Chapter 13: The Foibles of Learning to Fly

> ***Now, there are two ways of learning to ride a fractious horse: one is to get on him and learn by actual practice how each motion and trick may be best met; the other is to sit on a fence and watch the beast a while and then retire to the house and at leisure figure out the best way of overcoming his jumps and kicks. The latter system is the safer, but the former, on the whole, turns out the larger proportion of good riders. It is very much the same thing in learning to ride a flying machine.***
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> — Wilbur Wright, from an address to the Western Society of Engineers, Chicago, 18 September 1901.

Few aviators have the opportunity to experience more than one flying occupation at a time. Some are airline pilots, some are freight dogs, others fly charters, some are missionary pilots, some are corporate pilots, some fly military jets, some pull banners or tow gliders, and some are flight instructors. I belong to a group of select few professional pilots who are engaged in two or more flying occupations. For me, it is: (1) business flying and (2) flight instruction. Together, these two pursuits consume about 800 flying hours a year plus another 300 hours in ground instruction. In other words, over one-half of my professional life is devoted to aviation. This experience allows me to observe the vagaries of weather, malfunctioning equipment, and pilot errors. It also permits me to witness the many misadventures of people learning how to fly.

I enjoy both flying occupations equally well. Business flying allows me to fly high and to fly far, to large airports in a high performance propeller-driven aircraft equipped with all the latest bells and whistles. Flight instruction, on the other hand, is most often performed in basic trainers, many of which are old and tired. Nonetheless, I derive considerable joy in observing flight students acquire and demonstrate the skills necessary to operate in today's busy national airspace system. I have talked much about my business flying experience. I am devoting this chapter to the highlights of my world of flight instruction.

Before beginning, let me modestly interject that I do not think of myself as a particularly noteworthy business pilot. I am able to perform adequately well "in the system," as they say. I am frequently humbled as I listen on the aircraft radio to the performance of professional pilots far more skilled and experienced than me. I have a much higher regard for my skills as a flight instructor. If there is one area of my flying life that I truly believe I excel, it is flight instructing.

I base this immodest self-assessment on my observations and comparisons of the many other flight instructors I have known. Rather than casting dispersions on their teaching skills, let me simply say that I have studied their deficiencies and worked very hard to exclude these deficiencies from my own practice of flight instruction.

What is more important, I have studied their strengths and worked equally hard at emulating these strengths as best I am able. I must also say that I was one of a small cadre of pilots who received excellent instruction from top notch instructors. I include in this list my primary instructor, Barry Schmidt, my instrument instructor, Ken Beyea, my commercial and CFI instructor, Pat Campbell, my recurrent training instructors at Flight Safety International in Wichita, Kansas and at Fighter Combat International in Mesa, Arizona, and my mentor of all instructors, Louie Nalbone from Dunkirk, NY. Each of these talented aviators planted in me the standards of excellence that I try very hard to bring to my own flight students.

I believe that one of my strengths in the flight instruction phase of my flying career has been the pursuit of a learning environment that most closely resembles that which the student will eventually encounter after receiving his or her pilot certificate. Instructors who fail to create this environment leave his students dangerously deficient in their skill set. On the other hand, instructors who make this environment too real expose themselves and their students to unreasonable risks. Far too many fatal accidents have occurred in the name of "realistic" training.

How does one prepare flight students for icing encounters? Do you limit icing instruction to the classroom? Or do you plan a flight into known icing conditions? One scenario leaves the student under prepared; the other scenario may be risky . . . or downright illegal, depending upon aircraft limitations. What about thunderstorms . . . wind shear . . . high winds . . . wake turbulence . . . engine failures or fires. . . unusual attitudes in actual instrument conditions. . . spins . . . control surface failure? Curiously, the FAA flight training regulations have little to say in this regard. The matter is pretty much left to the discretion of the flight instructor.

I have struggled with this issue more than any other aspect of flight instruction. My concern arises from the many incredibly dumb things that poorly trained pilots do after they receive their certificate. A word of caution hear. Well-trained pilots also do incredibly dumb things. I do incredibly dumb things. Every aviator screws up. The idea, however, is to minimize the number of pilot-induced mishaps by creating a realistic training environment that effectively addresses those issues that cause pilots to stumble. The idea is to also restrict mishaps to those that do not bend metal or threaten life or limb.

I will proceed through this chapter by illustrating a number of my actual training scenarios where, in the name of learning, dumb things happened. I will tell you about close encounters with airliners, loss of electrical power and frozen Pitot tubes in instrument meteorologic conditions, poor weather landings, getting lost and giving up in the clouds, power losses on take off, and pushing the cross wind envelop beyond the demonstrated capability of the airplane. I am pleased to report that none of the many adventures resulted in bent metal or the spilling of blood. Each, however, left the student better prepared to handle unexpected in-flight emergencies, poor weather, and whatever else they may encounter from departure to destination.

Equally important, these adventures instilled pilots with the confidence to utilize their airplanes for the purpose they were ultimately created . . . .to get someplace, quickly, reliably, and

safely. In this regard, I have observed far too many pilots abort missions, cancel travel plans, miss meetings or social gatherings out of an over-conservative approach to weather and equipment assessment. I have heard numerous corporate and airline pilots, for example, exclaim that night IFR flight in single engine airplanes is inherently dangerous. These two, three, and four engine jet pilots fail to recognize the inherent reliability of today's piston aircraft engine. They fail to recall that light singles are able to land safely at night, sans engine, on roadways, golf courses, and corn fields with little risk to life or limb. These pilots were never trained to use a GPS, panel mounted or handheld, to punch the "nearest airport" button, perform a descending spiraling turn, again without the engine, through the clouds and make a spot landing on the runway, then walk away to fly another day.

I have seen too many pilots freeze in fear of a forecast presence of thunderstorms anywhere within 50 miles of their route of flight. How soon they forget that a weather forecast is nothing more than a horoscope with numbers! Worse, a forecast of icing in the clouds is like screaming fire in a crowded theater. Panic, flight cancelled, back to bed . . . until spring when the warm winds of summer again begin to blow!

"Hold it, Bob," you say. "You are preaching heresy here. They should take away not only your flight instructor certificate but your flying license as well for encouraging readers to launch into poor weather with minimally equipped airplanes."

On the contrary. I would much rather be on the ground wishing I were in the sky than the other way around. And I would certainly remain on the ground if thunderstorms or icing conditions were actually hovering over or near the airport. I would also remain on the ground if there were ever a situation where I did not have a solid gold "back door" to escape out of if the worse should happen.

Here, in two words, is my issue with much of today's flight instruction: STUFF HAPPENS! Translated, accident statistics confirm the fact that most accidents result from events that took the pilot by surprise. Lacking realistic training experience, they freeze at the controls. The JFK, Jr tragedy is a perfect example of this. The number one killer of private pilots today, according to the Air Safety Foundation, is continued visual (VFR) flight into instrument (IFR) conditions by non-instrument rated pilots. The point being that weather often changes unpredictably. "I looked up and suddenly I was in the clouds," is an all too frequent comment made by low time pilots with their first unexpected encounter with declining weather.

Yet we continue to provide student pilots with their required three hours of instrument training by having them put on a hood on a sunny day. This is about as realistic as sitting through a John Wayne war movie and coming out believing that you have actual combat experience! It simply does not work . . . yet it remains an FAA approved form of training. Remember . . . the number one cause of death among non-instrument rated pilots?

Thunderstorms and icing happens . . . sometimes without being mentioned in the forecast. Having never experienced an upset caused by severe downdrafts, the hapless pilot fights the controls. He or she yanks the control wheel back with such force that wings bend or worse! Never experiencing the effect of ice on the wings, they fail to understand the horrendous effect of tailplane icing which is exacerbated by lowering the flaps while on final approach.

Why do we allow this sub-standard form of training to continue? Economic reality is the

principal reason. Young, aspiring professional pilots often resort to flight instruction to build the requisite number of flight hours to qualify for an airline interview. By mere definition, they lack actual flight experience beyond that which they received being trained themselves. Rather than knowing and respecting the hazardous aspects of flight, e.g., adverse weather, etc., they simply avoid them. Plus, they work cheap!

Flight schools have a unique challenge in this regard. Recognizing the skill limits of their young, inexperienced flight instructors, many flight schools impose specific training restrictions to limit their own exposure to the risks of law suit. Graduating fair weather pilots lacking serious, real world training, they send new, marginally prepared pilots into the system every day. It is simply an economic fact of life necessary to remain afloat as a profitable business.

What about me? What makes me a particularly unique flight instructor? Age, experience, bravado . . . who knows? I do know this, however. Training must be real if it is to be effective. It must be relevant to the conditions most likely to be experienced by the student pilot after he or she receives the cherished airman's certificate. And it must be in the system rather than restricted to a familiar practice area around the home airport. I launch when the legal minimum or better flight conditions exist rather than retreating to the classroom at the first sign of "questionable" weather. This, in my opinion, is what makes good pilots who are comfortable in the quakes as they are in the calms, who do not freeze at the controls, and who are inspired to continually advance their level of training.

The following several flight training scenarios illustrate what I am trying to say. While some are quite harrowing, each left the student better prepared as a pilot. Each scenario was conducted within applicable federal air regulations and with the necessary "back doors" to assure a safe and secure outcome.

It was a dark, moonless December night. The temperature was well below freezing and light snow was falling as John and I lifted off Akron Airport in a Piper Warrior. That evening's mission was to provide my student with realistic night operations training at and around a busy tower-controlled airport. John was about one-half way through his primary training and had a good command of the airplane. His weakest area was ATC communications. This is a common problem with students for two reasons. First, air traffic controllers typically speak at about 200 words per minutes with occasional gusts up to 500 words per minute. It takes an experienced ear to decipher ground to air communications. Second, most flight students use the cheapest headsets money can buy. Lacking even rudimentary passive noise insulation and the more advanced electronic noise cancelling features common among high-end headsets, these cheap headsets make it inherently difficult to hear what is being transmitted.

We were being vectored around the north side of the Buffalo-Niagara Regional Airport for a planned landing on Runway 05. At the same time, a United Airlines A-757 Airbus was approaching the same airport from the south. I was paying close attention to Buffalo Approach Control's communications with the Airbus along with the several other arriving and departing airplanes in the area. This is one skill I bore into the minds and hearts of all my flight students. I was not sure that John was getting the point. By listening carefully to the communications between other arriving aircraft and the approach controller, I could begin to draw a mental picture

of what was going on all around us. As I said before, I did not think John was forming this same mental picture.

ATC called us with another vector. "Cherokee 40060, turn left to a heading of 240 degrees." John dutifully complied with the directive. The controller's plan was to put us on a left base turn for Runway 05. Similarly, his plan called for putting the United Airbus on a right base to the same runway.

ATC again called us. "Cherokee 40060, turn left heading 140 degrees. You have an Airbus at 12 o'clock, eight miles. I'll call your turn to final." He then called United Airbus.

"United 662, turn right, heading 320 degrees. You have Cherokee traffic 12 o'clock six miles. You are number two for landing behind the Cherokee."

Get the picture? The controller had us on a left base and the Airbus on a right base. To make his plan work, he had to turn us onto final before he could clear the Airbus to land. Peering out the windshield, I could see the high-powered landing lights of the Airbus showing directly in our face. The closure rate between our two aircraft was about 250 nautical miles per hour or about four miles per minute. It appeared that we were playing high stakes "chicken," with the controller calling the shots. In truth, the controller had allowed enough space between us to assure a safe outcome assuming both pilots did their job.

Anticipating his plan, I was spring-loaded to make a 90 degree turn to the final approach course just a soon as the controller called our turn. Unfortunately, John was not quite so ready. The landing lights of the approaching Airbus were growing larger. The call came.

"Cherokee 40060, turn to 05 degrees, cleared to land Runway five, maintain best forward speed." I immediately glanced left to John and waited for him to make the turn. Nothing. I waited another precious five seconds. The controller called again, this time with more urgency in his voice.

"Cherokee 40060, turn left now, cleared to land Runway five." Again, I waited for John to acknowledge the call and make the turn. Still, nothing. I instantly grabbed the yoke, made a quick left turn, applied full power, and acknowledged the controller's instructions. Then, in truly uncharacteristic fashion, I ripped into John with the force of a line boss on a chain gang.

"John . . . where are you? Didn't you hear the controller's calls? What were you trying to do?" John sheepishly replied, "Here what? I didn't hear them call us." I could feel the beads of sweat sliding down my forehead.

"You know, John. It's bad enough that your inattention could have cost us our lives, but when you take out 240 innocent people with you plus dozens of people on the ground, that's a damn shame!" I was angry and I made sure that John knew it. This was the first and only time I recall ever losing my temper in the cockpit. I was angry with John, but truth be known, I was angry with myself for allowing the encounter with the Airbus to get so close as to possibly endanger lives. I had learned a valuable lesson. Sadly, John did not. He never flew again.

Knowing what to say and how forcefully to say it is the trickiest part of flight instruction. In John's case, we had covered the importance of paying attention to controller issued instructions many times before. He was simply not getting it. My hope was that by creating a more realistic training scenario, he would discover for himself importance of inflight communications. It worked, but it worked too well. He became frightened to the point of

quitting.

Interestingly, on rare occasions pilots find themselves in desperate situations. But they cannot quit. If they do, they die . . . and many, unfortunately, have died as a result of quitting in such situations. This is one of several psychological profiles referred to as *resignation*. Some have suggested that John F. Kennedy, Jr. fell victim to this psychological profile after his airplane entered a steep spiral while approaching Nantucket Island. Losing all reference to attitude, watching his altimeter unwind in that dark, foggy night over the Atlantic Ocean, and feeling the increasing G forces may have caused him to resign and accept his fate. Consider the fact that all Kennedy had to do was press a single button on his instrument panel to recover his airplane. That button would have activated his autopilot system which, in turn, would have automatically returned the airplane to straight and level flight.

Was I disappointed that John quit taking flight instructions? Certainly. But that was better than later finding himself in a frightening situation alone in the airplane . . . and quitting.

I had a similar encounter with an instrument student while navigating at night to the Olean Airport in the southern tier of Western New York. Like my experience with John, it was a cold, blustery night. The only difference was we were in instrument meteorological conditions. Hank was at the controls of his new Cessna 182 Turbo Skylane. I had taken Hank through his initial pilot training and by now he was about one-half way through his instrument work.

The training environment was about as real as it gets. Night IFR, freezing temperatures and low ceilings. Hank's problems that evening began as he transitioned from the enroute to the approach phase of the flight. We were operating outside of Cleveland Center's radar coverage. Cleveland had cleared us for the published approach into the Olean Municipal Airport based upon our last issued position report.

Perhaps distracted by the light ice building on the wings or by the opaqueness of the outside environment, Hank lost his position awareness. This meant that he was not quite certain where we were in relation to the airport.

"Take it, Bob," he said. "I'm not sure where we are."

My response was simple and direct. "Can't help you, Hank. I'm lost, too," I lied. He apparently believed me because I could see beads of sweat appearing on his forehead in the dimly lit cockpit.

"Cut the crap, Bob. Take it!" I could not discern whether Hank was angry or frightened. I think it was a little of both.

"Sorry, Hank, I replied. You're all alone on this one." I was trying to create as much realism as possible. It was my next comment that caused Hank to take control.

"Dear Mrs. Stockwell. I regret to inform you that your husband, Hank, died on impact while trying to land at the Olean Airport."

"What are you talking about," asked Hank?

"That's what the letter to your wife will be saying if you can't get us out of this mess," I replied.

My sample letter must have worked because Hank suddenly took charge. He began spinning the dials on both VORs looking for centered needles. Using basic navigation skills he

learned in his private pilot training, Hank triangulated his position.

"Okay, Bob, we're just north of the airport. I'm going fly east and intercept 223 degree radial off of the Geneseo VOR, then fly it outbound until I intercept the localizer. Once established inbound on the localizer, I'll descend down to 3,200 feet until passing the final approach fix at Eaney, then I can go down to the minimum descent altitude and hopefully pick out the airport."

I marveled at Hank's immediate grasp of the situation and the accuracy of his planning. It must have been the thought of making his wife a widow that sparked a new sense of confidence. Hank had formulated a plan, then executed his plan skillfully. The lesson here was profound and it, in theory, saved Hank's life. Rather than becoming a victim of his fears, he took control. He fell back on his previous training. He searched his memory banks for a solution. He worked the problem and he solved it.

Sadly, many unfortunate pilots failed to master this technique. They could not separate their fears from their skills. Overwhelmed and unable to overcome their powerful emotions, they froze at the controls and accepted their inevitable demise . . . tragically taking their passengers with them. Hank learned a valuable lesson and will likely enjoy a long and happy life as a skilled aviator.

My search for realistic training environments took a major leap forward one dark, foggy night over Central New York. This time, however, the event was real, not contrived. I was preparing Jerry for his instrument check ride. The training agenda for that evening was IFR emergencies. These included simulated instrument failures, loss of communications, vacuum and electrical failures and whatever other nasty little deeds I could simulate. The weather south of Syracuse, NY, where we were operating, was bad, with ceilings right at minimums and less than one mile visibility.

Jerry had satisfactorily completed all of the simulated emergencies I could safely throw at him and were beginning to head home when we both noticed a flickering low voltage annunciator light. "How did you do that," asked Jerry.

"I didn't do anything. I think we may have a real problem," I replied. I checked the voltage digital readout on the JPI multi-function engine monitor. It was reading less than the required 14 volts to keep the battery charged. The flickering light suddenly went on full bright.

"We've lost the alternator," said Jerry calmly.

"Try resetting the alternator circuit breaker."

Nothing happened. "Cycle the master switch." Still nothing.

An electrical failure in IMC conditions was a serious emergency. Electricity powers the navigation instruments we needed to get safely on the ground. Unlike most other required aircraft systems, our airplane had no backup alternator. The only thing going for us was the stored energy in the battery. Without continuous alternator charging, the battery would give us no more than 30 minutes of usable power.

My goal of producing a realistic training environment was suddenly achieved. Except, this was no simulated exercise. We had a very real problem. A widespread low pressure area had created low ceilings and poor visibility over all of New York and Northern Pennsylvania.

There was no VFR that we could bolt to. We had to get on the ground within 30 minutes or that would be our last flight . . . ever.

"We can make Ithaca in 20 minutes," said Jerry. My concern about the emergency was interrupted by Jerry's coolness. Jerry had maintained excellent position awareness and he was adept at finding the "nearest" airport using the GPS.

"Okay, let's go for it." I called the Elmira approach controller who had been working our flight and informed him of our situation. "Are you declaring an emergency," came his reply?

"Affirmative," I said with the calmest tone I could muster.

"N364 Sierra Papa, you are cleared present position, direct Ithaca, fly heading 180 degrees, descend and maintain 4,000. Ithaca weather is winds 160 at five knots, ceiling 200 overcast, visibility three/quarters in fog. When you get a minute, we need your number of souls on board and remaining fuel."

"Two aboard and about two hours of fuel, I read back quickly, not wanting to consume any more electrical power than necessary on radio transmissions."

Jerry and I formulated our cockpit resource management plan. It was agreed that Jerry would fly the airplane and I would troubleshoot the electrical problem and handle the communications. I looked at Jerry and reminded him that may have only one shot at the airport. If we missed the approach, we might not have enough time to come back around and try it again. I could tell that Jerry had already figured this out.

I fumbled through the approach plate book to find Ithaca's instrument approach procedures while Jerry followed the vector given to us by ATC. At the same time, I began reducing the electrical load by turning nonessential components. First to go were our incandescent navigation and strobe lights on our wingtips and tail. Fortunately the outside temperature was above freezing so we could operate without propeller or Pitot heat. Next to go was the GPS, the multifunction moving map display, and the number two nav/com radio. I was reluctant to leave on the transponder but decided to do so in order to provide ATC positive identification of aircraft on his scope.

The approach controller called, "November 364 Sierra Papa, you are nine north of Ithaca, fly heading 140 degrees, descend and maintain 3000, expect ILS runway 32 approach, contact tower on 120.5." I gave a quick reply and called the tower. It had been almost 15 minutes since we lost the alternator. If the battery was good, we had another 15 minutes to go.

"Tower, N364 Sierra Papa inbound, no delays please."

"Roger, N364 Sierra Papa, fly heading one zero zero degrees, descend and maintain 2,200 feet, you are cleared to land runway 32. We have the equipment rolling." The tower was referring to the crash/rescue equipment that would be standing near the runway as we touched down. I think they are trained not to use the word "crash/rescue" in such transmissions to avoid producing any additional stress on the cockpit crew. Nonetheless, both Jerry and I knew what he was referring to.

I kept a close watch on the digital readout of remaining battery voltage. It was down less than the required 12 volts as we intercepted the localizer/glideslope. Jerry was flying superbly, keeping the needles squarely centered. His concentration and skilled flying caused me to think that Jerry was either a masterful pilot or he was totally unaware of the serious nature of our

situation. To Jerry's credit, I concluded it was the former . . . based, of course, on his excellent instruction!

Inside the final approach fix, I called "gas, undercarriage, mixture, pump, prop, seatbelts, lights." We were descending through 1,200 feet above the ground and were still in the scud. The only electrical equipment now operating was the number one nav/com and turn coordinator. I had turned off the transponder earlier on the final approach course. Jerry began to call out the remaining altitudes: "one thousand . . . five hundred. Nothing outside the windows could be seen. The tower controller came on with a wind check and confirmation that we were on both the localizer and glideslope. He noted that no reply was necessary, perhaps realizing that each of our transmissions consumed electrical power. I glanced over at Jerry thinking that I should take the controls at this final critical phase of the approach. We were approaching the inner marker at 300 feet above the ground, still nothing in sight.

I was being cornered into making a potential lifesaving decision. What if we reached decision height and no runway or landing lights were in sight? What if Jerry allowed the localizer/glideslope needles to make a full scale deflection? Do we break off the approach and fly the published missed approach, go around and try it again. This would take another 15 minutes to accomplish. We might not have 15 minutes of electrical power left.

No! I knew we could not risk missing this one opportunity to get in. Runway lights or not, we had to continue below the mandatory 200 foot decision height. If this occurred, we would be operating outside of all standard instrument procedures, very, very close to the ground. Pilots have followed the glideslope right to the runway and landed in zero visibility conditions before, but it was rare and aircraft damage almost always occurred . . . but they walked away.

Jerry had excellent command of the situation. I did not disturb his concentration but I stayed close to the controls with my left hand pressed against Jerry's right hand as he used it to tweak the throttle.

Jerry called out "Decision Height" at the instant I caught the approach lights. "Continue, Jerry," I whispered, not wanting to break his concentration. We descended another 100 feet. I could see the glow of the approach lights reflecting off of the tree tops racing below us. I turned on the landing lights just as the runway was coming into sight. The ominous glow of the red flashing lights of the crash/rescue vehicles following us down the parallel taxiway was an attention grabber.

We rolled to a stop. Jerry and I looked at each other in the dimly lit cockpit. I turned and said to him, "If I had the authority, I'd hand you your instrument rating right now. You did a masterful job." Jerry thanked me and said, "How do you suppose we get home?"

One of the most troubling areas of flight instruction is designing realistic equipment malfunctions. This problem is solved equipment failures really do occur unexpectedly. Fortunately, or unfortunately depending upon how you look at it, aircraft equipment malfunctions in flight are rare. Nonetheless, they do occur. Obviously, it is best when they occur in the training environment, presumably with an experienced flight instructor on board. Such was the case with Jerry's alternator failure. Another occurred on a training flight one cold Saturday morning.

Jason was my youngest student. He began his flight instruction at the age of 12. He soloed on his sixteenth birthday, and he received his private pilot certificate at seventeen. I was preparing him for his private pilot checkride. The cloud base was at 3,000 feet and the cloud tops were at 8,000 feet. The outside air temperature at 6,000 where we operating was minus 20 degrees Celsius. We were picking up light icing. I requested a clearance down to 2,300 feet which would put us back in the clear and out of the icing conditions. Having a solid gold "back door" just below us, I deliberately took more time than usual to vacate the icing conditions. This would provide Jason an excellent opportunity to see and learn the effects of air frame icing. This exercise turned out to be a lesson that Jason would not soon forget.

Airframe ice was building steadily as we descended down through 4,000 feet. My attention was divided equally by monitoring Jason's flying, the gauges, and the ice building up on the wings. Suddenly I sensed something was wrong. Despite our nose-down attitude, our airspeed was dropping rapidly. I instructed Jason to add power and to increase our descent rate. Despite this, our airspeed was dropping uncomfortably close to stall speed. A quick glance to the altimeter revealed more trouble. It was showing level flight at 3,800 feet despite the fact that we were at full power in a 10 degree nose down attitude. Something was wrong. What is it?

"What's wrong, Mr. Miller," Jason asked with the innocence of youth? My mind felt like cream cheese. I should be able to figure this out. This was the first time I could recall ever losing critical flight instruments in the soup. My flight with Jason had suddenly changed from a training mission to a real life event. I had to think.

Suddenly, I got it! The Pitot tube must have frozen over. Could it be that we had forgotten to turn on the Pitot heat? No. The switch was on. We had even tested its function as part of our pre-flight inspection.

For non-aviators, the Pitot tube hangs below the left wing. It has two small openings. One opening measures the impact pressure of the airflow passing by the wing. The other hole provides balancing static pressure necessary for proper functioning the of the airspeed indicator, altimeter, and vertical speed indicator. These three instruments are critical for controlled flight, especially when operating in the clouds.

The rapidly building ice was apparently more than the tired heating element in our 27 year old airplane was able to handle.

As every beginning flight student is taught, when the Pitot tube is covered by ice, it is possible for airspeed indicator function like an altimeter. Similarly, when the static port is covered over by ice, the altimeter will remain in a fixed position. Thus, the lower we flew, the airspeed indicator revealed a correspondingly slower air speed.

All of this simply meant that our altimeter, airspeed indicator, and vertical speed indicator could no longer be relied upon for controlling our flight. Our vacuum powered attitude and heading indicators were still working properly, thus we were able to keep our wings level while still in the clouds. The only flight condition we had to compute using other remaining instruments was our descent rate and our altitude. Keep in mind that we were still accumulating airframe icing as all of this was going on.

I notified ATC of our condition and asked that they call our altitudes from the Mode C readouts they were receiving from our transponder. While not formerly declaring an emergency,

both I and ATC recognized the seriousness of our condition. The real saving grace of this flight episode came from knowing that the cloud bases were 4,000 above the ground. All we had to do was keep our wings level and control our descent rate so as not to overspeed the airplane. I reduced the power to 1,700 RPM. This reduced power setting from our previously trimmed condition at 2,400 RPM would give us a 400 to 500 feet per minute descent rate . . . or perhaps a bit faster due to the ice on the airframe.

What seemed like hours really occurred over just a couple of minutes. We broke out of the clouds just as ATC was calling out 4,000 feet. The appearance of the ground below and a distinct horizon made the rest of the flight easy. We motored back to the Akron Airport having both experienced another real life lesson in this business of flying.

One of the most rewarding things about flight instruction is the rapid progress made by most students. Like all learning, students advance at differing rates. Plateaus in learning are common as are periods of remarkable advancement. One of the most dramatic examples of all this is Hank. Recall earlier, I described Hank's plea for help on an instrument training flight. I would like to fast-forward my description of hank developing flying skills by about two months.

We took off from Buffalo just after dark on an IFR training flight to Dunkirk, NY, then to Jamestown, then to Bradford, PA, then back to Buffalo. The weather was deteriorating quickly as we taxied to the active runway. Hank had a doubtful look on his face. "Bob, do we really want to go up tonight?"

"Sure, Hank. Why not?"

"Don't know, the weather doesn't look too good."

Buffalo was under the influence of a temperature inversion with little or no wind. A 300 foot high layer of warm, moist air had drifted inland from Lake Erie. The cooler ground surface caused the temperature and due points to come together, thereby creating foggy conditions. We launched just as the weather phenomenon was occurring. We climbed above the emerging fog layer at about 800 feet above ground level. The sky was clear above and the moon was shining brightly. We motored southwestward toward Dunkirk and completed our first practice instrument approach of the evening. I could see that Hank was on his game. Hours and hours of instruction and practice were really beginning to pay off.

After completing the published missed approach procedure, the Buffalo approach controller called to advise that weather conditions at the Buffalo Airport were going down rapidly. I thanked the controller for her advisory and suggested to Hank that we continue our training exercise as planned. My thought was that the fog settling over Buffalo would dissipate by the time we completed our planned route that evening. I was wrong.

Rethinking the weather situation, Hank and I agreed to skip the last leg of our trip to Bradford and return to Buffalo. We had excellent visibility with clear skies. It was hard to imagine Buffalo being shrouded in clouds just 30 miles to our north. We tuned and listened to Buffalo's Automatic Terminal Information Service (ATIS). The recorded message advised that the visibility was less than the 1/4 mile minimum required by airlines and charter operators to initiate an instrument approach to the airport. Equally troublesome was the fact that the reported ceiling over the airport was below 100 feet.

I switched frequencies and gave Buffalo approach a call to secure a clearance back to Buffalo. The controller quickly approved our request and gave us an update on the weather. She said that the RVR (runway visual range) for Runway 5 was 1,600 feet at the threshold; 1,400 feet at mid runway; and 1,500 feet at the departure end. The RVR is a more precise means of measuring runway visibility. Keeping in mind that one mile equals 5,280 feet, an RVR of 1,600 feet was about one-eighth of a quarter mile. She asked for our intentions.

"Ah, Approach, give us a vector to the final approach course and we'll let you know," I replied. I needed some time to sort things out in my head. I figured we had another 15 minutes before we would have to commit. Meanwhile, I listened to what the other inbound traffic planned to do.

It was clear that no airline, commuter, or charter flights would be getting in. Each of these operators were assigned to holding patterns at various altitudes over runway 5's final approach fix. Time was running out for me. I had to let Approach know our intentions. Sorting out our options, we could join the gaggle of aircraft in holding patterns. Or we could fly to our filed alternate at Niagara Falls, but the weather there was not much better. Or we could shop around for another airport with better weather. The hour was getting late and neither Hank nor I cherished the thought of calling either of our wive's for a late night pickup at a distant airport.

The choices were made a bit easier for the airliners, commuters, and charter operators as the Federal Air Regulations (FARs) prohibited them from even commencing an instrument approach if the reported is reported to be below the published minimums, e.g., one-quarter mile visibility for the ILS to runway 5 at Buffalo. Their choice was to either remain holding until the weather improved or go to their planned alternate airport.

We, on the other hand, were operating under Part 91 of the FARs which meant that we had no such prohibitions. In other words, we could legally commence the approach, fly down the instrument final approach course to the missed approach point. If we could see any part of the approach lighting system, we could legally fly down another 100 feet. At the point, we could land IF we had the runway environment is sight. If not, we would have abort the approach and climb back up in accordance with our missed approach instructions.

Aeronautical decision making is a complicated process. Many variables enter the process. This was a training flight for us. I could have easily cut and run to another airport with better weather. Or, I could bring my student into the mouth of the beast in the most realistic instrument landing scenario possible. The decisions one makes in situations like this determines the overall quality of instruction afforded to students.

I have long been critical of meaningless flight instruction provided by others essentially under simulated conditions. Far too many new private and instrumented rated pilots have died in weather conditions for which they had never been trained. Given only rudimentary training designed to meet the minimum skill requirements, these hapless pilots were often short-changed in their flight training experience. Tragically, many died before they ever realized this. Among those were the estimated 50 percent of all B-17 crews that crashed during World War II due to inexperience and training in actual instrument weather conditions.

Balancing the need for realism with the associated risks of pushing the envelope too far is a tricky call. This was going through my mind on this foggy night in Buffalo. Cut and run or

charge in and go where angels fear to tread. I chose the latter and gave the approach controller a call.

"Approach, Skylane 2125Golf, we're going to give it a try."

"Roger, 2125Golf, flying heading 030, maintain 2,300 until established, cleared ILS Five Approach."

Hank read back our approach clearance and adjusted the power for the ride down the electronic glideslope into the soup below. I cinched up my seatbelt, studied the approach chart and asked Hank if he was okay with this. Hank grunted a simple reply. "Yeah, what the hell!"

It was clear in my mind that the commercial operators spinning around in holding patterns were hoping that our landing would stir and clear enough fog to bring the RVR up to their legal minimums. One of these pilots in fact called told us to do as much!

Hank and I reviewed our cockpit crew management plan. He would fly the approach while I called out the critical numbers. I would be making the missed approach call based upon what I would eventually observe out the window. I gave serious thought to doing the entire approach myself and having Hank simply observe "how it is done." No, I thought. This is Hank's training . . . and I wanted him to do it.

We slid into the mucky fog at 900 feet about the ground. The city below was completed obscured by the dense fog layer. At a descent rate of 400 feet per minute, it would take us less than two minutes to reach that 200 foot high point where we had to commit to land or to abort. I instructed Hank to turn off the strobe, navigation, and landing lights to prevent distracting cloud reflections. He complied and began to call out the remaining altitudes. Six hundred to go; five hundred to go; three hundred to go . . . We were still buried in thick fog. The wing tips were barely visible. Two hundred to go; one hundred to go. Eighty, sixty, forty, twenty . . .

"I got the approach lights, Hank . . . take us down another hundred." A provision in the Federal Air Regulations allows pilots to fly below the published decision height by another 100 feet if they can see the approach landing lights.

Hank was performing masterfully. He had the localizer and glideslope needles crossed at the center of the instrument head. He was flying a textbook approach! We were barely 120 feet above the ground, quite literally over the Kensington Expressway, traveling at over 100 miles per hour.

Reaching the 100 foot mark with no runway yet in sight, I called out. "Going missed, balls to the walls, let's get out of her, Hank." Hank eased in the throttle to full power, advance the propeller to high RPM, and pressed the mixture knob to the wall. "We got a positive rate, Hank, flaps two, stay on the runway heading, make your call."

"Tower, 2125Golf is on the missed," said Hank with surprising calmness in his voice as I was wiping the sweat from my forehead. The turbocharged Skylane seemed to understand how close it came to skidding its knees on the concrete below and blasted itself skyward at nearly nearly 1,200 feet per minute. This was the single most critical part of the entire experience. An engine burp here would not be pleasant. I silently thanked the folks at Lycoming Engines for producing a reliable product!

Almost within an instant we found ourselves back on top of the fog layer. Looking straight down I could see the glow of the high intensity runway lighting softening the blackness

of the undercast below. The tower controller switched us over to the departure controller who immediately asked us of our intentions. By this time I began to wonder if we might have a better chance of getting in if we tried the approach from the opposite direction on Buffalo's runway 23. This runway had a far better approach lighting system including sequential strobe light flashers called "the rabbit" which extended out one eighth of mile from the runway threshold.

I called the departure controlled and passed along my suggestion for an approach to runway 23. She first denied my request indicating that she still had traffic in holds over the approach to runway 5. I reminded her of the better approach lighting system at this end of the runway and asked to be put in a hold until she could clear the other traffic on the west side of the airport. The winds were light so they presented no barrier to changing runway directions.

"United Express 1550, we're changing over to runway 23, fly heading 120, radar vectors to Klump, expect holding instructions." That call by the controller began the shift of several airliners to holding patterns on the east side of the airport.

She called us back. "N2125Golf, say intentions."

"Ah, Buffalo, request vectors to the ILS 23 approach."

"Roger, 25Golf, fly heading 090 degrees."

"Let's try this again, Hank," I said with a bit of growing fatigue in my voice. "You're the boss," replied Hank. I was proud of Hank. He was hanging in there, not quitting as he had tried to do several months earlier on an approach to another airport. I had convincingly demonstrated that low weather approaches have solid gold "back doors" if the required weather minimums did not appear at the decision height. That, in fact, is what makes instrument approaches a literal "walk in the park" for well trained instrument pilots.

We completed our vectors and intercepted the final approach course. The glideslope came in as expected and we, again, started down the slippery slope to the beckoning runway below. This time we could see the glow of the pulsing sequencing strobe lights lighting up the thick fog below. Again, Hank was on the controls as I called out the critical numbers. We descended lower and lower. Like on the previous approach, I caught a good view of the approach lights right at 200 feet. "Down another hundred," I said to Hank. I'll call the missed."

This is where I pulled over 20 years of flying experience to the table. We were approaching the critically 100 foot mark. I had to make the call now.

"We got it, Hank. I have the runway environment in sight. Continue down!" At our request, the tower had all the runway lighting set at highest intensity. The runway center line lights began to appear as flashbulbs going off in our face. We were both staring at a fast moving array of runway center line and edge lights racing by through the dense fog. We had just crossed the runway end identifier lights so I knew we had better than 8,000 feet or a mile and one half of runway still before us. Hank eased the power back and began lifting the nose. "Don't rush it, Hank," I said while keeping my eyes focused on the center line lighting passing below us.

Hank sat it down gently on the main gear in a perfect textbook landing, then rolled to a complete stop somewhere on the first one third of the runway. I advised the tower that we had landed and requested taxi instructions. "Say your position on the runway," called the tower controller.

"Don't know," I replied.

"Can you find the intersection to runway 32," he asked?

"No, we're in irons out here," I replied with a phrase borrowed from sailing lore meaning that we were dead calm in the fog.

"Okay, there's an aircraft holding short of 23 on 32. Can you see his lights?"

"We're going to taxi forward along the right side of the runway. Maybe we'll see him in a minute or two." We approached a vague outline of concrete coming up on our right.

"I think I have runway 32," I said to Hank. "Let's pull off there." We turned onto the dimly lit ribbon of concrete only to find out that it was a taxiway, not a runway. Venturing a bit further I could see a sign with a yellow letter "D" on a black background.

"Hank, this is Taxiway Delta. We need to turn around an go back out on the runway." Hank reversed course and I called the tower requesting permission to re-enter the active runway. They approved my request and suggested a left turn upon entering the runway, then a taxi of about 500 feet. That should bring us to the intersection of runway 32. Within moments we could see the faint glow of a pair of bright lights of the aircraft holding short on 32.

Using the lights of the holding aircraft as our guide, we maneuvered onto runway 32 and literally inched our way into the general aviation ramp area to several waiting ramp servicemen. "Tough night," asked of the ramp servicemen?

"A walk in the park," replied Hank!

Hank graduated with honors on this dark, foggy night in Buffalo. He made me proud. We had encountered and conducted the lowest legal instrument approach in the book. Our airplane was well maintained, our instrument skills were sharp, and our "back doors" were golden. I recalled the words of Wilbur Wright recorded at the beginning of this chapter. We had, indeed, ridden fractious horse.