

RARE BEAR

A Gold Race Record at Reno

by Birch J. Matthews

*"Don't look back. Something
may be gaining on you."*

—Leroy "Satchel" Page
How to Keep Young (1953)

THE RENO CHAMPIONSHIP unlimited class Gold Race festivities began at 4:30 on Sunday afternoon, September 23, 1990. This was the culmination of four days of racing in all classes held annually at Reno-Stead Airfield for 27 years, the longest continuous air race program in the world. It was also a day during which a piece of racing history would be made.

For race fans the weather was picture-perfect. Midday temperature was 78 degrees, and by late afternoon the sun still warmed the western Reno sky within a few degrees of this high. The unfolding race classic was framed by a bright blue sky punctuated with scattered white cumulus clouds drifting slowly overhead. In the background lay the ancient and majestic Red Range Mountains pockmarked by a myriad of blackened clumps of sagebrush.

Nine unlimited racing aircraft stood stationary in front of the grandstands along with anxious pilots and crews waiting for the Gold Championship finale. The big unlimited racers presented a diverse spectrum of color and shape before the 45,000 or so spectators crowding the grandstands and box seats. Sunday's program indicated this final race would start at 3:55 P.M.; however, the actual schedule was running over 30 minutes late. No one particularly seemed to mind except, perhaps, some of the participants anxious to be up and away.

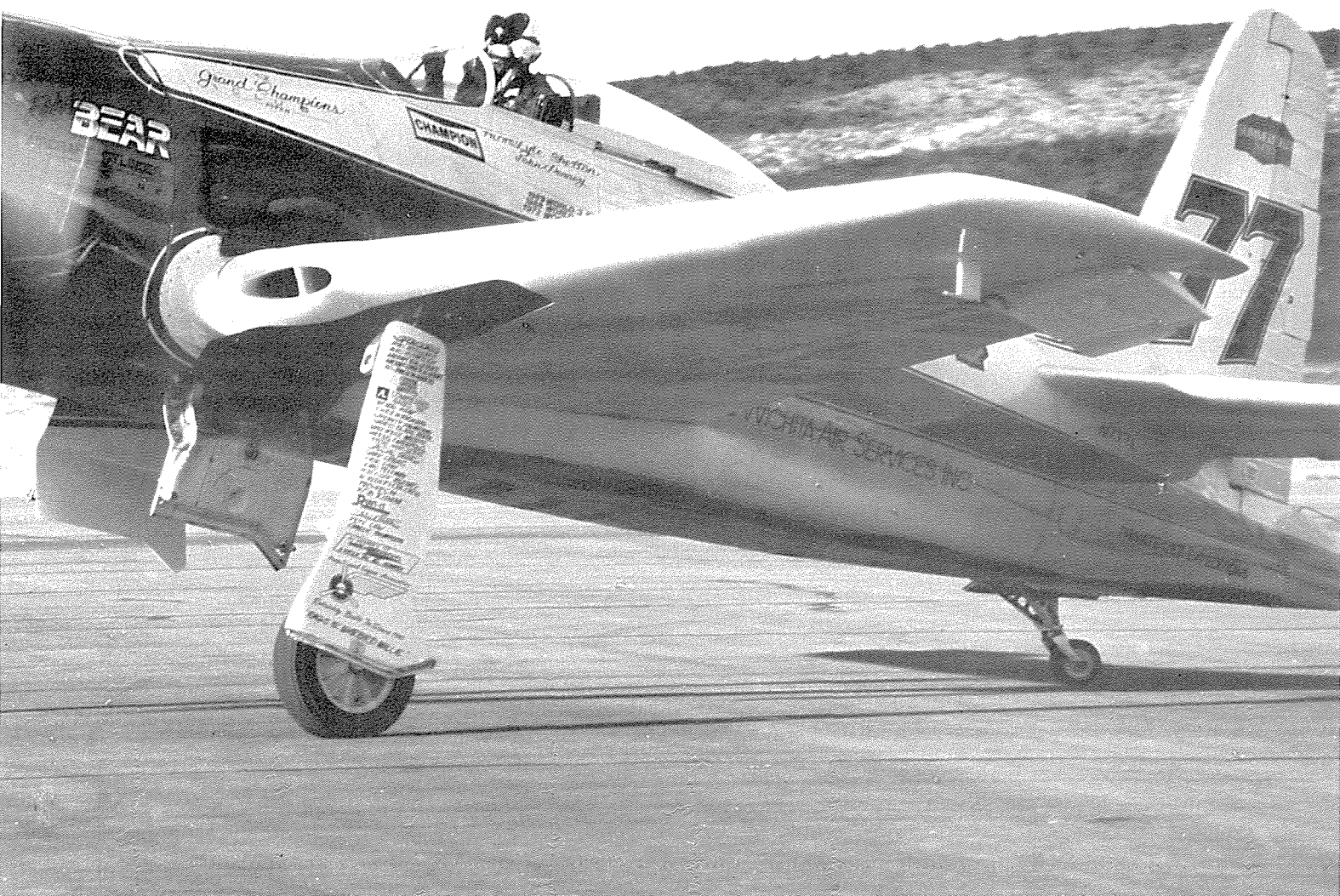
Lyle Shelton's much modified Grumman F8F-2 *Bearcat* named "Rare Bear," sat in the lead or pole position by virtue of wins in the heat races of prior days. The other eight contestants were arrayed in an imprecise line off the right wing of the "Bear." Lyle and the *Bearcat* were certainly odds-on favorites to win around this northern Nevada gambling city. He had captured the gold race in each of the prior two years, and longtime aficionados also knew he had raced to victory in 1973 and 1975 as well. But Lyle's recent success was aided, to a large degree, by the sponsorship of Jack DeBoer and his Wichita Air Service. Beginning in 1987, DeBoer's support provided a needed infusion to bring the *Bearcat* into top form.

During the 1990 races, interest and speculation centered on the speed benefits of a new wide chord, three-blade pro-



peller hung on the front of the "Bear." The installation radically altered the racer's appearance. Onlookers were invariably drawn to this massive propeller and spinner combination. The spinner was of such proportion that it surpassed even the late Jimmy Durantes' famous schnoz. . . .

This new propeller was a result of an ongoing process to achieve greater speed. Retired Lockheed Flight Science Division engineer Carl Friend is a member of the "Rare Bear" race crew. His function on the team is to consult on aerodynamics. In 1988, Carl knew that a limiting factor in the *Bearcat*'s performance was the 13-foot, six-inch-diameter Aeroproducts H20-162 propeller blades being used with the big Wright R-3350 engine. At the speeds the *Bearcat* was achieving, this propeller was operating at lower efficiencies (net thrust horsepower/propeller shaft horsepower) due to



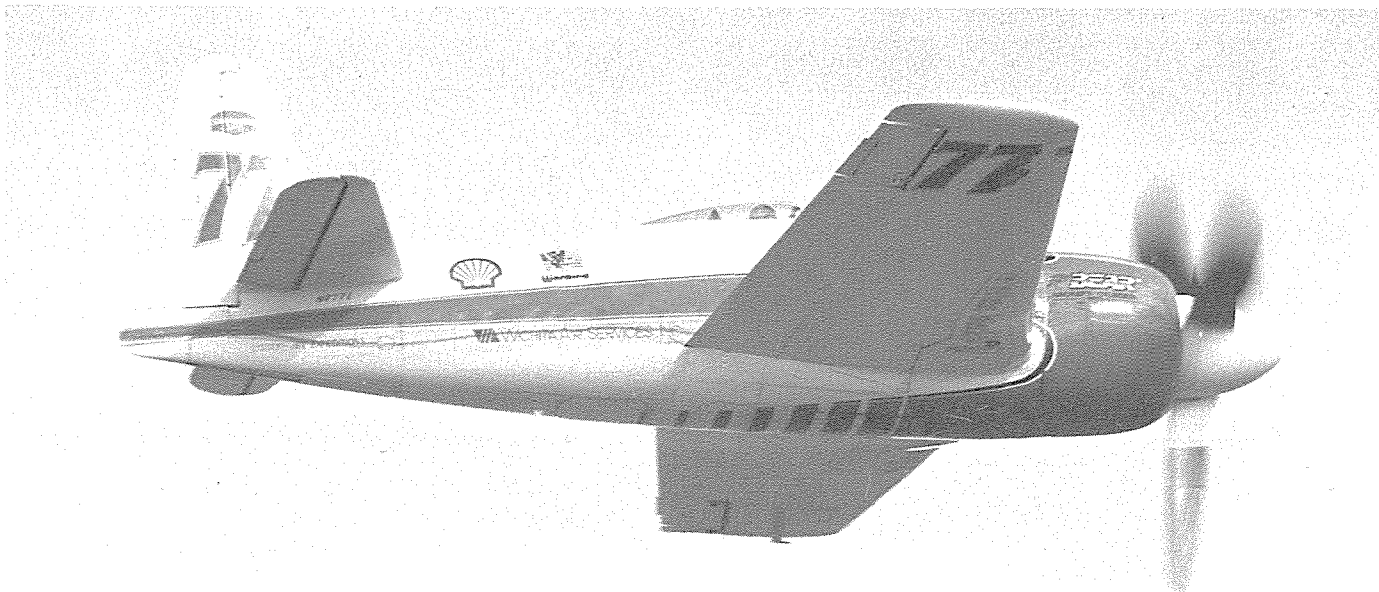
airflow compressibility. The Aeroproducts propeller was standard equipment on the Douglas AD *Skyraiders* when this aircraft was part of the inventory. It is a well-proven, very light design and has good efficiency in converting power to thrust at speeds up to 450 miles per hour. Historically, this propeller was designed for use on an airplane whose attack mission required lower speeds and weight was a more important consideration. These factors resulted in blade thickness to chord ratios such that hollow steel construction was possible.

The powerful Wright radial was capable of generating copious amounts of horsepower but the problem revolved around more efficiently converting this power to thrust. Carl goes on to relate that at "the reduced propulsive efficiency [with this propeller] encountered at current air race and

Lyle Shelton taxis into the victory circle after winning the "Gold Championship Race" at Reno for the third year in a row. (Neal Nurmi Photo)

record speeds there was a need for a replacement propeller. The 'new propeller' obviously should have decreased thickness-to-chord blades and consequently lower blade section drag due to compressible airflow for greater efficiency. Improved efficiency would decrease power requirements at current speeds increasing engine life and help reliability. Furthermore, increased propulsive efficiency would provide a higher speed with ultimate engine power.

"The only successful American high-speed, high-power propeller widely used is the four-blade Hamilton Standard [blade number 7121A-0] installed on the Lockheed *Electra*, *Orion* and *Hercules* aircraft. The latter uses a similar but not



A near profile of the "Rare Bear" in flight during a practice run around the course.
(Neal Nurmi Photo)

identical propeller blade. This design provides the required strength coupled with a low thickness-to-chord ratio. It is a solid blade made of forged aluminum alloy. However, increased blade chord and airfoil surface area with these propeller blades are accompanied by more aerodynamic drag and thus significantly decreased thrust with the *Bearcat* installation. This thrust loss was alleviated by reducing the total blade area simply by going from four blades to three.

"Fortunately, a Lockheed 1649 *Star Constellation* 33E60 Hamilton Standard three-way propeller hub is compatible with the new blades and R-3350 engine-propeller shaft used on the *Bearcat*. Certifiable used blades were located and obtained for the racer at a reasonable cost. New, the blades and hub would cost \$85,000, a sum beyond the project budget. The new blades were two inches shorter [13 feet, four inches in diameter] than the old four-blade configuration. As a consequence, the new blades were designated as 7121A-D to denote the reduced diameter. The only blade modification to fit the three-way hub was a small chamfer machined on the retaining rim of the blade shank. The 7121A-2 blade cuffs [that plastic fairing around the blade shank] were reshaped to accommodate the racer's spinner and cowling."

A propeller reduction gear ratio of 0.355:1 run with the turbocompound engine was already being used on the *Bearcat*. At race power settings of say 70 to 75 inches of manifold pressure and engine speeds of 3,000 revolutions per minute or more, the non-turbocharged R-3350 engine gear ratio of 0.4375:1 would result in excessive propeller speeds (over 1,300 revolutions) leading to sonic velocity at the blade tips, a decided disadvantage. The lower 0.355:1 reduction gear ratio with an engine speed of 3,000 revolutions yields a propeller rotation speed of 1,065 revolutions per minute.

To assess the new installation, Carl Friend developed a computer program designed to calculate installed propeller efficiency and also determine local stress concentrations at predetermined stations along the blade length. The purpose of this program was to gain assurance that the new propeller would indeed yield improved thrust efficiency and simultaneously ensure structural integrity under race operating conditions. The last thing a pilot needs is to have a propeller

blade depart at any time.

New blades were purchased during 1989 with the objective of installing and testing the new propeller in time for the Reno races that fall. Because the new setup would use three blades instead of four, a new spinner was fabricated from graphite composite material in place of the aluminum spinner used with the four-blade propeller. The new spinner was defined by tracing the old spinner contour. The only change was addition of a four-inch cylindrical section just beyond the parabolic spinner contour. This addition was made to facilitate easier installation and removal during engine or propeller maintenance.

The new propeller, built up by Barrett Bearson and crew at California Propeller Company, was first hung in August 1989. Installation was done at Mojave Airport, in the high desert region north of Los Angeles. Dynamic testing of the propeller was performed before flight to determine its vibration characteristics. This work was performed by Sandy Friezner of Specialized Testing Services. Strain gages were epoxied at various locations on the trailing or back side of the blades. As many as 20 gages were used. Strain gage lead wires were routed down the blades to and out along the propeller hub and then through a swivel mechanism, the spinner having first been removed. Lead wire bundles were connected through cabling to remotely located recording instrumentation. With the airplane tied down securely, the engine was run and vibration measured as a function of propeller speed, determined by engine revolutions and reduction gear ratio. Test results revealed resonant vibration at engine speeds around 2,800 revolutions per minute. Based upon these findings, it was decided to operate the engine at settings other than 2,800 revolutions to avoid the disquieting vibration phenomenon.

The first test flight was made in late summer of 1989. As part of the test program, Lyle simulated an engine-out "Mayday" situation by pulling the throttle back to idle power. Propeller drag created in this condition caused the racer to lose altitude at an alarming rate. In Carl Friend's words,

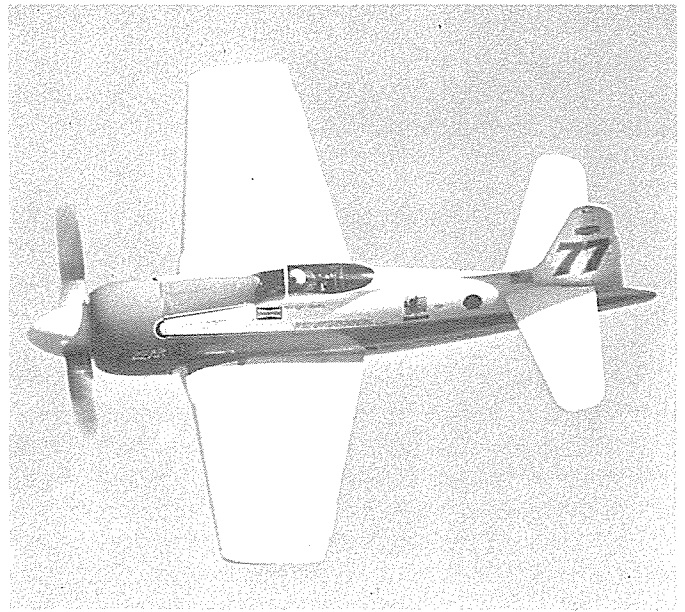
"The airplane dropped like a rock!" At idle power, the blades created immediate and excessive drag. In reality, the propeller was acting as a huge air brake on forward velocity. Lyle applied power and landed. The difficulty was rectified by resetting the propeller pitch stops. Another difficulty surfaced. Propeller speed governing was not functioning properly. The number of days before the races was rapidly diminishing. Further attempts to utilize a new propeller for the 1989 Reno races were abandoned. When the airplane arrived at Reno, it sported the old four-blade propeller. This proved not to be a handicap as Lyle captured the Reno Gold Championship Race for the second year in a row.

Nineteen ninety brought renewed team effort to solve problems with the new propeller. Speed governing difficulties were eliminated through further adjustment by personnel at California Propeller. Flight testing resumed, this time with pilot John Penny at the controls. John had previously raced the *Bearcat* for Lyle. Flying out of Mojave Airport, about one hour's drive north of Los Angeles, John ran a variety of flight tests. Running low on fuel, he elected to land at nearby Fox Field, just west of Lancaster, California, also in the high desert. *Bearcat* brakes are notoriously weak and on this landing they burned out. (Lyle plans to convert to T-33 brakes in the coming year.) The brakes were repaired and Lyle later flew the aircraft back to Van Nuys.

Confidence in the new propeller increased and it was decided to fly this configuration at Reno. John Penny ferried the aircraft to Reno-Stead, Lyle having a prior commitment. John departed Southern California on Sunday, 16 September, touching down on Stead runway eight around two in the afternoon. Following an inspection of the racer by Lyle's crew, John made one test flight over Stead and then rushed to catch a commercial flight returning to work with United Air Lines. Lyle arrived later that afternoon and took up the task of readying the airplane for qualification. This process was relatively uneventful, with Lyle achieving a qualifying speed of 468.369 miles per hour, second only to Bill Destefani flying some two miles per hour faster in his modified P-51 *Mustang*, "Strega."

Excitement grew during race week as more unlimited racers qualified. Competition would be intense with the presence of John Sandberg's "Tsunami" flown by Skip Holm and "Strega" piloted by Bill Destefani. Lyle knew that "Tsunami" was a formidable challenger but at that point was more concerned with Destefani's P-51 racer based upon "Strega's" qualifying speed and performance in prior years. Racing got under way Thursday but top qualifiers, including Lyle, did not have to fly that first day. He flew the *Bearcat* in gold heat races on Friday and Saturday winning both at speeds of 454 and 452 miles per hour, respectively. Heat races do not necessarily tell the tale depending upon strategies employed by the top contenders. So Lyle's concerns about "Strega" and "Tsunami" remained in his mind.

Sunday, the final race day, dawned once again with a clear blue sky. Exciting class races, aerobatic demonstrations and military exhibitions—not the least of which was a fly-by of a Lockheed F-117A *Stealth* fighter—enchanted the crowd. The program wore on through Sunday afternoon. Although the sun was rapidly settling westward toward the Sierra Nevada, air temperature still hovered in the low 70s. By four o'clock,



Clipped wings and the wide-chord three-blade propeller are apparent in this pylon turn.
(Neal Nurmi Photo)

cumbersome tugs of varying description were towing nine unlimited finalists slowly away from the pit area toward a temporary resting place in front of the grandstands. A race everyone anticipated for most of the week was about to begin. East of where the unlimiteds would settle, red and white Canadian Air Force "Snowbird" CT-114 *Tutor* two-seat trainers squatted in a precise military line before the grandstands. Each race day, the Canadians flew an unmatched display of formation aerobatics.

As one looked north beyond the unlimiteds, the Red Range Mountains formed a familiar backdrop to this finale. With a low-angle sun casting long exaggerated shadows across the texture of this landscape, soft rolling contours accentuated these aged mountains. Desert landscape beneath this lighting revealed many color hues from ochre to deep, deep purple. It was a fascinating, almost mystical visual expanse in the relative quiet before the race.

Promptly at 4:30 P.M., the crowd heard race announcer Sandy Sanders introducing each unlimited pilot over the public address system. Favorites were cheered, bets were placed and adrenalin started to flow. This was the climax to a week-long extravaganza known simply by dedicated race fans as "Reno." For these individuals, this one word described it all. It was the 1990 Unlimited Gold Championship Air Race.

Introductions were done in reverse order with the slowest qualifier first, leading finally to Lyle Shelton in the pole position. This prelude required 15 minutes. The level of nervous excitement and anticipation continued to grow. For anyone having a nostalgic bent, the only missing ingredient might have been the late Roscoe Turner resplendent in riding breeches and tunic with his unparalleled ability for showmanship. But this is a new era. Today's racers are larger, much faster and more sophisticated to a degree that earlier generations of Thompson Trophy contestants could hardly have foreseen.

As pilot introductions ended, engines began cranking at the direction of Race Control. With engines warming and radio checks complete, the fastest motorsport racing event

was about to commence. On radio frequency 118.5 megahertz, Race Control got things started with:

"Race seven-seven, you are cleared to taxi. Taxi east in front of the Snowbirds and taxi with caution."

All engines were turning but as yet, no one moved. Lyle, sitting in "Rare Bear," radioed:

"Bob [Hoover], are you going to move us out?"

At this point, Race Control came on frequency again and with characteristic formality said:

"Mr. Hoover, if you're going to lead the group out, you're cleared to taxi. It's a left turn-out departing."

With this bit of temporary confusion cleared, Hoover eased the throttle forward and his yellow P-51 *Mustang* edged ahead into a left turn. Using his brakes, Lyle urged the *Bearcat* forward and left trailing Hoover's lead. The remaining unlimiteds followed in turn. Race Control urged caution with regard to taxi speed and spacing. The unlimiteds circled the grounded Snowbirds and turned onto the taxiway heading slowly to the west end of runway eight. The procession reminded one of colorfully robed clerics ritually winding their way to some previously appointed rendezvous.

At the conclusion of this ritual, each racer taxied into a "hold short" position stopping at 45 degrees to the runway. This was the designated run-up area adjacent to the end of runway eight. With engines now turning up, final temperature, pressure and magneto readings were checked. The resulting windstorm from all nine unlimiteds created one huge rooster tail of sand and dust from the desert floor. Amidst the noise and dust, each pilot signified over race frequency that he was ready for takeoff.

Earlier, while the unlimiteds were still lined up in front of the grandstands, Lefty Gardner launched his Lockheed P-38 "White Lightning" for an aerobatic demonstration to occupy

the crowd's attention. This has become a tradition at Reno over the past several years. Lefty's exhibition is smooth. He covers the length of the field in front of the pits and grandstands performing each maneuver with great precision. His lead maneuver from west to east is a knife-edge pass standing on the right wingtip of his P-38 and in the process describing a three-dimensional arc of vast proportion. His unique show continues until Race Control intervenes with:

"Stand by, and P-38 [Lefty], I need you to clear for the race, please."

Lefty replies with:

"Ah, Roger. I'll clear."

Race Control again:

"Red Knight" [the Lockheed T-33 pace plane flown by Steve Hinton], "wind out of the east, southeast for 10, cleared for takeoff."

"Red Knight" immediately responds:

"Roger. Red Knight's on the roll. Lyle, I'll call 60 knots." (This is a signal for Lyle, already in position and holding, to start his takeoff in the *Bearcat*.)

Lyle acknowledges "Red Knight's" transmission. At five minutes before five in the afternoon, "Red Knight" calls "60 knots" and Lyle rolls the *Bearcat*. Thirty seconds later, the racer is airborne with landing gear retracting. Typical of Navy carrier fighters, the *Bearcat* is flying after a relatively short ground roll. The *Mustangs* will require a somewhat longer takeoff run. Race takeoff has started and remaining planes leave in disciplined 10-second intervals.

Lyle flies a long, relatively low-level straight-out run as he chases the pace plane. Succeeding racers will shorten their straight-out departure and begin a climbing left turn to inter-

Very early in the race, "Tsunami" leads the "Rare Bear" around pylon eight with "Strega" trailing in third. (Neal Nurmi Photo)



sect the flight path of the T-33 pace plane. The last plane off leaves the ground and immediately banks left with landing gear already retracting. By this time, the pace plane and several racers have completed a climbing left turn to about 8,000 feet altitude and are heading west. Pace plane visibility to the ascending race pilots is enhanced by long white cloud trails periodically emitted by "Red Knight's" smoke generators.

The procedure is to have all racers form a line abreast of the pace aircraft. The formation takes shape some five miles north of Stead. Turning once more into a downwind leg relative to the race course start the formation proceeds south with Lake Tahoe now in view. Like a battalion of infantry wheeling left, the outer racers apply power to maintain position as the pace plane next leads its flock into a three-dimensional downhill envelope to the race course known as the "chute." At this point the formation is once again heading north toward Stead. Progress of the racers is radioed by Steve Hinton in the pace plane:

"Red Knight's making the turn onto the downwind leg, 210 knots and . . . ah . . . 8,500 feet."

"Ah, Roger, Red Knight is now advancing the throttle slowly and guys, we're starting down the chute."

"You guys are lookin' good!"

"Smoke on." (Pace plane turns on the smoke generation system making the advancing formation visible to all the spectators.)

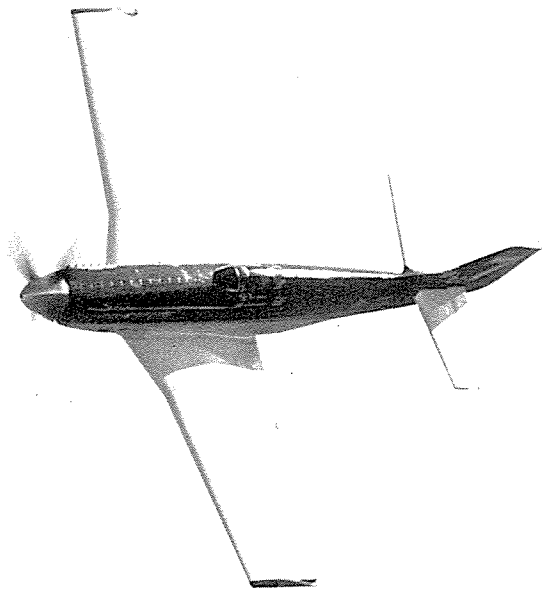
"Formation still looks good, guys."

"You guys are lookin' great. Pace plane to all race aircraft, gentlemen, you've got a race!"

With that pronouncement, race pilots advance throttles. Spectators see a blur of closely bunched racers streaking for the first leg of the course. The sound of engines simultaneously reaching a crescendo of full power is awesome. In the confusing start of any gold championship race it takes a minute or two to straighten out positions and determine the leader. This race was no exception. Even veteran racer announcer Sandy Sanders was confused. He at first thought Bill Destefani's "Strega" was in the lead. In reality, it was Skip Holm in "Tsunami."

The Reno course is slightly over nine miles in length (9.126 miles to be exact). Mathematically described, the course is a polygon composed of 10 sides of varying length. In reality, it somewhat resembles a very crudely drawn rectangle with the two longest sides running roughly north and south, both in excess of 11,000 feet. The course is defined by nine official pylons, two guide pylons and a home pylon, the latter opposite the grandstands and representing the start-finish line. Course layout is strongly influenced by two factors. One is a geographical landscape of the valley and its surrounding mountains and the other takes into account safety of a few nearby residential homes as well as all the spectators. The sharpest pylon turns are located at the extreme north side of the course rounding pylons four, five and six. These three closely spaced pylons represent turns of 56, 57 and 48 degrees, respectively. Wing up in these turns, the racers are in a near vertical bank. A descending Reno sun reflects sharply off highly polished wings making the airplanes quite visible to the crowd some three miles away.

As the contest begins, Race Control intervenes with infor-



Bill Destefani in race seven, "Strega," was frustrated throughout the race in his attempts to catch the leaders. (Neal Nurmi Photo)

mation for all that "winds are out of the southeast, 10 to 15 [knots]." In the pole position with "Tsunami" on his right wing, Lyle heads for the race course. Skip Holm puts "Tsunami" into a diving start flying out of view beneath "Rare Bear" and accelerating rapidly in the diminutive plane. Lyle's next awareness of "Tsunami" is a vision of Holm's racer sliding out from under the *Bearcat*'s left wing in very close proximity. With that dangerous if not illegal passing maneuver, "Tsunami" darted into the lead. To add to Lyle's concerns, the engine speed control refuses to stay in a fixed position, continually wanting to retard. Approaching pylon four, Lyle realizes he is only running at 2,700 or 2,800 revolutions per minute and quickly corrects the problem. His plan is to run the engine at 3,000 to 3,100 revolutions.

Around lap one and again during lap two, Skip remains ahead of Lyle, but not by more than a fraction of a second. Bill Destefani in "Strega" trails by about one second in third place. As the leaders round pylon eight and head down the home stretch in front of the stands, "Rare Bear" and "Tsunami" are in a virtual dead heat. Skip Holm keeps his racer low while Lyle flies slightly higher. Around pylon one, "Tsunami" runs a tighter turn and is, at that point, clearly in front by a couple of plane lengths. But the overwhelming power of Lyle's Wright R-3350 finally allows him to pass "Tsunami" on the long stretch leading to pylon four. A roar goes up from Lyle's crew bunched atop the support trailer in the pits. Skip closes the distance between his aircraft and the *Bearcat*, but still cannot pass Lyle who maintains the lead.

Lap three begins and the two contestants battle for first place. Lyle is still in the lead. As they round pylon eight turning into the home stretch, "Tsunami" suddenly grabs for altitude. One suspects Skip Holm may have encountered a bit of rough air generated by that huge *Bearcat* propeller. Lyle has the racer moving very fast. This impression comes not only from visual observation but also by listening to the smooth deep rumbling growl of the powerplant.

The *Bearcat* retains first place for the remainder of the race. Skip Holm has "Tsunami" at full throttle but it is not enough. The R-3350 is producing something like 3,800

horsepower and this is just too much for the competition. This race becomes one of endurance at massive power settings. Lyle has settled into a repetitive three-dimensional groove around the course. His pylon turns are flown to sustain no more than three or four times the force of gravity although at some point during the race, the "g" meter pegged at six. In retrospect, Lyle felt this was probably an instantaneous value and not representative of average forces encountered through his turns.

With the *Bearcat* running at perhaps 510 to 515 miles per hour true airspeed on the long straightaways, Lyle laps Robert Converse in race seven-one during lap five. In lap six, he passes two more racers, Howard Pardue's beautiful *Sea Fury*, race six-six, as well as Chuck Hall in *Mustang* racer five-five. During the next circuit, Lyle flashes by race eleven, "Miss America," flown by Ralph Twombly. In the final race lap, Lyle closes on "Super Corsair" piloted by John Maloney. He streaks past the home pylon a fraction of a second behind the *Corsair* simultaneously taking the checkered flag. To spectators watching the race, the end comes unexpectedly, many having lost track of the lap count. Fortunately, Race Control has not and comes on frequency with:

"Race seven-seven has the checkered flag. Wind out of the east at ten."

Unknown at this moment is the fact that Lyle has just set a new closed-course world speed record of 468.620 miles per hour. It is truly a phenomenal pace around the nine-mile course. As a point of reference, Fritz Wendel flew the Messerschmitt Me 209 to a world's speed record over a straight three-kilometer (1.6 miles) course with a diving start to a speed of 469-plus miles per hour. Lyle and the *Bearcat* virtually

equaled this mark around a nine-mile course losing speed with each pylon turn.

Passing the home pylon finishing point, Lyle pulled the *Bearcat* up and into a left banking victory climb headed for the cool-down area high in the Reno sky. "Tsunami" and "Strega" follow in that order taking second and third, respectively. Race Control had been silent the entire race which was certainly unusual. There were no Maydays. Now, however, the frequency is overrun with chatter as house-keeping chores take over and Race Control attempts to bring order out of a somewhat chaotic situation as the unlimited pilots seek to bring their mounts back to earth. Race Control received a status request from race eleven and responded with:

"That's affirmative, eleven. Seventy-seven has already taken the checkered flag!"

Following on the heels of this transmission, Bill Destefani in race seven immediately informed Race Control he had a serious problem:

"Race seven calls a Mayday."

Race Control:

"O.K., race seven, the wind is out of the east, southeast at a 10 to 15, recommending either [runway] 14 or eight."

Bob Hoover:

"Race Control from pace plane. Can you tell me where the Mayday is?"

Race Control:

"O.K., sir, we're looking for him. . . . He's at the north-east end of the field at this time."

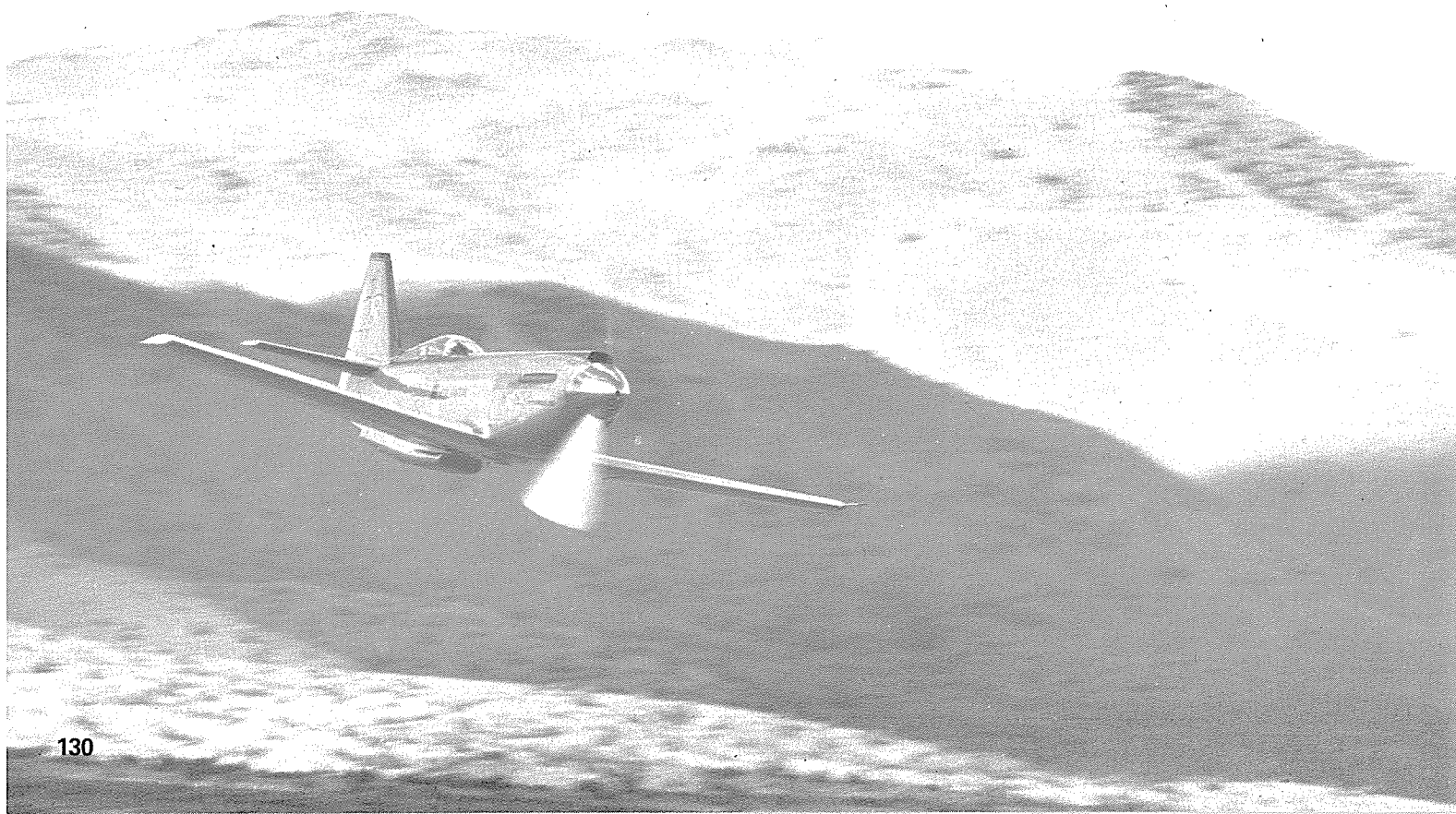
Destefani in race seven:

"Race seven, I'll use [runway] 14."

Race Control:

"Understand, seven, you're comin' in on 14. What it looks like right now, it's . . . ah . . . [wind] southeast at about 10

The competition. Skip Holm in race 18, "Tsunami," flying on the deck.
(Neal Nurmi Photo)





John Slack chalks the wheels as Lyle prepares to shut down at the end of the race. Note the massive spinner and propeller. (Neal Nurmi Photo)

knots.”

Bob Hoover:

“Seven, you’re lookin’ clean. No smoke!”

Destefani in race seven:

“Thank you, Bob. I’m out of everything. I’m out of water spray . . . and I’m out of oil spray [sic].”

Bill “Tiger” Destefani guides his badly overheating racer down onto runway 14 and, safely landing, begins his roll-out.

Race Control:

“Good job, seven, and when you, ah . . . can get it under control, if you could get off to the right side, please.”

Lyle and the remaining racers orbit over Stead during the emergency. The race was over. It was 5:17, late Sunday afternoon and Race Control turned his attention to recovering the other contestants. Lyle makes a 500-foot pass over the home stretch, banks left turning into a downwind leg for runway eight and then informs Race Control: “Seven-seven turning base.” Minutes later, Lyle steers the *Bear* into a final approach and eases onto runway eight. At the end of his roll, Lyle turns and taxis to the winner’s circle in front of the stands. He is greeted by a joyful crew and a very happy sponsor, Jack DeBoer. Champagne, the traditional lubricant of victory, soon flowed freely as the crowd pressed in on Lyle to offer congratulations.

It’s difficult to overstate the accomplishments of Lyle Shelton in the sport of air racing. His first air race in 1964 was spent as a volunteer on Clay Lacy’s *Mustang* racing team. That was it—he was hooked on air racing. In 1965, he raced a *Mustang* owned by Richard Vartanian and his career began. He next flew Mike Carroll’s Hawker *Sea Fury* during the 1966 races and soon thereafter acquired the remains of a wrecked Grumman F8F-2 *Bearcat*. Thus began his love affair with what was to become the “Rare Bear.” Lyle has flown the *Bearcat* in competition for more than two decades. He has won nine gold championship races from Florida to Cape May and on to Hamilton Field, then Mojave and, of course, Reno. This is more than any other unlimited race pilot in history. In the process, he established a world time-to-climb record reaching 3,000 meters (9,842 feet) in 91.9 seconds during 1972, and the absolute speed record for three kilometers in a piston engine aircraft at 528.329 miles per hour. Lyle holds the Reno Air Race qualifying record of 467.378 miles per hour and now, the current pylon race record of 468.620 miles

per hour.

Can this *Bearcat* yet go faster? Crew member Carl Friend believes it can. His engineering logic is reasoned. Lyle has taken the *Bearcat* to Mach number 0.68 (Mach 1 is the speed of sound) during his assault on the world’s absolute speed record. In designing this aircraft, Grumman engineers established a red line speed of 0.7 Mach. In factory flight tests, a dive velocity of Mach 0.74-plus was obtained; however, the airplane begins to go out of control much beyond this velocity. So it would seem that with the present airfoil the answer is yes, “Rare Bear” still has more speed potential.

The achievements of pilot and airplane are incomplete without acknowledging the contributions of many other people. Throughout 25 years of competitive racing, many have contributed thousands of hours of work to bring the *Bearcat* into Hall of Fame status. Their contributions culminated in a truly spectacular finale at the 1990 Reno Gold Championship Race. ■



Lyle Shelton (left) and his sponsor, Jack DeBoer (right), after his closed-course, world record race speed of 468.620 mph. (Neal Nurmi Photo)

ACKNOWLEDGEMENTS

The basis for this article was a knowledge of the *Bearcat* and a friendship with Lyle Shelton beginning in 1969 when AAHS member Harry Gann first introduced the author to Lyle. I witnessed the first tentative flight of the restored *Bearcat* from Orange County Airport in California. At the time of its rebirth, the “Cat” was dressed in a rude coat of zinc chromate. It was a long way from its present technical state. Following the history of the “Rare Bear” and its pilot was fascinating and at once intriguing through both the lean and victorious years.

Details of the 1990 races were recorded by the author on audiotape including radio communications by Race Control and the pilots. Added to this tape was a real time commentary on the progress of the race. This information was augmented by a telephone interview with Lyle Shelton for which the author is greatly appreciative.

Information concerning the selection, installation and testing of a new propeller was provided by AAHS Secretary and member of the “Rare Bear” race team, Carl Friend. Carl’s knowledge of technical aspects was invaluable. Without his input, the article would have been incomplete.

And finally, I am deeply indebted to AAHS members Dell and Hersch Rourk, also longtime members of the “Rare Bear” race team. They provided background information on both Lyle and the *Bearcat*. The author is also grateful for the accompanying photographs supplied by Neal Nurmi, a faithful recorder of “Rare Bear” adventures. My thanks to Neal and all the others.