



# MACH MATCH

***Did an XP-86 beat the X-1 to the punch?***

**G**oing supersonic for the first time is clearly a historic aeronautical event, just as the Wright brothers' first flights are. But I can never remember which brother did it first. They did it on the same day, and whether it was Wilbur, then Orville, or Orville, then Wilbur, doesn't seem to matter much. In the supersonic event, was it George Welch, then Chuck Yeager, or Yeager, then Welch? Looking at the record, it could have been Welch by a fortnight or Yeager by four weeks.

by Al Blackburn

*A North American XP-86, prototype for the U.S. Air Force's first swept-wing fighter, takes off on a test flight over the high desert of California. At about the same time, the Bell X-1 was preparing to become the first aircraft to exceed Mach 1.*



COURTESY NORM AVERY

The fall of 1947 in California's Mojave Desert was an incandescent time to be alive—for the crazy-ass pilots who were testing myriad new aircraft and for the lovely, loving, hopeful ladies who attended their safe return. So soon after the war, the prevailing mood was akin to the euphoria of victory but blessed with much smaller casualty lists. Much of the exhilaration centered on a little orange rocketship being sent aloft from Muroc Army Air Field with growing frequency, attached to a B-29 mother-ship. Everyone knew that this represented a substantial national effort, bringing together the resources of the U.S. Army Air Forces (soon to be renamed the U.S. Air Force), the National Advisory Committee for Aeronautics, and the Bell Aircraft Company to launch the first manned aircraft designed solely to fly faster than sound.

The word from the X-1 camp at Muroc was that Army Air Forces Captain Chuck Yeager had come very close to going supersonic on September 12. Surely on the next flight he would push it through. But then the X-1 flights were postponed. Rumors of a serious pitch control problem drifted out of the Bell camp. There was evidence of a lot of scrambling. Yeager was pressing fellow pilot and engi-

neer Jack Ridley, the one man on the X-1 team in whose hands he'd entrust his life. He wanted Ridley's assurances that the changes would work—he wanted no more running out of pitch control at Mach 0.94.

North American test pilot George Welch could only smile as these tales leaked out of traded confidences. His money was on another contender. The first XP-86 aircraft, Army Air Forces serial number PU597, was rolled out of his company's plant in Los Angeles on

August 8. The more involved Welch had gotten in the development of the Sabre, the more he was convinced that he could capture the laurels of the first supersonic flight for North American Aviation.

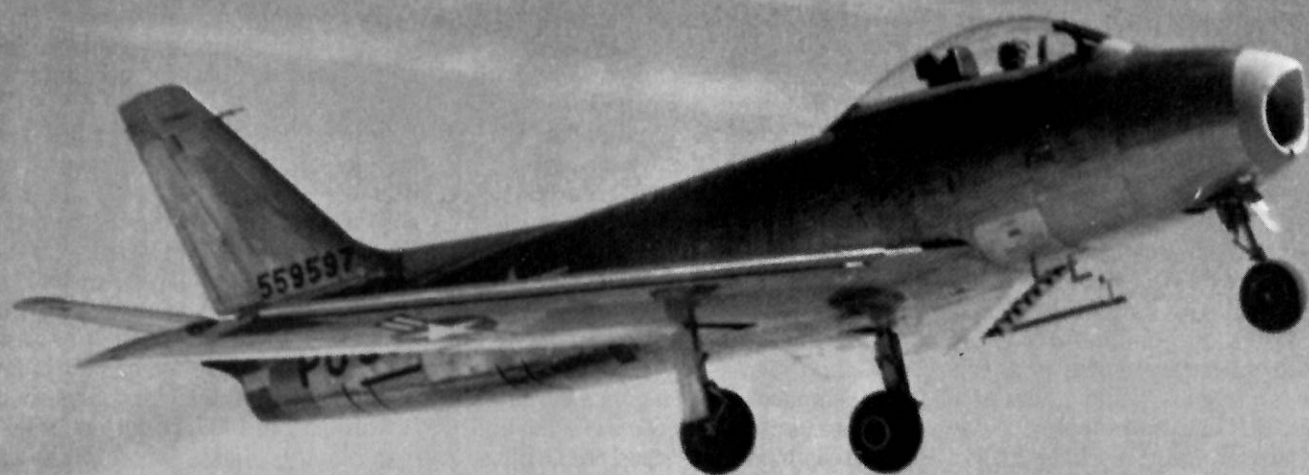
Welch had joined North American in the middle of 1944, at the height of the war and the peak of demand for North American's prime product, the P-51 Mustang. He'd been there only a month or two when Fred Borsodi visited from Wright Field and showed his

film of shock waves on a Mustang's wings as it dove at max power straight down from 40,000 feet. Theodore von Kármán, the legendary aerodynamicist from the California Institute of Technology in Pasadena, was at that screening, and observed that when an entire aircraft, not just the air accelerating over the thickest part of the wing, went supersonic, shock waves would be sent to the ground. He theorized that people nearby would hear and feel the passing of that pressure pulse. Listening intently to all this were Ed Horkey, a former student of von Kármán's, and Harrison Storms and Larry Greene, who were leaders in the aerodynamics section of North American's advance design group. Another observer was George Welch.

SAN DIEGO AEROSPACE MUSEUM







*Editors' note: October 14, 1947, was a day of undercover celebration at the Muroc Army Air Field in California's Mojave Desert. Captain Chuck Yeager had broken the so-called sound barrier in the experimental Bell XS-1, and the news was immediately locked away in the vaults of the newly independent U.S. Air Force and the National Advisory Committee for Aeronautics. Although the X-1 program was classified and there were no*

*independent observers, Yeager was able to claim an official record because all airspeed, Mach number, pressure, and temperature data from test flights were tracked, recorded, and documented. Such documentation, like that produced by the Wright brothers, who painstakingly recorded all details of their flights, ensures an unassailable place in history.*

*But there was another high-speed experimental aircraft flying over the*

*desert that autumn. And although claims that the North American XP-86 achieved Mach 1 are merely anecdotal, Al Blackburn, a former North American test pilot, interviewed eyewitnesses, researched historical accounts, and reconstructed the events of those memorable months in the book *Aces Wild: The Race for Mach 1* (Scholarly Resources Inc., © 1998, 800-772-8937, \$24.95), from which this excerpt has been adapted.*

Irina Solovyova says of her friend. "He became a big boss but never became arrogant, never became self-conscious about his beginnings. After his flight the image of cosmonaut meant a lot."

The day after the symposium at Gagarin City, on the 30th anniversary of Gagarin's death, Leonov attends another memorial service some 40 miles northeast of Moscow, in the forest where his friend's jet crashed. He points to a clump of birch trees: "See the broken tops, where the trees have grown bushy: that's where they came down."

Today a 30-foot polished granite obelisk with relief carvings of Seryogin and Gagarin marks the site. Some 4,000 people, bundled up against the lingering winter weather, show up to honor the memory of two Soviet heroes. Several hundred of them knew Gagarin: cosmonauts, scientists, instructors, technicians from Star City and other space centers. But many who come to pay their respects could not have known him personally. The newest generation

V. SAVOSTYNOV, ITARTASS/ SOVPHOTO



*After the accident, thousands flocked to pay their respects to Gagarin and copilot Vladimir Seryogin in the Central House of the Soviet Army (above). Russians of that generation, like the woman tending a garden near one of the monuments in Star City (below), still cherish the First Cosmonaut's memory.*

of cosmonauts in attendance have only seen pictures of him. Scores of schoolchildren climb trees and stand on the raised berms of plowed snow at the edge of

the ceremony so that they can get a better view.

In an era when the statues of Communist politicians, military figures, and other Soviet heroes have been torn down and piled like cordwood in Moscow's Gorky Park, when more than 160 streets in Moscow that were named after cold war icons and other notable Soviets have reverted to their original names, every capital city from the old U.S.S.R.

still displays at least one monument to Yuri Gagarin.

On this day his memory evokes passionate speeches, several poems, an original song by folksinger Josef Kobzon, and tears. As hundreds of people queue up to lay floral wreaths at the monument, an 11-year-old girl slides down from a pile of snow, looks me in the eye, and shakes my hand. Her name is Olga, and she tells me quietly, in English, that she studied Yuri Gagarin in her history class. "World history or Russian history?" I ask. "World," she answers. "He belongs to world." ➔







NASM

through. The entire X-1 flight test team was at Pancho's that Friday evening waiting for the data reduction people to show up with the official figures. Yeager and Pancho were huddled in a corner. The X-1 pilot had a furrowed brow. He was trying to explain to Pancho that he might not have been pointing toward the Fly Inn when he finally pushed through the big barrier. That might explain the absence of a boom earlier in the day, when he was virtually certain he had finally made the first supersonic flight. When Pancho pointed out that Welch had sure made one hell of a boom more than a week ago, Yeager insisted that it was just a fluke. Pancho arched her eyebrows and noted that it had sure heated up a stable full of filies at her hacienda.

Then the data sifters showed up, half elated, half despondent. Yeager had gone a lot faster than ever before. He had come as close as you can get and still had not made the ultimate penetration. The most careful analysis showed

that on the morning flight, the X-1 had attained Mach 0.997. Another pint of rocket fuel and it would have slid through.

On October 13, Welch called Ferren to check on the status of the Sabre, which Ferren reported would be ready first thing next morning. "By the way, L.A. is insisting that like the last two flights, the next one be made with the gear down," he added.

"We can focus on gear-down tests on the next two flights, but I want the option to retract the gear if I need to," Welch replied, his mind working at warp speed. Why were they doing this? Was the Air Force making sure there would be no more surprise, albeit unofficial, booms?

Early Tuesday morning, October 14, Welch taxied the company Navion onto the ramp of North American's hangar at Muroc's North Base. The XP-86 had already been rolled out. Also on the ramp was the P-82 chase plane. Fellow test pilot Bob Chilton would be flying chase again.

"The Air Force is kinda looking down our throats on this flight, aren't they?" said Chilton. He also knew that Yeager might bust Mach 1 that morning, and, knowing what Welch was up to, noted that there might be an awkward 15 minutes between Welch's reported performance of test card maneuvers and his eventual return to base. He suggested that Welch stretch out the test card, letting the narration over the radio trail the actual performance of the maneuvers. That way, when people on the ground heard a boom, they might think it was Yeager.

Welch climbed to 10,000 feet and ran through the lateral and directional stability checks on the test card, but he reported the results via radio to the North American flight test engineer at Muroc on only half of them. He retracted the landing gear and waited for Chilton to slide underneath to check on his gear doors. Chilton gave him a thumbs-up and Welch advanced the throttle to full military power. During his climb to

37,000 feet, he kept reading out the results of the tests not yet reported. As he reached his altitude goal, 2,000 feet above the starting point for his successful sound barrier penetration of nearly two weeks earlier, he once more rolled into a dive of at least 40 degrees and headed westward with the nose of his Sabre pointing directly at Pancho's. On the way down, he called out the results of the next to last test point on the card.

Once again he experienced some wing roll as his airspeed indicator hung up, then popped through to greater readings. Because he had started at a higher altitude, the Mach-related transients were less pronounced than they had been on the first flight. Instead of a gentle, throttled-back recovery like he'd flown on that first outing, Welch left full power on and performed a four-G pull-up, little realizing that this would greatly increase the impact of the shock wave aimed at Pancho's place. He carefully throttled back and called off his last

AFTIC HISTORY OFFICE, EDWARDS AIR FORCE BASE (2)



point on the test card as though he had just completed it.

Welch had shut down and dismounted and was heading for the locker room to drop his parachute and helmet before debriefing with the flight-test en-

*Pancho Barnes' Fly Inn was the social center of Muroc (below), and the huge spread, comprising restaurant, bar, pool, stables, and airstrip (above), was an ideal target for enterprising sonic boomers.*

gineers when he heard a distant but distinct ba-boom. His watch read 10:30.

A security clamp was immediately placed on Yeager's penetration of the sound barrier. Consequently, a celebration at Pancho's was out of the question. Instead the X-1 team started their whoop-de-do at Yeager's house, and later, when Yeager ran out of booze, they adjourned to Dick Frost's. It's not that Pancho's closed down for the evening.

The North American crew showed up, if only to get a reading from their own highly sensitized boom detectors at Pancho's. Welch and North American pilot Bud Poage were making careful mental notations while ascribing all credit to Yeager and the X-1. Both Millie Palmer and Mona (soon to be Poage's bride) were on hand to provide authentication, especially of the first boom, which cracked a couple of windows in two of the rooms facing east. Major General Joe Swing, a Pancho's regular, found it strange that there were two ba-booms some 20 min-





utes apart. Didn't it take at least two days to get the X-1 ready to fly again? With only four minutes of fuel at best, it certainly couldn't make two ba-booms in such a short interval. Welch shrugged and suggested with a straight face that maybe a V-2 had flown off course out of White Sands.

Welch flew the Sabre the next morning. The following week he made four flights, and the subsequent Monday, October 27, he flew four flights in one day. He then surrendered the Sabre to Bob Chilton for a couple of familiarization flights. Chilton was no shrinking violet. It is entirely possible he laid a boom or two on his own. On November 3, Welch commenced a series of high-Mach dive flights, so labeled in his flight log.

This persistent barrage of ba-booms at the Air Force test base finally precipitated permission to use the high-precision radar theodolite facility that had confirmed Yeager's climb to immortality. Welch's dives in the Sabre were measured during two flights on November 13. His first dive was clocked at Mach 1.02, the second at 1.04. The ba-booms were finally officially acknowledged, but only under tight security. The North American flight test reports are asterisked with a notation that data concerning speeds in excess of Mach 0.90 have been detailed in an amplifying document under higher security. This amplifying data could not be found in the North American archives. In Welch's handwritten flight log, these flights are variously classified as "Hi Mach No. Dive" or simply "Hi Mach." Between November 3, 1947, and the end of February 1948, Welch flew 23 flights in the XP-86 that are so characterized. Almost certainly each flight included at least one incursion into the realm of the supersonic. More likely two or three were made per flight. By way of comparison, during the same four-month period, the X-1 made seven flights, attaining supersonic speed on three of them, but no more than once per flight.

November 1947

XP86	Hi Mach No. Dive	1:10
"	"	1:58
"	"	1:06
"	"	1:51
"	"	1:12
"	"	1:45
Nov. XP86	XC Mach No. Dive	1:45
0829	Stab	1:45
0514	Finest.	1:45
"	"	1:45
Nov. XP86	XC Mach No. Dive	1:10

George Welch's XP-86 logbook entries refer in shorthand to his sonic sorties, noted as "Hi Mach No. Dive" and "Mach No." Author Al Blackburn (below, readying for an F-100 flight) maintains that Welch could have gone supersonic two weeks before the X-1.

The Air Force's Wright Field XP-86 project officer, Major Ken Chilstrom, gave a glowing report on the aircraft while flying it to a maximum altitude of 45,000 feet and a Mach number of 0.90 during Phase II evaluation in early December 1947. Why didn't Chilstrom push the Sabre through the sound barrier? Probably because he was Colonel Boyd's chief of fighter test. Al Boyd

kept a tight rein on Air Force flight test operations. He had just carefully nursed Yeager through Mach 1 after 28 flights spread over a year and a half. He no doubt had difficulty even conceiving that a prototype fighter only two months past its first flight could be ready to explore the supersonic realm. He was a great friend of Pancho's and had no doubt heard the rumors that floated out of her hacienda of Sabre ba-booms. But the fall of 1947 was an era in which the sonic boom phenomenon was not yet broadly understood, even by technically sophisticated people. Pancho had assembled some very nice young ladies, but none were CalTech graduates. Moreover, such knowledge as might have surfaced as a consequence of Yeager's flight was still highly classified. Similar restrictions were applied to details of the Sabre dances.

Boyd was keenly aware of his route to stardom. He knew the X-1 program had special protection from high places. Being first to go supersonic was important to the Air Force. For the Bell Aircraft Company, it was absolutely vital. The X-1's sole purpose was to pave a way through the sound barrier. Millions of taxpayer dollars had been spent to make that happen. Now it had been done. For North American Aviation to come along and say "Hey, what's the big deal? Our new fighter does it as an incidental piece of cake" certainly wasn't going to be helpful. Boyd could see that



COURTESY AL BLACKBURN



AFFTC HISTORY OFFICE, EDWARDS AIR FORCE BASE

*After the Air Force tested three XF-86 prototypes, the fighter entered service as the Sabre in 1949 to face Soviet-designed MiG-15s in the Korean War. All the American aces of that conflict were F-86 pilots.*

it was in the Air Force's best interests that the X-1 be clearly first by a considerable margin and that the Sabre rattling be quelled as long as it might take to keep the press away.

The Air Force wanted Yeager to push the mark a little higher. On November 6, Yeager raised the mark to Mach 1.35 at 48,600 feet. When the number two X-1 was ready for the NACA, the Langley leadership wanted to make sure one of their pilots—Herb Hoover—became the first civilian to crack the sound barrier. On March 10, 1948, Hoover flew the NACA X-1 to Mach 1.065. At that point, North American Aviation and the Air Force deemed it acceptable to announce that the Sabre had indeed gone supersonic as of April 26, a month and a half after Hoover managed to struggle through.

**W**e know for certain that the number one XP-86 Sabre prototype did fly faster than the speed of sound, to Mach 1.02 and 1.04, as measured on the Muroc radar theodolite, on the two flights of November 13, 1947. Anecdotally, we know Welch was taking the Sabre supersonic as early as November 3, according to his logbook. But the reason for conducting those high-Mach exploratory flights in the first place was that Welch had complained to Ed Horkey about funny jumps in his airspeed indicator before any "Hi-Mach No." flights were scheduled. That would mean that on one or more of the Sabre flights in October, a supersonic excursion took place. For those who insist "Welch did it first," this would have had to have been on October 1, or on the fourth flight, prior to 10:30 a.m. Pacific time on October 14. Supporting the notion that Welch did in fact become the first Mach buster on October 1 is Jan Welch's call to her mother on October 10 or 11 to report the birth of a son on the 9th, and incidentally to announce the hush-hush fact

that Welch had gone supersonic. Jimmy Williams, Jan's younger brother, remembered the call: His mother couldn't tell whether Jan was more pleased with the new baby or Welch's latest aerial exploit. Also attesting to the belief that Welch did it before Yeager are the affirmations of Bud Poage, Bob Cadick, Joe Swing, several of Pancho's girls, and scores of others.

Could anyone believe that in the supersonic sweepstakes a competent but wholly apolitical company could mount a meaningful challenge to the massively supported—both technically and politically—orange rocketship? What could be worse form than to rain on their parade, to cop their prize with a loud baboom, and then to shrug it all off as just another of the incidental challenges that must be met and mastered en route to building better fighters? For the truly dedicated, it's not so hard to say "Leave the laurels to those who need and want them most, we have a job to do," then laugh all the way to Pancho's to needle the old gal about betting on the wrong contender. —



*After completing extensive ground testing at North American Aviation's Los Angeles facility (opposite), the XP-86 was disassembled and trucked to Muroc for its first flight. NAA test pilot George Welch (opposite, bottom) had kept close tabs on the project and thought the aircraft capable of busting Mach 1 before Captain Chuck Yeager (below, at left) and the Bell X-1 did.*

Over the next three years, Welch stayed in touch with Horkey, Storms, and Greene as they created the XP-86. And he spent time with Walt Spivak, who had cut out the pieces and put them together on the shop floor. Welch also spent a lot of time in the Sabre's cockpit at Muroc and observed the flight test crew as they checked out all the systems and instrumentation for this sleek new fighter.

Welch knew that the engineers had carefully reviewed the analytical data and wind tunnel test results the Germans had obtained from their swept-wing designs, and that North American had also run its own wind tunnel tests. Storms told him that they were almost certain that top speed at altitude would be better than Mach 0.9 in level flight. He explained to Welch that at that Mach number, the center of lift would start to move aft on the wing and that he would have to pull back on the stick and start trimming...but very carefully. Changing the angle of the whole stabilizer at that speed and a changing Mach number could get pretty tricky.

"So I'm doing nine-tenths at, say, 35,000 feet and push the nose over into a 25- to 30-degree dive. What then?" Welch asked the designers.

Greene couldn't contain himself. "By 30,000 feet you're supersonic."

"What's the risk?"

Greene shook his head. "We really don't know. Our best guess is that it's not very great."

"My guess is virtually zero," Welch said. He described a recent visit to New Mexico, where he'd spent the night just south of the Army's White Sands Missile Test Range. Another group of experimenters there were launching V-2 missiles brought from Germany. Welch talked to several men who had witnessed some launches, and they told him about

the blasts of shock waves that hit the mountain top about 30 seconds after each V-2 had taken off. "A big ba-boom just like von Kármán predicted," Welch said. "Hell, that V-2 is bigger than the Sabre, or the X-1 for that matter, and it slides through the so-called sonic wall like a surfer riding a big wave." Welch thought that too big a deal was being made over faster-than-sound flights, a theory he intended to test.

**W**elch came to Muroc in September and stayed at his usual hangout, Pancho Barnes' Fly Inn, later to be named the Happy Bottom Riding Club. It comprised some 400 acres bordering Muroc Field on the south. In addition to rooms, there were suites, a restaurant, a bar, a swimming pool, riding stables, and an airstrip. Many of the North American crew would show up—flight test supervisor Roy Ferren and flight test mechanic Bob Cadick—as well as members of the X-1 team: NACA leader Walt Williams, Jack Ridley, Chuck Yeager, and Bell project engineer Dick Frost. The usual bevy of Pancho's down-on-their-luck ladies added their own leaven of lust and luster in more or less equal measure. Pancho herself was unique. Born wealthy of distinguished forebears, she chose what might be called today an alternative lifestyle. Her friends included Jimmy Doolittle, Chuck Yeager, Buzz Aldrin, and many of the

Hollywood set, for whom she had done stunt flying in the early days of aviation films. Her conversation was punctuated with obscenities that would make a boatswain's mate blush.

Among the ladies at Pancho's, Welch had formed a special relationship with one Millie Palmer. Palmer was quieter and more serious than most of the other girls. When Welch and Palmer had dinner together at Pancho's, he drank less and got to bed earlier.

On Monday evening, September 29, after some XP-86 taxi tests, Welch was at Pancho's having dinner with Palmer. He was quietly pleased at how well the first outing had gone. He noted that the X-1 crowd looked pretty glum. The little rocketship hadn't flown in more than two weeks. Palmer reported the rumor that Ridley was working on giving Yeager more pitch control through the trim mechanism. "It looks as though Wednesday is my big chance," Welch told Palmer. "A supersonic dive is for sure not on the flight card for the first flight, so I'll have to do it without recording data. It's agreed that I'll pull up the landing gear, just to get a feel for how it flies in the clean condition. Without making a record in the usual way, you'll have to be my data bank. If on Wednesday morning you hear a sharp boom like a clap of thunder, be sure and write it down—what it sounded like, what time, reaction from others, stuff like that."

NATIONAL ARCHIVES



The first flight of the XP-86 did indeed take place on Wednesday, October 1. Welch climbed with full power to 10,000 feet above sea level, which was 7,700 feet above the Mojave desert floor. On his wing was North American engineering test pilot Bob Chilton in a P-82 Twin Mustang. The right cockpit of the dual-fuselage fighter was occupied by a cameraman.

In a little more than 10 minutes, Welch had reached 35,000 feet. Leveling out, he watched the indicated airspeed climb to 320 knots. He estimated that should be Mach 0.90. He had been heading east and was just passing over the El Mirage dry lake. Rolling into a 40-degree dive, he turned to the west. His aircraft was pointing at Pancho's hacienda, several miles south of Rogers Dry Lake. The airspeed indicator seemed to be stuck at about 350 knots, but the Sabre was behaving just fine. At 29,000 feet there was a little wing roll. Correcting the roll, Welch pushed into a steeper dive. The airspeed indicator suddenly jumped to 410 knots and continued to rise. At 25,000 feet he brought the Sabre back to level flight and reduced power. The wing rocked again and the airspeed jumped from nearly 450 back to 390. Welch pulled up into a barrel roll to the left followed by one to the right, not unlike the victory rolls used in the recent war by returning fighter pilots to let their crews know they had bagged an enemy aircraft.

Before he left for Los Angeles to brief the Sabre project people, Welch called Palmer, who reported that a big "ba-boom" had nearly bounced her out of bed. She added that Pancho, a big Yeager supporter, had heard it too but attributed it to some mining operation up in the hills.

(Bell program manager Dick Frost recalled the first boom laid down on the dry lake in February 1947 as Bell pilot Slick Goodlin did his crack-the-whip maneuver in the X-1 model with the thicker wing, pulling 8.7 Gs at Mach 0.80 and snapping back abruptly to negative Gs. It was a sharp crack, not the ba-boom that would later become so familiar over the Mojave.)

After the first flight of the XP-86, Welch dropped into Horkey's office at the Inglewood plant in Los Angeles to talk about some "funny" readings on the airspeed indicator. He explained the "stuck" phenomenon he encountered at 350 knots while accelerating downhill, then the sudden jump to 410 knots, then the drop back to 350 knots as he leveled out at 25,000 feet. Horkey asked if the flight recorder showed anything odd. Welch confessed that the dive wasn't on the flight card. "I was just feeling it out, so I wasn't running the camera," he told Horkey. "You know how brassed off the instrumentation guys get when I run out of film for the landing. Anyway, they said there wasn't anything wrong with the

airspeed system. They checked it out after I landed."

Horkey thought Welch may have run into some Mach effects and told him to take another look next time he was up at altitude. (Down the road, before Mach indicators became standard equipment, the only signal to the pilot that the aircraft was going supersonic was the hangup on the airspeed indicator as the shock wave passed over the indicator's static source, followed by the jump in the indicated airspeed. This occurred at various airspeeds, depending on the altitude and temperature at which Mach 1 was exceeded.)

"Meanwhile, I'll see about getting NACA to help us out," Horkey said. "They have that fancy new radar theodolite at Muroc that can tell us how fast, how high, and where you are within a gnat's ass. But we have to get on their schedule."

Welch knew that the new NACA equipment was being used to track Yeager's flights in the X-1. He also knew that North American didn't have a prayer of getting on the theodolite until Yeager had done his thing. Welch was on his own.

On October 9, Welch's wife delivered a baby boy. When she called her mother to announce the birth, she also dropped the news of another blessed event. The new dad had days earlier made aviation history by becoming the first pilot to fly faster than the speed of sound. She made her mother promise not to tell anyone, explaining that it wasn't just a family confidence but a military secret.

One week after Welch pushed the XP-86 over into what he believed was a Mach 1 dive, the X-1 flew at Mach 0.925, faster than the Mach 0.92 achieved on an October 3 flight. But on October 10, Yeager was sure he had done it. Ridley had worked his magic on the horizontal stabilizer trim mechanism and Yeager was certain he had popped



COURTESY NORM AVERY

*With tests of the P-82 (left) under his belt, Welch (second from left) turned to the sleek XP-86 (opposite) as a project engineering test pilot with a special agenda. Welch was a loner who did not cultivate friendships with fellow pilots, but he got along fine with airplanes.*