

# FLYING

**S A F E T Y**

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**Ordeal**

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**Arctic Survival Training**

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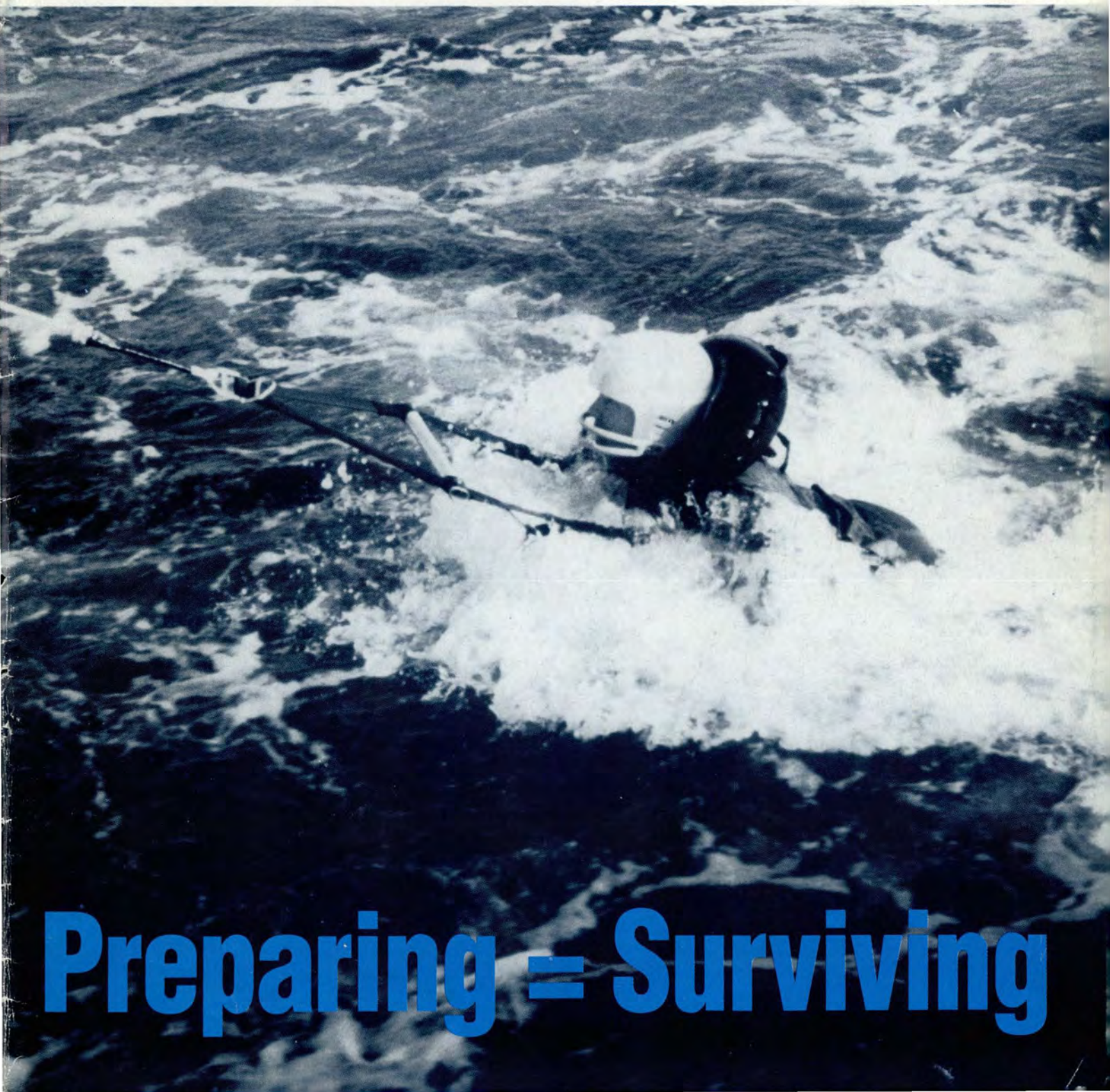
**Into the Woods**

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**Water Survival**

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MAY 1993



# Preparing = Surviving





# THERE I WAS

■ Twenty-five years of flying experience, nearly 10,000 hours in the cockpit — you'd think I'd know better. It was an early morning local training mission in the C-141. I'd like to blame it on getting all of 2 hours sleep prior to the alert call.

Crew fatigue is a real problem, but only one of the links in the unbroken chain of events leading to a mishap report. The crew consisted of myself, five other pilots, and two engineers — I'm a flight examiner pilot, and another pilot is an instructor.

The crew has more flying time and experience than you can shake a stick at — the type of crew a mishap report would call "highly experienced and qualified." The weather was beautiful — high overcast, nearly calm winds. The only visibility restrictions were the patchy ground fog in the trees and the curvature of the earth. The board might say "weather was not a factor." The aircraft, for a 33-year-old, was in rather

good shape. There were only relatively minor open discrepancies. The kind of aircraft which leads a mishap board to use the phrase "The pilot failed to ..." (read that "pilot error").

We had been flying almost 3 hours. The local had worked out very well. Each of the six pilots accomplished three approaches and at least two touch and go's. Every other approach was an opposite direction approach. All approaches and landings had been very well planned and flown. The morning had been extremely productive.

I was in the right seat. I had an annual composite eval coming up, so I decided to finish the local with a no-flap approach and landing. We were in the closed VFR pattern. There had been some call sign confusion by the tower controller between us and another local in the pattern. Originally, we were to be no. 2 for the approach and landing,

but due to the call sign confusion, we were now no. 1. This was fine with me because I was already late for the engine running crew change.

For the benefit of the other local, I reminded the tower we were planning a no-flap, full stop. We were cleared for "the option," and, again, I reminded the tower we would be a full stop. The tower cleared us to land. Due to the tower's apparent confusion, additional communications were required, and I failed, for a short time, to pay attention to flying the aircraft. As a result, I delayed getting the power back and getting the aircraft configured. I couldn't extend the pattern (or could I?) because we were now no. 1 inside the other -141.

Well, we all know how the Star Pig likes to fly no-flap approaches — 20 knots hot on final, 30 knots hot over the threshold. I had, and passed up, several opportunities to "break the chain" of events leading

*continued*



# **Flying** **SAFETY**

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### CONTRIBUTIONS

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## THERE I WAS continued

to a mishap investigation. I've got two chain-breaking opportunities left at this point — go around or land and get it stopped before the other end. Remember, I'm late for the crew change, and I've got all this experience. You guessed it. I planted that sucker.

For those of you waiting to read the mishap report, I'm very glad to say there will be no report. I put it down smoothly in the first 1,200 feet and injected the brakes with only 4 million foot-pounds of energy.

Was it the correct decision? *Absolutely not!* This has got to be one of the poorest decisions I've made since pilot training. I chose to break the mishap chain at practically the last possible link. I must tell you, I am furious with myself for this decision. There are several reasons for my feelings.

Permit me to "what if." What if my airspeed had been higher? I could have "wheelbarrowed" on the nose tire. I'm sure you all remember the C-141 mishap when that happened.

What if the thrust reverser(s) had not extended? What if the spoilers had asymmetried? What if, because of the close temperature and dew-point (remember the fog in the trees?), the runway had been moist and I needed heavier braking at the far end of the runway — in the rubber deposits?

What if I needed heavier braking and the antiskid malfunctioned? What if I had executed a go-around? (All the other what-ifs would have

disappeared.) I caught grief from the next IP for being late at the change anyway. What's another 5 minutes compared to an investigation?

What makes me most angry with myself is I am a flight examiner, and my performance sets a tone for the way the rest of the pilots in the squadron fly the airplane. As the saying goes, "Your actions speak so loudly, I can't hear what you're saying." I tried, after the local, to make it very clear to the rest of the crew I had made the wrong decision. I hope they can hear over my actions.

Our discussions after the local led me to ponder one other disturbing point. I always state in my pre-mission briefing that if **anyone** sees **anything** they don't like or understand, please bring it up. It's better to clear up the problem among ourselves than try to explain it to someone else later.

After we were on the bus back to the squadron, several of the crewmembers said during the approach and landing, they thought to themselves things like "Aren't we a little hot?" "Maybe we should go around," or "This is going to be very interesting!"

Don't get me wrong. I am **not** attempting to shift responsibility for my poor performance from myself; however, "The **crew** failed to ..." is another favorite phrase in mishap reports. I am certain if I had rolled through the approach lights at the other end, the "Why didn't you ..." questions asked by the investigators

would have to be answered by more people than myself. I also feel certain nothing was said to me, in part, because of my crew qualification, and the other crewmembers were sure I knew what I was doing.

Every time I go flying I learn something. Occasionally, the learning curve is steep. This local training mission was one of those *steep climbs*. Next time, I hope to break the mishap chain sooner, rather than later. The sooner it is broken, the more options there are available.

Also, there are too many mishaps discussed in resource management classes where the obvious question asked is "Why didn't \_\_\_\_\_ say something?" Generally, most everyone in a classroom forum says, or feels, they would say the appropriate phrase in a given situation to break the mishap chain. I watched it not happen on this local. I am going to try to feel more free to speak up when I see something apparently wrong. I am also going to try harder to foster the same feeling in other crewmembers.

Finally, if I had made the right decision and gone around, I would have been embarrassed, but I would have felt better knowing I had made the right choice. If I had ended up sitting in the middle of the localizer antenna, I would have been very embarrassed and certainly much more angry at myself than I am now. This time, things went my way. I'm not going to press to test again. ■



On 7 November 1973, an Oregon Army National Guard helicopter rescued a man and his 4-month-old daughter after they survived 5 days in the rugged Cascade Mountains. During 5 days and 4 nights of numbing cold, hunger, and thirst, this man sat helplessly and watched his wife die from exposure. The man who endured this is eager to share what he learned so others won't have to experience his ...

# ORDEAL

■ As I lie here in my hospital bed, memories of the past 5 days paint dark, broad brush strokes across the pictures of my dreams and plans for the future. At 28, I'm a commercial artist but my real love is painting. My wife Diane was 31 on November 4th, and our daughter Emily is 4½ months old. Diane had breast-fed her since birth. Most of that will be different now — because of what happened.

My strongest wish now is that I can tell others about what happened so they, caught in the same circumstances, might recall my experience and survive.

It all began on Saturday, November 3rd. We left Portland for a 1-day outing to Bagby Hot Springs in our 1966 station wagon.

Our car had three new radial tires and one older radial on the rear. The weather was clear and cool, and we had heard a storm was forecast for the following day. That morning, I called a friend in Portland for directions to Bagby.

We brought along a large wool blanket, a baby blanket, and a bag of extra diapers for Emily, a camera, two sandwiches, and a thermos of hot chocolate.

The 1½ mile walk into the hot springs was beautiful. There were patches of snow on the ground, and the sky was overcast. We met and

chatted with several other people on the way to the springs. After bathing in the hot springs, we hiked back to the parking lot. It had begun to snow, and by the time we reached the car, it was snowing heavily.

I noted several other cars in the lot including a self-contained bus with a propane heater, a camper pickup, and a Volkswagen belonging to two people we had met on the trail. We ate the sandwiches and drank the

hot chocolate before starting home. The VW left before we did. I recall thinking if the weather became bad, we could probably find shelter in the self-contained bus.

I was wearing waffle-stomper shoes, double socks, Levis®, a wool shirt, a medium-weight wool long shirt, and a zippered, light-wool coat. I also had leather gloves and a wool cap.

Diane had similar shoes and socks

*continued*





# ORDEAL

continued

on, wool pants, a wool sweater, a leather, full-length coat, and a wind-breaker. The baby had on pajamas and a new snowsuit with a hood covering her completely when it was zippered.

As we left the area Saturday afternoon, we saw two sets of tire tracks preceding us. The smaller ones belonging to the VW showed they'd had considerable difficulty — skidding in the fresh, foot-deep, wet snow. At times, I found it necessary to get out and push the car while my wife drove. I saw the older rear tire slipped more often. We stopped and put on the spare, which was a radial I had recently repaired. When I lowered the jack, I found the tire was flat. I had to rechange to the nearly bald spare. I was very discouraged.

From the point where I changed the tire, we were able to drive only about a half mile further even with my wife driving and me pushing, using one of the blankets under the tires for traction.

It was completely dark when we skidded off the right side of the road into a ditch. We were permanently

stuck. At that time, we had a quarter of a tank of gas, and I was soaking wet from the waist down.

We ran the car engine with the heater on for half an hour. This dried our clothes. We spent the night in the car, awakening occasionally to start the engine and run the heater. By morning, we had  $\frac{1}{8}$  tank of gas left. Diane breast-fed the baby during the night.

We assumed we were about 5 miles from the ranger station, and on Sunday morning, we left a note in the car stating we had spent the night and were leaving the car. The people in the Volkswagen that preceded us had seemed reliable and would probably stop at the ranger station and report that others were still in the hot springs area. We also figured since our friends in Portland knew where we were, they would report us missing. We felt our chances were better attempting to walk out.

Before we left the car at 8:00 a.m., we dressed the baby in her snowsuit and put her into a backpack made especially for her. All the tire tracks were covered when we left, and the

knee-deep snow made walking difficult. I led most of the time, making only 20 to 30 feet before having to rest each time. At 10:00 a.m., we stopped by a tree to get shelter while my wife nursed the baby. We both ate some snow to satisfy our thirst.

At 12:00 noon, we stopped again to nurse the baby. The wind was light but it was still snowing heavily.

By 2:00 p.m., the snow was waist deep, and I began feeling pain in my upper legs from the exertion. Diane was getting more and more tired so we decided to discard her camera and an extra bag of diapers.

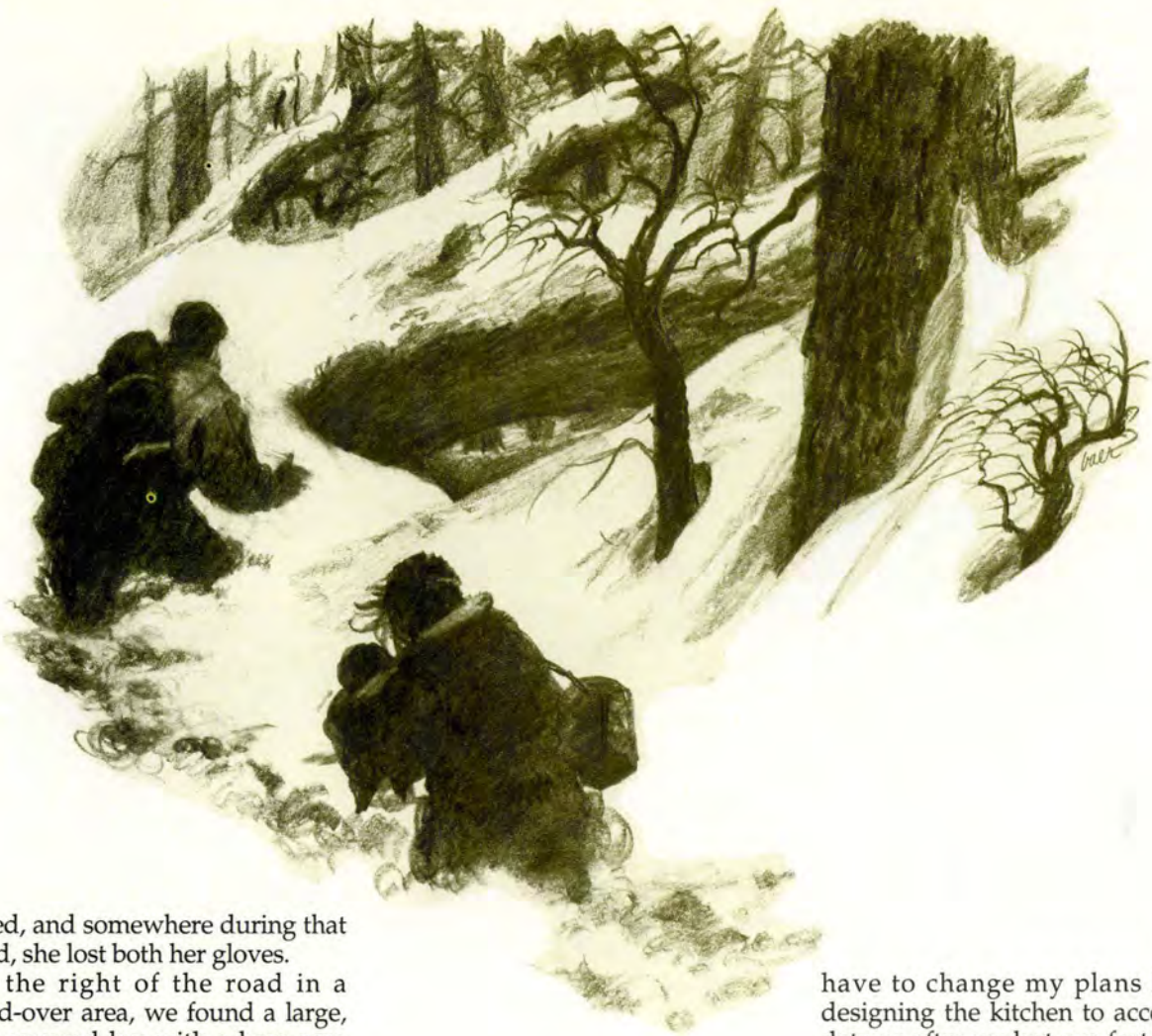
We came to a road junction, and I felt a right turn was the best route. We shoved our way down a long hill through waist-deep snow before deciding this was not the right way. We labored back up the hill to the junction and pushed through the snow on the left-hand road. After a short while, we decided this was not the correct route either. We returned to the junction and proceeded back down the road we had first chosen.

At the bottom of a long hill where the road started uphill again, we stumbled into a large snowdrift which was over our heads. It was totally impassable. I tried to go around it but could not. This whole series of wrong road events took 2 hours, and by now, it was getting dark.

During the trek, we both became very fatigued, especially my wife. She had allowed her hands to drag in the waist-deep snow as she







walked, and somewhere during that period, she lost both her gloves.

To the right of the road in a logged-over area, we found a large, snow-covered log with a bare area beneath it. We had a plastic sheet and an umbrella which we put on one side of the log, and we laid down beneath it. By this time, we were very cold and shivering. It was here we first began expressing some doubt we might survive.

My wife continued to nurse the baby and to eat large amounts of snow. Beneath the log, we were able to lie with our bodies protected down to our knees with our feet stuck out in the cold. I placed a large plastic bag over our lower legs and covered them from the waist to the knees with the wool baby blanket. The large plastic sheet kept the snow out but the umbrella started to come apart.

After we settled down for the evening, we were still shivering but able to talk quite freely. We discussed many things. I tried to make a fire but my matches were wet. What little wood I saw was snow-covered but I managed to scrape some bark from the log we were

under. With wet matches, it really didn't matter.

"I love you very much," I told my wife, and she said the same thing to me. We agreed we'd had a good life together, and if we didn't make it, we'd had a better 2½ years than most couples have in a lifetime. All through this I kept wondering why this was happening to us. Life had been so good to us.

Neither of us had been extremely religious, but Diane prayed out loud and asked God to help us. We both felt this was a crazy accident — being in the wrong place at the wrong time. We did not feel we were being punished in any way and had no guilt feelings about any of our previous life. I wished the tires on our car had been better equipped and prepared to survive in this cold weather and snow. We both discussed the fact we'd probably lose our feet from frostbite. I thought how I'd

have to change my plans for re-designing the kitchen to accommodate us after we lost our feet. I even made plans on how I could continue to work as an artist without feet.

During the long, cold night, we were able to sleep in short stretches. I was afraid if I slept 2 or 3 hours, I might not be able to rewarm myself when I woke up, if I did. The baby awakened frequently during the night, and Diane nursed her.

My wife complained all night of severe stomach cramps. She compared them to labor pains. I also felt stomach pains, but they were a lot less severe than hers. I also ate snow, but she ate much more than I did.

On Monday morning, the weather was the same — cold, snowing hard, and fortunately not too windy. I told Diane the couple in the Volkswagen had probably notified the ranger station, and I hoped our friends in Portland who knew we'd come to Bagby Hot Springs would send help.

Diane talked of dying more on Monday afternoon than previously. We both became more convinced we would not survive. I just accept-

*continued*





# ORDEAL

continued

ed the fact. I didn't get hysterical or panicky. I felt I would last longer than Diane but that if she didn't make it, I wouldn't make it either. I wanted to live as long as Emily, though, to give her the best chance I could.

Toward Monday evening, my wife became disoriented and delirious. She held her hands in a claw-like manner and awoke from fitful sleep to claw at the baby or me. I spoke to her but she did not respond. I was afraid she might hurt the baby, but I didn't get angry. On one occasion, I had to protect the baby from her. "Can you see me?" I asked, but her words had no meaning to me.

I went to sleep with the baby on my stomach, and when I awoke, I saw Diane was not moving. Immediately, I tried to feel her pulse and check her breathing. There was no pulse — no breath — no life. My wife just lay there staring at the dark sky with lifeless eyes — cold and

dead.

Strangely, I felt no grief, no remorse, no guilt — I did not even think of the possible future without her. I decided to try to keep the baby and myself warmer with Diane's windbreaker, but I was too weak to get either sleeve off. I abandoned the idea and spent the rest of the night sleeping on and off as I had before.

My sleeping pattern was now primarily influenced by the baby's sleeping and waking patterns, and by Tuesday morning, she would sleep for about an hour or so and wake up crying. I put snow in my mouth to melt it and then attempted to nurse it into the baby's mouth using my lips or tongue. At first, she took the water quite vigorously and returned to sleep, but as the day wore on, she became less interested in the water and took very little of it.

Each time I filled my mouth with snow, I'd swallow some myself. I developed severe chest and stomach pains. Then I would vomit. This con-

tinued throughout the rest of my experience in the snow.

My activities during this period consisted mostly of sleeping, melting snow to feed the baby, and standing to urinate. I was so weak I had to grab a branch on the log, pull myself up, and then lean against the log. My hand motions became difficult to coordinate, and I found it almost impossible to perform such simple tasks as opening my zipper or putting snow in my mouth.

I heard numerous commercial airliners flying overhead and also some small planes. I did not think at any time they were searching for me. They seemed to be flying directly from one point to another. The sky was still overcast, although the snow had diminished. I had no real thoughts about what was going on in the planes. I just felt "they are up there, and I am down here."

By Wednesday morning, the snow had stopped but the sky remained overcast. From where we lay, I could see there was a very attractive view of the valley, particularly the logged-over area. There were small pockets of fog which made it quite scenic. It did not seem at all strange to me that even under these circumstances — my wife dead beside





me and my own survival questionable — I could appreciate the beauty of nature.

The improved weather gave me a more optimistic feeling. I felt I could survive another night. My biggest problem on Wednesday was the continual vomiting and pain in my chest and stomach. I spent the morning the same way as previous days, sleeping intermittently.

At 2 o'clock Wednesday afternoon, I heard a helicopter overhead. I believed immediately we would be rescued and I felt a great relief. I laid the baby on Diane, and as quickly as I could pull myself to my feet, left the snow-covered log, stumbled out, and began waving my hat at the helicopter. He made several passes, and I was sure he'd seen me.

Then I just sat down in the snow feeling very relieved and relaxed. The helicopter landed fairly close, and three men, a deputy sheriff, and two newsmen came to me and asked my name and how I was. I told them my daughter and I were fine but my wife had been dead since Monday night. I reached under the log, grabbed Emily by the snowsuit, and handed her to one of the rescuers. The other two men then helped me to the helicopter.

They handed me a cup of hot coffee. I took one sip, but the stomach pain was unbearable and I wanted no more of it.

They flew me to the nearest hospital where I received a very painful rapid thaw of both hands and both feet. Emily was in very good condition, but the doctors said I may lose some toe tissue. They told me the two people in the Volkswagen who left the hot springs ahead of us were found only a half hour before we were — alive and well in the car.

The doctors said the reason my daughter fared so well is she received excellent, uninterrupted care. She was never really exposed to the cold, and she was well fed for the first 2 days. Even the water she received was warmed in my mouth.

They also commented on Diane's loss of fluid and calories when she nursed the baby. These losses, they said, plus her lack of gloves and her having to replace lost fluid by eating snow, further increased her loss of heat.

Wind chill was no problem for us but our continued wetness was. We were both soaked through from the waist down but our wool upper clothing, even when wet, insulated well. One of the biggest sources of discomfort was we weren't able to keep our legs and feet adequately covered.

Because of the effect all this had on my emotions, it's been very difficult to tell the story objectively, but I did the best I could. If just one person learns enough from what I've said to avoid the same misfortune, my effort to share what I now know will not have been in vain.

#### Editor's Note

This tragic saga demonstrates two of the most basic rules of survival. First, make optimum use of what you have. Second, don't assume rescue, weather improvements, or an oasis are only a matter of hours away — don't assume anything. In short, use what you have.

The driver of the converted bus telephoned search officials on Wednesday. The day the man and his daughter were rescued, it was too late to save his wife. The two people in the Volkswagen were just as

stranded. They were rescued on Wednesday also. Friends in the city apparently were unaware they hadn't returned from the hot springs. Yet this couple assumed at least one of these parties would reliably report their presence in the area.

It's no crime to go on a 50-mile car outing without full survival gear. But had these people carried only some emergency flares, survival rations, or even a full tank of gas, they might not have left the car, and they would have been able to start a fire. Even a dry container of matches would have helped.

They didn't worry about drinking water. Snow is water, but they didn't know it takes 80 calories to change 1 gram (1/30 ounce) of ice or snow to water at 32 degrees and another 0.56 calories to raise it each degree over 32.

When this family spent more time than they anticipated in the elements, a deadly "energy crisis" emerged. Walking, especially in deep snow, takes energy. Nursing a baby costs some more. Exposure of any part of the body to cold, wet cold particularly, causes a caloric loss. And with no food to regain the lost calories, one's strength ebbs rapidly.

Staying with the known shelter — a car in this case — is the best idea in all but escape and evasion situations. If there's some fuel, you can start a fire even with the car cigarette lighter.

If there's no shelter, making camp before you become exhausted gives you more energy to build a better camp. Energy is a key factor in both strength and resistance to cold. Calories do count.

If all efforts to remain warm and dry fail and frostbite develops, avoid damaging frozen tissue. While rubbing cold feet helps improve circulation, it should not be used on frostbitten parts.

In any survival situation — lost in the mountains, down at sea, in the desert, or deep snow — take stock of everything you have. Plan a long stay, prepare for it, and never assume rescue is certain until you're telling someone else about how you survived. ■





Place framework poles vertically 8" apart.  
NOTE: Smaller branches can be attached horizontally to framework poles for hooking boughs.

Add covering to framework using parachute, boughs, or boughs, emergency blankets, etc., for additional insulation. Save sufficient amount for floor of shelter, if possible.

Stack on lower door logs.



Cover entire shelter with snow 8" thick (minimum).

Parachute / snow door plug (or other suitable material) inserted from within will seal the shelter.

# Arctic Survival Training

Capt Candace Ballmer and Maj John Sovocool practice knot-tying skills.



**CMSGT ROBERT T. HOLRITZ**  
Technical Editor

■ For the Air Force captain it was a perfect day for flying. During the week, he was an aircraft maintenance officer, but on weekends, he was a certified flight instructor at the base Aero Club. The purpose of the day's flight was to give his student some hands-on training in cross-country navigation.

Everything was perfect until 45 minutes into the flight when the engine shuddered and abruptly quit. Although there were only 2,000 feet between the aircraft and the tree-covered hillside below, the skilled instructor found a suitable landing spot and managed to set the aircraft down in the deep snow. The aircraft was totaled, but the pilot and student experienced only some minor injuries.

Two months later, a hiker came upon the wreckage and the bodies of the pilot and instructor. They had survived the crash almost without injury but lacked the necessary skills

to survive and be rescued in an arctic environment.

This is not an unusual scenario. In fact, in the past 10 years, hundreds of people have perished in an arctic environment simply because they were not trained in the appropriate skills of survival.

## The School

Shortly after it became a separate service, the Air Force established the Arctic Survival Training School. It opened in November 1947 at a site near Nome, Alaska. But, according to Maj James W. Burgin, the school's commander, "It was just too warm at Nome so, in 1950, the school was moved to Ladd Field (now Ft Wainwright)." The school remained there until 1960 when, for financial reasons, it was moved to its present location at Eielson AFB, Alaska. With temperatures which can dip to -70°F during the winter months, Eielson was an ideal location to train people to survive in the severe cold of an arctic environment.

Each year, more than 500 people





Sgt Keith Lasseigne explains how to track and trap animals for food.

attend the school which has been dubbed "COOL SCHOOL." Contrary to what many folks believe, the school is not just for aviators. For example, in addition to fliers, a recent class was composed of members of a joint service inspection team, a physiology specialist, and several civil engineering specialists.

### Objective

Another misconception of the course is that it is a test of physical endurance. According to CMSgt David Stack, the purpose of the course is to train the students to be survivors. There are no 5-mile hikes with 50-pound packs or anything like that. In fact, there is so much to learn in the 5-day course, testing a student's endurance would not only be counterproductive but would also take valuable instruction time.

Many students who have attended this course were in their fifties (the author is a good example). One graduate was in his late seventies.

While the course is not a test of stamina, the field training is conducted under austere conditions and in extremely cold weather. For this reason, students are required to bring their medical records for review by the flight surgeon prior to deploying to the field.

### Academics

The course consists of 14½ hours of academic instruction and 52 hours in the field. Safety is a common thread throughout the course.

In the classroom, students learn basic arctic survival techniques such

as personal protection (clothing, etc.), how to obtain food, medical aspects of arctic survival, first aid, and shelter construction. The academic training also includes several hours of preparation laboratory during which the students learn skills they will need in the field such as flare and signal use and how to catch small animals for food. Prior to going to the field, each student must pass a multiple-choice test.

### In the Field

The field training is conducted regardless of the temperature or weather. On the morning of the third day, our class was taken by bus to the training area about 8 miles from Eielson. Led by our instructor, Sgt Keith Lasseigne, we hiked about a mile down a moonlit trail to the base camp which would be our home and classroom for the next 52 hours.

Our first task was to gather enough firewood to last for the time we would be in the field. Since there are only 3 hours of daylight in a December day at Eielson, the fire not only provided much-appreciated warmth but also the light for our field instruction.

### Sustenance

The second priority was to find a water source. Working in the snow and cold can quickly cause dehydration which can lead to headache, irritability, and a general ill feeling.

Thirst is not necessarily a symptom of dehydration. A survivor requires 5 to 6 quarts of water every



Students learn helicopter rescue techniques.

day, thirsty or not.

There are a variety of water sources — ponds, rivers, and springs. Water from these sources must be treated before drinking. However, water derived from snow and rain does not have to be treated. There were about 20 inches of snow covering the ground at our camp, so we constructed a water "generator." We filled a piece of parachute with snow, hung it near the fire, and let the snow melt into a coffee can.

Since our individual rations for the next 2½ days consisted of one can of chicken broth and two MREs, we began to forage for food. A large variety of edible plants, including herbs, blueberries, rose hips, and alders were found near the bases of trees.

There are many species of animals in the arctic — just about all of which you can eat and a few of which can eat you! As Sgt Lasseigne put it, "In the arctic, as a survivor, you become part of the food chain."

The area near our camp was covered with animal tracks. Sgt Lasseigne identified them as rabbit, squirrel, and moose. Although a moose could feed the entire class for

*continued*



# Arctic Survival Training

continued



weeks, we were without a high-powered rifle and opted to pass on "Bullwinkle" and go after "Rocky."

We set up snares to trap rabbits or squirrels. Snares are particularly suitable because they can be made from any kind of wire scrounged from aircraft electrical wiring or flight control cables. They are also ideal because they don't require constant attention. Although we checked the snares every few hours, it wasn't until the following evening we caught some squirrels. That evening, we learned how to skin small animals, boil the little rodents, and share the tasty meat and broth.

## Shelter

The first night in the field, the class slept in a community shelter provided by the school. It was constructed of felled tree trunks covered

with a parachute and a foot-thick layer of snow. However, the next day, each student was required to construct a shelter and sleep in it our last night in the field.

While students were encouraged to use some creativity building their shelter, most decided to build an A-frame thermal shelter. This type of shelter was constructed of an A-frame of branches and small trees over bare ground. It was then covered with parachute material and a minimum of 8 inches of snow.

The bare ground adds as much as 18 degrees to the inside temperature of a shelter, and the snow provides excellent insulation from the -22°F outside air. It took most of us about 3 hours to build these shelters, just about all of the daylight hours. That night I was amazed. In spite of temperatures below zero Fahrenheit,

my shelter and sleeping bag made sleeping warm, in fact, comfortable.

## Final Trek

The final day, our class disassembled our shelters, and around noon, we made our way down the trail to our pickup point. During the last 5 days, Class 93-07 received more than 66 hours of survival training. We learned rescue depends on the survivor's ability to use common sense, available resources, and, perhaps, most of all, on a strong will to survive.

There is no way of knowing how many members of Class 93-07 will ever find themselves in an arctic survival situation but, in the words of one instructor, "Survival training may be likened to life insurance, with one major difference — you are your own beneficiary." ■

AIC Laura Dacks and SSgt John Oliva make a wire snare to trap small animals.



Survival instructor AIC John Solomon demonstrates skinning and dressing a squirrel.



At camp, the students make a water generator from a parachute and coffee can to make potable water from snow.







# WATER SURVIVAL

***Training is the  
key to  
survival  
in the  
open water.  
It is Possible***

**CMSGT ROBERT T. HOLRITZ**  
Technical Editor

■ It began as a standard dissimilar air combat training mission. But during the first engagement, the pilot was alerted by a voice warning and a fire warning light on the master caution panel. Before he could press to test the fire warning light, the entire master caution panel lit up like a Christmas tree. Seconds later, the aircraft no longer responded to the controls, and the pilot made the decision to eject.

In less than a minute, he was pulling himself into the liferaft. Within the next 45 minutes, the pilot was located and pulled from the water by a Coast Guard search and rescue helicopter.

During the mishap investigation, the pilot recalled that once he was in the liferaft, he ran through the ejection and water-landing checklists. He found, without even thinking about it, he had instinctively com-

plied with the procedures exactly as he was trained during water survival training nearly 10 years earlier.

For nearly 30 years, water survival training has been a requirement for all flightcrew members assigned to parachute-equipped aircraft. Formal water survival training began in TAC at Langley AFB in 1964. In 1966, the school moved to Homestead AFB.

Throughout the '60s, other commands also conducted water survival training. But in July 1971, the schools were consolidated under the Air Training Command as the USAF Water Survival School.

## **Hurricane Andrew**

The school remained at Homestead until 1992 when the facility was destroyed by Hurricane Andrew. According to Lt Col Lance Bachran, the commander of the 17th Crew Training Squadron, "Two days after the hurricane hit, I was at Patrick AFB orchestrating salvage

*continued*

**SSGT JEFFREY L. BROWN**  
Eielson AFB, Alaska

■ Four-fifths of the earth's surface is covered by open water. Although accounts of water survival incidents are often pessimistic, successful survival is possible.

Modern equipment for survival was designed to give all aircrew members the means to remain alive until rescue could be effected.

In general, shelter yourself from the elements, keep as dry as possible, keep striving for water and food, signal for help, observe strict water discipline, and above all, do not despair.

In this type of environment, many priorities must be set. Certain items go on a much higher platform than others. Some of these items might be difficult to accomplish or obtain whereas others might be quite simple for us.

Some of the items easier to obtain would come under the category of

*continued*



# WATER SURVIVAL continued

and recovery operations. Because of the effects of water, heat, and humidity on our equipment, time was critical. Only 3 weeks after Andrew struck, our equipment began to arrive at our new facility at Tyndall AFB on Florida's panhandle."

## The Fleet

The school operates a fleet of 12 vessels. They vary in size and speed from an 82-foot converted US Navy LCM, with a top speed of 8 to 10 knots, to a 29-foot utility boat powered by two 225-hp outboard engines with a top end of 40 mph.

The boats are operated and maintained by the school's 38 boatmasters and marine engineers who carry the 591xx AFSC. "We are a dying breed," said MSgt Brian Glavin, a chief engineer on a launch recovery boat. "Tyndall is one of the few places in the entire Air Force members of the marine career field can be assigned."



A wave of a flag from an instructor on the launch boat tells the student to release the tow line.



MSgt Glavin explained, "When the boats are at the dock, the engineers perform maintenance and inspections. On the water, the engineers not only ensure the boats remain operational but they also perform other duties. For example, on the launch boats they also operate the tow reels regulating the student's altitude in the parasail. Basically, if it is mechanical, it is the engineer's job to make sure it works."

Like the marine engineers, boatmasters are an endangered species. Many of the school's boatmasters are licensed Coast Guard captains. SSgt Dwayne Saunders is the boatmaster on one of the launch vessels. In this capacity, he acts as the overall commander of the vessel and crew. It is his job to navigate and ensure the boat is operated in accordance with maritime law. The boatmaster is also responsible for scheduling all maintenance on the boats and deck equipment. In addition to aircrew

# It is Possible continued



sustenance, or very simply — water and food.

As we know, if we had to place one ahead of the other in terms of importance, water would win. Contrary to popular belief, water is very easy to procure in this open water environment.

Now the questions come to mind: How much water do I need, and what water sources are available to me? The answer to the first question is easy: 2 quarts/day minimum. The answer to the second question needs more explanation.

One of your first sources will be your emergency drinking water found in your accessory kit. The Flex

Packs contain approximately 4 ounces of ready-to-drink water. The main reason this is your first and most important source is that by drinking this water now, you aid in the treatment of shock. You can also slow down, relax, and start thinking of other sources available to you.

When solar stills are available, be sure to read the instructions and set them up immediately. Use as many stills as possible, and make sure they are securely fastened to the raft. The greatest single improvement to survival on the open ocean is the inclusion in survival kits of manual reverse osmosis desalinators. There are currently two models —



training, SSgt Saunders and his crew are also trained to conduct search and rescue operations.

### The Instructors

As with the marine specialists, the survival instructors belong to a small, unique group. TSgt Pat Dwyer is a survival instructor assigned to the 17 CTS. According to TSgt Dwyer, "All survival instructors must attend a 6-month course in the basics of survival. There they learn such things as first aid, land navigation, and survival techniques. They then spend another 6 months in what is called field, or upgrade, training. During this segment of training, they learn how to relate their experiences and expertise to aircrew members.

Actually, the first 6 months is used learning their trade, and the second is spent learning to apply that trade. Then they specialize in one of the different types of survival training. For example, they may be assigned to "Cool School" (arctic survival school) at Eielson AFB, Alaska, resistance training course at Fairchild, Washington, or water survival training here at Tyndall. So, by the time they arrive at the Water Survival School, they already have a year and a half experience in the career field."

### The Curriculum

Water survival is a 3-day course. Attendance is a one-time requirement for Air Force fliers assigned to parachute-equipped aircraft. Student slots are allocated by the Military Personnel Center at Randolph AFB, Texas.

From the beginning, the emphasis is on safety. The first 2 days consist of academic training. There the students learn post-egress and parachute techniques, raft boarding, and survival in a water environment. They also learn signaling techniques, the medical aspects of water survival, and how to acquire sustenance while in the drink.

One hour of the training is spent studying the hazards of marine life. Many students are concerned about the possibility of being bitten by one of the many varieties of shark indigenous to our training area. But, as TSgt Dwyer put it, "Sharks have not been a problem for us because humans are not a normal part of their food chain. However, we do emphasize the importance of preventing blood from getting into the water. As with most animals, they avoid man and when our boats enter the area, they usually leave.

The last 7 hours of training are conducted on the water. During this

continued



Once released from the tow line, students splash down, release from the parachute gear, and climb into the liferaft.



the Survivor 06 which produces approximately 1 quart per hour (ejection kits) and the Survivor 35 which produces approximately 1 and 1/2 gallons per hour (multiplace). Rain, dew, and old sea ice (blue, rounded corners, splinters easily) are natural water sources which should not be overlooked. Water should be procured at every available opportunity.

Your last resort for water is the desalinator kit. You can use the kit to produce only 8 pints of water. The water should only be used if no other sources are available.

As a general rule, if you don't have the proper amount of water, don't worry about food. But if you

have water, then carbohydrates would be your best food source because they use a smaller amount of water in producing nutrients.

The only real source of carbohydrates you might have on the open seas will be your general purpose rations. In this aluminum can, you will find approximately 880 calories of almost pure carbohydrates. These "carbs" will come in the form of four cereal bars, sugar, soup, and gravy base. There is also coffee in the can but it should be avoided. If you are low on water, drinking coffee will increase your dehydration.

The ocean is a great big picnic basket just waiting to be opened. Espe-

cially in this environment, food should not be difficult to procure.

Your first source of protein will be fish. This is an excellent source; however, certain precautions must be taken. Here is a set of guidelines to follow when selecting an edible fish. Don't eat the fish if:

- It doesn't look like a fish.
- It has a parrot-shaped beak.
- It has a large torpedo-shaped body with a V tail.
- It is a puffer.
- It has a box-like body.
- It has skin instead of scales.
- It appears unhealthy.
- It has indented skin and a bad smell.

continued



## WATER SURVIVAL continued



Water survival training for aircrews of nonparachute-equipped aircraft is conducted in a mock-up at Fairchild Air Force Base.

phase, students learn how to don the parachute harness with the life preserver unit and how to use the parasail to practice post-egress procedures and perform landing and release procedures. And depending on the availability of aircraft, each student is actually hoisted from the water into a rescue helicopter. This allows them to experience the wind, noise, and spray they would encounter during an actual rescue.

According to TSgt Dwyer, it is not the parachute release or the helicopter lift which the students find most difficult. Rather, it is the high wind drag and parachute release which seems most difficult for students. However, this is also the most important lesson during the open water training.

"During WW II, we learned many pilots were drowned trying to release themselves from the harness while being dragged by their parachutes," said TSgt Dwyer. "During this exercise, the students gain confidence by learning to stabilize their body and release themselves from a parachute harness while being dragged on their backs or stomachs. As a result of this training, we



Aviators huddle in a 20-man raft during open water survival training.

haven't had people drown because of drag in years," Dwyer added.

### The Results

The Air Force survival school trains over 1,200 aircrew members a

year. "When they leave this school, each one will have a new level of confidence and knowledge and feel, if ever faced with the reality of a water survival situation, they can survive," said Lt Col Bachran. ■

## It is Possible

continued

Keep in mind there are exceptions to every rule. These are merely the best guidelines to follow.

Another food source available on the ocean is birds. Birds have been seen several hundred miles out at sea. They can be captured by hand or caught with a baited hook when

they land on you or your raft.

Last, but certainly not least, you have seaweed. This is a very high source of vitamins and minerals. Certain precautions should be taken. First, eat only seaweed which is red, green, or brown in color, and second, eat only the leafy-type varieties.

Just because you are placed in an unfamiliar situation doesn't mean you have to go totally without the so-called "comforts of home." Only

now, these comforts become necessary for sustaining life. Remember your priorities — water, then food. You can get along for weeks without food, but you can't live long without water. When you get that 2 quarts or more of water, per day, then worry about the food.

There are only two ways you can return from a survival situation — as a survivor or a statistic. The choice is yours! ■





# HYPOTHERMIA

**SGT RON SPRANGER**  
McClellan AFB, California

■ Most people think of hypothermia as a severe cold weather condition and too often overlook it when the temperature begins to rise. Little do they know the ideal condition for a person to fall victim to hypothermia is windy and wet weather with the temperature between 30 and 50 degrees Fahrenheit.

Hypothermia begins whenever a person's inner body core temperature falls below their normal body temperature. As the body core temperature falls, the symptoms begin and become progressively more severe. At first, mild shivering begins as the body tries to reheat itself. Then, intense shivering results in a reduced ability to perform even the simplest tasks. When the core temperature falls even further, violent shivering nearly shuts down all speaking and thinking functions. Eventually, shivering is replaced by muscular rigidity and a loss of contact with the environment. Next, the victim will drift into a stupor and then unconsciousness. Finally, heart

failure and cessation of brain control lead to death.

## AIR BATHING

Like the old saying goes, "Cleanliness is next to godliness." In a survival situation, cleanliness is essential to prevent infection. But what do you do when water is in short supply? Simple — take an "air bath."

To air bathe, just remove your clothing and expose your body to the air. Exposure to sunshine is ideal, but even on overcast days, a 2-hour exposure of your skin to the air will refresh your body. Care should be taken to avoid sunburn and cold injuries when those conditions exist. Exposure in the shade, shelter, and sleeping bag will help if weather conditions don't permit direct exposure.

Adequate personal cleanliness will not only help protect you against germs present in your personal surroundings, it will also help protect others in your group by reducing the spread of germs. The persons in your group might appreciate you a little more, too.

The time to prevent hypothermia is during the period of exposure and exhaustion. The moment the body begins to lose heat faster than it produces it, you become hypothermic. Exercising to stay warm or involuntary adjustment made by the body to preserve the normal temperature of vital organs causes the exhaustion. These actions drain your energy reserve.

By following a few simple rules, hypothermia can be avoided. First, stay dry. Wet clothes lose about 90 percent of their insulating value. Also, beware of the wind. Wind drives cold air under and through clothing, removing much of the warm air. Wind mixed with wet clothing refrigerates the body by removing moisture. When moisture is removed, it takes heat with it. Finally, understand the cold. Many people can underestimate the danger of being wet at moderate to cool temperatures.

Remember, hypothermia can happen any time of the year. No matter where you go or what you do, take enough clothing to protect you from all types of weather. ■



# Into the Woods



"Our aircraft departed controlled flight at about 21,000 feet. I strained to see the flight instruments on the pilot's side to help evaluate our situation. Because of the violent motion of our aircraft, the only way I could focus on the instruments was to lean far to the left.

"The pilot command-ejected us without warning at an altitude of 10,000 feet AGL. My shoulder harness retracted during the ejection sequence and helped pull my head from under the canopy bow, but my left arm was grossly out of position.

"The last thing I saw as my seat left the cockpit was the altimeter

rapidly descending through 11,000 feet (9,000 feet AGL). In a flash, I was clear of our aircraft as it spun out of control into the rugged terrain below. The wind ripped away my helmet and oxygen mask. I glanced up at my parachute as the violence of the ejection subsided and saw that it was perfect.

"As I hung in my chute, I screamed in anger and disbelief at what had happened to my arm and to what was a perfectly good jet.

"I was also very troubled because I could see I was going to come down in a hilly, heavily timbered area with no help in sight"





***You have to be  
prepared to survive ...  
and survival school will  
get you ready!***

**PEGGY E. HODGE**  
Assistant Editor

■ You never know when you will be forced to eject and subsequently become stranded with "no help in sight."

All Air Force aircrews, and other career field members who must fly, are trained at Combat Survival School, Fairchild AFB, Washington, to effectively operate in this type of environment. Our profile of the school highlights their important survival mission. Since we are offered this training just once in our career, the photographs on these pages will review some important training information.

### **The School**

The school at Fairchild began in 1949 when Strategic Air Command's General Curtis LeMay became concerned the crews of long-range B-36 bombers might be forced down anywhere in the world. Crews would have to survive for unknown periods of time.

Today, the 336th Crew Training

Group is committed to preparing aircrew members for the eventualities of flight, to include surviving in any type of environment regardless of friendly or unfriendly conditions.

"That They Shall Survive" is the school's motto and is representative of their critical Air Force mission. A highly skilled and professional staff of administrators and instructors conduct the Air Force's 17-day land survival and prisoner-of-war training course. Some of the instruction takes place in the Colville and Kaniksu National Forests, 70 miles from Fairchild AFB near Spokane, Washington.

Course content provides crews with valuable information on everything from firecraft to proper shelter construction to water purification. Sections on finding food — what you can and can't eat — parachuting, proper hoist procedures, and protection from the elements all may prove invaluable to aircrew.

A major goal at the school is to get aircrews who have had no experience in the woods used to the idea

*continued*

The Colville and Kaniksu National Forests near Spokane, Washington, provide a realistic training environment to help ensure aircrew receive vital survival training.

Your parachute or raft provides a very good source of material for shelter. Remember to select a natural concealment area and one least likely to be searched.



The three essential elements for starting a fire are heat, fuel, and oxygen. Once you have prepared your tinder, matches, a lighter, or various rocks and metals can be used to light your fire.







You will need to know your exact location in order to radio this information to rescue personnel. Remember to move up out of valleys, drainages, and canyons before transmitting.



You can use your parachute material to create a message for rescue personnel.

At the end of the day, the students are required to actually sleep in their self-made shelters.

The instructors must be skilled in all areas of woodsman basics. They also know trouble areas to watch out for. At one extreme, there are students who have the attitude a survival situation will not happen to them. It can and does happen. A lot of good basic survival information is offered, and it is best to retain as much information as possible.

The other extreme is the student who presses too hard. Do not press your physical condition beyond its limits.

# Into the Woods

continued

of being alone in this type of environment. It's an element many of us have little or no experience coping with. Classroom lectures provide theory and necessary basic information. The field days in the woods are for practice and resistance training.

The actual hands-on training in the woods is effective and as realistic

as possible. Upon arrival, the students are divided into groups and given a minimal food allowance and sent on their way into the woods.

The terrain is very rugged (not your average hiking trail). They first must build their campsite. Although only 5 days in duration, long workdays include every kind of training.

## The End Result

Students learn all those basic skills one needs to get along "in the woods." Students graduate with an awareness of what is in the woods they can use to survive and what they can use to protect themselves.

Perhaps just as important as the basics is the confidence students gain after course completion and the attitude that **it can be done — you can survive!** ■

If you decide to travel to a safer place, make sure you know which direction you are going, and keep track of where you have been.

A person could last weeks without food, but only a few days, at most, without water. Water purification may be necessary!







**336 CREW TRAINING GROUP**  
Fairchild AFB, Washington

## STARTING A FIRE

■ In any survival situation, a fire should be high on your list of priorities. Fire is used for cooking, warmth, signaling, purifying water, drying clothing, and can also be a big morale booster. Starting a fire, however, requires preparation.

When preparing to start a fire, you need to remember a fire needs fuel, oxygen, and a heat source. These three elements make up what is known as the "Fire Triangle."

Fuel is broken down into three

stages relating to size and flashpoint: tinder, kindling, and fuel.

Tinder is any type of small material with low flashpoint which can be ignited with a minimum of heat, even a spark. It must be arranged to allow air between the dry, hairlike fibers. The preparation of tinder is one of the most important parts of firecraft. Dry tinder is so critical pioneers used extreme care to have some in a waterproof "tinder box" at all times.

Some common tinders are shredded bark from trees and bushes; crushed fibers from dead plants; fine, dry woodshavings; bird or rodent nest linings; cotton balls or lint; and foam rubber.

Kindling is the next larger stage of fuel material. It should also have a

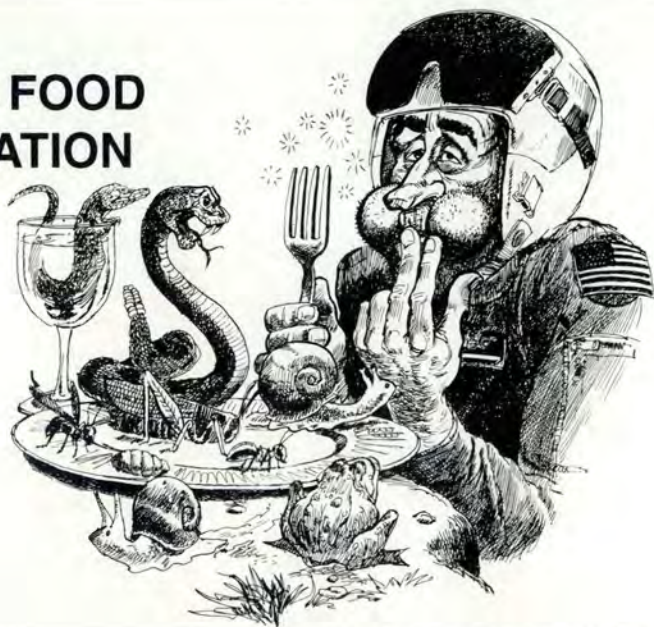
low flashpoint. It is arranged over the tinder so it ignites when the flame from the tinder reaches it. Kindling is used to bring the burning temperature up so larger and less combustible material can be used.

Kindling includes dead, dry twigs; pieces of dry, thinly shaved wood; coniferous seed cones or needles.

Fuel, unlike tinder and kindling, does not have to be kept completely dry as long as there is enough kindling to raise the fuel to a combustible temperature.

Recommended fuel sources are dry, standing dead wood and dry, dead branches; green wood which has been finely split; and in treeless areas, other natural fuels such as dry grasses, dead cactus, and dry animal dung. ■

## PROPER FOOD PREPARATION



**SSGT DON WELCH**  
Soesterburg, Netherlands

■ Cooking food at home and in the survival environment is a popular method of making food more enjoyable. Some foods taste better, are digested easier, and make us feel good when cooked. In any situation,

cooking is also the best way to kill parasites.

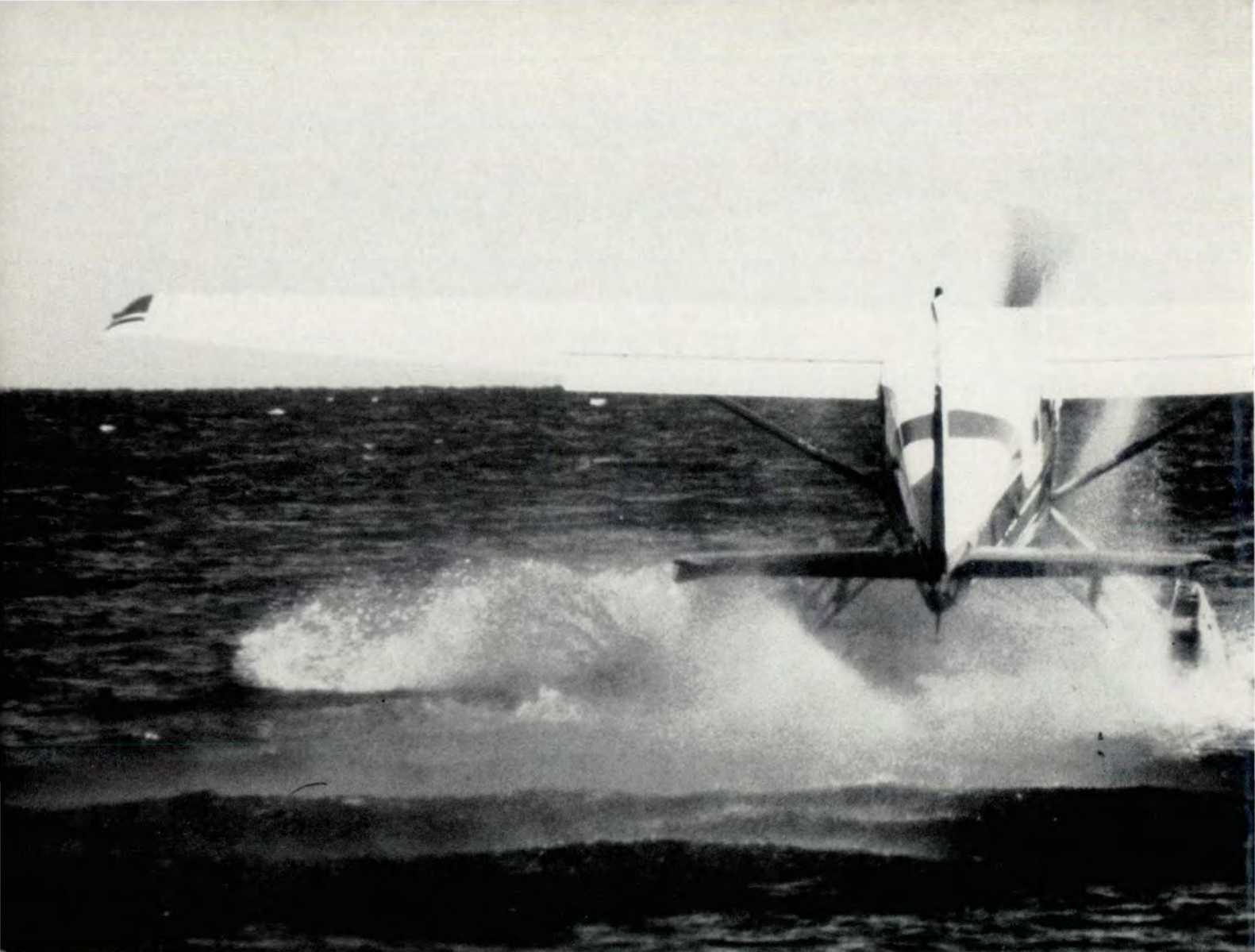
AFR 64-4, *Survival Training*, says "all wild game, large insects (grasshoppers), freshwater fish, clams, mussels, snails, and crawfish must be thoroughly cooked to kill internal parasites." In a combat situation, cooking might not be feasible. In

such a case, food may have to be ingested uncooked. However, in a training situation, there is no reason to ingest uncooked food which could carry parasites.

Overcoming food aversions is critical for survival, but you don't have to take chances. Take, for example, slugs found near rivers. Sure, survival students can learn to overcome food aversions by eating uncooked slugs; however, most people would agree any nontraditional food, cooked or uncooked, can be challenging. When training a student to overcome food aversion, forcing him or her to ingest nontraditional food could produce traumatic results, further hindering the training goal. Parasitic infections may result in distractions, illnesses, or absences which affect learning.

By teaching potential survivors how to cook food and that cooking will make the food more enjoyable, we help them overcome the aversion. After all, isn't this our primary objective? ■





# Getting a Seaplane Ticket



For those just learning to fly, float flying has many advantages.

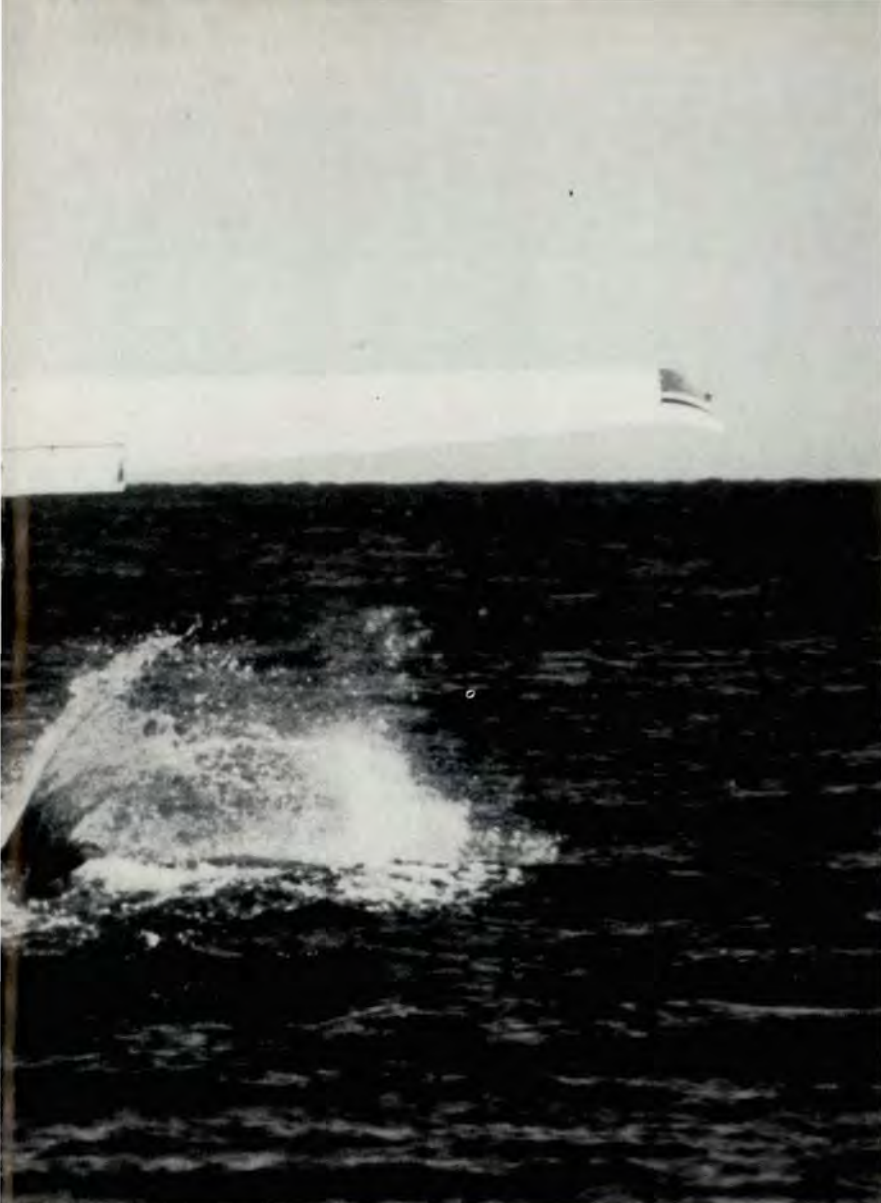


**CMSGT ROBERT T. HOLRITZ**  
Technical Editor

■ Few aviators have not toyed with the idea of adding a seaplane rating to their ticket. The thought of flying to your favorite hunting or fishing spot or just spending a few days near a secluded lake lures more SEL (single engine land) pilots to take to floats every year. Most are surprised at how inexpensive it is to get the required training. And, for a licensed pilot, it takes only a few hours of flight training to be awarded the rating.

For those just learning, most instructors consider float flying the easiest way to learn to fly. This is because a seaplane is more forgiving during landing and takeoff. Also, the lakes and rivers used during training are usually much larger





and, generally, more traffic-free compared to most airfields. And on wide lakes and rivers, the student does not have to sweat out cross-wind landings as much as on a relatively narrow runway. Finally, since many of these training areas are on long rivers or wide lakes, the student rarely has to worry about clearing fences and other objects at the end of the runway.

Since a seaplane can land on land as well as water, in an emergency, it offers a pilot a greater choice of safe places to set down. In most cases, a seaplane can land on smooth or grassy areas with little or no damage to the pontoons. And, except for extremely rough seas, forced landings on water are rarely considered life threatening.

However, while landing a float plane is easier than bringing in a

land plane, there are some extra precautions which need to be observed when landing a float plane on water. For example, it is important to remember a float plane can be landed in a smaller area than is needed for takeoff. Therefore, it is possible to land in places where you can't take off. It is also important to check the



Special training is required to learn how to taxi a seaplane, especially in windy conditions.

landing spot from low altitude to check for floating objects or underwater obstructions.

Power lines can also be a deadly menace to a float plane pilot. Quite often, they are strung across rivers and between islands. Since the poles are usually located in or near tree lines on the shore, there is often no indication of the lines connecting them.

Landing a seaplane also presents some hazardous perception problems. Surprisingly, it's more difficult to set a seaplane down on a glassy body of water. This is because there are few, if any, visual cues to give the pilot an indication of when to expect touchdown. Those who have had the experience of landing on large, flat terrain, such as dry lake beds, understand this problem. In this situation, most of us tend to flare too high, resulting in a hard landing.

Night landings are extremely hazardous. For one thing, it is difficult or impossible to see floating debris or watercraft. For another, it is often difficult to distinguish between open fields and lakes. Finally, there are usually no runway lights to provide visual clues. The fact is, most seaplane pilots simply plan to avoid night landings and seek a land

*continued*

Seaplane pilots enjoy the best of both sports, flying and boating.





Crosswind takeoffs are easier in a seaplane.

## Getting a Seaplane Ticket

continued

runway rather than attempt to set down on water after twilight.

The cost of buying or renting a seaplane is about 20 percent more than a conventional aircraft. But for the satisfaction it provides the adventurer or sportsman pilot, it is well worth the money and effort.

### Sailing

In addition to takeoffs and landings, special training is required to learn how to taxi a seaplane. During severe wind conditions, there is a possibility of dumping a seaplane, especially when taxiing crosswind or when turning. You may spend as much time learning to sail the aircraft as learning to land.

As the term implies, sailing is a way to keep the aircraft under control by sailing it into the wind, and sailing a seaplane is much like sail-

ing a sailboat. After a little practice, you will learn to sail the aircraft to a point, such as a dock some distance away.

### Preflight

Preflighting a seaplane is basically the same as a land plane with a few exceptions. The big difference is inspecting the hull or the pontoons for obvious defects such as cracks, loose rivets, corrosion, and punctures. The attachment gear must also be checked for defective welds, cracks, and for proper installation. And, as one might expect, the pilot should inspect the bilge for excessive water. A small amount of water is not necessarily the sign of a problem. But remember, water not only causes corrosion, it also weighs 8 pounds per gallon. **Don't forget to reinstall the access plugs.**

### Not Boats

Surprisingly, the United States Coast Guard does not consider a seaplane on the water a vessel. However, they are required to follow the right-of-way rules for vessels. It's important to know rules for inland waterways differ from those

of international waterways.

There are also two unwritten rules for seaplanes maneuvering on water:

1. A seaplane maneuvering on the water has the right-of-way over one in the air.
2. A seaplane taking off has the right-of-way over one coming in for a landing.

### Publications

There are a lot of excellent books on flying floats. FAA Advisory Circular (AC) 91-69, entitled "Seaplane Safety," contains recommendations for operating seaplanes. It also contains a list of government publications on the subject. It is available free of charge from the FAA.

Another good reference is "How to Fly Floats," by Jay J. Frey, EDO Corporation, Float Operation, 14-04 111 Street, College Point, New York 11356.

A seaplane rating can bring new adventure to the already exciting art of flying. For many pilots, it brings together the best of two worlds, boating and flying. The time and effort involved in earning the seaplane ticket are worthwhile investments. ■

Fly over the landing the area first.



Seaplane fly-in at Oshkosh, Wisconsin.





# Fuel Contamination

*Improper fuel sampling is a major cause of aircraft mishaps.*

ROB LUNDIN, CFI

■ After our recent rain storms, I wanted to “exercise” the O-2. My preflight was extra careful. When I pumped the gear doors open, water poured out. When I sampled the first fuel tank, I was pleasantly surprised to see “clear, no water bubbles, no crud, light blue — good.”

The second and third tanks were the same — I was “on a roll.” I had a “rhythm going of seeing what I expected and expecting what I saw.” I was already thinking beyond the fuel samples to what kind of fun I was going to have flying. The fourth tank was the same — “clear, no water bubbles, no crud — good!”

As I dumped the sample, I thought to myself, “Self, wait a minute ... did I see any BLUE on that last one?”

I resampled, took off my sunglasses, stepped out of the wing’s shade into the sunlight, and compared what I was seeing with gas from the other tanks. It SMELLED like gas, but it was definitely CLEAR (as in water or turbine fuel).

It *was* water — a lot of water. Obviously, a bad tank cap seal had

allowed rainwater in. After several samples, I got brown crud and then pure water — probably 1 to 2 gallons — my arm was getting sore! Got more brown crud and finally fuel. About 15 samples after fuel showed up, I had pure fuel.

Remembering some FAA articles about water “hiding” in tank irregularities and the airplane not being perfectly level to allow contaminants to settle to the lowest point in the tank, I rocked the wings up and down, let it settle, and resampled all four tanks. I found a little more water in that one tank. I cranked up, carefully checked the engines and fuel feed systems, and flew a short pattern hop. I resampled the tanks after flight and found a little more water in the problem

tank. I informed the mechanics in case they wanted to check further.

In 27 years of flying, I’ve never seen or heard of a completely clear, BAD sample without globs of water and crud. Globs/bubbles/crud are easy to see. The difference between 100LL’s LIGHT blue color and clear is slight. Throw in night, sunglasses, bad weather, being in a hurry, and you have a setup to miss the light fuel dye coloring.

Think of the many pilots who drain their “samples” straight onto the ground without inspecting it in a clear container! Never do that! Fuel contamination has caused many accidents. Carry a personal fuel sampler in your flight bag. Don’t expect the Club or FBO to furnish you one. Fly Safe! ■





# CLASS

# THE INBETWEEN CLASS



## ***C? It's Not So Confusing***

LT COL ROY A. POOLE  
Editor

■ Okay, so you think you understand our discussion about Class B airspace from last month's article. Well, the good news is Class B is perhaps the most restrictive of all airspace. Therefore, the rest of the airspace will be even easier to understand. Things might seem a little confusing right now, but hang in there.

Class C airspace logically follows Class B on a scale of decreasing complexity. Whereas Class B has all sorts of restrictions and extensions with altitude blocks changing every couple of nautical miles, Class C smooths out many complications.

Technically, Class C is the new

name for the old Airport Radar Service Area or ARSA. The reason for Class C airspace is to smooth out the arrivals and departures into busy airfields which don't qualify for the more complex Class B designation. These airfields have a combination of IFR and VFR traffic, and the Class C airspace is meant to make life safer for both types of pilots. Class C airspace designations will soon be showing up around Ontario IAP CA, San Antonio IAP TX, Jacksonville FL, and other former ARSAs.

In order for Air Traffic Control to do a good job, they have to be talking to all the players. Therefore, contact must be established before you enter Class C airspace. Aircraft on an IFR flight plan will also receive a clearance to enter the airspace. Air Traffic Control will provide traffic separation between IFR and Special

VFR traffic, but VFR-only pilots must ensure they remain safely clear of other airplanes.

However, Air Traffic Control is trying to help keep things safe, and if possible, they will provide conflict resolution and traffic advisories. This can be a big help since student pilots can be operating in Class C airspace using the 500' below, 1,000' above, and 2,000' horizontal cloud clearances on a day with just 3 miles visibility.

As a reminder, if you are VFR in Class C airspace and the controller has given you an altitude to maintain, you are NOT cleared to climb or descend when the controller issues "resume own navigation" instructions. If in doubt, ask for a new altitude or maintain the currently assigned altitude until clear of the Class C airspace. ■



*Our story so far ...*







# OPS TOPICS



## "Cleared for the Transition" ... Mostly

■ In all the static which passes for radio transmissions these days, "Cleared for the transition" seems easy enough to under-

stand and to comply with. Well ... maybe not. A recent report to NASA's Aviation Safety Reporting System showed the in-

structions are not always what they seem.

"Approaching the VOR, I was given the following clearance from air traffic control: 'Cleared for the ABC Transition.' I acknowledged.

"My last amended altitude assignment was 8,000 feet ... The published altitude for the transition is 4,500 feet.

"At XYZ VOR, in adverse flight conditions, I began a descent. The Center frequency was busy, and I did not inform them of vacating 8,000 as I was on a published transition.

"At 7,000 feet, Center informed I was to be maintaining 8,000 and now to maintain 7,000. I acknowledged the clearance but

offered that I was cleared on the transition. Center responded I was cleared to fly the profile only of the transition and had to maintain altitude. I didn't argue ...

"Since 'cleared for the transition' is not in the pilot/controller glossary of the AIM (*Airmans Information Manual*), I believe the clearance should have been 'fly outbound on R-277, maintain 8,000.'"

Published transition altitudes provide pilots with terrain clearance and radio reception minimums in case they should lose communications.

The basic rules of good communication still apply — if in doubt, don't assume, ask. ■

## G-SUIT

■ Those of you who've flown any time at all have a devotion to your usual personal equipment. Your helmet is custom fit to you alone, your gloves know how to fly by themselves, and your G-suit reacts when you need it most.

But what happens when things get strange and the G-suit tries to fly your jet?

Recently, the pilot of an Electric Jet was wearing a new G-suit, model CSU-13B/P, during a training mission. Well up into the MOA and turning the jet with a good 7 Gs, the G-suit side zipper failed.

The bladder was unre-

strained and quickly pushed against the side stick controller, commanding a hard, right roll. It

happened so quickly, the jet reached an inverted attitude before the pilot could react.



Fortunately, the pilot had the altitude to recover. The force required to override the inflated bladder was not very great either.

A metal clip called a Metal Stay Channel failed, allowing the zipper to pull apart as the G-suit began to inflate. Recommendations to evaluate the clip design are already in the works. The lesson learned, however, applies to all personal equipment — although you may be familiar with your personal equipment, a thorough inspection before each flight remains a good idea. ■





■ A civilian airliner with 77 passengers on board was preparing to depart from a European airport when the controls jammed. Mechanics summoned to the aircraft found three bags of bottled whiskey and vodka hidden under a hatch.

It was determined the bottles were smuggled aboard by the pilot, who was subsequently grounded for 10 months. The bags had prevented the controls from moving freely.

The flight was canceled, and the passengers were transported to their destination by other operators.

## GREMLIN ON A STICK

■ Most maintainers are pretty conscientious when it comes to performing a tool inventory after working on a jet.

But we often fall into a trap when we use tools, such as pocket knives, which are not listed on the tool inventory. Swiss Army survival knives, nail clippers, pens, and pencils are all handy "tools" which are not usually listed on the tool inventory.

Then there are the special tools which are usual-

cluded on the tool inventory list.

As one might expect, these unlisted items often end up where they can cause foreign object damage. Here's an example. A

T-37 was sent to the defuel pad for paint prep. The crew chief found the Tweet's fuselage tank would not defuel. After several tries, the crew chief turned the problem



ly locally manufactured to make the job easier. The problem with these "unofficial" maintenance aids is they are not always in-

over to the fuel shop. The aircraft was towed to the fuel barn where the specialists discovered a 3-foot-long broomstick with a rag, duct taped to the handle, clogging the defuel valve.

After a brief investigation by local quality assurance sleuths, it was determined a technician who accomplished fuel cell maintenance failed to remove the makeshift tool when the task was completed. The technician failed to follow established consolidated tool kit procedures by using an unauthorized and undocumented tool. In addition, a seven-level supervisor signed the discrepancy off without noticing the illicit broomstick. ■





From left to right: A1C Foster, SrA Goldston, CMSgt Williamson, TSgt Henkle, Capt Smallidge, Capt Walsh, MSgt Alesi, SSgt Peterson, TSgt Messer, TSgt Stevens.

Captain **Craig A. Walsh**, Aircraft Commander  
 Captain **David S. Smallidge**, Copilot  
 Chief Master Sergeant **Donald M. Williamson**, Loadmaster  
 Master Sergeant **Anthony W. Alesi**, Flight Engineer  
 Technical Sergeant **Craig D. Henkle**, Flight Engineer

Technical Sergeant **Andrew J. Messer**, Flight Engineer  
 Technical Sergeant **Kenneth W. Stevens**, Flight Engineer  
 Staff Sergeant **Mark A. Peterson**, Flight Engineer  
 Senior Airman **Travis R. Goldston**, Loadmaster  
 Airman First Class **Donald M. Foster**, Loadmaster

#### 22d Airlift Squadron, Travis Air Force Base, California

■ Upon departure, the C-141's left forward main landing gear failed to completely retract. The crew noted it was in a position rotated 90 degrees to centerline, slightly retracted.

Dash One procedures for the emergency extension of the landing gear were accomplished resulting in no change in the left forward gear position. Soon, all of the procedures in the "book" had been attempted without avail. The affected gear appeared to be frozen in position. With this configuration, the malfunctioning gear would probably shear off and take the left rear main landing gear with it, resulting in the left wing contacting the runway.

The engineers depressurized the airplane and removed an access port in the cargo compartment. A cargo chain was attached to the gear sidebrace to pull the gear to the down and locked position using the cargo winch. This effort was partially successful and moved the gear to within inches of its down and locked position. However, the gear and its six tires remained 90 degrees out of alignment.

The engineers successfully isolated the original leak by skillfully manipulating the manual hydraulic "buttoning" valves in the cargo compartment. The crew reduced airplane weight by dumping 50,000 pounds of excess fuel. As an added precaution, the loadmasters jettisoned 180 pounds of Class B explosives out one of the troop doors. The crew landed the aircraft flawlessly and shut down on the runway.

As the aircraft was towed from the runway, the cargo chain holding the gear snapped and the damaged gear collapsed. It was dramatic testimony to the aircrew's ingenious handling of a "one of a kind" malfunction which spared millions of dollars in aircraft damage and the potential loss of life.

WELL DONE! ■





UNITED STATES AIR FORCE

# Well Done Award

*Presented for  
outstanding airmanship  
and professional  
performance during  
a hazardous situation  
and for a  
significant contribution  
to the  
United States Air Force  
Mishap Prevention  
Program.*



LIEUTENANT COLONEL  
**Thomas V. Stinson**

CAPTAIN  
**Michael B. Kane**

**72d Tactical Fighter Training Squadron  
MacDill Air Force Base, Florida**

■ Lt Col Stinson, flight lead, and Capt Kane were on an RTU surface attack tactics sortie to Avon Park Range in two F-16s. During the low altitude ingress, a 5-pound turkey vulture struck Capt Kane's aircraft. This impact destroyed the radome and radar antenna. Forward visibility was restricted by splattered bird remains.

As they proceeded to Avon Park Airfield for an SFO landing, Lt Col Stinson advised Capt Kane his radome was hanging to the left side of the fuselage (more than 120 degrees offset from its original position). Capt Kane noted his airspeed was zero, and the AOA indicator read "off." Additionally, neither pilot was sure of the extent of the engine damage from pieces of the radome or vulture debris. They decided not to delay the landing.

Since Capt Kane was faced with flying an SFO without airspeed indications, Lt Col Stinson took control of the situation. They flew a flawless formation teardrop SFO approach. During the flare for landing, Lt Col Stinson went around as Capt Kane was now able to see the runway environment through the vulture remains on his canopy. Capt Kane landed without incident and stopped the aircraft 10 feet prior to the departure end cable.

Lt Col Stinson's and Capt Kane's expert airmanship and coolness under pressure allowed them to recover a valuable USAF resource.

WELL DONE! ■



***You can land here ...  
but can you take off?***



**CHECK YOUR DENSITY ALTITUDE**