Emergency Location Transmitter (ELT) signal is circular, this is seldom realized outside the laboratory. Even on the airport ramp the propagation is affected by nearby objects such as hangars, terrain, power lines, etc. The theoretical build and fade location pattern of Figure A is often more like Figure B.

Even over flat, open ground, a signal direct from an antenna will combine with one reflected from the ground and either add or subtract from it. The resultant vertical pattern is shown in Figure B. Note that at times, the signal strength becomes weaker and may even disappear altogether while the plane is flying toward the target. This effect may be used as an aid to positive target location because the plane will pass rapidly through peaks and nulls near or over the target giving the signal a slow flutter. This effect is absent in false target situations discussed later.

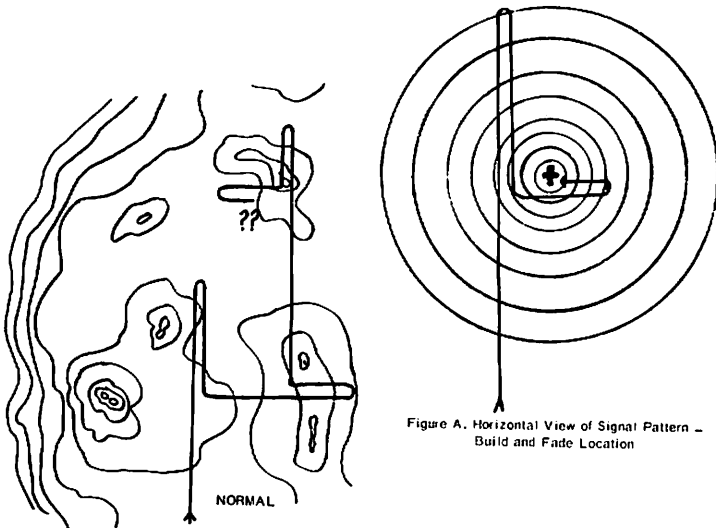


Figure A. Horizontal View of Signal Pattern - Build and Fade Location

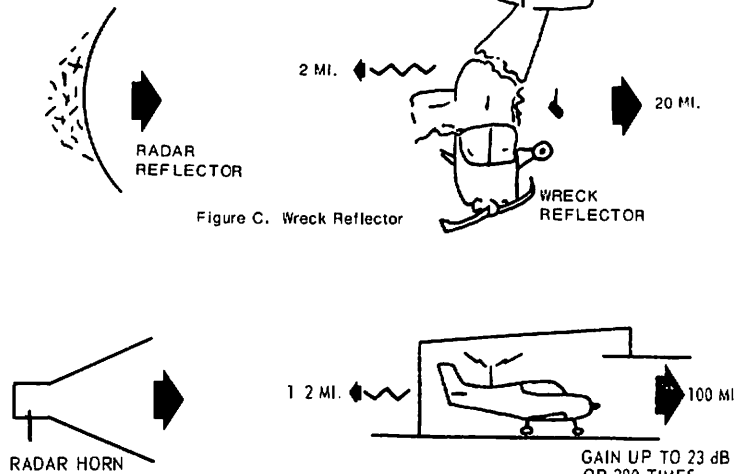


Figure C. Wreck Reflector

Figure D. Das Hangarhorn

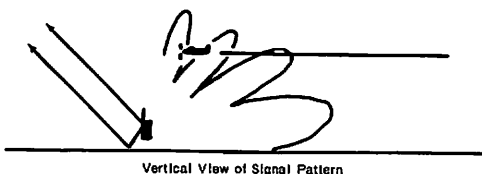


Figure B. More Realistic Field Conditions

## Distortions Due To Nearby Objects

Distortions due to objects within 50 feet of the ELT affects the ability to hear the signal. Figure C compares a radar reflector and a "wreck reflector." As you can see, the signal is heard much further in one direction due to the reflector (airplane), while the signal is greatly reduced by shielding to the back.

Another source of distortion is "das Hangarhorn," where the signal is compared to a radar horn as shown in Figure D. Gain was measured on an actual search.

A third distortion is caused by shielding in a vertical direction as shown in Figure E. Such shielding has made an ELT almost impossible to hear from the air (one mile useful radius) while yielding a ten mile ground range.

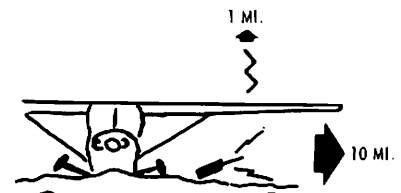


Figure E. Vertical Shielding

### Distortions Due To Distant Objects

While distortions from objects near the transmitter affect the ability to hear a signal, distortions from distant objects affect the ability to locate a signal. These include reflections, interference, and signal concentrations.

Reflections are probably the biggest bugaboo of ELT search, particularly in mountainous terrain. It may cause a distortion in the direction of arrival of the signal and/or cause multiple directions where no positive Direction Finding (DF) bearing can be obtained.

All objects reflect radio waves to some degree. Generally, the larger or more electrically conductive the object, the better reflector it makes. Metal buildings are more efficient than wooden ones, and wet hills are more effective than dry ones. To produce an error in apparent direction, the reflected signal must arrive at the receiver with nearly the same strength as the direct signal. This can occur if the direct path is blocked as in Figure F or if unequal signal radiation from the target sends more signal toward the reflector than it does toward the receiver. Most DF antennas are vertically polarized. If the ELT happens to be horizontal, this "cross polarization" will weaken the direct signal in comparison to a reflected signal because most signal reflectors scatter the original polarization.

When faced with a reflection situation, the solution is to fly or drive toward the apparent signal source if one exists. In the situation of Figure F, as the reflecting objects are approached, the direct signal will come into play and a proper direction determined. The path to an ELT may be anything but a straight line under such circumstances. If a clear direction cannot be obtained due to a large number of reflections, aircraft will have to fall back to a grid search until a clean signal area is found. Such situations usually occur in wet or snow-covered mountains. A clear situation can sometimes be had by climbing six to ten thousand feet above the mountains to reduce the angle made by the various reflections at the airplane. Weather permitting, prominent ridges can be used as shields by flying very close, as in Figure H, to reduce the search by the process of elimination. In the case of cross polarization, the ground teams can gain a distinct advantage by rotating their antennas to horizontal. This rotation will produce a pronounced increase in signal strength in a cross polarization situation.

Distortion due to interference has two major sources: adjacent channel and areas of strong signal sources. While the Little L-Per is designed to reject adjacent channel interferences, some receivers can be badly confused by strong signals from 121.6 and 121.7 MHz airport transmissions. Another culprit is an area where many radio and television transmitters are located. This causes overload and may reduce the receiver sensitivity so much that the ELT is inaudible.

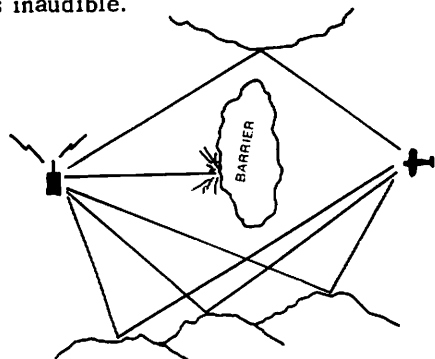


Figure F. Distortion from Barrier.

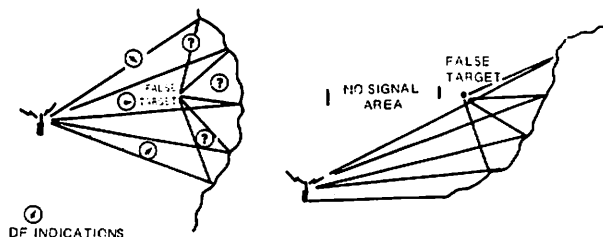


Figure G. False Targeting Due to Signal Concentrations

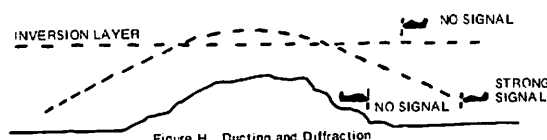


Figure H. Ducting and Diffraction

A third type of distortion is caused by signal concentrations, particularly noticeable in mountains. It is often responsible for the false target caused by vertical or horizontal focusing. Aircraft can often resolve this problem by descending, as the false target usually fades at lower altitudes. A false target never seems as strong or "contrasty" as the true target. Uncertain DF bearings are frequent in large areas around the maximum signal indication. Figure G shows how confusing DF bearings are obtained in this situation.

A vertical confinement of signals, called "ductings" are prominent in coastal areas with temperature inversion and generally affects airborne DFing more than that done on the ground. This bending around or over ridges can also be due to diffraction. In both cases, the angle of bend is small and the signal will be absent close to the obstruction. Diffraction may obscure the high altitude signals. See Figure H.

### Distortions Due To Objects Near The Receiver

This factor is particularly important to ground DF equipment, and can produce severe errors. It can be reduced by antenna elevation, directive antennas, and by averaging of the DF bearings received. See Figure I. DF readings should not be taken near power lines, vehicles, or buildings if a clear area is available. Dense trees can also weaken or distort the signal, particularly if they are wet. This can make the signal appear to approach through roads or power line cuts in a forest, regardless of the actual direction to the source. See Figure J. The only solution is to get clear of the trees.

### Signal Strength and Obstructions

Ground search in particular is affected by shadows of hills or other obstructions which may lie between the ELT and the searcher. This effect can often produce a situation where the signal grows progressively weaker as the target is approached and may disappear altogether, as shown in Figure K. Properly used, this shadowing effect can assist into turning away from the ELT. We have named it "The Gilroy Effect" after an actual search.

(Continued next page)

## ELT SEARCH (continued from preceding page)

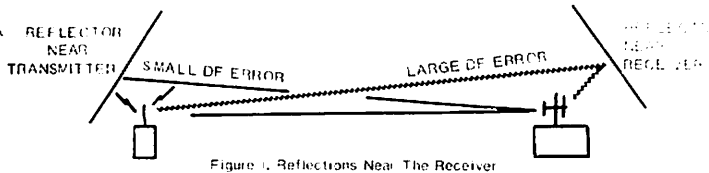


Figure I. Reflections Near The Receiver



Figure J. Absorption Effects In Trees

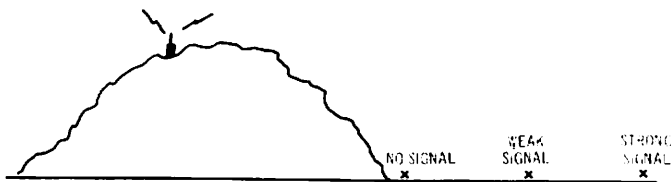


Figure K. The Gilroy Effect.

### Long Range Ground Direction Finding

Signals received on the ground are usually weaker than those in the air at the same distance. High receiver sensitivity and high gain antennas are required for good performance. Signals received on the ground are subject to most of the problems of propagation noted earlier. In addition, freedom of movement on the ground is limited in many ways.

In its favor, ground operation may be the only one possible in bad weather. Interference and some distant reflections may be minimized and location and beacon shutdown can be done with the same equipment. Ground DF measurements are free of motion flutter; time is available to do accurate plotting.

Because of limited freedom of movement and long travel time, ground location depends heavily on precise bearings and triangulations. The following general points are the basis for most ground search:

- 1) Use air direction to probable area if available. Prior coordination on communications is desirable.
- 2) Head for high ground in the suspect area. Walk around hilltops checking all possible sides.
- 3) Make multiple DF readings along a line at right angles to received signal. Average the results.
- 4) Listen while traveling in low country. Stop and take additional bearings if signal is heard.
- 5) Try to bracket target from high points before attempting detailed search.
- 6) Make notes of the quality of DF and the nature of surrounding terrain at each point as an aid for possible later date re-evaluation.
- 7) Request assistance of other agencies (police, USFS, etc.) and private individuals for access as required.
- 8) Use multiple teams with radio communications between them for initial triangulation.

### Short Range or Airport Ramp Location

The directional beam antennas and receivers with signal strength meters or left-right hand held DFs used in long range ground DF can be employed at short ranges also. These equipments are very efficient, although some installations lack portability for hiking. When working around metal buildings, cars, or wires, the average of several readings taken at five foot intervals may be required to get an accurate heading. "Eyeball" triangulation will usually pin-point the ELT.

Although equipment with left-right DF features will be much faster and direct in locating beacons on the ramp, here is some information on other ways of short range DFing that may interest you and assist in training others.

At short range, most of the \$20 to \$30 transistor aircraft band radios have adequate sensitivity for location. One of the most reliable ways to use these radios resembles the build and fade aircraft technique. Tune in the ELT and, holding the set away from the body, retract the antenna until an audible but noisy signal results. If full antenna retraction leaves a strong signal, tune off to one side until a noisy signal is obtained. Pick a direction and walk or drive with the radio held outside. If the signal builds up, retract the antenna or change the tuning to put the signal back near noise. If the signal fades, reverse course. Do not recenter the tuning or re-extend the antenna if the signal is momentarily lost. These settings are a memory of the loudest signal encountered. After bracketing the maximum signal in one direction, repeat at right angles. Continue the process in decreasing pattern size until the ELT is found.

Beware of small maxima (100 to 200 feet or less) that are not very strong around large metal objects. These are probably local reflections. When most small radios are within 20 feet of an ELT, the signal will be heard from one end of the dial to the other.

Final identification of a specific aircraft can be made by tightly gripping the top of the aircraft's ELT antenna with the portable receiver 20 feet or so away. A sharp drop in signal will be observed when the proper antenna is held. ELT antennas are usually thin, vertical and straight. If in doubt, try them all, but don't climb on the aircraft except on walks.

Body shielding can also be used to shield the receiver's antenna from the signal source. Place the receiver close to your body and turn 360 degrees. When you are facing the direction of the signal, it will be loud. As your body shields the source from the receiver, it will diminish.

Several articles have appeared describing loop or screen antennas that can be attached to portable radios to give some added DF capability. Some radios, like the Pilot II, have this built in. These aids can greatly reduce the amount of walking or riding required to localize an ELT. The plain loop is subject to 180 degree ambiguity and polarization errors which cannot be resolved like the left-right DF can. A triangulation pattern or auxiliary shield is needed for resolution. In all cases, averaging of several readings may be required to compensate for local reflections.

All of these ground patterns must be fitted to the terrain. Practice is necessary to get the feel for signal levels, reflection effects and the capabilities of your particular equipment.

### What To Do After Finding The ELT

If you are in the air, notify the nearest FAA facility or your operating organization by radio of the situation. If an airport is nearby, you can then land and complete the search on the ground with an hand DF.

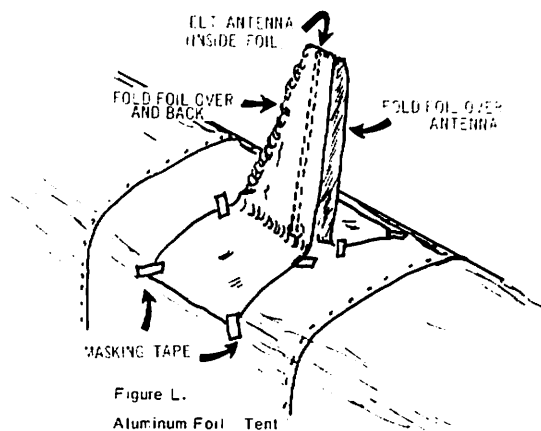
On the ground, the detailed procedure to follow upon locating an activated ELT will depend on the circumstances and the policies of your organization. The primary job should be to shut off the beacon or, failing that, reduce its transmission range so that it will not prevent reception of other distress or emergency communications. In an actual wreck, this, of course, is secondary to care of

(Continued next page)

## ELT SEARCH (continued from preceding page)

the survivors, but should be accomplished before leaving the site. Disturb the wreckage as little as possible while deactivating the beacon and make thorough notes of what was done for later use by accident investigators. For non-distress activations, it is common to find the beacon inside a locked airplane or building. Assistance of the local police, sheriff, or airport manager should be obtained to locate the owner or otherwise gain access to the beacon. The FAA, FCC, CAP or other search organizations do not have special entry authority in non-distress situations. If access cannot be obtained to a parked aircraft, the signal can be reduced by wrapping the external antenna with aluminum foil. Take a piece of foil 12" wide and about five feet long. Place the tip of the antenna in the center of the foil, being careful not to punch a hole in it. Fold the foil down on both sides of the antenna and let the ends lay flat on the fuselage. Tape the foil to the fuselage if possible and fold the two sides together to completely enclose the antenna. See Figure L.

ELTs have a variety of switch mechanisms. Most are plainly labeled. Switch malfunction is fairly common, however, so always check the result with a receiver. If the switch can't be found or doesn't work, the unit can be disabled by removing the batteries. This operation often requires hand tools, but is a positive method to disable the beacon. Any time an aircraft or ELT is worked on, be sure to leave a warning note in a prominent place for the owner if he was not present. Do not depend on the airport operator or the police to pass the word. Also, notify the nearest FAA facility or your organization's controller of the time the beacon was shut off; the aircraft type and number, if any; beacon make; model and serial number; owner's name; and circumstances causing activation, if they can be determined. This information is being used to improve beacon design.



### "The Wrong Way Reflection"

When operating in a steep or deep valley which is not aligned with the signal source, the reflection from the valley wall away from the ELT will often overpower the direct signal giving a reading opposite to the true direction. Be suspicious of this effect if your DF points directly to a high hill, particularly if it is wet or snow-covered. The effect can be overcome by climbing or, in some cases, by a good map plot of bearings from several locations. If the DF indications were followed in the example below, the bearing would first become confused and then swing to the proper direction as the hill is climbed. If you are part of a team, alert your central plotter or other team members of your surroundings so that a reverse plot can be tried. ■

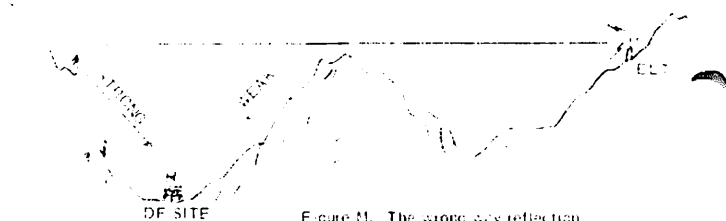


Figure M. The wrong way reflection.

## TEACHING YOURSELF TRACKING (cont. from Page 11)

If there is no other reason than this one, I feel it is sufficient justification for a person involved in search and rescue work to invest the time and energy necessary to learn something about the age-old art of following "sign." But before we proceed, let me first make several definitions:

There are three definitions that must be learned well if you are going to understand a tracker as he fondly discusses his art. These are: "sign," "signcutting," and "tracking." Exploring a dictionary will do very little to help you understand what "sign" means to a tracker. You will find some descriptive words such as "mark," "trace," and "vestige," which do apply, but what sign means to a tracker is: "any evidence of change from the natural state that is inflicted on an area by a person's passage."

Nor will careful scrutiny of the dictionary aid in your search for the word "signcutting." It is a pure word in that it has meaning only to practitioners of the tracker's art. It simply means: "looking for sign in order to establish a starting point from which you can begin tracking."

Tracking means "following someone, or something, by stringing together a continuous chain of their sign."

I have several friends in search and rescue work who, though they are not trackers, have gone to great lengths to popularize tracking as a rescue tool. They felt uneasy with the word "tracking," so by fussing with it a little they came up with the more descriptive term "man-tracking." It made me feel a little uncomfortable. It was something like deciding to change Tosemite Sam's outfit into a top hat, white tie, and tails. I squirmed, but grudgingly had to admit that it was more descriptive. Then, while reviewing some notes that were written by an MRA team that was putting together a tracking supplement to their training manual, I came across "sign" being altered to "signs of man." That gave me a jolt, and I began having recurring nightmares wherein a bearded fellow with sturdy legs and wearing a jaunty green beret atop his head would be smiling pleasantly at me in a wilderness setting, saying, "Signcutting? Oh, you must mean looking for signs of man tracks." — That did it for me — completely.

Tracking is an eons old art and entitled to the dignity of its own terminology.

What I do is "tracking," and I do it by following "sign." I no longer intend to be a party to the vulgarizing of this colorful and traditional terminology. I will not quibble with people who refer to what I do as "man-tracking," but beyond that one concession, I rebel.

If you remember my last article in *Search and Rescue Magazine*, Fall, 1975, (if you do not remember and have not practiced what I outlined, please do so before you read further) I outlined the manner in which a beginning tracking problem should be laid out. It was suggested that you lay out a practice set of tracks in a straight line on level ground. This was to allow the walker to move at a steady, even gait that produces a relatively constant stride.

(Continued next page)

## TEACH YOURSELF TRACKING

(Continued from preceding page)

Knowing the walker's stride and the distance between his tracks allows you to mark a stick with these distances. When this stick is held near the ground and properly utilized it will usually pinpoint the location of the next track.

The site of the beginning problem was chosen so as to be largely free of vegetation, heavy rock outcropping, and miscellaneous ground cover. The purpose of this is to eliminate as much of nature's camouflage as possible. The subtle evidence that a human foot leaves on the surface of the ground is hard enough for the beginning tracker to find, without the additional distractions of ground cover.

Lastly, it was suggested that the initial exercises be executed very early in the morning or very late in the afternoon so that the sun would be at a very low angle. That was because light which approaches the ground at a low angle causes an accentuation of shadows that makes all indentations in the ground easier to see.

Assuming we have completed the exercises presented in the last article and devoted as much as two to four hours to each outing, we should now be ready to advance to something more exciting.

In order that we may mutually understand the direction we are taking with this training, I should, at this point, outline the first eight types of tracking problems in their ascending order of difficulty:

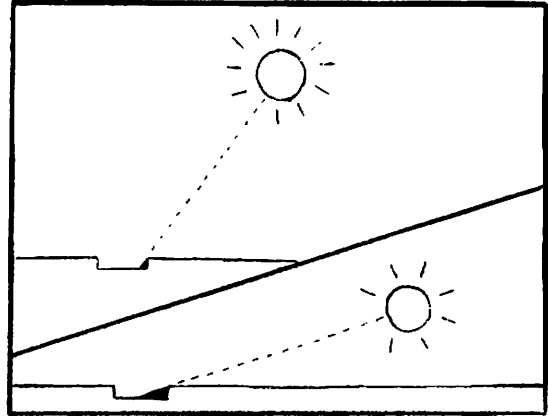
1. Flat ground, free of vegetation, early morning, tracks straight towards sun.
2. Same as above except done in the late afternoon.
3. Flat ground, free of vegetation, early morning, tracks in straight line that forms an angle with the sun of from 45 degrees to 90 degrees.
4. Same as above except done in the late afternoon.
5. Flat ground, free of vegetation, early morning, tracks in straight line forming an angle with the sun of from 90 degrees to 135 degrees.
6. Same as above except done in the late afternoon.
7. Flat ground, free of vegetation, early morning, tracks in straight line forming an angle with sun of from 135 degrees to 180 degrees.
8. Same as above except done in the late afternoon.

In the beginning exercises you were encouraged to work on Problem 1 or 2. You should now move to Problem 3 and should perform that at least three times. On the first occasion you should be working with an angle of roughly 45 degrees and on the last occasion you should be working with an angle of roughly 90 degrees.

Although repetitious in-the-field practice is the only way to learn tracking, it is not imperative that you perform the even numbered (late afternoon) exercises. It is, however, important to perform each odd numbered exercise at least three times before moving on to the next one.

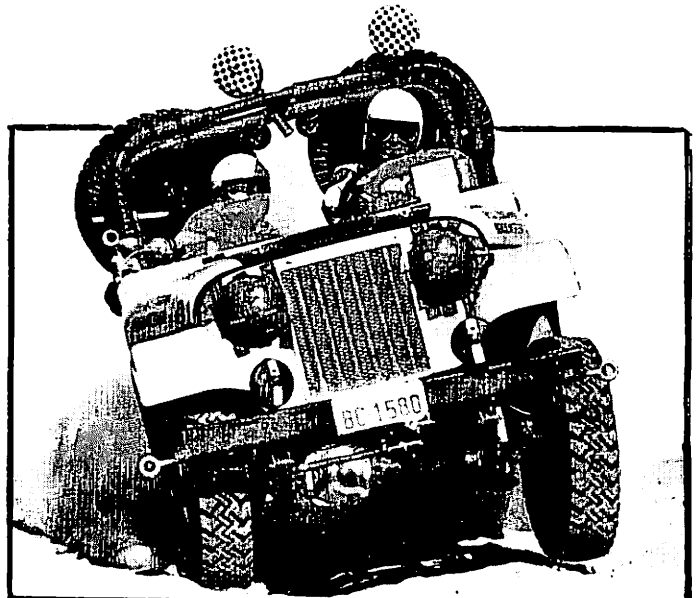
Many techniques may be developed while doing these exercises; the most important is the manner of positioning yourself so as to best see the sign.

Signcutting and tracking are two different operations. Signcutting is usually preliminary to tracking. In signcutting, the single most important thing you can do is always position yourself so that the sign will appear directly between you and the light source. In tracking, you have less flexibility but the same basic principle should be applied as much as possible.



Sun angle plays an important role in tracking

(Continued next page)



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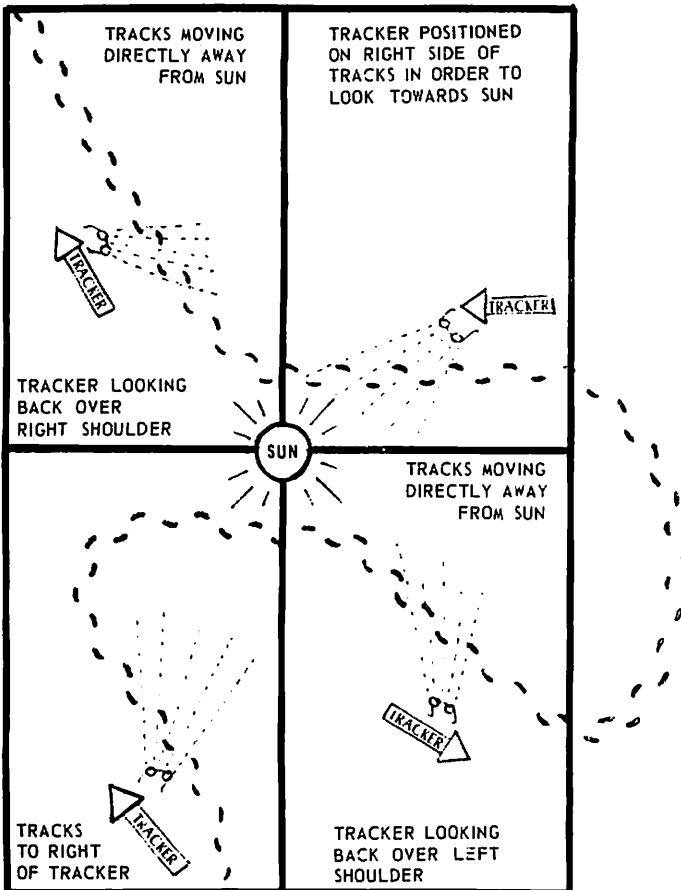
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## TRACKING (continued from preceding page)

The optimum position may not be realistic — you may end up atop the tracks and thereby obliterate them. However, it is possible to position yourself to the side of the tracks and look across them towards the sun. If the tracks are headed 180 degrees away from the sun you can be positioned to the side and be looking back over your shoulder so as to more closely approach the desired angle.



The experienced tracker places the tracks between the sun and himself

For the time being, these problems are all we need to concern ourselves with. Lying ahead are at least nine field exercises encompassing some thirty-plus hours of practice. When we have completed these we should have acquired enough skill to handle the more advanced problems introduced in Problem Number 9.

If you find the exercises too easy and tend to become bored, there are several things that can be done to increase the difficulty:

1. When laying out the tracks, wear a flat soled shoe that is somewhat worn.
2. Have someone other than yourself lay out the tracks. This prevents you from subconsciously cheating by making mental notes of where you placed your feet when crossing through a particularly hard area.
3. Have a person of light weight, such as an 80 pound child lay out the tracks. The reduction in weight reduces the damage inflicted on the ground.
4. Have the person laying tracks wear a very soft soled shoe such as an old tennis shoe or a moccasin.

You may have noticed by now that this article is surprisingly devoid of brilliant inside tips that will produce an instant expert.

At the outset I mentioned that learning to track would be no more difficult than learning to play the piano. Like studying anything, we are talking about a solid groundwork of fundamentals, and plenty of practice. This article can supply some of the fundamentals. Only you can provide the practice at applying these. But it is this practice which will improve tracking skills, and will allow us to spot the sign, rather than step on it.

Let's hope you are still motivated to give it a try. But if it sounds like a lot of hard work and you rationalize your laziness by telling yourself that you never wanted to become a tracker anyway, let me leave you with one thought. We need you in search and rescue work, but if you are going to come into a search area with your big feet and your big vehicle tires destroying all those clues that we trackers need to save a life, I would prefer that you stay the hell away.

Too many times we have followed a set of tracks up a dirt road only to see it disappear under a ton of wide tired jeep tracks, and too many times we have followed a set of tracks down into a drainage to find it go under the tracks of a swath of line searchers.

Too many times? . . . . If it had only happened once, that is too many times.

We are human beings and we make mistakes, but if people die as a result of our mistakes we have some responsibility to our fellow man to put forth the effort needed to prevent those mistakes from being repeated.



PHOTO BY J. D. WILSON-MACKINTOSH STUDIOS

It doesn't have to be big to be significant



PHOTO BY J. D. WILSON-MACKINTOSH STUDIOS

A stick, cut to the length of the rescuee's average pace, can aid in tracking.

## NICARAGUA (continued from Page 3)

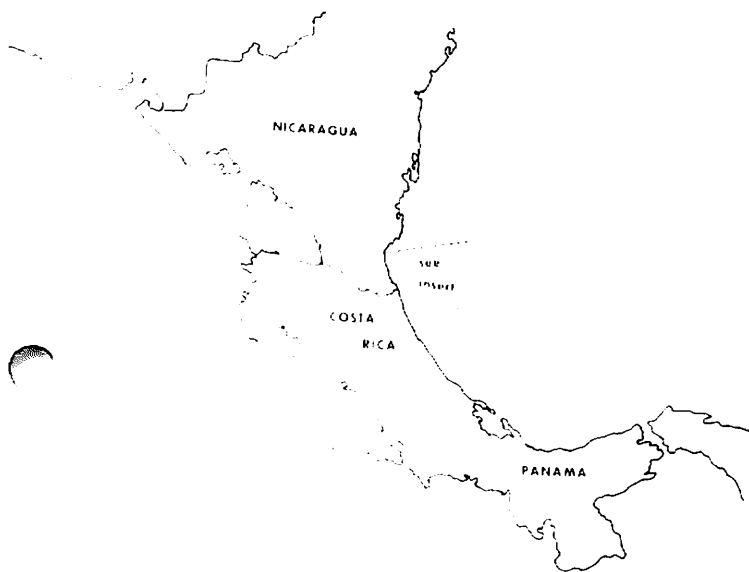
"They never showed," Bundick recalled. "I waited, which was discouraging. I was getting hungry."

At the river crossroads, he abandoned some of the heavier items he was carrying and began walking downstream. He managed to catch a bony-mouthed fish on a hook he had with him, cut it in strips with a pocketknife and eat it raw.

Still, eating for basic survival never crossed Bundick's mind. He knew exactly where he was and fully expected to meet up with the guides at any minute. He continued to walk downstream. When rains came hard they often left knee-deep mud in their path, making the going rough for Bundick. The machete he had was too heavy for the jungle. Being inexperienced in cutting trail, he later realized he had cut a far wider trail than necessary.

Mosquitos, luckily, were not a serious problem as the nearby waters were fast-moving rather than stagnant pools. Ticks, however, were something else.

Bundick remained firmly confident he would be out of the jungle in just a matter of days.



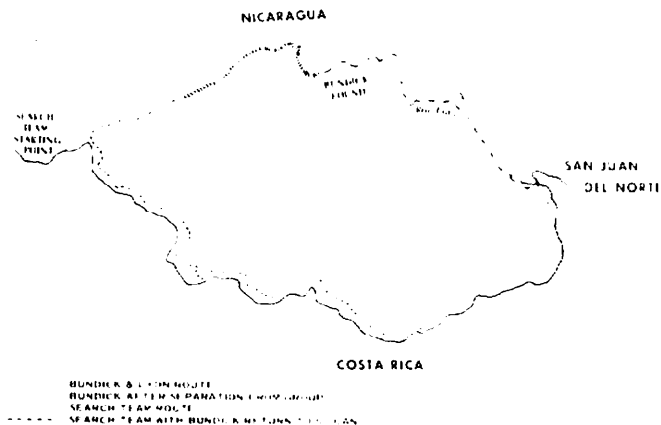
"I didn't realize how my body would lose strength," he said. "I never thought I'd have trouble getting out."

His thoughts wandered to the whereabouts of the guides. He guessed that, perhaps, they had had some kind of trouble and were forced to return to San Juan. At any rate, they'd come back for him. Bundick said he was really enjoying the solitary excursion except that he was getting weak.

On March 13th, he lost the fish hook so he nibbled on unripened berries and seeds, thinking these would be high in protein. Occasionally he would try eating an insect, including a grasshopper. There was plenty of drinking water from nearby streams, and he used this to wash down his "natural meals."

A heavy rain fell on the morning of the 14th. Bundick had crossed the river as the terrain on that side looked less steep. The move brought him into a thick thorn forest. There was no sun visible and the rain made it impossible to see far in front of him. Afraid of becoming disoriented, he retraced his steps back to the river and camped on a sandbar.

The following day, despite feeling terribly tired, he decided to try his luck at building a raft. It was a "bad decision," he admits. He was unable to find a light-weight wood and knew that using the available wood would result in a sinking raft. He found a dead tree,



luckily of light wood, and cut a log in two with his machete. Working on a cliff near the river, Bundick accidentally lost one log as it went sliding down the steep terrain into the water.

He tried floating another log, tying it with vines, but the launching spot was in deep water and the effort was unsuccessful.

He decided to go back to the sandbar and make camp once again. It was a difficult return trip even though it was only 200 meters away.

"I had really put out energy and I wasn't replenishing any energy back into my blood," he said.

Bundick abandoned the raft idea, realizing he would lose it in the first rapids. Unable to catch turtles or fish, he continued to eat unripened berries, settled back on his sandbar campsite and read a philosophy book he had with him.

"The 17th and 18th of March were good days," Bundick recalled. He took time out to swim a bit, ate some algae and figured he was having a "positive" experience alone in the jungle. He was sure the guides would be coming soon.

"On March 19th I began to worry," he said. "I was getting pretty weak." Up until that time, he had not switched to definite survival measures. That day, Bundick remembers, he thought, "Hey, they're not coming." He started to prepare to move ahead downstream.

"He tore off a large corner of his map and wrote a note, leaving it at the sandbar campsite along with everything but a few absolute essentials. He decided not to have a definite destination nightly — only to make his way downstream until he came to some sort of civilization.

By that time, Bundick was breathing hard with every couple of steps. He had not eaten a full meal for more than 10 days, losing about 30 pounds in the process. He was weak and worried.

During this time, a friend of Bundick's in San Juan, Ben Hammond, began to worry about him.

After several days of radiogramming El Castillo without results, Hammond notified a doctor in a northeastern town who, in turn, alerted the U.S. Peace Corps main office in Managua.

Peace Corps officials contacted the American Embassy which alerted the military and governments of both the United States and Nicaragua. A major search was initiated.

(Continued next page)

## NICARAGUA (continued from preceding page)

A military plane was assigned to fly periodically over the area where Bundick was proposed to be stranded. The pilot kept a close lookout for campfires or other signs of human life.

The core of the search party consisted of a lieutenant commander from the U.S. Navy and a major from the U.S. Army, both members of a military mission from North America; a lieutenant and a radio operator from the Nicaraguan Guardia Nacional, and one of the original San Juan guides and his brother. After gathering information on the possible whereabouts of Bundick, the men set out up the river from San Juan.

Around 8:30 on the morning of March 18th, they saw Bundick walking downriver.

"Are you Paul Bundick?" one of the party asked, followed by, "Are you hungry?" Bundick, tired and, indeed hungry, remembers smiling upon seeing the rescue party. He got into the boat and dined on C-ration peanut butter, tuna fish, a can of peaches and a candy bar. He later learned that the guides who were supposed to meet him had actually camped below the Salto Grande Waterfall. Also, they had apparently left a day earlier than the original plan called for. Further, the falls indicated on the map were inaccurately marked. There is confusion on the part of natives as to the exact location of Salto Grande since there are two extremely similar waterfalls in the same area.

Bundick remains confident that had he been able to obtain food and a compass, he would have been able to get out of the jungle alone.

"I like to think that I would have made it," he said. "If I had had an inflatable rubber raft and food, it would have been a perfect trip." he said, "Still, it was definitely good to see the rescue workers, especially at a point when I had given up hope that anyone was coming."

He said he is sorry for the anxiety his parents suffered when they heard the news that their son was lost and possibly dead in a deep section of unexplored jungle.

"Other than that it was a positive experience in my life," Bundick said, "and I'm kind of glad it happened."

Thanks to expert training on the part of the rescue workers as well as Bundick's own careful planning and fortitude, the Peace Corps volunteer came out of the experience a bit thinner and slightly shaken, but alive.



PAUL BUNDICK

## ALBATROSS (continued from page 5)

see only a large piece of wood. With throttles full open we begin our climb back to altitude and the search is continued. The day passes slowly for these six crewmen and as evening draws near, signs of fatigue become readily apparent. I radio the center for further instructions for we have nearly completed the search area. We are instructed to fly to Merida, Mexico, and remain overnight taking on fuel and continuing the search the following day. Permission is obtained from the Mexican government to land at Merida and we're on our way. The flight will only take thirty minutes but for this tired Albatross crew it couldn't be close enough. Gazing out the windows with our first chance of the day to relax, we are thinking of that shrimp boat and hoping for a miracle in tomorrow's search.

Upon landing we must service the airplane, obtain customs, and fill out all the necessary paperwork involved in landing in a foreign country. When we finally get to the hotel, grab a snack, and have the usual cold frosty, it is midnight and no one has trouble falling asleep. We have no change of clothes and the old green flight suits are getting a little ripe.



U.S. COAST GUARD PHOTO

A crewman scans the search area with nervous anticipation

We're up the next morning at the crack of dawn and it's off to the airport. No time is wasted in getting the engines cranked and starting another long day. We commence the search and are on the scene only ten minutes when one of the crew shouts, "Raft in the water, off the left wing!" A smoke float is dropped and we circle back, dropping once again to seventy-five feet. Directly in front of us we see the two small life boats, two men in each, bobbing in the choppy water. On our second pass we are able to drop emergency rations and from the boats they wave frantically. My heart slows a little, and I call our base and tell them of our findings. We are instructed to mark our position and continue to circle the boats until a relief plane arrives. Eventually a Coast Guard cutter is dispatched and the actual rescue takes place. It is a hopeless feeling to circle above, knowing that we can do nothing more, but I'm sure that it gives those below a sense of security just hearing our engines. We are low on fuel when the aircraft arrives on scene to relieve us, and we start for home immediately. Those below wave in appreciation. As we leave the area we are informed that these are not the people for whom we have been searching; the shrimp boat had been located and towed to shore by a cutter. The boats we found were life boats from a Cuban vessel that was broken up during a storm.

It has been a long search: one of many that I've flown in the Coast Guard, and I feel the sense of pride that always accompanies a job done well.

# "ROMPIN' RICK

RICK LA VALLA

Hello!? Is there anybody really out there? The response from people writing in wanting the information I have listed in past issues has been great. But so far, I have received no information on new publications, products, methods, ideas or whatever. Let us know what's happening, new and/or exciting. (We will print that which is printable.) Press on!

A "NASAR Aviation Curriculum" compiled by Skip Stoffel with assistance from the NASAR Survival Education and Aviation committees is now available. This 12 hour curriculum was developed to fulfill the needs of general aviation pilots (or anyone who rides in flying machines) as to what is critical knowledge regarding remote emergencies in hostile survival environments. Listed in the 6 page publication are the outline and rationale of subjects that should be taught as minimum "must know" knowledge. Copies sent upon request.

I am attempting to compile an SAR training bibliography and resource list to include all relevant books, pamphlets, brochures, teaching aids, films, slides, etc. Please send me descriptions of any of these items currently in use in your area. Helpful specific information on each item would include: Title and author; publisher and date of publication; how this item is available, complete address, and cost; a description of its content and how it applies to any aspect of SAR training.

As promised, the first annual Baja snowshoe race in honor of Snowshoe Thompson was held on May 22 in San Diego. The Sherpa Snowshoe Team from Washington State was beat out by ping pong paddles and badmitten rackets. Many more events are planned for this once-a-year anything goes SAR festivity. Write to Don Peterson c/o San Diego Mt. Rescue Team, P.O. Box 267, La Jolla, CA 92038 for details of next year's event.

I have just recently seen a prototype of a trackers catalog of boot and shoe prints developed by Doug McClelland. The title of this publication will either be **Lost Soles** (souls?) or **Bottoms Up!** It will contain more than 250 photos and descriptions of the most common boot and shoe sole prints. Write to Doug c/o the SAR Dog Assn., 3035 - 64th SW, Seattle, WA 98116, for more details.

The U.S. Coast Guard Institute has a correspondence course dealing primarily with maritime SAR coordination. NASAR has been allocated 20 slots for this course. There are still several openings available. Contact me to enroll or to have your name placed on a waiting list. First come, first served.

Bye for now. Rick LaValla, 4220 East Martin Way, Olympia, Wash. 98504. ■

---

**"Loser of the Year":** the fellow, lost in the desert, who spied a mirage, caught up with it, fell in, and drowned.

---

## CALENDAR

### SEPTEMBER 9-12

#### NASAR 8th Annual Conference

Cheyenne, Wyoming

Contact: Lois McCoy, Executive Secretary, NASAR

P. O. Box 2123, La Jolla, CA 92038

La Jolla, CA 92038

(714) 276-7228

### SEPTEMBER 9-11

#### 21st Annual Conference of the Empire State Rescue and First Aid Association, Inc.

Massena, New York

Contact: Gerald Rubado, 24 Walnut Street, Massena, NY 13662

### SEPTEMBER 12-16

#### 14th Annual Survival and Flight Equipment Symposium

San Diego, California - Town and Country Hotel

Contact: SAFE, P. O. Box 631, Canoga Park, CA 91303

### SEPTEMBER 13-17

#### NPS Managing the Search Function

Golden, Colorado - Camp George West

Contact: Jim Brady,

(602) 638-2691

P. O. Box 477, Grand Canyon, AZ 86023

### SEPTEMBER 16-19

#### Civil Air Patrol National Board Meeting

Philadelphia, Pennsylvania, - Sheraton Hotel

Contact: Maj. George R. Andrews, USAF,

(205) 293-5093

HQ Civil Air Patrol, Maxwell AFB. AL. 36112

### SEPTEMBER 28-30

#### HEW National Symposia

Contact: David R. Boyd, M.D.C.M., Director

Div. Emergency Medical Services

6525 Belcrest Rd., West Hyattsville, Maryland 20782

### OCTOBER 2

#### California Region Mountain Rescue Association Meeting

Orange County

Contact: Abbey Keith, MRA Executive Secretary

P.O. Box 396, Altadena, CA 91001

(213) 791-1731

### OCTOBER 22-23

#### National Mast Conference

Olympia, Washington State - Olympia Hotel

Contact: Rick LaValla, SAR Coordinator,

(206) 753-5255

Washington State Dept. of Emergency Services

4220 E. Martin Way, Olympia, WA 98504

### OCTOBER 26-28

#### HEW National Symposia

Albuquerque, New Mexico

Contact: David R. Boyd, M.D.C.M., Director

Div. Emergency Medical Services

6525 Belcrest Rd., West Hyattsville, Maryland 20782

### NOVEMBER 3-5

#### HEW National Symposia

Reno, Nevada

Contact: David R. Boyd, M.D.C.M., Director

Div. Emergency Medical Services

6525 Belcrest Rd., West Hyattsville, Maryland 20782

### NOVEMBER 16-19

#### HEW National Symposia

Boston, Massachusetts

Contact: David R. Boyd, M.D.C.M., Director

Div. Emergency Medical Services

6525 Belcrest Rd., West Hyattsville, Maryland 20782

### NOVEMBER 20-21

#### Mountain Rescue Association Fall National Meeting

Grand Canyon, Arizona - NPS, Albright Training Center

Contact: Abbey Keith, MRA Executive Secretary

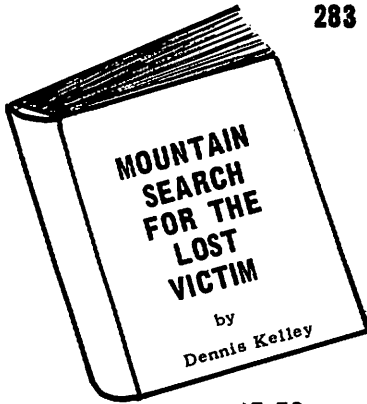
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