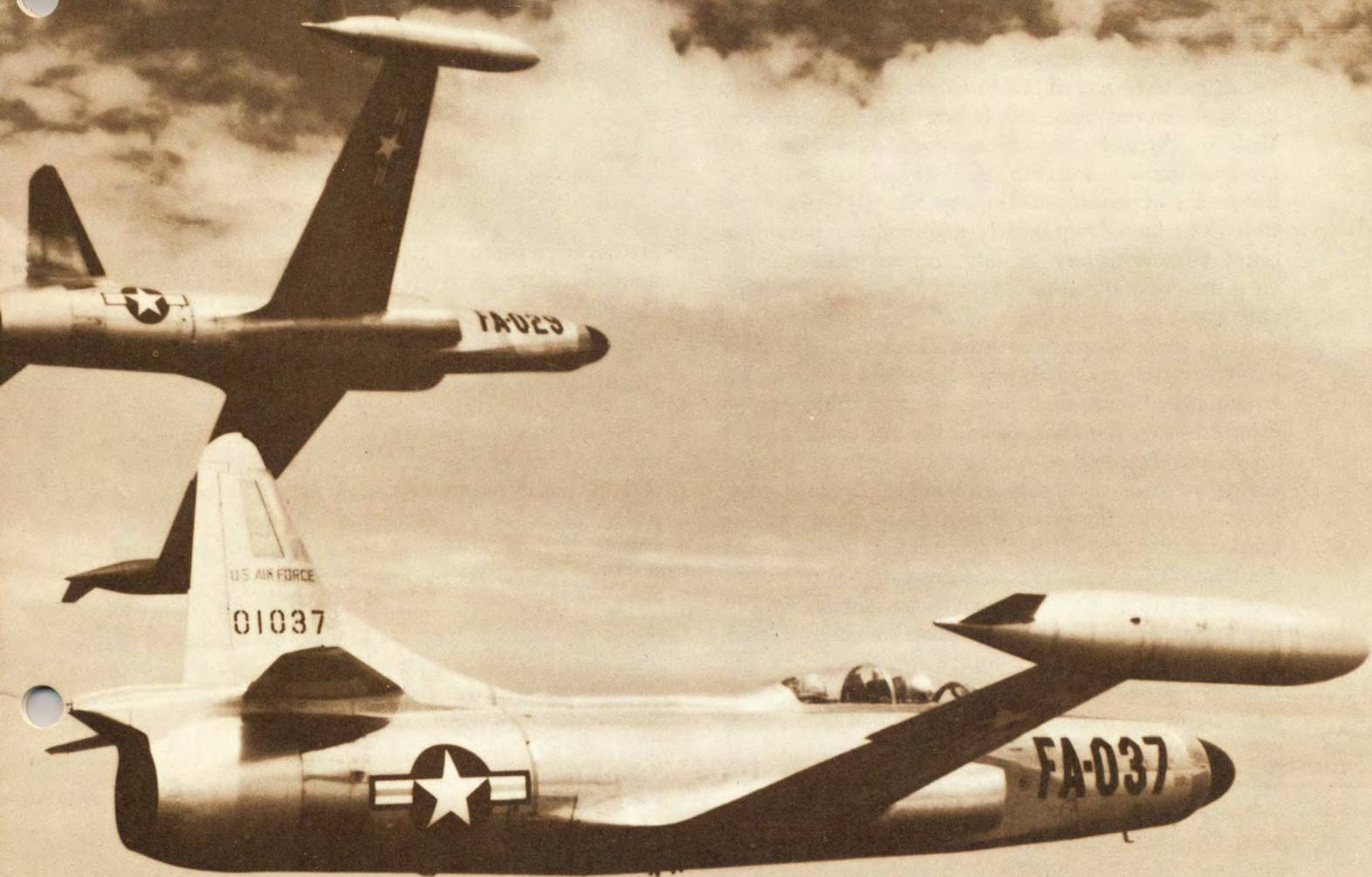


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Chapter VIII \* \* \* JITTERS AND JETS

*A History of Lockheed Aircraft Corporation*

*November 1957*

# OF MEN AND STARS



In the five months that followed introduction of Lockheed's Model 049 Constellations to commercial airline service in February 1946 the majestic triple-tailed transports set new standards of speed, comfort, and safety. They made 300 mph schedules a reality, ocean-to-ocean nonstop flights commonplace.

Record after record fell to Connies—New York to Burbank in less than 10 hours. Bermuda to New York in three hours, 26 minutes. New York to England, to South Africa, to Portugal, to Brazil, to Paris—all at history-making speeds. By July Constellations had flown nearly 200 million passenger miles without injury of any sort to passenger or crew member, an all-time record for any airplane of any type.

True, some operational bugs developed. The first major mishap occurred when fire broke out in an engine nacelle in flight over Kansas. The engine dropped from the ship, taking the fire with it, and the Constellation flew on for more than 100 miles before making a wheels-up landing. During crew training flights fires started twice in the engines' air induction systems. This same problem had plagued Air Force B-29 Superfortresses using the same Wright Cyclone power plants during World War II. And in late spring of 1946 a Constellation starting an overseas flight developed an engine fire similar to the one over Kansas. Once again the engine dropped and once again the pilot made a wheels-up landing.

### Flight Ends in Disaster

These mechanical malfunctions caused real concern. They led to intensive studies by Lockheed, airline, and Wright engineers to devise guards against similar future accidents. Then came an unexpected blow to Lockheed's prospects, prestige, and morale.

Shortly before noon on July 11, 1946 a Model 049, owned and operated by Transcontinental and Western Air, Inc., took off from the airport at Reading, Pennsylvania, on a crew training checkout flight. Nineteen minutes later, its forward baggage compartment and cockpit choked with dense smoke, the Constellation crashed in a hayfield. Five crew members died. A sixth was seriously hurt.

The disaster struck at a time when the company faced other serious problems. Only three months earlier Robert Gross in a report to shareholders spoke of keen competition for shrinking postwar markets.

## SORRY

We erroneously numbered the October 1957 issue of this series Chapter VIII.

Actually the October issue was Chapter VII. The one you are now reading, dated November 1957, is Chapter VIII.



Speedpak, an external cargo carrier with load capacity of four tons, hung snugly under Constellation's belly.

He declared the coming of peace had not brought a hoped-for "return to normalcy." And he admitted Lockheed's problems, "though different," were "just as numerous as in the war."

### Lockheed Stunned

Gross and Lockheed's 23,365 other employees staggered under the impact of the Reading crash. Quickly engineers found the accident's cause. A relatively minor short circuit in an electrical fitting had set fire to oil soaked cabin insulation material.

Had crew members known of the procedure for clearing the cockpit and passenger cabin of smoke they could have averted the tragedy. Instead of opening the emergency exit hatch in the passenger cabin, they threw open the crew entrance door. The cabin air recirculating system quickly billowed smoke into the cockpit.

But the Civil Aeronautics Administration, apparently influenced by the earlier engine fires, temporarily grounded every Constellation in U.S. commercial service. The grounding idled 58 airplanes valued at about \$50 million—and it stunned Lockheed's people. "We thought the end of the world had come," one company officer said later. Gross termed it a "very serious blow" to Lockheed and to airlines building postwar plans largely around the Constellation. It was, he declared, "harmful to the good name of the plane, our company, and to aviation in general."

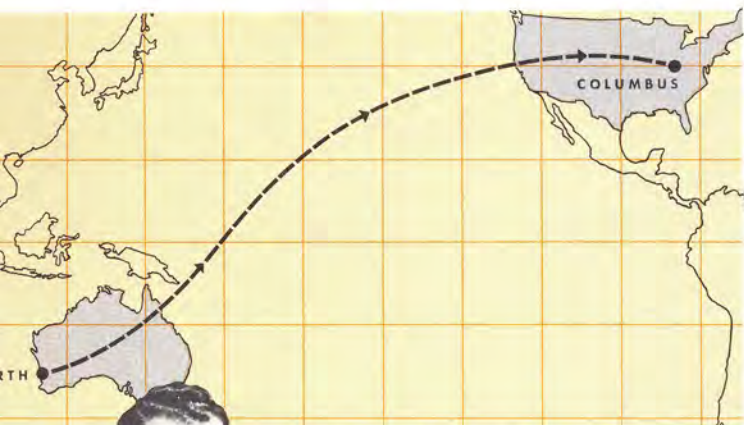
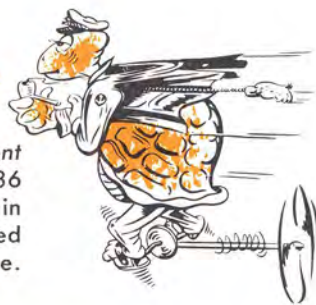
After the first shock, the action aroused the fighting spirit of the whole Lockheed family. Management and the work force showed their faith and loyalty during brutally long hours spent in costly modification to put the Model 049s back into the air. Needed fixes included redesigned electrical connectors through bulkheads, additional fire extinguisher protection, and improved engine exhaust collector rings.

On its own initiative Lockheed made another significant improvement. To assure even greater protection against engine fires and to lower fuel costs, it installed Wright fuel injection systems as replacements for carburetors. After completing CAA test flights modified Connies spread their wings again and



## Voice of the Turtle

Navy P2V, famed as *Truculent Turtle*, set nonstop mark, 11,236 miles from Australia to Ohio, in 1946. The record has remained unchallenged since that time.



Map traces Neptune's space-conquering achievement. Project engineer on Operation Turtle was Robert A. Bailey, shown at left.



Crowds welcomed *Turtle* as it ended long flight in Columbus. Crew at right included (from left) Navy officers Rankin, Tabelaing, Davies, Reid.



went back into operation on August 24, just six weeks after the grounding order.

During these weeks airline customers and the flying public demonstrated their confidence in the Model 049. No signed customers canceled contracts. Negotiations continued undeterred with prospective purchasers. A survey among air travelers after the Reading accident revealed 81 per cent would fly in Constellations if they were available. The CAA called the plane an "advanced transport" of "fundamentally sound" design.

And production lines did not slow down. The last of the Model 049s came off the line late in July for delivery to TWA. At the same time final assembly began on the luxurious new Model 649 "Gold Plate" Constellation—incorporating Model 049 modifications and expensive improvements to make it queen of the postwar passenger fleet. First to receive Model 649s was Eastern Air Lines, which worked with Lockheed on the design development. It accepted delivery of the first "Gold Plate" Connie in May 1947 and Eddie Rickenbacker, president of Eastern, hailed the transport as the "world's most advanced."

## Four Men, One Kangaroo

There were other bright spots in those disheartening times. One came when a rugged member of the Winged Star family wrote a thrilling new page in aviation history and earned world-wide acclaim.

The plane was a P2V-1 patrol bomber, third Navy Neptune to come off the Lockheed line. Dubbing it the *Turtle*, the Navy selected five alternate routes and prepared for a crack at the world's long distance record—then held by a B-29 that had flown from Guam to Washington. All routes started from Perth on the far western coast of Australia, cut across Washington, D.C., and ended at Bermuda, halfway around the world.

Project engineer on Operation Turtle was Robert A. Bailey, now California Division chief advanced systems research engineer. Art Viereck of engineering experimental modified the plane. John Margwarth, now head of trainer flight test in the California Division, supervised the flight test program. The late Stanley Beltz did most of the test flying.

Just before dusk on September 29, 1946, the *Turtle* stood on the runway of the Royal Australian Air Force field at Perth, poised for its great adventure. Carrying 8467 gallons of gasoline, the sturdy P2V staggered under a gross weight of 85,575 pounds—nearly 43 tons. Navy and Lockheed personnel, working out fantastic schemes to eliminate every ounce of excess weight, were actually on the verge of dropping both starters after the engines were running to cut off another precious 120 pounds.

Then the *Turtle's* skipper, Commander Thomas D. Davies, confounded ground crews and the three veteran Navy officers who were to make the flight with him. Davies insisted on adding 100 pounds to the plane's manifest—a nine-month-old kangaroo named Joey and a bale of feed.

"It's one of the ageless wonders of aviation how that airplane ever got off the ground," Courtlandt Gross recalled a decade later.

But the *Turtle* did. With the help of four JATO units its two 2500 hp Wright Duplex Cyclone engines lifted the Neptune into the air in 4270 feet.



No other twin-engine aircraft before or since ever carried so much tonnage.

Across Australia droned the *Turtle*. It sped over the Coral Sea to Midway, and from there flew 3120 miles to the Pacific coast—longest overwater hop in history. Perhaps the biggest difficulty the crew encountered came when the Neptune reached California. They couldn't convince a skeptical feminine traffic controller they'd flown all the way from Australia.

### **Turtle's Flight Thrills World**

"She just wouldn't believe us," Captain Eugene P. Rankin, one of the *Turtle's* crew, said later. "We finally had to tell her to get in touch with the Navy in Alameda."

Through press and radio an excited world followed the Neptune's progress across country. Reporters renamed it *Truculent Turtle*. But nature intervened to prevent the P2V from reaching its Bermuda goal. Bad weather, icing, and unexpected headwinds forced it down in Columbus, Ohio. Averaging 204 mph, it covered 11,236 statute miles nonstop in 55 hours, 17 minutes. It conquered time and space as no airplane had ever done before. Through 11 years of rapid aeronautical progress its record still stands unchallenged.

Perhaps more important, the flight dramatized the need for peacetime defense in an era when people had already begun to forget aviation's contributions during war. And the *Turtle*, using the same engines that equipped commercial Constellations, proved the effectiveness and durability of those power packages.

Jubilation was high at Lockheed. And the Navy, its faith in the Neptune stronger than ever, placed a new \$16 million order for more.

### **Lots of Luck—All Bad**

Still groggy from effects of the Constellation grounding, Lockheed absorbed more one-two punches in late 1946 and early 1947. In October the Airline Pilots Association called a strike of TWA pilots. Claiming the walkout "severely affected" its long-range plans, TWA canceled an order for eight Model 049s. Lockheed sold four to other airlines, and TWA later repurchased the remaining four—but canceled a \$20 million order for 18 new Model 649s.

Bad weather that fall and winter brought a rash of airline accidents and a congressional probe of air safety regulations. Postwar domestic air travel grew at only a slow pace. These developments affected airline earnings, slowed plans for buying new airplanes, and cut back sales.

Reworking grounded Model 049s and redesigning successor Model 649s also drained the Lockheed



"Postwar domestic air travel grew at only a slow pace..."

treasury. So did critical material shortages and strikes in suppliers' plants that led to production delays and created unwieldy inventories. So also did changes in government requirements affecting new transport aircraft that delayed engineering and development programs—and boosted costs. Delivery delays tied up huge chunks of capital.

### **Other Companies Have Their Troubles**

Lockheed wasn't the only firm that ran into trouble with postwar transports. Like the Constellation, the competitive Douglas DC-6 later found itself grounded—for a longer period—until engineers eliminated the cause of disastrous fires. Extensive changes in transport design required by the government slowed development work on Boeing and Convair entries. Martin ran into structural troubles with its airliner.

Years later Robert Gross summed up the winter of 1946-47 as "the hardest time I can remember." That covered a lot of ground, but other members of management agree. Vice President Cyril Chappellet, for example, recently called those months the most discouraging in Lockheed's 25 year history.

"We owed about \$40 million to the banks," Gross recalled. "We had a lot of airplanes we couldn't sell. The pilots' strike had crippled our biggest airline customer, TWA. From then on we worked harder than we'd ever worked before. We sold Constellations here and there, one or two at a time. And we began to crawl back uphill."

Among the hardest of Lockheed's hard workers in those troubled days was Vice President-Treasurer C. A. Barker, Jr.

"At a time when the company desperately needed help," one member of management recalled later, "Barker put on his hat and went calling. His ability to sell sources of financing on Lockheed's basic integrity, and to raise money when we had to have it, was a major accomplishment."

Tough though times were, Lockheed led the airframe industry in 1946 with sales of \$112.7 million. It delivered 57 Constellations to eight airlines, 398 P-80 Shooting Star jet fighters to the Air Force, and two P2V Neptunes to the Navy.



The Lockheed backlog was down to \$154 million from \$213.2 million a year previously. Gross informed stockholders in his annual report that the company suffered a \$21.9 million operating loss. A tax carryback provision cut this in half, but the loss still totaled \$10.7 million. Fortunately Lockheed during the war had established a reserve fund as a bulwark against the possibility of such substantial losses during transition to peacetime operations.

By using this fund, Lockheed was able to record a net of \$3.1 million.

### Competition Gets Tougher

Competition grew steadily sharper. In the three years 1947-49 U. S. air travel volume increased only 10 per cent. Domestic carriers' finances dropped to new lows. Salesmen from the Big Five in the transport field—Lockheed, Douglas, Boeing, Convair, and Martin—tramped on each other's heels at the doors of prospective customers.

On the other hand, international airlines prospered. In those same three years 1947-49 overseas air traffic doubled. The boom began with a spring 1947 travel rush. Busy rebuilding their world-wide networks, foreign carriers sought long range aircraft.

That kind of over-ocean traffic was made to order for Connie. Engineers added outer wing tanks and a beefed-up landing gear that turned the Model 649 into the 749. Ten airlines bought nearly 100 of these ocean hoppers, and the North Atlantic became an aerial highway for Constellations. They pioneered new routes like a 3660-mile nonstop flight from New York to Paris.

And they exerted a strong economic influence. When their home countries were critically short of U. S. dollars, foreign operators like Air France, KLM-Royal Dutch, Qantas, and Air India counted on Connies to earn American money.

So one way or another Lockheed salesmen kept a trickle of orders coming in—often just in time to keep Constellation assembly lines from a costly halt. Early in 1947 Gross told employees a "ground swell of confidence" in Connie was "developing all around the world." Recalling that Lockheed was "the first to get into the woods" by entering the postwar luxury transport field, he predicted it would "be the first to find the right road out."

But it took Lockheed a while to find the right

road. By March 1947 the backlog of unfinished modification work on Constellations had grown so large that the company had to lay off 1200 line workers for two weeks until the "out of station" condition was corrected.

### Aviation's Downward Trend

As the year went on the contrast between aviation and other U. S. industries became more marked. Confounding economists and analysts who had feared early postwar years would bring unemployment and even a depression, overall industrial productivity and profits reached new highs. So did employment. Unable during the war to buy new automobiles, television sets, and household appliances, people cashed in defense bonds and dug into savings to grab such shiny new commodities as fast as manufacturers could turn them out. New houses and huge subdivisions sprouted.

Everything boomed—except aviation. At a time when business generally was making money, the aircraft industry sank rapidly into red ink. Production in 1947 dropped nearly 19,000 airplanes of all kinds under the previous year to a total of 17,700—lowest volume since 1940. Federal expenditures for military aircraft shrank to \$593 million in 1947, about one-third of the 1946 total.

One reason was apparent to aviation leaders.

"If the aircraft manufacturing business is to survive," Robert Gross declared in May 1947, "and it must survive because it's the very guts of our air power, we must have a long range national air power policy that will make it possible for us to know what is expected of us—and to plan in advance for it."

He warned America was following the same course it took after World War I by allowing its aviation, "potentially the greatest in the world," to decline "to the danger point." And he recommended a "steadying hand" to prevent a swing from "starvation times to an overflow of production."

### Government Probe Begins

The government listened to such warnings. In July 1947 President Truman created a new five-man Air Policy Commission to inquire into aviation's problems and defense policies. Its chairman was Thomas K. Finletter, a New York attorney who later became Air Force Secretary.

From bases near Ketchikan six P2Vs photo-mapped Arctic areas in 1948. Bearded E. B. Gibson (left), and Gene Mellon of Lockheed Aircraft Service helped Navy on Alaskan assignment.







"The Finletter committee ... found an industry lurching along in low gear ..."

The Finletter committee made farsighted contributions to national security. During its transcontinental survey and questioning of Gross and other leaders, it found an aircraft industry lurching along in low gear, with production ebbing and skilled teams deserting the industry. It found an Air Force "inadequate" for peace and "hopelessly deficient" in event of war.

Its report six months later, *Survival in the Air Age*, forecast that Russia would have atomic bombs in quantity by the end of 1952. It recommended that air power form the "core" of a new national defense concept. An essential element of air power is a strong aircraft industry, "skillful in technological application, efficient in production, capable of rapid expansion, and strong in basic financial structure."

It urged a "much stronger" air force. And it asked a long range buying program to stabilize the industry, cut costs, and enable it to expand fast to meet a

## Sky Sentinels

...THEY FILLED DEFENSE NEEDS



First in long series of aerial pickets that help guard America against enemy attacks was PO-1W Connie (upper photo) that had first flight in June 1949. The planes bulge with electronic scanning devices (below).

crisis. It warned that "heavy appropriations" would be necessary.

Congress and the administration acted on these findings and similar ones by a joint congressional committee and the Air Coordinating Committee. They approved a 1949 budget calling for expansion of the Air Force and Navy air arm at a cost of more than \$2.3 billion.

## Government Takes Action

Gross reported a \$4.9 million net loss for 1947's first six months—even after a \$6.5 million capital gain from selling land and buildings no longer needed. The backlog dropped, and employment slumped under 17,000.

The picture brightened toward the end of the year. Improvement in earnings trimmed the net loss for the whole year to \$2.5 million. Lockheed reduced its bank loans \$7 million and inventories \$48 million.

Sales for the year totaled \$134.3 million, highest in the industry and nearly half commercial. For the two years 1946-47 Lockheed led the industry in production, accounting for nearly one-fifth of all U. S. output, excluding small private planes.

Despite such indications that better times were on the way, Gross and other members of management had to admit that development and manufacture of Constellations was still "costly and at times burdensome." Sales of the big triple-tailed transports were far from brisk.

At one point when the production lines came dangerously close to halting entirely, the Air Force placed a life-saving order. Having considered design proposals for Constellations in specialized configurations, it bought 10 Model 749s with heavy flooring and provision for both seats and hospital litters.

## Connies Fly Important Missions

As C-121s these formed the Military Air Transport Service's "VIP" fleet used for long distance transportation of military and diplomatic officials—"very important persons"—on urgent missions. One became General Douglas MacArthur's *Bataan*. Another was General Dwight D. Eisenhower's *Columbine* as military commander of the North Atlantic Treaty Organization. As President he has used two other Connies, *Columbine II* and *Columbine III*.

A little later the Navy purchased two Constellations that worked for a living at less glamorous tasks. They were the first of Lockheed's long series of early warning and picket planes to meet the need for improved continental defense after the U. S. realized Russia had an atomic bomb.

Originally called PO-1Ws, quickly nicknamed "Po' Ones," and later designated WV-1s, the planes



bulged with electronic scanning equipment. A radome below the fuselage housed search radar, and a huge midship fin on top contained height-finding equipment. The craft's mission: to serve as an aerial combat information center at four to five mile altitudes, providing a radar umbrella for Navy task forces by spotting enemy aircraft and surface vessels.

Carl Haddon, Constellation project engineer since 1942 and now California Division chief engineer, became PO-1W project engineer. The prototype made its first flight in June 1949. The airborne radar ships proved successful. Follow-on orders from both Navy and Air Force rolled in, and today Lockheed's hump-backed early warning Connies have added up to more than \$350 million worth of business.

### Birth of the T-Bird

Hardly had the Air Force's jet-powered Shooting Star become operational before the late Mac Short, vice president in charge of military relations, bobbed up with a suggestion.

"The armed forces need a two-place jet trainer," he told his Lockheed associates. "Ground instruction isn't enough—student pilots still have to solo without jet experience in the air. Let's develop a trainer out of the P-80."

Short didn't sell his idea right away, even though the Navy ordered some Shooting Stars in 1947 and put them to work as one seat TO-1 trainers.

"Some of the rest of us thought making a trainer out of that beautiful, high-performing Shooting Star would be demoting it," Vice President Hall L. Hibbard said later. "But Mac was right. He kept at it—and he deserves a major share of the credit for what developed."



Model 749 Constellations served as transports for "very important persons" on military and diplomatic missions. Users included Air Force Secretary Finletter (below) who earlier had conducted survey of ailing aircraft industry.

In early postwar days the Air Force was especially budget conscious. So Lockheed gambled \$1 million of its own funds on Short's proposal. The Air Materiel Command approved the company's taking an F-80—the designation had just changed from P for Pursuit to F for Fighter—off the assembly line and turning it over to experimental engineering for modification. With Don Palmer, now F-104 assistant project engineer, as project engineer, a crew of 14 cut the F-80 fuselage apart and stretched it more than three feet. In this extra space they installed a seat for a student behind the pilot.

Seven months later, in March 1948, Pilot Tony LeVier took the nation's first jet trainer up for its maiden flight.

"It handles like an F-80," he commented when he landed, "only faster."

The Air Force ordered 20. Lockheed took another gamble by starting work on the first production airplane before the contract was officially signed. That first ship rolled out the door in June.

Immediately the company launched a concentrated selling campaign. LeVier went on a month-long tour of Air Force bases, taking aloft everyone from generals to green cadets.

### Armed Services Order T-Bird

Sales Chief Carl B. Squier acted as advance man for the LeVier tour. Keeping ahead of the demonstrator trainer, he made necessary arrangements at bases—trying his best by car, chartered plane, and airline transportation to keep one jump in advance of LeVier and his mechanic.

"I was never so tired in my life," Squier laughed later. "I was losing sleep night after night. And Tony maddened me because he'd step out of that jet job at each new stop fresh as a daisy."

Then LeVier showed the trainer to the Navy at its test center at Patuxent, Maryland.

The result: orders to build the plane for both services. The Air Force called it the TF-80C and later the T-33. The Navy and Marine Corps designation was TV-2.

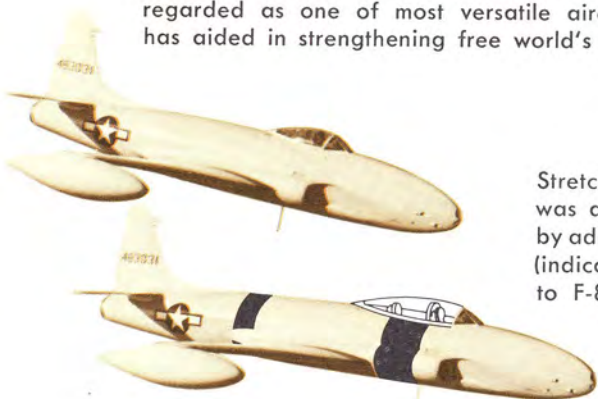
Puffing pipe, General Douglas MacArthur gazed through Constellation window during aerial survey of battlefield in Korean hostilities. Military "VIP" Connies had heavy flooring, provision for hospital litters, and hauled cargo.





## Cadets in Jets

Famed T-33 two place jet trainer developed from F-80 is regarded as one of most versatile aircraft ever built, has aided in strengthening free world's aerial defenses.



Stretch into T-33 was accomplished by adding sections (indicated in black) to F-80 fuselage.



In past 10 years armed services have ordered a total of 5800 T-Birds. Nine of every ten U. S. air cadets have acquired jet knowhow in Lockheed's "flying schoolrooms."

With rapidity that matched its speed the T-Bird earned a reputation as one of the most versatile aircraft ever built. In addition to its primary duty—teaching pilots to fly jets—it serves in air-to-air and air-to-ground gunnery instruction, high speed navigation and night flying training, tow-target flying, and automatic rocket launching. Probably no plane has figured more prominently in strengthening the free world's aerial defenses. Quantities have been diverted to 26 Allied countries whose pilots receive their first jet instruction in T-Birds. Canada has built them on a royalty basis. Under a similar licensing agreement Japan manufactures T-33s today with technical aid from Lockheed Aircraft Service.

Since 1948 Lockheed has received orders for almost 5800 of them valued at \$625 million. A recent \$11 million contract from the Air Force for 130 more marked the 14th successive purchase by U.S. military services.

Unfortunately Short did not live to observe the success achieved by the airplane to which he had contributed so much. He died of a heart attack at his Lockheed desk in August 1948 when the T-Bird was just beginning its flight to fame.

Air Force purchase of the T-33 was only part of \$92 million worth of new military orders placed with Lockheed in early months of 1948. The contracts boosted Lockheed's backlog to \$196.4 million, highest since March 1946. The first to stem from funds appropriated under the 70-group Air Force and Navy air arm expansion bill, they called for substantial follow-on production of F-80s and P2Vs in addition to T-33s.

News of Lockheed's expanding business came only weeks after a disturbing international develop-

Navy's TO-1 one seat trainer version of Air Force F-80, shown at left on takeoff, grew into two place TV-2.



In global use, T-33s serve German Air Force (left). In Japan they fly patrol over Mount Fujiyama.





# Operation Vittles:

## THE COLD WAR WARMS UP

Berlin blockade by Soviets in 1948 dramatically demonstrated value of air transport to haul supplies to beleaguered city.



Lockheed C-121 Constellations joined other transports in airlift to Berlin, carried personnel and cargo to Rhein-Main airport (above). Cold war and blockade also flooded Lockheed Aircraft Service bases with overhaul and repair business in Burbank (below) and Long Island.



ment that was to demonstrate anew the value of air power. In June the cold war waged between the free world and countries behind Russia's Iron Curtain warmed almost to the boiling point. The Soviets poured on the fuel that did the trick by halting all train and highway traffic between Berlin and western occupation zones in Germany.

The Berlin blockade left only the skyways open for the free nations to bring desperately needed supplies into one of the world's great cities. Within three days—on June 21, 1948—the Berlin airlift, "Operation Vittles," began. Lockheed C-121 Constellations joined C-54s in the aerial bridge that hauled personnel, sacks of coal, food, and other supplies into Tempelhof Airport from western Germany. In their first month of operation seven C-121s chalked up nearly 5.9 million passenger miles, carrying personnel and cargo from Westover Air Force Base, Massachusetts, to Rhein-Main, Germany.

By any yardstick the military air transport services did a magnificent job. In the first 30 days of "Operation Vittles" they flew 36,000 tons of food and supplies into the city. But to do it they recruited almost every usable military transport airplane and slowed or halted other essential programs.

## Soviets Give Up

The Russians lifted the blockade in May 1949. Their plan had backfired, and unwittingly they had done U. S. aviation an invaluable service. They had given it an opportunity to demonstrate dramatically and effectively the indispensable nature of transport as an element of air power. They had called forcefully to public attention the fact that American air transport strength was about 15 per cent of the minimum needed in event of a war emergency.

The cold war and stiffening of Allied defense programs also expanded Lockheed Aircraft Service business. The Berlin airlift flooded LAS bases at MacArthur Field, Long Island, and Burbank with overhaul and repair work.

And to the company's surprise, LAS in mid-1948 won an Air Force contract to take over operation of the big World War II airport at Keflavik, Iceland. Within 10 days a crew under Daniel J. Gribbon, now executive assistant to D. J. Haughton, Lockheed executive vice president, moved to Keflavik, a key refueling and service stop for heavy military air traffic over the North Atlantic. Lockheed operated it for three years, set an outstanding performance record, and made some money.

In September 1948 came an important change at the management level. Burt C. Monesmith, then superintendent of Constellation assembly, took over duties of works manager. A year later Monesmith—now vice president and California Division general manager—became assistant to H. E. Ryker, vice president-manufacturing. G. A. Fitzpatrick, now California Division assistant general manager, became works manager. When Ryker resigned in May 1950, Monesmith succeeded him as head of manufacturing operations.

## Back in the Black

The year 1948 was significant in other respects. For one, it marked Lockheed's return to profitable operations for the first time since 1946. On sales of \$125.6 million the company reported net earnings of better than \$6.2 million. It hacked its staggering \$40 million bank indebtedness down to \$6 million. And it had a comfortable \$195.9 million backlog of orders for F-80s, T-33s, P2Vs, Constellations, and a new and deadly Air Force fighter, the F-94. Stockholders received their first dividends in 21 months.



But employment continued its downward spiral to a postwar low of 13,826 in April.

The F-94 owed its existence to a radical change in Air Force thinking. Combat experience in World War II had convinced the military of the need for a long-range "all purpose" penetration fighter—a rough, tough, brawny plane that would excel at a variety of combat jobs. When the Air Force asked U. S. aircraft designers to submit proposals, Lockheed spent two years developing and testing 65 major designs. Finally in the spring of 1947 it picked one—a needle-nosed, swept-wing configuration called the XF-90.

## The XF-90:

Heavy and incredibly strong, needle-nosed XF-90 built to Air Force specification flew through sonic barrier 15 times.



Swept-wing all purpose penetration fighter first flew in May 1949. It carried only pilot, had two jet engines and afterburner, hit 668 mph in level flight. But changes in defense plans obsoleted design. Lockheed built only two.

"She likes to fly," Test Pilot LeVier (right) reported after first XF-90 flight. From left, others in photo are H. E. Ryker, Cyril Chappellet, Courtlandt and Robert Gross, Hall L. Hibbard, C. L. Johnson.



XF-90s in flight showed rugged beauty of needle-nose design.

Twice the weight of the F-80 Shooting Star, the XF-90 carried only a pilot. Behind him, side by side in the fuselage, lay two Westinghouse J-34 jet engines designed to develop 4000 pounds of thrust each. By use of a revolutionary device called an afterburner—its function is to inject extra fuel into the tailpipe and ignite it—the engines delivered even more power. "An afterburner," one veteran pilot explained, "is just like a kick in the pants."

Although heavy and rugged—Test Pilot LeVier called it "one of the strongest airplanes ever built"—the XF-90 was a going machine. In level flight it hit 668 mph. LeVier and other test pilots dived it through the speed of sound 15 times.

But several factors weighed against the XF-90, and Lockheed built only two. Even with afterburners the engines did not put out as much thrust as anticipated. Changes in Air Force specifications for range and rate of climb hampered engineers. The XF-90 lost the design competition to McDonnell's XF-88 Voodoo. Then the military scuttled plans for an "all purpose" combat craft when it learned the Soviets had successfully flown intercontinental bombers. Instead it gave top priority to an urgently needed fast-climbing all-weather interceptor.

Lockheed didn't immediately participate in the design competition for such a plane. But late in 1948, having determined that other proposals did not measure up, the Air Force hurriedly came to the company. Could Lockheed put together an "interim" interceptor? And could it begin deliveries in 1949?

Hibbard and Johnson didn't happen to have blueprints for a two-place all-weather jet tucked away in a filing cabinet. But they have earned reputations as being ready to try anything. Debating whether to start from scratch or modify an existing design, they took a close look at the prototype T-33 trainer.

## Along Comes the Starfire

Its airframe, adapted from the tried and proven F-80, was fully qualified for combat. It was the only two-seat jet fighter type in the air. But could it be modified to carry radar for all-weather service?

If so, a reworked T-33 undoubtedly would be the solution to the problem of speedy delivery. By comparison, to design and develop a new plane would take 18 months to two years.

Quickly Hibbard, Johnson, and Project Engineer J. R. Daniell, now California Division engineering project manager for fighters, discovered they could pack airborne radar and an afterburner into elongated nose and tail sections of the accommodating T-Bird. A radar operator replaced the student flyer. Thus was born the F-94A Starfire, with a top speed of 602 mph and a service ceiling of 48,000 feet.





Burt C. Monesmith, now Lockheed vice president and California Division general manager, became works manager in 1948, two years later headed manufacturing operations.

LeVier flew the production model in April 1949. Two days before the end of the year deliveries began. The F-94A proved so successful that the Air Force placed additional orders for a new version, the F-94B. It had increased fuel capacity, better instrumentation, and improved all-weather capabilities.

Altogether Lockheed built 466 F-94As and F-94Bs. They served well, but no one knew better than the company that made them that they were only stopgaps. Before the first F-94B rolled off the line the Hibbard-Johnson engineering team was hard at work on a better one.

To be fully effective an interceptor had to reach altitudes of 50,000 feet and higher to meet and knock down high-flying enemy bombers. Specifications called for a thinner, faster wing, a bigger engine, and rockets for firepower.

At first the Air Force displayed no interest in Lockheed's proposal. But management backed up its engineers' confidence by developing the design with company funds.

### Plane Flies in 1950

Work on the prototype—Lockheed could afford to build only one—began early in 1949. Powered by a Pratt & Whitney J-48 jet engine with 6350 pounds of thrust plus an afterburner, the plane flew in January 1950. It promptly carved out a new series of Lockheed firsts.

It was the first aircraft other than purely experimental types to exceed the speed of sound with a straight wing. That wing, made up of three spars and a thick skin, was light and tremendously strong.

It was the first U. S. fighter without guns. Instead, a ring around the nose radome housed 24 "Mighty Mouse" rockets—deadly blockbusters developed by the Navy as air-to-air missiles. Project Engineer Daniell supervised another pioneering advance, closed-breech rocket launchers that insured a higher degree of firing accuracy.

It was the first fighter plane to employ a drag chute—stowed in a tail compartment—to cut landing distances by 40 to 50 per cent. And it was the first to use the Hughes automatic fire control system.

As with the T-33, also developed with Lockheed's own funds, the gamble on the new thin-winged fighter paid off. Impressed with its performance and

encountering delays in other all-weather designs, the Air Force placed a production order for 110 called the F-97. Later it changed the designation to F-94C.

Even before it became operational the Air Force bought still another version, the F-94D tactical fighter-bomber for long range ground support. It was a one-seater with the radar operator's place eliminated to provide space for additional fuel. But early work showed the mission required extensive redesign of both wing and empennage, a redesign that would have led to long delays. So the Air Force later canceled the F-94D contracts.

### Business Looks Better

By early 1949 Lockheed was building up substantial commercial and military backlogs, even though not on a spectacular scale. Although no broad federal air policy grew out of recommendations of the Finletter Commission, increased appropriations stabilized the demand for military aircraft. In the commercial field sales of Model 749 Constellations reached the point where Connie at long last began to pay for herself. At yearend, 219 Constellations had been delivered to or ordered by 14 airlines. Earnings reached nearly \$5.5 million on total sales of almost \$117.7 million. The commercial backlog stood at \$48 million, highest since early days after the end of World War II, and the combined backlog had grown to nearly \$230 million.

With pleasure and profound relief Robert Gross reported that during the year the company paid off all its bank indebtedness. But he warned that competition was stronger than ever among aircraft manufacturers, both U. S. and foreign.

Conditions in domestic and overseas markets were changing. At home airline operators experienced marked improvements in passenger-freight volume and financial results. They began a two-way quest for equipment that would offer higher performance for premium flights and at the same time more room to crowd in seats for the air coach service that had begun to spread to scheduled carriers.

They studied jet transport developments and proposals, including those of Lockheed, by then the

Lockheed began jet transport studies before the end of the war, made 300 designs. This L-193 proposal in 1954 had jets on the aft fuselage like the present UCX JetStar.





nation's largest and most experienced builder of jet-powered aircraft. The British received several orders abroad for its new Comet jet airliner, destined later to encounter a series of disastrous accidents.

Lockheed designed its jet, the L-193, for 600 mph service at ranges from 500 to 2500 miles. Its advanced configuration included engines attached to the fuselage aft of the wing—a proposal put to practical use seven years later on the 10-passenger JetStar that first flew in September 1957.

"All we need is orders," Vice President Hall L. Hibbard said of the L-193 at the time. "Our business is to build airplanes to sell."

American lines seemed little interested in jets at this point. Lockheed and other manufacturers shelved their jet designs for the time being and plunged into another tightly-competitive round of piston engine transports.

### Connie Grows and Grows

Many airline patrons had shown their liking for roominess of the Boeing Stratocruiser with its two-storied cabin connected by a spiral stairway. Douglas decided to stretch the fuselage of its DC-6 into a longer and faster DC-6B that narrowed the Constellation's speed advantage. Lockheed, which had been engineering a similar extension of the Constellation for several months, followed suit early in 1950.

Engineers lengthened the fuselage better than 18 feet. Wright Aeronautical came up with an improved Cyclone that delivered 2700 hp on takeoff, an increase of 400 hp.

Lockheed Aircraft Service began operations at Idlewild airport in New York in 1949. Phil Willcox (inset), now LAS vice president, became base manager.



The result was the Model 1049 Super Constellation, carrying more passengers at lower cost per seat mile and with a 40 per cent greater payload. Eastern Air Lines, first purchaser of the 649, ordered 10 of the bigger and faster 1049s. TWA bought 14.

With its net losses in 1946 and 1947, Lockheed had no money to invest in additions to its plants, property, and equipment. But in 1948 and 1949 the earnings picture brightened. Looking forward to steady and profitable operations, management fore-

Hall of Giants in Burbank was finished around huge fabrication equipment. This \$750,000 triple action hydraulic press installed in 1951 was the largest of type.



saw the need for new high capacity fabrication equipment and other machinery to help the company meet the "greater technical challenges" that Gross predicted Lockheed would face in the future.

Highlighting a major modernization program, the company early in 1950 purchased a \$750,000 triple action hydraulic press, largest of its type in the world, and two other heavy duty machines. Another \$500,000 went into construction of the "Hall of Giants" at the California Division's Plant A-1 to house the costly new equipment.

### War Threat Looms

Lockheed launched the \$6.5 million program just in time. The "greater challenges" Gross had envisioned came sooner than expected.

They arrived June 25, 1950, when a peninsula called Korea, jutting out from Asia between the Yellow Sea and the Sea of Japan, turned suddenly into an international battleground.

On that day Communist troops from the North Korean "People's Republic" stormed across the 38th parallel into South Korea. After less than five years of uneasy peace, the United States and its allies viewed the invasion with growing alarm. Could it be the spark that might ignite World War III?

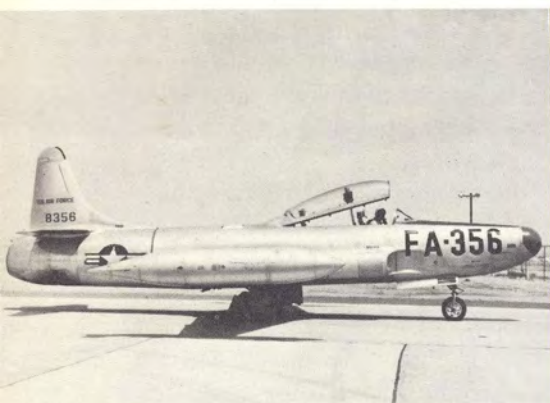
Immediately the United Nations Security Council called upon the North Koreans to withdraw. That plea was ignored. And within 48 hours President Truman directed General MacArthur's Far East Command to employ American air and naval forces to support the South Korean army.

Once again air power had a job to do. Shortly after the first shots were fired the Air Force threw every plane it had in the Far East into action. There weren't many—about 400 fighters including North American F-51 and F-82 Mustangs and Lockheed F-80s, as well as a smaller quantity of Douglas B-26 Invader and Boeing B-29 Superfortress bombers.

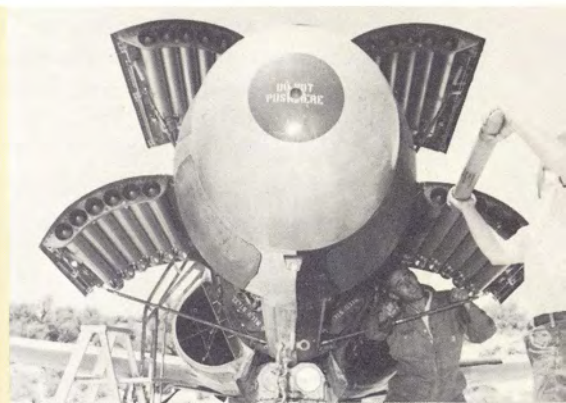


# The Starfire

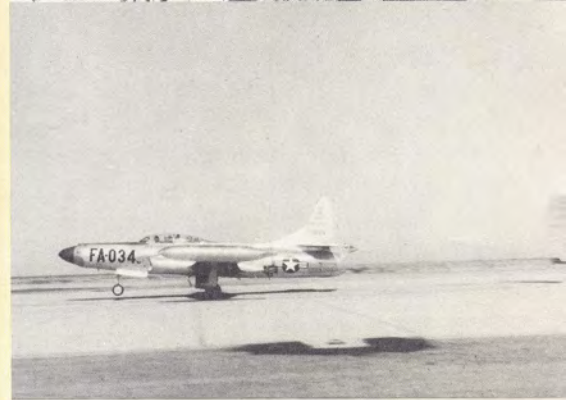
Developed from T-33 jet trainer, rocket-spitting daredevil above was F-94C Starfire, deadliest version of series designed to fulfill urgent Air Force request placed in 1948 for all-weather interceptor. Speed passed 650 mph.



"Old Hodgepodge" (left) began as F-80, turned into research plane that became T-33, F-94. Picture at right shows rocket loading in ring around F-94C nose that packed deadly punch.



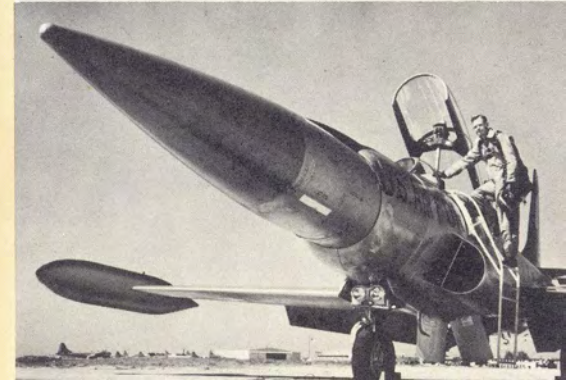
Underslung tip tanks (at left) boosted F-94A range to almost 1600 miles. Drag chute in tail reduced F-94C landing distance nearly half (right), enabling operation from shorter strips.



Greater fuel capacity, better instrumentation and relocated tip tanks marked the F-94B (at left). Both F-94As and F-94Bs served at northern bases, were first line of defense (right).



First designation for Starfire prototype was YF-97 (left). At right, modified F-94 had huge nose, instruments to simulate missile flights. Plane tested Air Force missile components.





The jet Shooting Stars quickly proved their mettle. They performed beyond all expectations and took a phenomenal amount of battle punishment. Crossing from Japanese bases—where early summer weather is consistently foul—they cleared the air of Russian fighters over North Korea until the MIG-15s arrived. They struck blows against ground forces. They delivered accurate low altitude attacks. Lieutenant General George E. Stratemeyer, Air Force commander in the Far East, described their achievements as "magnificent." Captured North Korean soldiers called F-80s the airplanes "that made no noise until they were gone—and always hit whatever they pointed at." Shooting Stars flew 40 per cent of all U. S. combat missions in Korea. A reconnaissance version, the RF-80, was the first jet used for wartime photographic survey work.

And an F-80 accounted for another Lockheed first. It was the victor in history's first all-jet air battle.

### F-80 Downs Enemy

That accomplishment came on November 8, 1950. Piloted by Lieutenant Russell Brown of Pasadena, California, a Shooting Star spotted a Russian-built MIG-15 jet fighter over northwest Korea. Brown dived on the MIG and set his gun sights for maximum range. Then, he explained later, "I squeezed the trigger and held it down." The enemy jet exploded into flame from the wing section aft and hit the ground in a cloud of black smoke. In 60 seconds Brown and his F-80 had gained immortality in the annals of military aviation.

During the first seven months of Korean combat, F-80s flew more than 26,000 sorties and knocked down 94 enemy aircraft. Although designed as high altitude interceptors, they proved their versatility by

working just as well only 30 feet off the ground in close support.

Shooting Stars stole the headlines, but other Lockheed planes also played important roles in the Korean crisis. Days after the war began, P2V Neptunes joined other Navy forces in a coastal blockade of the beleaguered peninsula. Their missions included conveying troopships, spotting for naval surface gunfire, search and rescue, radar counter measures, day and night reconnaissance, armed strikes against coastal shipping, and night illumination—dropping high intensity flares to determine troop movements and concentrations. Air Force Constellations and even the Navy's two mammoth Constitutions joined other Military Air Transport Service planes on the Pacific airlift, hauling military personnel and cargo to distant islands, Japan, and Korea.

Most important, the conflict stimulated a sudden spurt in military and commercial buying. This reached almost frantic proportions in December after Chinese Communists reinforced the North Koreans and chased Allied troops out of Pyongyang and Seoul and toward a beachhead at Pusan. Threats of Russian intervention and World War III filled the headlines.

Congress approved four supplemental appropriations to the 1951 budget to build the nation's air strength. Fearing that military production would crowd out civilian output, airlines rushed to order transports.

By yearend 1950 Lockheed's backlog more than doubled to \$447 million. Of those unfilled orders five-sixths called for accelerating production of all weather jet fighters, jet trainers, patrol bombers, and Air Force and Navy Constellations. Additional contracts with the armed forces totaling \$175 million were in negotiation.

### Turbo Compound Powers Connie

Foreseeing a need for a large fleet of planes to carry troops and cargo over vast Pacific stretches, the Navy ordered in production the first true freight version of the Constellation. The Navy's new R7V-1 Super Constellation had large cargo doors and a strong, light, watertight floor of extruded magnesium planks. It made use of the new Turbo Compound engine, a decisive advance developed by Wright Aeronautical and the Navy.

This redesign of the Wright Cyclone carried exhaust gases out through turbine wheels that recovered and returned the energy to the propeller shaft. The result was not only a 20 per cent gain in power to 3250 hp but a new lease on life for piston engines. It had already proved itself in two years of service on P2V Neptunes.

The new engine and other improvements made

## Connie: HOW SHE GREW

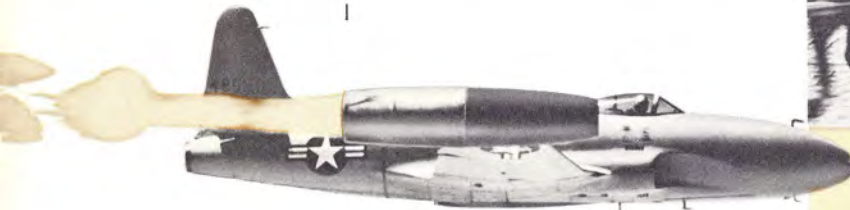
Constellations grew and grew just like human beings. The Model 749, rear, had fuselage stretched 18 feet to become 1049 Super Constellation, carry more payload.





## Uneasy Peace:

Man flew by ram-jet first time in 1948 when pilot turned off F-80 jet engine, used 30-inch ram-jets mounted on wing-tips.



possible a whole new family of bigger, higher performing Constellations ranging the skies in commercial and military service.

Through those early months of the Korean war Lockheed again faced the task of mobilizing to meet the challenge of an international emergency. But in 1950 it had assets it lacked a decade earlier. The management-work force team was seasoned through years of war and peace. The company's financial condition, manufacturing knowhow, and physical resources had vastly improved. Since World War II it had built one of every four transports, one of every six U. S. military aircraft, and more jets than any other American company.

A big job lay ahead. But Lockheed realized the importance of air power to the nation's strength.

"We must meet the challenge," said Robert Gross. "And we will."



Cold war of late 1940s saw hundreds of F-80s shifted to Germany. Above, F-80 moved along the streets of Bremen. Below, scores massed at Furstenfeldbruck base.



## Coming Next Month / THE MISSILE CHALLENGE

Back in September 1944, the year in which Lockheed was at its peak production of wartime P-38s and B-17s, a huge explosion rocked the residential section of Chiswick in London. At first no one knew what caused it. There had been no whining plane, no whistling bomb.

This was the first large ballistic missile used in a war—a 12-ton V-2 rocket that fell on London from 50 miles up in the ionosphere at a speed too fast to be seen or heard. The Germans fired 14,000 V-2s against the British from across the Channel, plus another 16,000 V-1 flying torpedoes. They had 138 different types of missiles and other secret weapons under development by the time the war ended.

Most Americans were slow to realize the importance of these weapons. After all, the war was over. We wanted peace. Even as late as 1951 the United States spent

only \$21 million—about the cost of two or three big jet bombers—on missile research, development, and production. Only in the last few years has our nation forged ahead of where the Germans left off in missiles.

Chapter IX in *Of Men And Stars* will tell of Lockheed in the missile age—our experimental work 10 years ago and our latest top-priority, breath-taking programs. It will also relate the growth of Lockheed during the Korean War, including the opening of the Georgia Division. And it will describe the competitive race to furnish airlines, military services, and private owners with jet-age transports.

Chapter IX will be the last of the series. Watch for it in your gate boxes late in December. And if you still are missing one or more chapters, call your public relations office. Most of you, we feel sure, would like to have a complete set for your home library.



# The 38th Parallel:

KOREAN CONFLICT FOUND  
WINGED STARS READY



"Whistling Death" was Reds' name for F-80, shown in Korean takeoff.



## U.S. AIRMEN WIN FIRST ALL-JET FIGHT

U.S. 5TH AIR FORCE HEADQUARTERS IN KOREA, Nov. 8 (Wednesday) 6P.—Jet met jet today in mortal combat for the first time in history.

A U.S. F-80 Shooting Star knocked down a Russian-built MIG-15 jet in a five minute 600-mile-an-hour battle over Sinuiju in northwest Korea.

High over Yalu River, F-80 downed Red jet MIG-15 November 8, 1950.



P2V Neptune on runway in Japan.



Constellations served on Pacific airlift.

TERRY AND THE PIRATES

News Syndicate's 1951 comic strip showed dogfight between F-80 and MIG-15 in Korea. Communist's guns damaged F-80 wing, but Terry won final victory.



## OUTNUMBERED LOCKHEED JETS CHASE RED PLANES

U.S. Fifth Air Force. 6P.—Russian-made jet f... attacked outnumbered A... planes over the Korean... border area today... after brief, vicious dog... One of the Soviet... marked MIG-15s was... sibly downed. All th... planes returned safe... It was the second... that the revived C... force has taken it

## F-80's Damage Two Red Jets

LOCKHEED PLANES COME OUT UNSCATHED IN BATTLE

U.S. Fifth Air Force... Lockheed F-80 jets reported... downed two Russian-made MIG-15... jets over North Korea today in... the second dogfight... The F-80 jets...

## Green Light for Jets

Air Force to Ask Funds to Step Up Plane Buying: Enthusiastic Over Performance of F-80 in Korea

From The Wall Street Journal, Washington Bureau WASHINGTON—The Air Force, enthusiastic over performance of the F-80 "Shooting Star" in Korea, will soon ask Congress for money to buy more jet planes.

A high defense official said a request to speed up the Air Force's rate of plane purchase to President Truman's money to be

live radar spotting network, and a fleet of "strategic" long-range bombers able to hit back at enemy bases right after any shooting started. Tactical air strength was to be built up afterwards, as U. S. ground forces grew and got into the fight.

The Air Force still thinks its strategic force "in being" should be kept at least at the current "minimum," but it now "add more"

spotting enemy targets in the air or on the ground.

Radio communications, vital in ground support missions, is easier in jets because the older engines produce much interference spark plugs and other parts

Torque Falls Off C... rt planes.



Shooting Stars packed weight under wings equivalent to two motor cars. Napalm (above) aided ground forces.



RF-80 photo plane in Korea.



Final F-80 built in June 1950.

BY GEORGE WUNDER