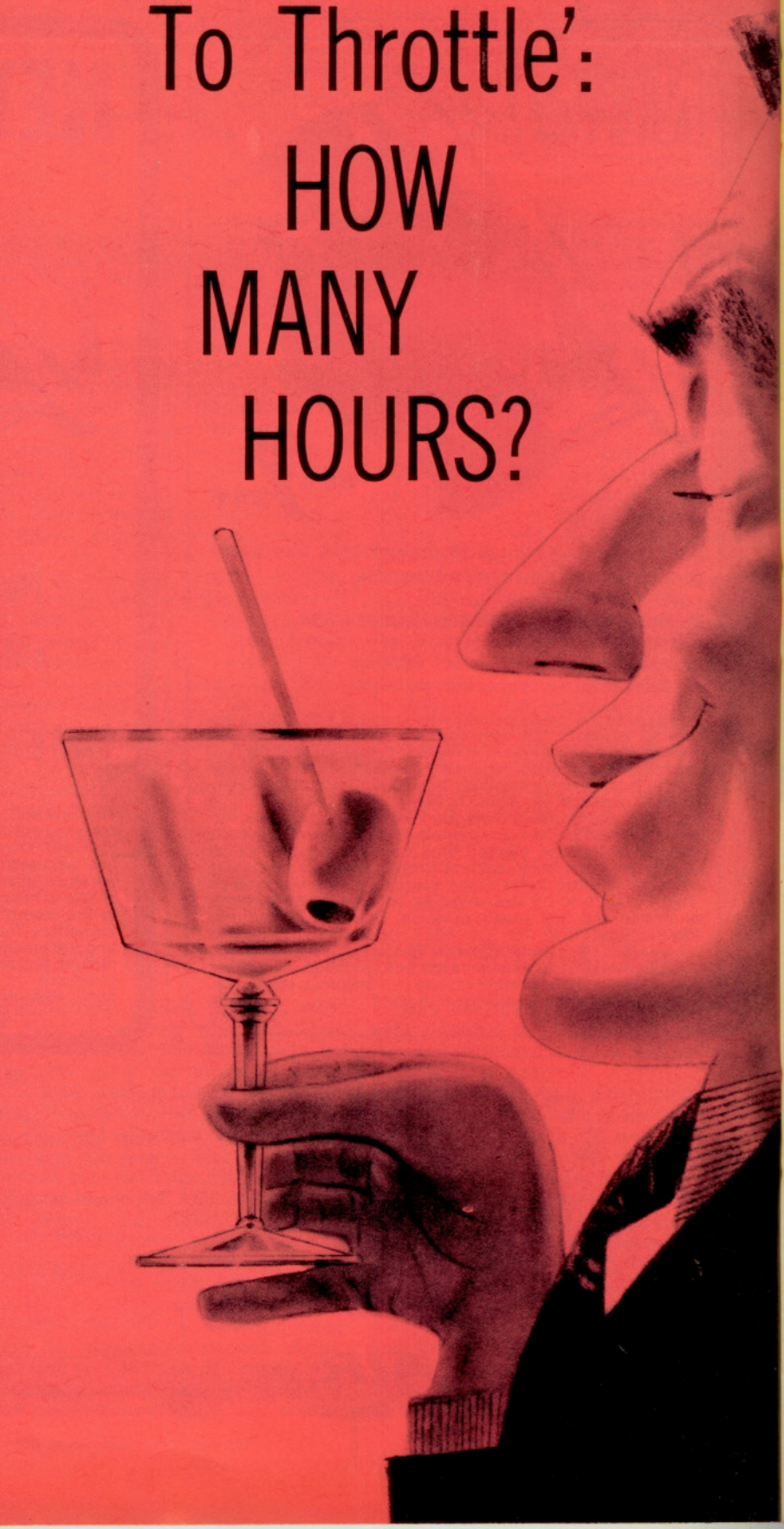
by DON DOWNIE • AOPA 188441

From 'Bottle To Throttle': HOW MANY HOURS?



Of course, alcohol and aviation mix. They've mixed for years—alcohol used as external deicer fluid for propellers and on some few aircraft with alcoholic leading edges. The combination of alcohol, ice and aircraft has mixed perfectly to shed ice from essential parts of aircraft in flight.

As one might suspect, there's another not-so-rare combination of alcohol, ice and aviation: specifically, booze, ice cubes and pilots. The combination is somewhat less than beneficial.

If we were to say, "Don't fly for at least eight hours after your last drink," and explain the reasons why, some pilots might figure "just another sermon" and turn the page. Others might read on, after pointing out accurately that the accepted figure usually is "12 hours from bottle to throttle." However, the FAA itself (Flight Standards Handbook 4040.1, Paragraph 2.111) says, "Eight hours is the minimum time allowed by the Federal Aviation Agency for its own pilots before flight can be undertaken following alcoholic consumption."

"This rule has worked with apparent safety within the context of the FAA flight activities and through the exercise of judgment by FAA pilots," stated Dr. Stanley R. Mohler, M.D. (AOPA 167639), Director of the Civil Aeromedical Research Institute of the FAA in Oklahoma City. Much of the following research is from his files.

For those who like to read capsuled information, here are the high points of pilots vs. alcohol. Dr. Mohler points out that: (1) the liver burns off the effects of alcohol at a fixed rate, normally about one "shot" every three hours. Under average sea-level conditions, nothing will speed up this process. (2) It takes a minimum of eight hours' rest to burn off the effects of a normal three-drink social evening. This leaves an hour to get to the airport and preflight the airplane. (3) The higher you fly, the "higher" you get as blood alcohol combines with anoxia. (4) A modern light plane is eight to 10 times as complex to operate as an automobile; thus the slightest dulling of reactions by a drink or two is hazardous. (5) Inexperienced pilots (300 hours or less) are by far the largest group of alcohol-induced accidents impatiently waiting to happen. (6) Pilot education seems to be the best way of improving the situation.

That quiet organization, Alcoholics Anonymous, figures roughly that one out of every two adults drinks. "A.A." considers that one in 10 of the people who drink is an alcoholic while the other nine are "social drinkers" to one degree or another.

If you're one of the 50% of pilots who don't drink, be happy and turn to the travel section. If you're in the 5% bracket of the true alcoholic (Definition: "An alcoholic is one who, having had one drink, cannot guarantee his behavior.") then don't bother with this material since you probably already know it. Actually, respected members of "A.A's" speakers group who are also pilots don't worry much about the alcoholic and aviation. He'll do one of two things; quietly pass out or, because of past experiences, be extremely cautious of what he does.

Let's talk with the "social-drinker-pilot" who represents nearly half of all today's airmen and -women. Two former FAA medical doctors, Charles Harper and William Albers, penned an article in the August 1964 PILOT titled "Alcohol and General Aviation Accidents." While admittedly based on a small sampling of accidents, the conclusion was that 35.4% of general aviation fatalities involved pilots with at least 15 milligrams alcohol per 100 milliliters of blood (0.15%). 0.15% is the automotive figure to evaluate a drunk driver in this country.

Some PILOT readers doubted conclusions of Drs. Harper and Albers and "would expect a much lower rate of alcohol involvement among . . . the pilots who were not tested."

Dr. Mohler is quick to stress that "the great majority of general aviation pilots are mature and dependable individuals, and operate their aircraft safely. However, through lack of understanding, lack of character or proper education, a small number of the total pilots undertake flights while under the influence."

In any event, there are some pilots who will fly after "a drink or two—or maybe more." On occasion, this leads to trouble. Many experts, both medical and legal, feel that the solution to the drinking-then-flying-pilot is probably not legislation—license revocation, stiff fines or imprisonment. They feel that the answer must lie in personal discipline, pride of pilot proficiency, public approbation and education.

So, let's try education.

As in any technical research, one finds many "old wives' tales" that we've been living and flying with for years. Just so you won't figure that this reporter is a blameless "blue-nose," let's step back briefly to the dark ages of World War II and our favorite old wives' tale—that 100% oxygen will counteract the effects of a couple of drinks and do the job in a hurry.

No, it wasn't a question of "having a couple at the bar" and then deliberately planning to fly. On the C-46 shuttle of the Burma Hump, we had a first-in, first-out crew rotation. Thus, it was possible to check the schedule and figure out when you'd probably fly. So why not stop by the bar for a nightcap? We did on occasion. Then what happened? Just about the time we were well asleep, there'd be a shake on the shoulder and, "You're wanted for flight." You'd pry an eyeball open and ask, "What the hell?" The reply was simple and psychologically sobering.

"The weather's stinking and they went down the list to the first Instructor Pilot. After you try it, we'll know whether or not to send out anyone else."

Nice guy!

At Base Operations, no one asked, or cared, if you'd had a drink or two. Sure, if you were "stoned," you were grounded—and scheduled for a talk from the Commanding Officer in the morning. But, "just a drink or two" and we flew. Assured by the old wives' tale, we'd climb into the cockpit, put on our oxygen mask, snap the regulator to 100% and sit for a few minutes. Actually, the system did seem to do the job, and I found it hard to believe, even after all these years, that you can't cram 100% oxygen into your blood stream to replace the oxygen diluted by alcohol. In fact, I asked Dr. Mohler to recheck his original statements.

The FAA doctor replied, "I checked with a number of chemists, pharmacologists, physicians and others, and all agree that breathing oxygen could not affect the rate of metabolism of alcohol. There is a general feeling that the exaggerated breathing which accompanies oxygen mask usage can have a beneficial effect, partially for psychological reasons and partly because of the respiratory muscle exercise effects due to the breathing." Another good old wives' tale just spun in.

The body burns up one shot of liquor in about three hours and little can be done to speed up process. There are different opinions on elapsed time between cocktail and flight, but eight hours considered minimum by FAA

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And to nail the coffin shut, Dr. Mohler added, "Actually, if the burning of alcohol by the body could be speeded up by breathing 100% oxygen, then the same would be true of the burning of sugar, or fat, and people could reduce by breathing oxygen."

Dr. Mohler also chuckles about the "black-coffee" treatment. "I've seen people take black coffee 'til it was running out their ears, but it really doesn't sober them up. No matter what you do, it takes about three hours for the liver to 'burn off' one drink of 90 proof alcohol."

Dr. Mohler came up with an explanation of the popularity of drinks aboard the *passenger* section of modern airliners. "The consumption of alcohol results in the loss of the 'queasy' pit-of-the-stomach feeling one normally gets (nature's warning signal) when one is about to do something he has been taught is wrong or something he would normally see as dangerous.

"There's really nothing new about him who drinks and flies. An FAA survey made between 1957 and 1960 showed that you get deader quicker with bottle and throttle; 40 to 50% of the aircraft accidents in which the investigation report mentioned alcohol *were fatal*, while only 10% of the non-alcohol accidents were fatal.

"In one book (printed in 1941) the statement is made that alcohol is 'really a very common cause of aircraft accidents.'" (Safety In Flight by Jordanoff)

We asked Dr. Mohler if there is any basic difference between drunkenness and anoxia. He replied that "anoxia (the absence of oxygen) or hypoxia (the lack of sufficient oxygen) result from the withdrawal of oxygen, a substance vital to metabolic activities, with attendant malfunction of the nervous system. Drunkenness is the result of the addition of a substance (ethyl alcohol) to the nervous system, which produces derangement of function.

"There are, thus, certain basic differences. However, some of the mental sensations and the quality of skill performance appear to be similar, whether resulting from too little oxygen or from the intake of alcohol. Examples are a feeling of unusual well-being (euphoria), a deterioration of ability to do mathematical problems, a prolonged 'decision' time, a narrowing of attention span, a loss of memory of recent events, etc.

"Some have hypothesized that the alcohol produces its effects by interfering with the proper use of oxygen by the nervous system, thus resulting in 'biochemical hypoxia.' This may also help explain why hypoxia and alcohol don't mix, through dealing a double blow to the tissue metabolism."

One of several AOPA members who read the rough draft of this article was a grey-haired, veteran fixed-base operator. "There's one professional man flying at my airport who won't have to read this story," he commented as we sat in a motel after flight. "He really

learned his lesson the hard way. I was just opening up at about 7 a.m. when this *Skylane* taxied up to the gas pumps. The pilot climbed out gingerly. He was scared, really scared!

"We pumped 3½ hours worth of gas into his tanks as he told me what had happened. He'd had considerable to drink at a party and, according to his fuel consumption, had taken off at about 3:30 a.m. Flight time for the trip he made is normally one hour and 40 minutes. The pilot said, 'All I can remember after takeoff was coming to every once in a while and retuning the omni. Then I'd pass out again. I didn't know where I was and must have stumbled all over the State of ——— before the sun came up and I got squared away. I'll never do that again,' he promised. And, to my knowledge, he's kept that promise," said the fixed base operator.

A survey of medical reports emphasizes that fatigue or emotional stress can produce both similar symptoms and similar results.

Fatigue, coupled with the effects of partying and moderately high altitude, can be fatal. This is an instance that I know personally, since I flew right-seat in the plane that "bird-dogged" the ground rescue team to the scene of the crash. A good pilot in his late 20's had been partying for the past two evenings. He'd had almost eight hours' sleep before flight, and the post-mortem showed that alcohol was not a factor. However, lack of sleep, perhaps a bit of a hangover and a 6,000-foot ridge all contributed. The pilot was right on course, 30 minutes after take-off, on a route that he knew very well. The weather was clear and calm. Apparently the pilot just plain went to sleep.

One of the morbidly interesting statements in Drs. Harper's and Albers' report was "that 48.7% crashed within 18 minutes or less . . . Of these, 18% crashed within 12 minutes or less."

We asked Dr. Mohler, "Why so soon?" His reply was simple and basic. "The pilot, through impaired judgment, takes off under IFR or essentially IFR conditions (night), without adequate prior training in this kind of flight and goes into a graveyard spiral, or through a euphoric desire to undertake low level aerobatics or do a 'buzz job,' strikes an object. These are common findings.

"Hypoxia may be a factor in some of the flights which were intended as higher-altitude (10,000 feet and above) cross-country flights."

A casual check of the climb-to-cruise performance of most modern light aircraft puts them well within the "thin air" bracket inside this time limit. So, if you're high and want to go higher, Dr. Mohler points out that "each drink is about equivalent to adding another 2,000 feet of altitude, starting at about 12,000 feet."

One of the many thought-provoking statements in Drs. Harper's and Albers' article was that "almost twice as many inexperienced pilots . . . (were) . . . killed when alcohol was involved than are killed in the over-all fatal accident population." Accompanying graphs showed the 300-hour pilot topping the list by a wide margin.

In PILOT's Vox Pilot of December 1964, Rex M. Weaver, M.D., (AOPA 188835) commented, in part, "The graph . . . is very likely to indicate to many readers that, if they can survive through 400 hours, they'd be better off to get 'loaded' from there on when they fly, in order to have a higher percentage of possibility to remain alive. . . . This is meant as a friendly 'poke', but it might help point out how misleading some graphs and statistics can be, even when valid."

So again, we asked Dr. Mohler, "Why is 300 hours by far the tops in frequency?"

He replied that "the student pilots have less skill and, consequently, are impaired to a greater extent than more experienced pilots. Also, more experienced pilots may more fully appreciate the requirements of flight by a sober mind, and not tend to fly after drinking. *The 300 hour pilot apparently is at a point where he is prone to be very overconfident* and will take risks he otherwise might avoid." (Italics are ours.—Ed.)

But let's allow the doctor a breather of pure air and talk with a few fellow pilots. Their names aren't really im-

portant, but the quotations are completely accurate.

A 55-year-old pilot, flying alone in a Cessna 182, stated that "I'd been out on a party the night before and did have a bit of a 'head' in the morning, but I was out of town and wanted to get home. I climbed to 12,000 feet to pick up the best tailwinds. I remember that I was reading a copy of Reader's Digest with an article about a little girl who died of leukemia. I cried like a baby! It was nothing more than the combination of a hangover and thin air at altitude. Since then, I'm a firm believer in '12 hours from bottle to throttle' and '24 hours from big bottle to blast-off.' "

It was the Christmas season when another pilot, well familiar with the use of oxygen, was out delivering presents to clients in his four-placer. He was invited to one of the many holiday parties and prudently asked for "a coke." Somewhere along the line, his "friends" arranged to have the cokes spiked, not realizing that he had flown in to the party. The first time that this pilot realized that he had been drinking —and was "skunked"—was at 3,000 feet over downtown Los Angeles. He had trouble reading the tower's instructions coming back into his home airport and finally had to follow an airliner into the proper runway. His comment: "After I finally got the ship back on the ground, I was scared almost to death. It seemed to me that the addition of only 3,000 feet in altitude was enough to really trigger a reaction."

Fly-in resorts have at least their share of bottle-to-throttle trouble. The post-mortem recount on the bar chit of one *Bonanza* that never got off the ground showed 13 drinks. On a recent trip to a resort-with-flight-strip, we personally watched the pilot of a Cessna 310 carefully put down his drink at the bar—it wasn't his first—and walk carefully to his plane. He climbed in alone, fired up the engines, made a good takeoff, performed a half-dozen very close "buzzes," made an excellent landing—and returned to the bar to finish his drink.

I asked the resort operator, "What do you do about this?" He shrugged his shoulders and replied, "Do you think I'm going up to a guest and tell him that he's too drunk to fly? He'd look me straight in the eye and say, 'Whaddya mean? I wouldn't go flyin' 'f I wuz drunk!' Then he'd stagger out to his ship and take off."

Since "fun zones" seem to go hand-in-hand with booze-in-hand, we contacted the two largest airport operators in Las Vegas, Nev. Wes Durston (AOPA 114401), owner of the north-of-town Thunderbird Airport—and a rigid teetotaler—said, "We never have any trouble over here. In all the years I've been operating this airport with over 200 planes based here, I've had only one occasion when I've had to stop anyone from flying. I saw a *Bonanza* taxiing out erratically one evening and drove my car out in front of him to bring him to a stop. The pilot was in no shape to fly, but his surprising comment was, 'I've been stumbling around here for half an hour waiting for someone to tell me not to fly.' "

George Crockett (AOPA 5715) of Alamo Airways at McCarren Field said, "Naturally, in 25 years here we have seen a few pilots fly in pretty loaded. But they are very few in number and they eliminate themselves pretty fast because if their judgment is bad enough to fly when drinking, it's bad enough so that their mortality rate is going to be high whether flying or driving.

"In one recent experience we had a businessman from a neighboring city who was inclined to have a few too many, after which he would decide to come to Las Vegas to make his fortune, or something. He generally flew his twin with a pilot, but it would seem that the pilot had also taken one-for-the-road. They landed here gear-up at 4 a.m. with no lights on the plane. I heard the noise from my house a mile away and came over to advise the tower not to land a 707 on top of them."

Wilber Zepp (AOPA 25029) of Zep Oxygen has been associated with the problems of keeping people breathing for over 20 years. He feels that the increased availability of alcohol at or adjoining airports contributes directly to the problem.

"Up until about 15 years ago, you had to get a cab or hitch a ride downtown from most airports," said Zepp. "Then the car rental business began and it became a simple matter to get into town and, if you were so inclined, have 'a couple of quick ones.' Within the past five to seven years, we've seen the popularity of the airport motel or hotel, coffee shop or cafe and usually an adjoining cocktail lounge. Thus, it has become increasingly easy for a pilot to have a drink or two and then go flying."

One of the first questions that many veteran police reporters will ask following any light plane crash is, "Where did the ship take off from?" And the reporters know which airports have bars.

As in any controversial subject, there are almost as many conclusions as there are people. "Slim" Kidwell (AOPA 31229) has been an active pilot for over 40 years. Among other interests, he owns the cocktail lounge at the Torrence, Calif., Airport. "We never have any trouble with flying and drinking," said Kidwell with conviction. "Pilots come into my bar after they're through flying for companionship and a comfortable place to talk about flying.

"The last alcohol accident we had on this field—the guy never got out of the traffic pattern—was simple to analyze. We went out to his hangar where his car was parked. There were two empty booze bottles and paper cups scattered all over the place. He certainly couldn't have done that in an airport bar," concluded Kidwell.

Dr. Mohler tends to agree. He feels that "the availability of bars (at an airport) probably has an effect on a

very small number of pilots who might be susceptible to temptation under various circumstances . . . No evidence exists that the percentage of flying and drinking is increasing."

We asked Dr. Mohler about the old-time, helmet-and-goggle group versus today's lightplane pilot. He pointed out that, despite aerodynamic improvements, "current light planes are *less* forgiving of alcohol impairments than the aircraft of three or four decades ago because of the cold slipstream of the open cockpit, lower cruising altitudes, slower rates of climb and really very simple airplanes."

Despite advertised claims of "go for a drive in the sky," a modern aircraft —even a very unsophisticated one—is up to 10 times as complex to operate as an automobile, according to Dr. Mohler's research. "Complexities include roll, pitch and yaw, drift movements and critical speeds at both ends of the meter. The pilot must do more than navigate by reference to a nearby white line. He must adjust power, trim, mixture, propeller, etc. Weather factors are far more critical in flight than in an auto; headwinds vs. fuel, rain, darkness. En route and terminal radio procedures must be met.

"Owners' handbooks of a typical single-engine, four-place, retractable-gear plane show 20 different preflight items, five specific starting maneuvers, 10 ground check operations, 10 pre-takeoff checks, seven climb operations, 10 categories of en-route operations, seven prelanding operations, three landing operations and eight shutdown items. This totals a bare minimum of 80 items compared with a current automobile owners' manual listing 10 critical items."

So—what's to be done about it?

One old-timer has a very simple solution. When he knows that a flying buddy is going to visit him and they'll probably "have a few," he'll put his plane in the back of the community hangar fairly early in the day. By the time he's closed a bar or two and has the urge to fly, his plane is completely boxed in by a dozen others. He'll shrug his shoulders and carefully head for the "sack."

George Crockett of Las Vegas admits that, "on a few occasions, we have 'lost' the keys, talked a pilot into going back to town, given him a room in our motel to 'sleep it off,' or in extreme cases, have blocked a plane from leaving. On rare instances, the airport-stationed deputy sheriffs have had to take over but they have never had to resort to an arrest that I know of."

Fear of punishment or ridicule is always a good dissuader, but law enforcement is usually "after the fact" and on some high-flying occasions, that's far too late. "Prohibition is the perfect answer," said our Alcoholics Anonymous-pilot contact. "There would be no problem if no one drank, but that's completely unrealistic as long as we're working with people and their frailties."

Here are a few things that have happened to pilots who drank—and got caught at it. Ned K. Zartman, Counsel for the FAA's Western Region, went into his files for the following disciplinary actions:

"A doctor, holder of a commercial pilot certificate, operated a——while under the influence, at a low altitude over a small town in California, crashed into freight yards, destroyed the aircraft and damaged freight cars. Emergency suspension order issued but pilot failed to surrender his certificate and continued flying. Emergency revocation order issued and pilot thereafter

THE AUTHOR

Don Downie, author of "From 'Bottle To Throttle': How Many Hours?", is well known to PILOT readers. A military flight instructor during World War II, he has been writing about aviation subjects ever since. His latest article appearing in the PILOT (March issue) was "A Visit With An Old Friend." The "old friend" was a Piper Cub, which he and Ruth Downie, his wife, flew across the country 20 years ago.

surrendered his certificate. No appeal made.

"A student pilot operating a Champion aircraft departed——Airport with a passenger while both pilot and passenger were under the influence, made several passes over the airport, operated contrary to red signal instructions from the Tower and without position lights on. Emergency revocation order issued and pilot surrendered his certificate. (Airport in this report has a bar adjacent to the transient parking area.—Ed.)

"An uncertificated person, following a chartered flight, entered the aircraft when the pilot was busy elsewhere, started the engine of a Beechcraft K-35 and totally wrecked the aircraft when he attempted to takeoff. $1,000 civil penalty imposed."

FAA Counsel Zartman also points out that "in many cases the local police authorities make arrests, and stiff monetary fines are usually imposed. . . . I might remind you, however, that revocation of a certificate is not considered a penalty because, under the law, it must be based on a finding of lack of qualification. Therefore it is our position in most such cases that the pilot has demonstrated his lack of qualification by operating an aircraft while under the influence of drugs or alcohol."

So what to do when you see a fellow pilot stagger toward his aircraft? If you can't talk him out of the flight, you can be a "rat" and call the tower, assuming that it's a controlled airport. "In such a case, the tower could immediately notify the police and, if time permitted, an arrest could be made. Of course, the ground-based representative of the Airport Department could make a 'citizen's arrest' if he cared to chance the possibility of being charged by the individual with making a wrongful arrest," said Zartman.

With the law-suit potential noted above, there's a good chance that our loaded fly-boy will fly. That is, unless he's "programmed his mind," through a decision made while sober, to stay away from his airplane. Dr. Mohler points out that "each man must be his own 'enforcement officer.' . . . The sober mind can easily handle the flying task, but there are so many 'time sequenced' actions to make in flying that alcohol has, therefore, a greater impairment on the flying task."

In the old, bold days of the Wild West, Sheriff Ralph Lamb of Las Vegas, the last of the cowboy sheriffs, reports, "it used to be a 'house rule' at some of the higher class saloons and dance halls that all hardware be checked when they entered, along with their 10-gallon hats."

So, why not check your aircraft keys when you arrive at a fun zone?

Since this entire article is subject to all kinds of rebuttal, we may as well conclude with something that no other aviation publication I know of has done recently: quote Shakespeare. Macbeth, Act 2, Scene 3, regarding alcohol: "It provokes the desire, but takes away the performance." ●