FAA GENERAL AVIATION NEWS

AUGUST 1978

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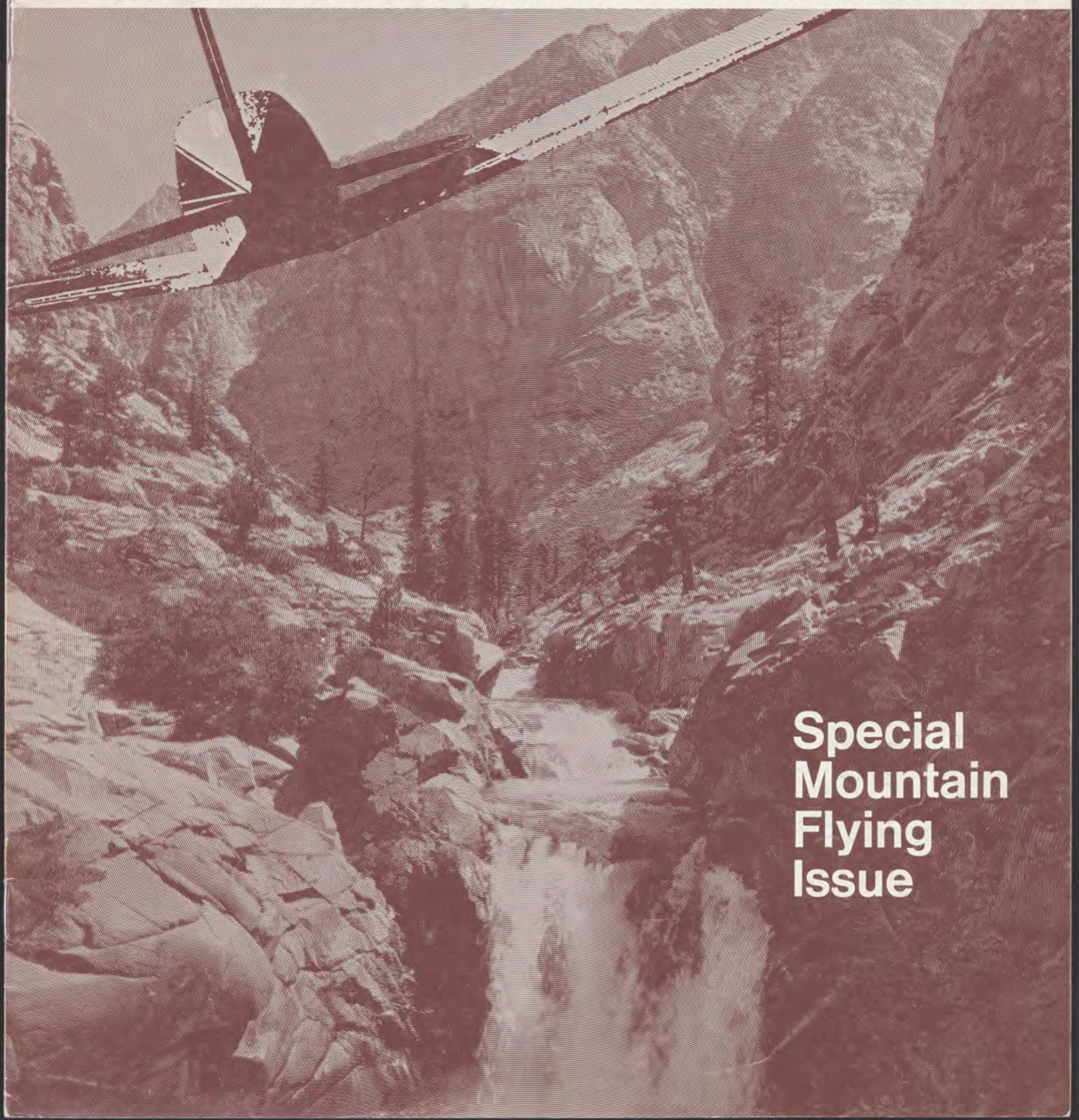

Special Mountain Flying Issue

FAA GENERAL AVIATION NEWS

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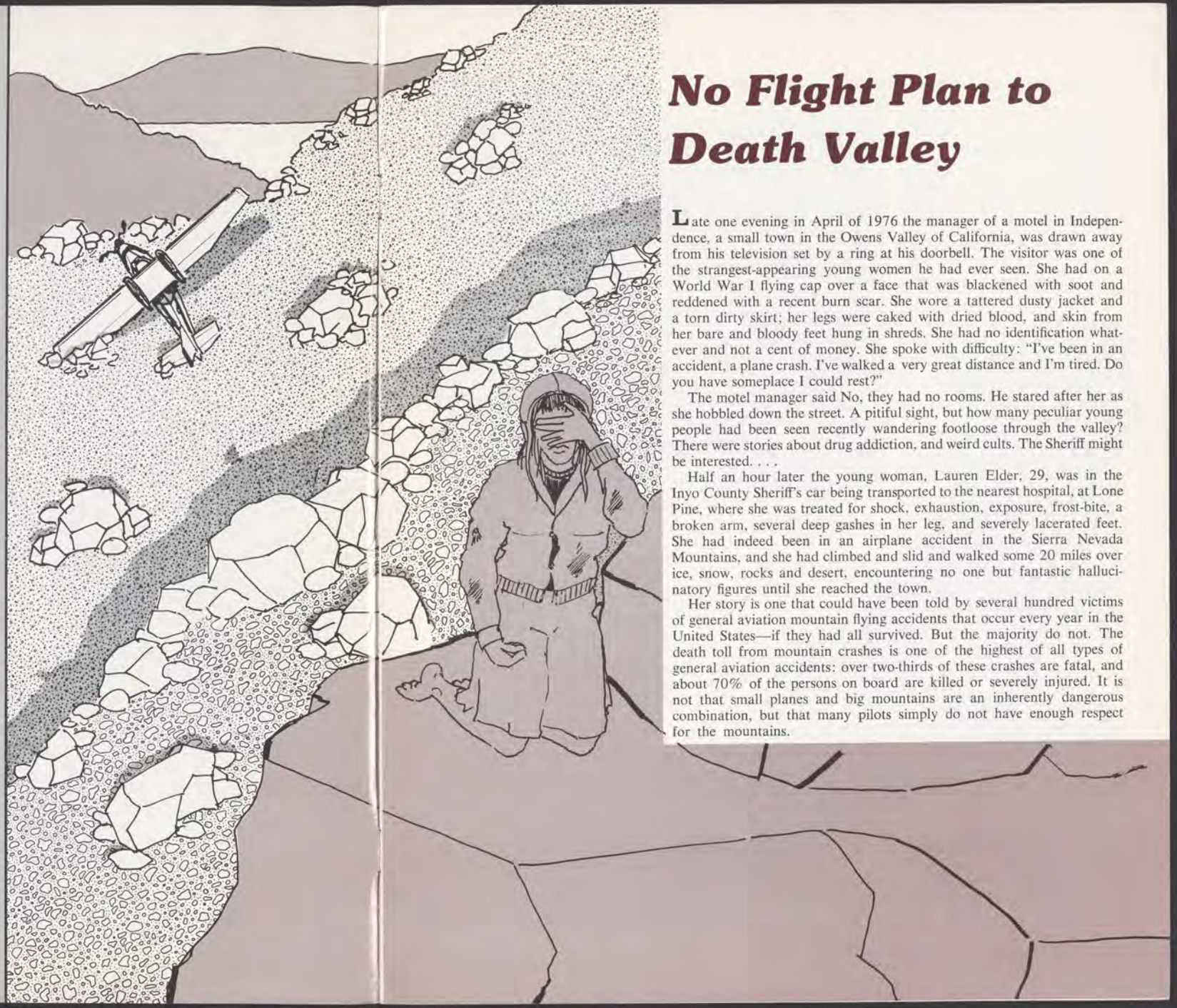


No Flight Plan to Death Valley

Late one evening in April of 1976 the manager of a motel in Independence, a small town in the Owens Valley of California, was drawn away from his television set by a ring at his doorbell. The visitor was one of the strangest-appearing young women he had ever seen. She had on a World War I flying cap over a face that was blackened with soot and reddened with a recent burn scar. She wore a tattered dusty jacket and a torn dirty skirt; her legs were caked with dried blood, and skin from her bare and bloody feet hung in shreds. She had no identification whatever and not a cent of money. She spoke with difficulty: "I've been in an accident, a plane crash. I've walked a very great distance and I'm tired. Do you have someplace I could rest?"

The motel manager said No, they had no rooms. He stared after her as she hobbled down the street. A pitiful sight, but how many peculiar young people had been seen recently wandering footloose through the valley? There were stories about drug addiction, and weird cults. The Sheriff might be interested. . . .

Half an hour later the young woman, Lauren Elder, 29, was in the Inyo County Sheriff's car being transported to the nearest hospital, at Lone Pine, where she was treated for shock, exhaustion, exposure, frost-bite, a broken arm, several deep gashes in her leg, and severely lacerated feet. She had indeed been in an airplane accident in the Sierra Nevada Mountains, and she had climbed and slid and walked some 20 miles over ice, snow, rocks and desert, encountering no one but fantastic hallucinatory figures until she reached the town.

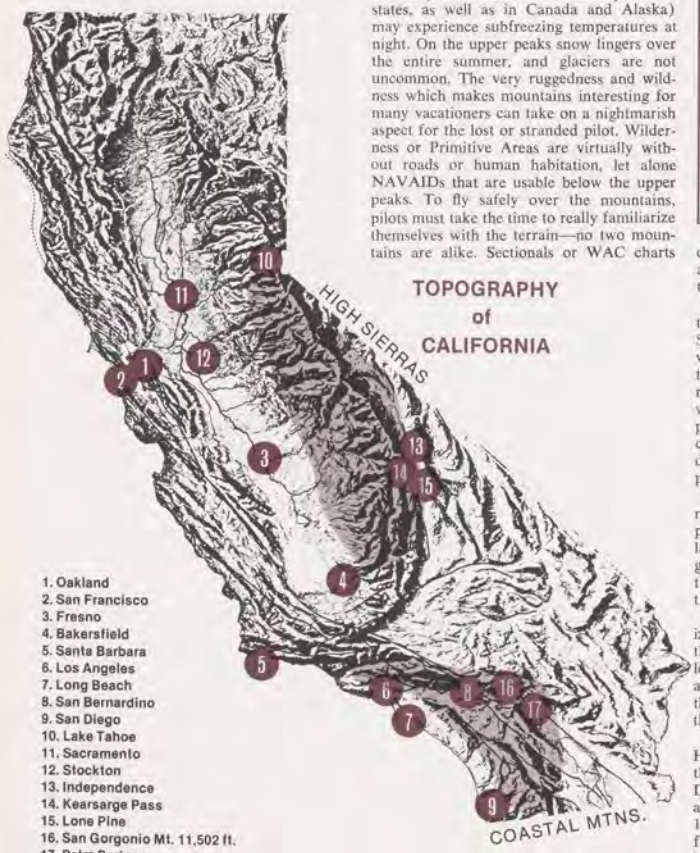
Her story is one that could have been told by several hundred victims of general aviation mountain flying accidents that occur every year in the United States—if they had all survived. But the majority do not. The death toll from mountain crashes is one of the highest of all types of general aviation accidents: over two-thirds of these crashes are fatal, and about 70% of the persons on board are killed or severely injured. It is not that small planes and big mountains are an inherently dangerous combination, but that many pilots simply do not have enough respect for the mountains.

Tall Peaks and Small Planes

Mountain flying accidents do not occur only to "flatlanders" on holiday, or in transit, or on business flights—the accidents which involve pilots from other areas of the country probably do not exceed 25 percent of the total according to the best estimates available from FAA and National Transportation Safety Board. However this "unfamiliar with the territory" type of accident is apt to be the most serious, often taking place in remote or nearly inaccessible terrain, which lessens the chances of rescue and survival.

Local mountain pilots are likely to know where the "weather-traps" and other pitfalls are located, and avoid them. If they do experience problems en route and have to put the airplane down, they are less likely to bore into solid rock than pilots who are strangers in the area. They are more likely to have survival gear on board, and to have their whereabouts and schedule known to friends or family. The pilot whose flight originates many hundreds of miles away from the mountains and who flies over them without a flight plan is extremely vulnerable to any mishap that results in a forced landing.

Even in midsummer the higher and more northerly mountains (within the adjacent 48 states, as well as in Canada and Alaska) may experience subfreezing temperatures at night. On the upper peaks snow lingers over the entire summer, and glaciers are not uncommon. The very ruggedness and wildness which makes mountains interesting for many vacationers can take on a nightmarish aspect for the lost or stranded pilot. Wilderness or Primitive Areas are virtually without roads or human habitation, let alone NAVAIDs that are usable below the upper peaks. To fly safely over the mountains, pilots must take the time to really familiarize themselves with the terrain—no two mountains are alike. Sectionals or WAC charts do not always tell the whole story. There are just too many details, too many variables to depict on a single sheet of paper.



Age and Experience of Pilots Involved in Mountain Flying Accidents, 1975-77

AGE

Total Pilots.	259
Average Age.	38
Number of pilots under 30.	69

EXPERIENCE OF PILOTS

Nationwide

Total Hours		Time in Type	
Over 1,000	98	Over 500	31
500-1,000	36	100-500	69
100-500	98	50-100	39
Under 100	27	Under 50	79
Total	259	Total	218

California

Total Hours		Time in Type	
Over 1,000	20	Over 500	5
500-1,000	9	100-500	15
100-500	27	50-100	6
Under 100	5	Under 50	28
Total	61	Total	54

The state with the largest number of mountain flying accidents is California. In part this is so because California is a very large state with a tremendous amount of general aviation flying. But it is also due to the presence of two major mountain ranges: the Coastal Range, and the Sierra Nevadas.

Geographically California may be visualized as consisting of a vast interior basin, the Central Valley, which runs almost the length of the state some 450 miles long and about 40 miles wide. It is rimmed on the west by the Coastal Mountains, and on the east by the Sierra Nevadas.

The higher reaches of the Sierras (the High Sierras) extend from Lake Tahoe in the north virtually down to the Mojave Desert in the south. Between Mono Lake and Kernville, a distance of approximately 170 miles, there is no pass under 10,000 feet. There are no airways, and no NAVAIDs in these mountains. Population is sparse. There are a dozen peaks above 14,000 feet, including Mt. Whitney, at 14,495' the highest point in the United States outside of Alaska.


The "Minarets of the Sierras," sheerest granite walls in America. (U.S. Forest Service)

The Sierra Nevada range is, geologically speaking, a tilted fault block, formed over a million years ago; the raised edge of the block actually forms the eastern slope, which is extremely steep, almost perpendicular at some points. It has little precipitation and few trees, but much brush and coarse grass, as well as rock and sand at the base, along Owens Valley, which is virtually a high desert (average elevation 4,000' MSL). A vast low desert area lies further east, including Death Valley—the lowest point in the United States at 282 feet below sea level.

The broad western slopes of the Sierras have considerable rain and snowfall, and are heavily forested with large pines and huge Sequoias. The alpine terrain is dotted with small lakes, and intertwined with countless valleys. Above the timberline there are massive formations of granite. The High Sierras consist mainly of National Parks, National Forests, and Wilderness Areas—thanks largely to the dedication of the famed naturalist John Muir who spent many years, around the turn of the century, exploring these mountains and working for their preservation as a unique national heritage: "Climb the mountains, and get their good tidings!" he wrote, and thousands have done so.

But in recent years many pilots have attempted to climb over the High Sierras in airplanes, without sufficient flight planning or mountain flying experience, in inappropriate weather conditions and in low-powered aircraft. As a result there has been a rash of accidents near the crest of these mountains, as well as a number in the western foothills. For pilots departing the San Francisco Bay area and bound for Owens Valley, Death Valley or Las Vegas (or vice versa), flight over the High Sierras is the most direct route.

However, it is by no means a simple or easy route for light aircraft. The only pass is the so-called "low" point in the ridgeline, at Kearsarge (11,823'). Maintaining a minimum safe separation from the ground requires a service ceiling that is beyond the capacity of many light aircraft—especially on warm summer days, when the density altitude may be several thousand feet above the actual elevation. On windy and turbulent days a clearance of 1,500 to 2,000 feet above the ground is recommended. Downdrafts with a velocity of 2,000 feet per minute on the leeward slope are not uncommon. A surplus of altitude is an indispensible safety valve for mountain flight. Time and again pilots who should have known better have tried to "creep"over the ridge, with tragic results.

The Kearsarge Pass is one of the most treacherous passes in the United States. One reason is the sharply contrasting physical features on either side, which produce a barrage of up and downdrafts. The sheer dropoff on the eastern slope, to the Owens Valley desert below, creates such strong thermals that many sailplane records have been set here. Indeed, a P-38 (fairly heavy WW-II fighter plane) is reported to have soared for over an hour with no engine power over the Owens Valley.

Turbulence increases the problems of navigation, which at Kearsarge are inherently difficult under the best of weather conditions. Pilots who visualize a mountain pass as a clearly defined V-shaped cut through a ridge, readily visible from the air, have never seen Kearsarge. Here there is only a narrow cleft, which can easily be missed from an aircraft only a short distance off course. The trail to the Pass from Cedar Grove, a small settlement at road's end in King's Canyon, is a narrow twisting, doubling-back route that weaves its way through numerous peaks that reach up above 14,000 feet. The peaks look much alike; even the superpeak, Mt. Whitney, is difficult to single out.

Within the past 30 months there have been six small-plane accidents near Kearsarge—all as a result of pilots losing the trail and winding up in a dead end, or blind canyon, with no room to turn and not enough altitude to clear the crest. For pilots flying eastward toward Kearsarge, the problem begins shortly after leaving Cedar


Storm signals over Mt. Whitney.

Backbone of the High Sierras

Site of the Elder crash (encircled)

Grove. About ten miles further up the canyon the route makes a sharp left (northerly) turn, through an uninvitingly narrow draw, while the river valley that opens to the south (Center Basin) is broad and appears the safer way to go. But this apparently comfortable valley to the south soon turns into a narrow blind canyon, with walls reaching up to 13,977 feet and angling so sharply that few small aircraft can outclimb them. Unless the pilot turns back before the walls close in, he is caught in what is notoriously known as The Trap.

Such a series of events led to the crash of Lauren Elder's aircraft in 1976 (p. 2), culminating in her heroic 20-mile trek to Independence. The stated purpose of the flight was to retrieve a cat, which had strayed and become lost while sharing a winter vacation in Death Valley with its owner. The cat was later found and the owner notified by means of an identification tag on its collar. The owner held a private pilot's certificate and he decided, one fine day in April, to take the day off and fly from Oakland to Death Valley to retrieve the cat.

The pilot had 213 hours total flight time, including 46 hours in the club Cessna 182 *Skylane* he was using for this trip. He invited two young women to accompany him: a student who sat in the right front seat, and Lauren, an artist who sat in back. Neither had any flight training, but Lauren, whose father was an ex-Navy pilot, had been up before.

The destination, Furnace Creek in Death Valley, was approximately 300 miles southeast by the most direct route, which lay over King's Canyon National Park and John Muir Wilderness Area. The pilot planned to fly to Kings Canyon via Fresno and cross the mountains over Kearsarge Pass.

A pre-takeoff check of the weather en route showed Fresno reporting: *clear, visibility 30 miles, temperature 64°F, dew point 26°F, wind 340° at 7 knots, alt. 29.89. Cumulous clouds topping the Sierra Nevada Mountains.*

At Bishop, Cal., in the Owens Valley (on the eastern side of the Sierras) about 40 miles north of Kearsarge, the 2:00 p.m. weather report read: *6,000 foot scattered, 12,000 feet broken, visibility 70 miles, temperature 49°F, wind 020° at 14 knots, gusts to 21, alt. 29.93. Snow showers of unknown intensity over mountains west. Peak wind 27 to 39 knots.*

Half an hour after taking off, the pilot called Fresno FSS, reported he was over Merced at 9,000 feet and requested current SIGMETs (significant meteorological information reports) for the High Sierras. The latest report described "Frequent moderate turbulence . . . with occasional severe turbulence in strong up and down drafts below 10,000 feet near the mountains."

The pilot reported the flight conditions at his present position as ". . . pretty smooth —very, very light turbulence."

The FSS specialist pointed out that Bishop's altimeter reading had gone up to 29.97, while at Fresno it was now at 29.87, and that with the significant one point "spread" between the two stations at opposite sides of the mountains, ". . . it's liable to be pretty windy across the passes of the Sierras."

(The Aviation Weather Services Handbook states that severe turbulence causes large, abrupt changes in altitude, attitude and airspeed. "Unsecured objects are tossed about. Aircraft may be momentarily out of control.")

The pilot indicated he would try to stay above the weather and would report cloud tops to the station. This was his last transmission. He did not file a flight plan.

Into the Canyon

In the back seat of the *Skylane*, Lauren had unstrapped her seatbelt in order to move about freely, taking pictures on either side. As they crossed the Sierra foothills and moved on up into Kings Canyon National Park the ride became decidedly bumpy, but the views were so spectacular that she paid little attention to the rough air. As they rose above the timberline they saw many patches of deep snow clinging to the base of massive granite pillars. Later she remembered flying over a narrow canyon that forked north and south, and following the southern fork into a broad basin. Shortly afterwards, as the valley narrowed and the walls steepened, the pilot pointed out what he believed to be Kearsarge Pass. He cautioned his passengers about the downdraft they would experience as they crossed over the Pass— ". . . you're going to feel a big jolt."

Lauren turned around from taking a photo out the back window in time to see an immense wall of granite rise in front of the airplane, so close she could see the veins in the rock. The crest was just above them but she realized they were not going to clear it, and instinctively she looped her arms over the back of her seat and held on tight. She heard a terrifying crunch of metal against rock and then nothing.

At approximately 2:00 p.m. the aircraft impacted the mountainside at latitude 36:44'N, longitude 118:20'W (about six miles south of Kearsarge Pass), at an altitude of 12,360 feet. The aircraft came to rest on a northerly heading, about 20 feet from the crest of the mountain. The fuselage remained in one piece, although it was broken open aft of the baggage compartment and the rear window was shattered. The left wing tip and left wheel were buried downhill in loose rock.

Lauren's first recollection after the crash was the sight of her gashed leg, laid bare to the bone. One of the doors dropped off, allowing her camera to roll out, and without thinking she clambered out to get it. She felt the chill of the wind off the peaks and then she heard the pilot calling her to help him with the other passenger. She was shocked at the sight of the pilot's bloodied face (he had also received internal injuries), but she managed to assist him in extricating the other passenger, who was badly injured and only semi-conscious. They covered her with spare articles of clothing and tried to comfort her, but she went into convulsions and expired within the hour.

The pilot attempted to make radio contact, but was unsuccessful. (The ELT also failed to signal; the terminals were corroded.) As the afternoon wore on the cold wind became intense, and it was obvious that neither Lauren nor the pilot would survive the night without some source of heat.

There were no survival items on board—no blankets, no flares, not even matches, bandages, or water—and no one had on winter clothes. They had started out for a picnic in the desert, with no thought for the rigors of a Sierra night—although Lauren wore a WW-I flying cap she had taken along almost as a joke.

Eventually they managed to ignite gasoline-soaked paper scraps with the airplane cigarette lighter, and they kept the small fire going with fuel drained from the airplane. They crouched over the sooty fire until the last of the gasoline was used up, then dragged the blackened and heated rocks into the airplane and hugged them close to their bodies. Lauren packed herself into the tail section of the airplane to conserve warmth. The pilot, whose internal injuries made it impossible for him to keep still, also huddled inside, thrashing about and moaning. They struggled to keep alive until daybreak, shivering and waiting in anguish for the first sign of light that would signal the return of sun and warmth and perhaps rescue.

A Long Bitter Night

During the long night the wind whipped loose ground snow around so furiously it resembled a blizzard, and the temperature fell sharply to an estimated 20 degrees. Desperately tired, Lauren was afraid to sleep for fear she would freeze to death.

At dawn Lauren discovered the pilot had succumbed to his injuries and the intense cold. She had difficulty moving about, some of her teeth had been broken, and it seemed to her that her arm was fractured (it was). The plane's radio had gone dead, and while she knew that they would be missed and searched for, she also knew that no flight plan had been filed, and there was no telling how long it might take for rescuers to find them. The prospect of having to spend another night on the mountain, with no heat whatsoever and the two frozen bodies for company, was more than she could face; she made up her mind to seek help. From the crest she could see the valley below clearly in the crisp mountain air and, she imagined she could make out an airstrip below.

The upper slopes beneath the crest seemed an impossible obstacle to the weakened survivor, but she studied the mountain until she was able to make out a zigzag outcropping that offered some purchase. She managed to work her way down over ice-covered rocks, only finger- and toe-holds in the snow and ice keeping her from hurtling down the side. Eventually, laborious hours later, the upper slope shallowed enough for her to slide on the snow from one ledge to the next (like a "human sled" she said) and finally she could sidestep down the slope and walk across a snowfield, over miles of rocks and brush, around a waterfall and eventually down to the desert valley, repeatedly deceived by apparitions of people and bizarre animals. Late in the afternoon she saw small planes flying over the distant peak she had descended from, but there was no way she could signal them. It was nearly midnight when she stumbled barefooted into the dimly lit town of Independence. She had to knock on three doors before anyone let her in.

The next day, as Lauren was recuperating in the hospital at Lone Pine, Air Force and Park Service helicopters landed a four-man rescue team in the Center Basin, about a mile below the crash site, and the bodies of the two non-survivors were taken down. The airplane remained where it lay, too remote and inaccessible for an on-site investigation. It was eventually taken out piecemeal by helicopter.

There was really no need for further investigation because the events leading up to this tragic accident were pretty well known and followed a classic pattern: the pilot has difficulty in following the route, takes a wrong turn, continues unaware of his error, disregards the fact that the rising terrain is outclimbing his airplane, or is sinking in a severe down-draft, eventually runs out of maneuvering room and either stalls or crashes headlong into the mountain.

In this case nearly all the fundamental safety rules for safe high mountain flying had been ignored or violated. *The pilot's knowledge of the route was insufficient*, leading to faulty navigation in an obviously unforgiving environment. *Adverse weather warnings* (concerning turbulence and strong winds) *were not heeded*, reducing the likelihood that the original navigation error could be safely overcome. Following the crash,

MOUNTAIN DO'S

The Ten Commandments of Mountain Flying

1. *Know your airplane.* Not just the airplane type or model, or just the rated performance data, but the particular aircraft you intend to fly over the mountains—especially its rate of climb at various altitudes and loading conditions, takeoff roll, service ceiling, etc.

2. *Know your altitudes.* Be able to compute density altitude readily from pressure altitude, and aircraft performance from density altitude.

3. *Carry supplemental oxygen.* For any area where clearance over the highest terrain obstacles could require flight over 10,000 feet.

4. *Keep your distance.* At least 1,000 feet above the ground and 500 feet from any mountain slope. Never advance beyond the point where you can safely turn around. Increase clearance if windy.

5. *Know where you are at all times.* If you have any doubt, turn around immediately and retrace your flight until you can identify a known landmark.

6. *Fly early in the day.* Turbulence and cloud buildup most often take place after the earth has been warmed by the sun.

7. *Anticipate abrupt weather changes—ahead and behind.* Request pilot reports, and keep your eyes peeled to all sides.

8. *File a flight plan.* If not possible, notify someone on the ground of your intentions and schedule—even though changes are possible.

9. *Have your Emergency Location Transmitter checked.* Rescue insurance you cannot afford to be without. Standards for ELTs are in process of being upgraded; many failures have been experienced with current models.

10. *Have survival gear on board.* As a bare minimum, warm clothes, drinking water and matches. (See FAA GENERAL AVIATION NEWS, August, 1976 for recommended survival kit.)

Each pin indicates the site of a mountain flying accident within the three-year period, 1975-77. Pilot error compounded by weather problems is the principal cause factor. Flatlanders are urged to get some experience flying over modest-sized hills before taking the high country.

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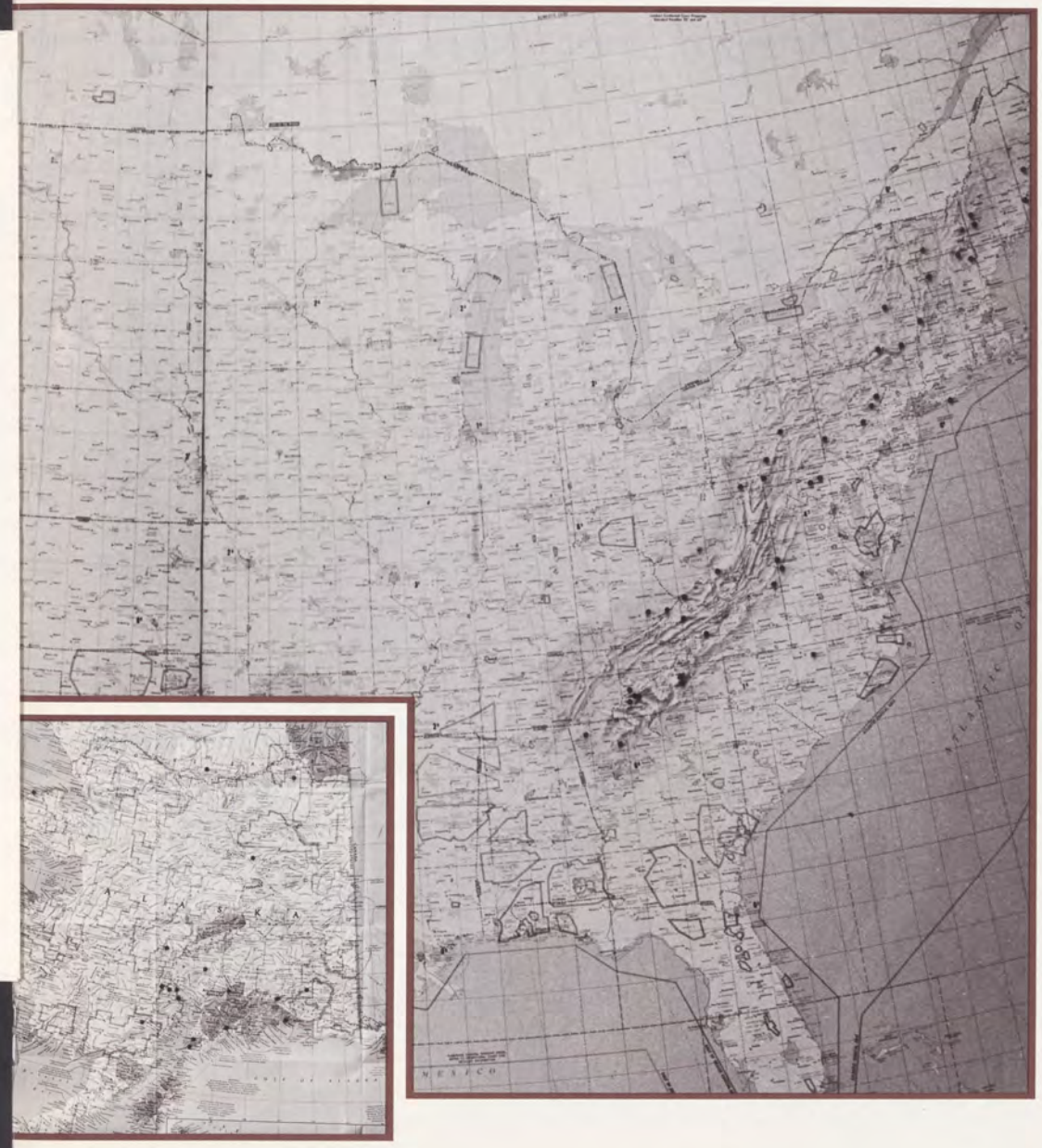
N FLYING ACCIDENTS
1975—1977



survival chances were weakened severely because of three cardinal sins of omission:

- No flight plan was filed (delaying search and rescue efforts for many costly hours).
- An *operational* ELT was not on board.
- No survival gear was carried.

Virtually all of the 72 blind canyon types of accidents in the United States identified by the National Transportation Safety Board for the period of 1975-77 followed this pattern. Significantly, the fatality rate for blind canyon accidents is very high. About 60 percent of the accidents were fatal and 56 percent of the occupants perished. By comparison, only about one out of six of all general aviation accidents is fatal.

The disturbing toll of small plane accidents resulting from pilots missing the turn into Kearsarge Pass led to requests that the route be marked with the standard blue diamonds which are used on some sectional charts to indicate routes through mountains passes, and this was done in the late fall of 1977. However the accident toll in the Center Basin continued to mount, and when it was feared that some pilots might be misinterpreting the markings to mean that this is a safe or easy route, the diamonds were removed.

The limitations of charted information are not well understood. Even where diamonds are used, it is not possible usually to give elevations along a route, for example or to represent the exact physical features of the terrain that would serve as guideposts. Pilots who wish to fly over areas that are devoid of Victor airways (like the High Sierras) should be *experienced* in precise navigation by reference to the ground—a qualification which relatively few pilots in our present-day, electronically oriented, environment can meet.

Mountain Flying Accidents in the U.S.

Total accidents	1975	108
	1976	89
	1977	68
		265
Fatal accidents	1975	71
	1976	55
	1977	39
		165
Total occupants	1975	266
	1976	219
	1977	162
		647
Fatalities	1975	157
	1976	137
	1977	94
		388
Serious injuries	1975	40
	1976	22
	1977	30
		92
By Causal Factors:		
Weather obscured terrain		91
Blind canyon		74
Misjudged clearance		36
Turbulence		46
Other		18
		265

The ability to visualize terrain features which are generally indicated on a chart is a skill that may only be acquired by practice. The cockpit of a small plane that is bobbing wildly in the up-and-down drafts of a steep narrow canyon is not the safest place to practice the art of map identification. Local, large-scale maps, even if hand-drawn, are often helpful; similarly, a discussion of a difficult route with pilots who know it well can be a lifesaver.

Avoid the Pass

As regards the High Sierra, the consensus of opinion from local experienced pilots to airmen transitting the area is simple: *stay out of Kearsarge Pass in a small airplane.* The alternatives are Tioga Pass (9,941'), about 90 miles north of Kearsarge, and Walker Pass (5,245'), about 80 miles south of Kearsarge. Tioga, near Mono Lake, is still pretty high for low-powered aircraft, but the route is well marked by the road that crosses the Sierras eastward from Merced, and presents few difficulties in good weather. The benefits in terms of time saved by going across at Kearsarge should be weighed carefully against the risks, which in many cases are just about as high as the Sierras themselves.

For the California Sierras as a whole, the majority of mountain flying accidents involving small aircraft are weather-related. Typically the ill-advised pilot gets caught between lowering ceilings and rising terrain. Eight of the 21 mountain flying accidents in this region, for the period 1975-77, are of this nature: more than half (13) were fatal. All but one involved single-engine aircraft; very few of the pilots were instrument rated.

The Southern Coast

Weather and blind canyons are also the predominant accident factors for small aircraft flying through the Coastal Mountains of California. Geologically, their history is similar to the Sierra Nevadas. They were thrust up from beneath the sea as huge granite fault blocks about a million years ago. Generally they are lightly forested or covered with brush or grass. The Coastal Mountains are lower than the Sierras and are broken into a maze of ridges and valleys. Along the sea coast, fog and low-lying clouds may be prevalent at any time of the year, and the mountain passes may be obscured and socked in when the sky is clear around or above the mountains.

The heaviest cluster of mountain flying accident sites observed in the entire United States is found in the mountains surrounding Los Angeles and the coastal cities to the north and south. Fatalities run extremely high: 16 of the 21 aviation accidents in these mountains reported by NTSB for 1975-77 were fatal.

Many pilots do not realize how completely this area is surrounded by mountains (except for the overwater approaches). The low altitude enroute routes, for example, are all in the 9,000 feet range, regardless of your point of origin or destination. VFR pilots can fly somewhat lower over the passes, but some of these passes along the more direct routes are narrow, not always easy to follow, and frequently cloud-covered.

Two of the highest mountains in this area, Mt. San Gorgonio (11,485') and Mt. San Jacinto (10,804') lie directly astride the valley route that leads from Los Angeles to Palm Springs and the eastern desert country, via Banning. This is one of the most heavily trafficked routes for light aircraft, and one which normally can be followed without difficulty. However, there have been at least eight accidents in the past three years in this area, resulting from the pilot's failure to stay in the pass either because of poor navigation or because the ground became obscured by weather.

One of the most widely known of these accidents involved a Member of Congress, a highly skilled former airline pilot with more than 18,000 hours of flight time. The pilot was returning to San Bernardino, on the eastern outskirts of Los Angeles, after a brief stay in Palm Springs, on the morning of February 14, 1975. A weather briefing by telephone, from the Thermal, Calif., FSS indicated the following:

Palm Springs. *Clear, visibility 15 miles, temp. 55°, alt. 29.83. Clouds topping mountains west, clouds in pass northwest.*

San Bernardino (*Norton AFB*). *Record special, partly obscured, est. 500 broken, 700 overcast, 2¼ miles, fog, temperature 51°, dewpoint 48°, wind 260° at 2 knots, alt. 29.95, 2/10 of sky obscured by fog.*

The pilot was told that the weather report for Beaumont (about five miles west of Banning) would be available in a few minutes. However he did not wait for this report, which included, *Estimated 800 feet overcast, visibility 1 mile, fog, temp. 47°, dewpoint 47°.*

VFR flight was not recommended.

Nevertheless, the pilot, a dedicated public servant with several speaking commitments around the state to fulfill, decided to fly up to Banning Pass and have a look. The Pass crests at Beaumont (elv. 2,800'), and many pilots who fly in this area believe that if they can just ease over the crest they can slip down into San Bernardino Valley and on into the Los Angeles area underneath the prevalent overcasts.

In this case the pilot's wife had gone on ahead by car, traveling over the same freeway (Highway 60) that led over to Banning. Just west of Beaumont, where Highway 10 forks northwest toward San Bernardino, she saw a *Bonanza* overhead which she believed belonged to her husband. The aircraft flew low over the highway, then initiated a right turn and disappeared into the overcast. When she arrived at Tri City Airport and found the airplane overdue, she notified FAA and a search was begun.

The *Bonanza* was located by the County Sheriff approximately three miles northeast of Beaumont, having crashed into a 40 degree slope of the San Gorgonio Range at an altitude of 3,500'. The plane burned, and the pilot did not survive. The on-site investigation of the wreckage suggested that the pilot had begun a 180 degree turn, but failed to clear a shallow ridge, presumably obscured by fog. There was no evidence of mechanical failure.

Weather Stacks the Odds

An unhappy combination of weather and mountains has claimed the lives of several outstanding pilots based in this area. They had flown over it all their lives and knew the location of virtually every slope, peak, pine and cactus. Nevertheless, all their skill and experience was no match for the mountains, once they were willing to take even the smallest chance with the weather. With the desert on one side, the ocean on the other, and the mountains in between, the flow of air and movement of clouds over and through the Coastal Ranges is beyond precise prediction. (In the near future FAA's flight service station at Thermal, Calif., expects to be operating a remote weather camera at Banning, which will provide continuous reports of the weather through this pass.) Too many pilots who escape the Los Angeles smog, and vacation over the weekend in the desert spas, are in the habit of slipping back through Banning Pass "just over the billboards." It is a dangerous game, frequently fatal.

Mountains, wherever they are located, demand special respect from pilots. The mountains often "make their own weather," and they offer, it must be remembered, very little in the way of emergency landing areas. That is one reason why the minimum low altitude enroute routes are 2,000 feet above the highest obstruction in mountainous areas (they are only 1,000 feet above terrain/obstacle clearance over flatland).

Pay the mountains their due respects and you can fly them in peace—not in pieces.

Contributing to this article were Paul Bayer, Ruth Benedict, Jane DiRenzo, Louise Oertly and David Gelfan.

(Portions of the article were derived from *And I Alone Survived*, by Lauren Elder with Shirley Streshinsky, Dutton & Co., N.Y., by permission of the authors. This book could be of interest to any person who is contemplating flying over high mountains in a small airplane.) ■

Above—Owens Valley and the eastern slope of the Sierras, from Lone Pine. Below—Deceptively placid-appearing Mt. San Gorgonio lies in wait for pilots who stray from Banning Pass in bad weather. (U.S. Forest Service)

Terrain Flying

Pilots planning to fly to new parts of the country—particularly mountainous areas—will want to consult Terrain Flying. *This pocket-sized FAA booklet, designed for the average private pilot, contains observations, opinions, warnings and advice from veteran pilots who have flown various parts of the country, including Alaska, as well as Mexico and Canada. Order* Terrain Flying, *AC 91-15 (stock number 050-007-00147-9), from the Superintendent of Documents, GPO, Washington, DC 20402. The cost is $1.40.*

Famous
FLYERS

Around the World in a Homebuilt

In 1933, Wiley Post in his *Winnie Mae* became the first person to fly solo around the world, in seven days and 18 hours. Some 43 years later another American, Donald Taylor, gained a similar unbreakable record. But in contrast to Post's sleek Lockheed *Vega*, with its 420 hp engine, Taylor flew around the world alone in a 2,000 lb. aircraft he built himself. He covered over 26,000 miles in 38 hops over 60 days, an ordeal that was plagued with a variety of problems, from official red tape and sticky palms to wet laundry and lead-fouled plugs (from military Avgas) but he endured.

This modern Ulysses was 57 years old when the spirit moved him to make his epic journey. A retired Air Force officer living in Hemet, Cal., and teaching aeronautics at a local community college, Taylor got interested in homebuilt aircraft in 1966. In 1973 he completed a Thorp T-18, a low-wing two-seater with an 18' fuselage and a 25' wing, designed simply for pleasure flying. The aircraft cost him $15,000 to build and he named it *Victoria*.

Familiar with England from his World War II experience as a pilot, he wanted to try setting a speed record for homebuilt aircraft between London and Paris, but once he started looking at maps he was struck by the thought: *Why not go all the way?* (Around the world, that is.) *What better way to prove the merit of his own handiwork?*

Some six weeks later and about $9,000 poorer, he terminated the flight, after waiting futilely in Japan for 25 days for favorable weather that would allow him to clear the last big hurdle over the Bering Sea and the Aleutians, a 2,000 mile hop that would take all of his fuel reserves and navigating skill.

Back at home he pondered the problem and laid out another route. Why struggle with the uncertainty and distance of the northern Pacific when he could island-hop across the ocean in a more southerly latitude as far as Midway and then scoot up north to Alaska? Others might have worried over the question: *"How are you going to navigate your way from one little sandspit or coral heap to another over 1,000 miles of ocean and hungry sharks, with the limited equipment and altitude of that little homebuilt?"* But not Mr. Taylor.

His only real worries had to do with money. It cost him $4,000 to modify the aircraft, principally with longer range fuel tanks, modified air intake piping, an oxygen system and a new ADF (automatic direction finder). Trip expenses could come to another $10,000 when he started to add up landing fees, overnight lodging and food, fuel, oil, repairs, visas, entry permits, charts, etc. There was no way he could carry all the sectionals, global charts and WACs he would need on board; they had to be mailed abroad and stashed for his arrival. Sending on a batch of charts to Karachi, for example, cost $50 as first class mail.

But when Don ran out of his own money, friends and well-wishers in the ranks of amateur plane-builders came to his rescue and raised a kitty for him with auctions of donated and homemade goods. Bidding was strictly from the heart, as evidenced by the price fetched by a jar of jam made by his wife, Lois: $8,000.

Departure for the second flight was on August 1, 1976, from Oshkosh, Wisc. (site of the annual meeting of the Experimental Aircraft Association). After a 730-mile leg to Burlington, Vt., Taylor continued north via New Brunswick and Labrador without incident. His first difficulty presented itself about 100 miles out of Greenland, when he was diverted inland because of the weather and began to pick up icing at altitude. He was lucky to find a hole in the clouds and break out under the overcast just over the gray hills of Greenland. On to England via Iceland and Scotland, then to Munich, Greece, Cyprus, Turkey and Teheran. Landing in Iran he was startled by the mix of heavy traffic, as a *Hercules* shot in beneath him and he could see a bevy of F-104s and a 747 in trail behind. In his haste to get off the runway he damaged his tailwheel as well as his dignity, neither seriously.

Map by Jack Cox, Sport Aviation

On to Karachi, Calcutta, Bangkok and Kuala Lumpur he went, and then down the Malay Peninsula across to Borneo, averaging about 700 miles and five hours flying time per hop and usually remaining over one night at each place. Early each morning he would be off and flying, once he had coped with a bewildering maze of officialdom and laggard laundrymen who were not used to the overnight service required by the hustling American homebuilt pilot.

Navigation began to loom up large after he left the Philippines for the small stepping stones of the Carolines—Guam, Truk and Ponape, about 500 miles apart. Dead reckoning was his mainstay, ADF his backup. About 100 miles out of Guam his ADF failed, and Taylor turned back to the island and the U.S. Navy base, where a friendly mechanic helped him remove the corrosion on the antenna plug.

The long (1,000 miles plus) flights to Wake and Midway were a real test of his navigating skill and his confidence, about eight hours of continuous cockpit time to ponder and reflect on how well he had done his work on the small plane, with hundreds of square miles of open sea waiting below. But at Midway it was his patience that was put on trial.

No response from his request for permission to land at this U.S. Navy-controlled island had been received by the time of his departure from the states, but he had no reason to doubt that it was en route. His only alternative was Hawaii, and from Hawaii the mainland was beyond the reach of his little plane. He landed at Midway without difficulty, but it was two weeks before the official mills, grinding ponderously between Midway, California and Washington, D.C. were able to sanction his release.

The leg from Midway to Adak in the Aleutians was his longest nonstop flight ever: 1,650 miles, all overwater, about 11 hours. A slight course deviation early on could lead to eventual fuel exhaustion over an ice-flecked sea. Using the winds aloft forecast, he made a course correction at every five degrees of latitude. Morning, noon and afternoon went by, and the sun started to descend. He turned on his ADF and picked up Adak to his immense relief—scarcely one degree off course. He landed with half an hour of daylight to spare.

Then it was overland all the way, across Alaska, the Yukon, Alberta, the Dakotas and finally, once again, Oshkosh. He had traveled 26,200 miles in 61 days, at an average rate of 143 mph. His time can be beaten, of course, but no one will ever take away from him the distinction of being first around the world by air in a craft of his own construction. There were no rich purses or wild acclaim waiting for him (he did receive FAA's Distinguished Service Award), only the satisfaction of having done something rather difficult rather well. ■

BRIEFS

HOW SEVERE IS THE STORM? To help pilots distinguish between weak thunderstorms and extreme ones—and all degrees between—radar reports are categorizing such storms by levels 1 to 6, according to the density of the precipitation (which usually is proportionate to the storm intensity). The higher the number the worse the storm, with anything above Level 3 likely to contain severe turbulence and lightning. Complete definition of all six levels can be found in the Glossary of the Airman's Information Manual (AIM).

"CHECK DENSITY ALTITUDE". If you hear those words from the control tower operator, flight service station, ATIS, TWEB, etc. it means you should do exactly that. You won't hear them unless two factors exist: (1) You are at an airport with an elevation of 2,000 feet MSL or higher, and (2) the temperature has reached a predetermined level that could affect aircraft performance at that airport. This new procedure is aimed at reducing the number of airport mishaps brought about by pilot inattention to this factor. (Note: If you do not have a handy D.A. computer, or need help, any FSS will compute current density altitude upon request.)

CLEARING THE RUNWAY. There's a right way and a wrong way. The right way is as follows: After landing, unless otherwise instructed by the tower, continue to taxi in the landing direction, proceed to the nearest turnoff and exit the runway without delay. DO NOT turn onto another runway, or make a 180 degree turn to taxi back on an active runway, and do not change to ground control frequency while on the active runway unless you are told to do so.

DE-FUELING CAUTION. Maintenance and fueling personnel, and any others who might be involved in removing fuel from aircraft tanks, are reminded that de-fueling requires as much precaution against fire as normal fueling operations do--sometimes more. Generally most of the fuel can be removed in the same manner it is put in--via a hose insert in the regular fuel filler opening. What cannot be retrieved in that way must be removed by other means, such as through sumps or central valves in the system, into vented drums or other containers. This final phase of drainage creates special fire hazards. Although there is a relatively small, slow flow of fuel, a large quantity of dangerous vapors may be present. Grounding is absolutely essential through all phases of defueling.

NO MORE GAS. Running out of fuel continues to figure high in the causes of general aviation accidents, according to the National Transportation Safety Board. Prominent among such accidents are the fatal crashes of the helicopter flown by former U-2 pilot Frances Gary Powers in California, and the Convair 240 carrying the Lynyrd Skynyrd rock band, which went down in Mississippi. Fuel exhaustion was determined as the cause of both accidents.

GOING OR COMING? Resembling an outsized mosquito, a Rutan VariEze homebuilt canard pusherplane taxis in after its maiden flight at Montgomery County Airpark, Md., recently. In the air the unconventional two-place VariEze (pronounced "very easy") appears to be flying backward, with the propeller and wings (with "winglets," or rudders, attached) at the rear, and the fin-like canard, which serves as horizontal stabilizer/elevator, at the front. Construction is of block foam, covered with fiberglass. Powerplant is a 100 hp Continental engine.

New Accident Prevention Boards Tell Pilots Where to Get Help

New, specially designed Accident Prevention bulletin boards are being installed in more than 1,000 general aviation airports across the country, containing briefing material which is intended to help pilots review specific flying techniques.

The destinctive red, white and blue bulletin boards will also provide the telephone number of the nearest FAA Flight Standards District Office, and the name of the associated Accident Prevention Specialist. Also listed will be the names and numbers of all nearby Accident Prevention Counselors, experienced civilian pilots, mechanics and others who volunteer their time to talk over aviation problems of their particular district.

The Counselor service is extremely helpful to pilots intending to fly into unfamiliar vacation areas, such as mountains, deserts, lakes, etc. There are presently about 3,500 counselors throughout the United States. Airmen who wish to set up meetings with them in advance, in order to make certain of fitting the briefing into their vacation flying plans, may obtain a list of names directly from the FAA District Office in that area, or may ask their local GADO to get it for them.

FAA is hoping that this increased availability of flight information and a convenient personal briefing will help avoid the usual upsurge of accidents during the heavy end-of-summer and Labor Day holiday flying, and reverse the increase in general aviation accidents recorded during the first half of 1978. A preliminary count showed 2,078 accidents for Jan.-May 1978, a rise of nearly 200 accidents over 1977 and an increase of 17 percent in fatal accidents.

Pilots Warned on Forest Fires

Pilots flying over forested areas, especially in western states, are being warned against flying near forest fires, in the interest of safety for their own flight and for personnel involved in combating such fires. Sightseeing flyers complicate an already dangerous situation that often involves reduced visibility because of smoke and possible heavy traffic of fire-fighting and rescue helicopters, fire-spotting planes and heavily loaded aerial tankers.

Pilots are advised that FAR 91.91 (which provides for temporary flight restrictions over incidents or events that might attract crowds of sightseers) applies to forest fires NOTAMS are issued in such cases, and flight in the area then requires authorization from the FAA Air Traffic Facility named in the NOTAM.

State-Managed ADAP Reviewed

In a report to Congress on the special demonstration program that allowed four states to administer their own Federal grants for development of general aviation airports, FAA gave generally good marks to the states but felt the experiment was too limited in scope and duration to be a fair test. For that reason FAA has recommended the program be continued through fiscal year 1980.

The four states—Arizona, Michigan, Pennsylvania, and South Dakota received a total of $5,870,167 in Airport Development Aid Program (ADAP) funds for fiscal year 1977 and granted $3,462,257 of that amount for development projects at 11 general aviation airports. Remaining funds were carried over to 1978.

Copies of the FAA report are available from DOT/FAA Publications Section, M-443.1, Washington, D.C. 20590.

Pilot Population Increasing

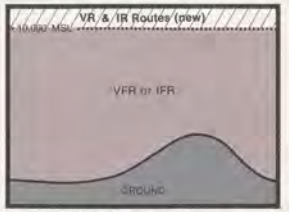
There were more active U.S. pilots in 1977 than ever before, according to the latest FAA book on airmen statistics, which places the number at 783,932—a five percent increase over the 1976 total of 744,246. Most airmen categories showed an increase, with student and private pilots accounting for most of the gain. Student numbers rose from 188,801 to 203,510 and the private pilots from 309,005 to 327,424. The number of women pilots increased from 41,643 in 1976 to 47,294 in 1977.

Single copies of "1977 U.S. Civil Airmen Statistics" may be obtained without charge by writing FAA Office of Management Systems, Information and Statistics Division, AMS-200, Washington, D.C. 20591.

Alteration Handbook Updated

The mechanic handbook that describes acceptable methods of making aircraft alterations has been updated by FAA. First published in 1965, the revised book contains all subsequent changes. Included are chapters on such items as structural data; installation of radios, antennas, lights, skis, oxygen systems, glider and banner towhitches, shoulder harness, batteries (including nicad), adding or relocating instruments, and penetrating pressurized structures.

Generously illustrated, the 102-page book "Acceptable Methods, Techniques, and Practices—Aircraft Alterations" (AC 43.13-2A) can be ordered by mail from Superintendent of Documents, GPO, Washington, D.C. 20402. Price is $2.75 (Stock No. 050-007-00407-9).



An article in the February 1978 issue of this magazine, recently reprinted, carried a depiction of the new IR and VR military training routes which was in error. The depiction showed a buffer zone between the floor of the routes and the ground (500' for VRs, 1,000' for IRs). This zone will not necessarily exist for the new military training routes and pilots are advised to plan their flights to avoid the altitude range depicted for the particular route. *Note: The text of the article was correct.*

Flight FORUM

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Tach Checker

In your publication of November-December you spoke of a simple, hand-held stroboscope instrument that will check the accuracy of your tachometer. I have tried a place or two in Houston and cannot find one of these instruments. Could you tell me where this item is available and how much it costs?

Dan R. Wolfe
Houston, Tex.

The device described in the magazine is one of several different types available for testing tachometer accuracy. The instrument shown, called the "Vu-Thru Tachometer," was developed by Hartzell Propeller, Inc., Piqua, Ohio, and sells for around $300.

• About Pilot Examiners

In a news item in your May 1978 issue about pilot examiner training you stated that Designated Pilot Examiners in the United States "are authorized to test qualified candidates for all pilot certificates and ratings except the original issuance of Instructor's rating . . ." Does this mean that a candidate who already holds a rating as a Certified Flight Instructor, can be tested by a designated pilot examiner for an additional rating—perhaps as a multi-engine airplane instructor?

Bruce Sherman
Huntington Woods, Mich.

Negative. According to the "Pilot Examiner's Manual" which is soon to be distributed, the Flight Instructor Examiner is authorized to conduct flight checks for the renewal or reinstatement of flight instructor certificates, only. He is not authorized to issue original certificates or additional ratings for flight instructor certificates. The issuance of renewals or reinstatements by a pilot examiner must be based on a flight check, not on the basis of personnel knowledge or instructor activity.

• Why the Engine Stopped

An article in your March edition, "Rotors in the Snow" talks of a helicopter accident where the engine stopped and the aircraft crashed after being flown into heavy snow. Could you please explain how they determined that the engine failed?

Frank A. Moore
Fairbanks, Alaska

In this particular accident the surviving passenger was able to describe the circumstances that led to the crash.

• Non-standard Terminology?

I am in full accord with the concern of Mr. Dan Keenan about the use of non-standard (CB) phrases by pilots on the radio (March Forum) and I feel that we CFI's should do everything possible to see that our students use the correct terminology from the cockpit. Sometimes, however, controllers themselves are guilty of using non-standard expressions, as I discovered recently when a temporary tower was set up at our sleepy little airfield for Army aviation personnel to use for participation in a joint service exercise.

I decided to take advantage of the opportunity to give one of my students some practice in dealing with a control tower, and we informed the controller that we would be remaining in the pattern for touch-and-go landings. When we reported downwind, as instructed, the controller acknowledged our call by informing us that we were "cleared for the option." My student asked me what that meant and I had to admit that I did not know. I asked the tower if we were cleared to land and he replied that we were "cleard for the option of a touch-and-go landing or a full-stop landing." Each time we reported downwind he would clear us "for the option." I was disturbed by this gap in my knowledge (and sensed that my student was too) so I asked a number of persons around the airport if they were familiar with the expression. All answered negative.

My questions are these: Are military controllers working joint civil military airfields allowed to use military jargon on civilian users? Or are new expressions authorized with no attempt to make them known to the flying public?

Name withheld
Barstow, Calif.

Neither of the above. The "option approach" has been described in the past several issues of Airman's Information Manual, Part 1, as a useful training aid that permits instructors a choice of touch-and-go, low approach, missed approach, stop-and-go or full-stop landing without the student knowing in advance which maneuver will be accomplished. Obvious advantages to the instructor include flexibility and the ability to obtain student reaction under changing conditions. Also, if the approach does not work out the instructor can change procedures quickly, with a minimum of radio communication.

Something to think about: we encourage all pilots—and particularly instructors—to examine AIM Part 1 each time a new issue is published (January and July), checking especially for new or revised items, all of which are clearly designated for quick reference.

• On the Air

KABN is Alaska's newest radio station. As we intend to have a quality of programming complemeniary to GENERAL AVIATION NEWS, we would like to broadcast material which appears there when it enhances our programming. Can we get permission to do this? If so, how?

William L. Hale, President
Station KABN, 1150 AM
Wasilla, Alaska

Radio and television stations as well as magazines and newspapers are welcome to use any material they wish from the pages of our magazine. Written permission is not necessary, but we do appreciate a credit—which is helpful to listeners or readers who want more information. We also appreciate receiving a copy of printed articles for our files.

• Dole Race Update

I hate to nit-pick your fine magazine, but as a very avid student of "The Dole Race" I have to point out some mistakes you made in your article on the subject ("The Dole Race to Hawaii", May 1978):

For example, you said that all the planes were plastered with advertisements. My information is that only a few entrants had ads on their planes. Also, the "Dallas Spirit" was a modified *Swallow*, not a *Travel Air*, and please note that the latter is two words, not one. The "Pride of Los Angeles" crashed in mud and water, and three occupants (not two) walked to shore (not swam). You indicated that by August 1st there were only eight entrants still in the race, of the 33 originally entered, with two thirds being disqualified and three having crashed. Actually there were 15 entrants up to August 8th and nine until 11 a.m. on August 16th when one was disqualified, after lineup. Otherwise, a good yarn.

R. H. Scheppler
Davenport, Iowa

• Something Split

I think your printer must have dropped a line out of the second sentence in your May brief on channel splitting. Something is missing.

Basil G. Maile, AOPA
Washington, D.C.

Right. The sentence, referring to the use of 25 kHz-spaced channels for enroute aircraft flying above 18,000 feet, should have said: "Aircraft now using the high altitude sectors will need a 720-channel radio in order to avoid possible delays, re-routing and other inconveniences."

INSTRUMENT CORNER

• Cape May Approach

In the May issue under a photo of Cape May Airport (N.J.) there was a caption which said in part, the "VOR-DME" approach is to 23, but the VASI lights are only on 19, *requiring* (my emphasis) a circling approach after the airport is sighted. I question the use of the word "requiring." If the airport is tower-controlled, the pilot is cleared to land straight in on 23 or to circle to another assigned runway. If the airport is not tower-controlled, the pilot lands straight in on 23 or circles to the runway he chooses. The use of VASI lights is not a requirement.

A. R. Boileau
San Diego

True. The word "required" in this case was not intended to mean "required by regulation." It meant simply that for the pilot to take advantage of the VASI-equipped runway 19 he must circle to that runway after sighting the airport, if he has come in on the VOR-DME approach, which is to runway 23.

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