

F.O. Rick

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OF MEN AND STARS

A History of Lockheed Aircraft Corporation

*Chapter VIII * * **
FROM WAR TO PEACE



"Lockheed Looks at Peace," read the Lockheed Star headlines. "No Layoffs in Mass Are Slated Here. World Market Seen by Sales Executives. Management Speeds Planning"

The date: August 20, 1945. Six days earlier, paralyzed by the impact of two A-bombs upon its homeland, Japan had quit. Unofficially World War II was over.

That special edition of the Star greeted 35,000 Lockheed men and women as they returned to their jobs after a five-day shutdown of the factories. Of those 35,000 more than 8000 still work for the company. And most can vividly recall their emotions as hostilities drew to an end.

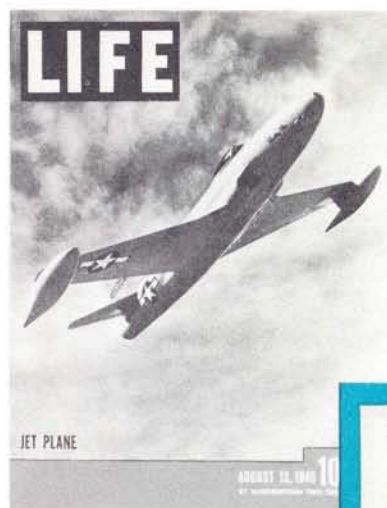
Although relieved and thankful that victory had been secured, they were uncertain about their future. As did nearly all of the millions of people who came into the aircraft industry during 1942-44, many felt their work was temporary. A great number were housewives. Others came from civilian industries, trades, and professions. Sincerely anxious to do their part in defeating the enemy, they also realized that with the coming of peace U.S. aircraft production would shrink from its inflated role as the nation's No. 1 industry.

But despite this realization, the ruthlessness of the sudden cutbacks couldn't help but come as a shock—a rude awakening to the inevitable. World War II had brought new meaning to air power. But it had not sufficiently stressed the wisdom of continued preparedness. Abrupt demobilization, contract cutbacks and cancellations all but wiped out military production.

Surplus Planes Await Purchasers

At Lockheed the rushing P-38 line halted—forever. The Air Force alone canceled 18,000 contracts and declared \$10 billion worth of war material surplus. Depots were closed and air bases abandoned. At one Air Force base—in Kingman, Arizona—7500 combat aircraft sat on the field priced at a fraction of

Headliners



Lockheed's leadership in postwar conversion activity, introduction of new commercial and military craft, earned wide press attention.



their original cost. Among them were hundreds of P-38s waiting for buyers to fly them home at \$1250 each. Many of them sold later merely for the salvage value of the aviation gasoline in their tanks. General Ira Eaker admitted that within months after the Japanese formally surrendered in September the Air Force did not have one operational group ready to defend the country.

Other aircraft companies slashed payrolls by as high as 80 per cent. One laid off 12,000 men and women with only a day's notice. Another dropped from 53,200 to 8300 in a few weeks. Still another fell from 41,400 to 4500.

Lockheed's reassuring headlines—unique in the entire industry—were a relief to its employees and to merchants and citizens of the community. How was Lockheed, almost alone among airframe manufacturers, able to avoid large layoffs and keep most of its workers on the payroll?

The answer lay in a courageous decision to forge ahead on a commercial program, continuing work on four planes with military usefulness during peace, and planning conferences that began months earlier as defeat of the enemy became assured. Management and sales personnel took a long, hard look at the future—and decided that the company's course of transition from war to peace had placed it in as good a position as any in the industry, better than most.



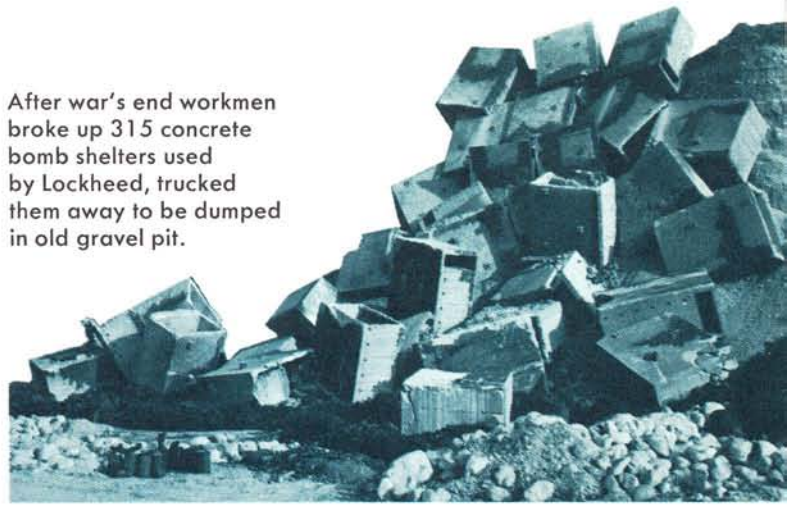
One of oddest uses for surplus P-38s was ingenious water scooter made from Lightning fuel tanks.

"We were fortunate, perhaps more fortunate than any of our competitors," Vice President Cyril Chappellet declared later. "We felt confident we could make the adjustment by tightening our belts a notch or two. We foresaw continuing production of two military models. And we believed our prospects in the commercial field were bright."

Lockheed's employees came back after the shutdown to a 40-hour week for the first time since war began. The shorter week meant smaller paychecks, but it also meant jobs for more people. It kept the work force almost intact.

Fortunately the military still wanted quantities of

After war's end workmen broke up 315 concrete bomb shelters used by Lockheed, trucked them away to be dumped in old gravel pit.



Joint entry by Lodge 727 and company, Connie in flowers won in its class at Pasadena's 1946 Rose Parade on New Year's Day.



three Lockheed models. Although it trimmed the rapid buildup and high rate of output planned to meet the wartime threat of German jet fighters, the Air Force continued production of P-80 Shooting Stars at the largest volume of any U.S. plane during the conversion years. The Navy placed orders for new P2V Neptune patrol bombers as well as nearly 100 more hard-working Harpoons that had already proved themselves in battle.

And Lockheed had still another ace in the hole.

That was the Constellation, its fast, luxurious four-engine commercial transport on which design and development had begun two years before Pearl Harbor. World War II interrupted commercial plans for Connie and the military took over further development as the C-69 transport. Then in 1945, when victory was near, the government cut back its C-69s from 260 to 73 airplanes. War's end brought termination of what was left of the contract.

Connie Ahead of Competitors

"During our five-day shutdown we explored two roads we could take with the Constellation," recalled Vice President Carl B. Squier. "We could develop an even more modern postwar airliner. But that would have meant layoffs for thousands of people during months of design and tooling work. Or we could buy back government surplus tooling, fabricated parts, materials, and five partly completed C-69s, and adapt the military transport into the Model 049. We chose the second plan."

By making that choice Lockheed retained virtually full crews in nearly all fabrication and assembly sta-

Rivals All

Eyeing Lockheed's head start in postwar sales, other companies rushed development of Connie competitors.

Republic planned Rainbow, speedy long range carrier, built only one prototype.



Boeing Stratocruiser was commercial adaptation of company's military C-97.



Connie had 18 month lead over Douglas DC-6 in the race for transport sales.



tions and saved jobs for about 15,000 employees assigned to Constellation work. And the company gained a tremendous time advantage over competitors.

As the C-69 the mammoth plane had first flown in January 1943 and demonstrated outstanding performance, hitting a top speed of 340 mph. Its enlarged P-38 wing and Lockheed-Fowler flaps gave the craft tremendous lift. Cabin pressurization enabled it to fly at 20,000 feet and higher—well above 90 per cent of troublesome weather.

The C-69 first commanded national attention in April 1944 when TWA's Howard Hughes and Jack Frye piloted one on a record-smashing, high-altitude flight from Los Angeles to Washington, D.C., in a shade under seven hours. In August 1945 another C-69 set a New York to Paris nonstop mark of 14 hours, 12 minutes.

Such accomplishments put the advanced Model 049 nearly 18 months ahead of the Douglas DC-6 and Boeing's Model 377 Stratocruiser, and so far ahead of Republic's Rainbow that this proposed transport version of a fast wartime reconnaissance plane faded at the prototype stage.

Lockheed's Model 049 gamble began to pay off. A few days after V-J Day President Robert Gross revealed with pride receipt of aviation history's largest block of commercial orders for one company—

103 Constellations valued at \$75.5 million from eight major airlines.

These orders dispelled most of the lingering post-V-J Day apprehensions. "In one hop," reported Time Magazine in October 1945, "the Constellation had carried Lockheed to the top of the heap."

At the same time Gross cheered stockholders with a report that disclosed \$213 million commercial and military backlog and more than \$32 million in working capital. The annual report for 1945 reflected an expected postwar drop in sales—to about \$418 million from \$603 million in 1944—but, encouragingly, a higher net income, \$5.5 million as against \$4.5 million.

Gross Looks into Future

The 1945 balance sheet had been cleared of all substantial war contract terminations. Gross, calling the task of negotiating these cancellations "formidable," noted Lockheed was one of the first west coast aircraft firms to complete the job.

The future was still somewhat uncertain—but Gross continued to exude confidence. "Once over the transition period," he said, "we are sure that the industry will grow steadily greater and stronger."

To try to look into the future was, he admitted later, "a perplexing thing." He found there "didn't

First with the Most...

Because of sound basic design, Model 049 was ahead of early postwar competition in speed, power, range, payload. Plane's superiority, early availability were huge sales advantages.



Air Force flew Constellation C-69s as cargo and personnel transports during war (above). After V-J Day Lockheed rushed conversion to commercial Model 049s (below) for peacetime.



Signing TWA's first Constellation contract (above) were Robert Gross and airline's Jack Frye. Stagecoach (below) was transportation contrast when TWA accepted first Model 049.





Howard Hughes (left) flew Model 049 on record hop in April 1944, also handled controls (above) as TWA began postwar Connie flights in 1946.



William Powell and wife Betsy Drake (lower left) were among film stars aboard as TWA launched transcontinental Constellation service after war.



Spanning four decades of aviation progress, Wilbur Wright, then 72, made his last flight in 1944, handled controls of Air Force C-69.



From left, Harvey Christen, Hall L. Hibbard, H. E. Ryker inspected Constellation that was 20,000th all metal Lockheed built since 1932.

seem to be any place to start."

"I was torn between two terrible alternatives," Gross said, "of doing everything for the present and neglecting the future, or doing so much for the future that we would neglect the present."

He knew the responsibility was there to do both. But should Lockheed confine itself to the airplane business? Or should it venture also into some other manufacturing field?

"It's one thing to build a product," Gross finally decided, "and it's another thing to build a company. We'll stay in our own field where we've proved we have a foot in the door."

That decision reached, he and other members of management concluded that Lockheed could best weather the early postwar "gap" period by offering a diversified array of aircraft "indispensable in war and desirable in peace."

Connie Deliveries Begin

Their analysis proved accurate. After victory came, aircraft production fell to about half of one per cent of the wartime peak. Some companies turned to designing washing machines and metal coffins, to stamping out automobile fenders, and to a variety of other activities. The government leased its huge Willow Run bomber plant to a motor car manufacturer. It put a dozen others in mothballs, including the big B-29 factory in Marietta, Georgia. Almost alone in the industry, Lockheed kept multiple assembly lines moving as it turned out P-80s, PV-2s, and Model 049 Constellations.

TWA accepted delivery of the first of 27 Model 049s in November 1945. Lockheed delivered nine more by the end of the year. In December, just three months after V-J Day, the Civil Aeronautics Board granted an approved type certificate after the Constellation passed rigid flight performance tests in the record time of 27 flying hours.

Even before Connie made her commercial bow, Lockheed sales and advertising specialists began evolving postwar marketing plans. A survey undertaken late in 1944 recommended a campaign to influence airlines to reorder and standardize on Lockheed equipment. And, said the analysts, this might be accomplished by demonstrating proof of the Constellation's appeal to the ticket-buying public.

New Ad Campaign Launched

So Lockheed inaugurated a "brand name" advertising campaign appealing directly to air travelers. "Next time you travel," said the ads, "enjoy the delights of this new kind of flying. Make sure your ticket reads Constellation—there is only one leader."

Except to a limited degree—Boeing had tentatively

explored the "brand name" technique with its pre-war Stratoliner—no aircraft manufacturer ever before attempted to create full-scale ticket-buyer support. And Lockheed enjoyed another advantage—previous promotion of both its company name and the Constellation had, according to a consumer survey, made the plane the fourth best known aircraft of any type, "by far" the best known transport name.

Launched in February 1946, the advertising program added momentum to the favorable reputation the Model 049 had already gained through record flights and the fact that it was the first to offer postwar luxury service. The campaign helped implant the idea of Constellation superiority at the actual point of sale—the airline ticket offices, travel agencies, and hotel accommodation desks. A survey made at the time revealed 40 to 65 per cent of flight reservation requests specified seats on Constellations.

Connies Fly High

Hurdles lay ahead of the Constellations. But they established new standards of luxury postwar air travel and set new speed records on each airline route they flew. They were to earn an enviable reputation as the proudest of Lockheed's Winged Stars. And in military and civilian versions they were to bring the company nearly \$1.5 billion in sales income in the first 12 postwar years through 1957. That amount is 43 times the value of all Lockheed's earlier transport sales, including Model 10 Electras, Model 14s, and Lode-stars. Fittingly enough, it was a Constellation, completed in January 1946, that marked the 20,000th all metal aircraft Lockheed had built in the 12 years since the original Electra first flew.

"Созвездие" КОМПАНИИ «ЛОКХИД»

Транспортный самолет «Созвездие» компании «Локхид» является новейшим продуктом в истории авиационной техники и представляет собой турбореактивный самолет. Этот самолет не только обладает высокой скоростью, но и способен перевозить большое количество пассажиров и грузов. Он является идеальным средством для международных перевозок и для доставки почты. «Созвездие» компании «Локхид» является самым быстрым и комфортабельным самолетом для международных перевозок. Он способен совершать длительные полеты на высоте 30 000 футов. Этот самолет является идеальным средством для доставки почты и для перевозки пассажиров. Он является самым быстрым и комфортабельным самолетом для международных перевозок.

Global sales effort for Connie included brochure printed in Russian (above) and 1946 plant tour by airmen from Soviet.



The famous Lockheed Constellation

Now you can fly in the famous Lockheed

CONSTITUTION

Hours quicker, Coast-to-Coast, Europe, So. America!

"Brand name" drive to stimulate public demand for flights on Constellations included displays at airline offices (above), full page advertisements in national magazines.

Another production bulwark that enabled Lockheed to retain hundreds of skilled craftsmen who otherwise might have been laid off during postwar reconversion was the P-80 Shooting Star. Its development is a saga as exciting as any in Lockheed history.

Jet Age Forecast

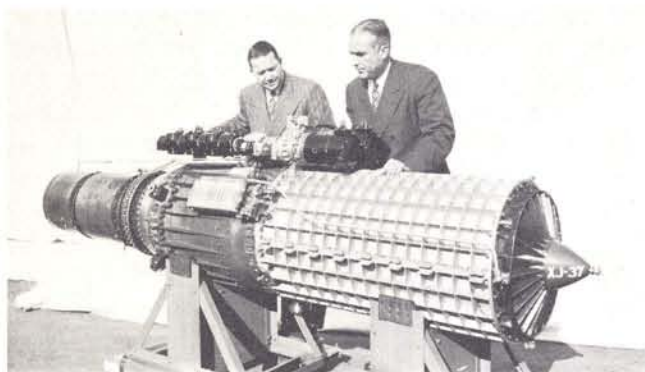
Lockheed's interest in jets had started as early as 1939 when Engineers Hall L. Hibbard, C. J. Johnson, and others realized the piston engine would eventually become obsolete as a power plant for military fighters. They did not know of the work of Germany's Dr. Ernst Heinkel, whose first turbojet monoplane flew secretly in August of that year, or of progress by England's jet engine designer, Frank Whittle.

In 1940 Nathan Price, a Lockheed engineer, drew the assignment of designing a turbojet engine. Two years later the power plant was patented, and Lockheed still collects royalties from some patents. Nearly a decade ahead of its time, it pioneered three important advances—first two-spool jet, first with afterburner, first to incorporate high compression.

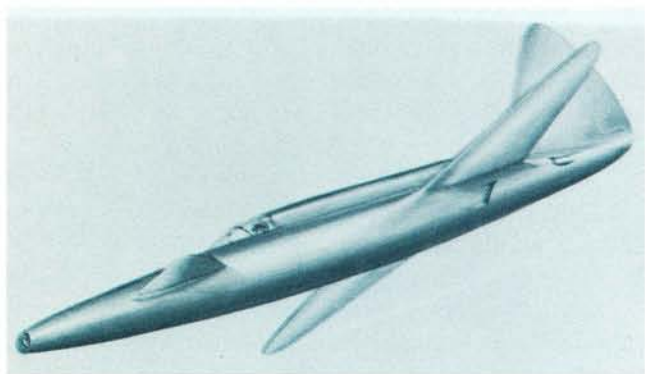
Lockheed immediately began work on a jet airframe, the L-133—a radical design of stainless steel—to incorporate its L-1000 engine, and proposed it to the Air Force as a high speed interceptor. But the military turned it down.

"The Army was very stern with us," Gross recalled. "It told us our double responsibility lay in turning out the P-38 and B-17, which the military regarded as the two great workhorses of the war."

The Jet Age...and Lulu-Belle



Lockheed Engineer Nathan Price, shown at right with Hall Hibbard, started turbojet engine design in 1940.



Lockheed proposed its L-133, a pioneer in U.S. jet design, early in World War II. Air Force decided against it.



Don Palmer (left), Kelly Johnson, Art Viereck of XP-80 project hovered over the plane during rapid assembly.

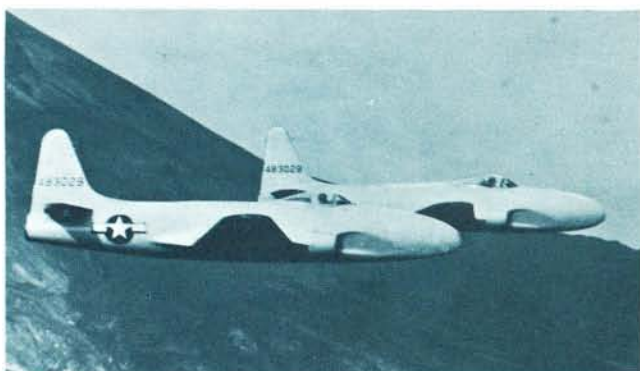
The military wanted jets, so Kelly Johnson designed the Shooting Star in 1943. But Lockheed's interest in jet propulsion began years before Pearl Harbor.



P-80 won plaudits at 1945 press preview attended by Test Pilot Tony LeVier (left) and Courtlandt S. Gross.



Before World War II ended, P-80s (foreground), P-38 Lightnings streamed down paralleling assembly lines.



Two P-80s flying over Mt. Vesuvius went to Italy in war's last months to show Allies jets were on the way.

Whine of jet engine sounded start of new aviation era when Lulu-Belle had maiden flight on January 8, 1944.



Sleek, deadly Shooting Star rapidly became nation's top fighter, remained in production for five full years.



That halted Lockheed's jet development work for a time. But by 1943 the company was back in the jet business—for good. In June that year Johnson learned of flight tests of the Bell P-59 Airacomet, powered by a Whittle-designed jet engine. But P-59 performance was only slightly better than piston-engine P-38s and P-51s. Johnson was afire with enthusiasm when Wright Field asked Lockheed to put a fighter airframe around a new British De Havilland jet engine, the H-1 Goblin.

Johnson rushed to Gross and Hibbard. "I've worked out some figures," he said. "I think we can have something flying in 180 days."

All three knew such a time limit was brutal. But there was only brief discussion before Gross nodded agreement. "It's your baby, Kelly," he said. "We'll give you all the help we can"

Within a week Johnson was at Wright Field with sketches and pages of specifications. General H. H.

numbered 128. The men worked 10 hours six days a week and sneaked in on Sundays against Johnson's strict orders. On the 139th day the airplane was at Muroc Dry Lake, now Edwards Air Force Base, ready to begin engine tests. On the 143rd day the Air Force accepted the XP-80 as ready for flight.

Lockheed had beaten its man-killing 180-day schedule by 37 days. It had used less than one third of the time normally needed to develop even a conventional plane from drawing board to flight.

But on final runup on November 15, 1943, the engine compressor housing cracked. Not for seven long weeks could another Goblin, flown in from England, be installed.

Lulu-Belle Proves Herself

On the brisk morning of January 8, 1944, the late Milo Burcham, then chief engineering test pilot, climbed into the cockpit. The plane—nicknamed *Lulu-Belle* by a mechanic—had a 37-foot wing span and weighed 6200 pounds empty. Its design was simple and clean.

Johnson's last-minute instructions were brief. "Just fly her, Milo," he said. "Treat her nice—and find out if she's a lady or a witch."

After one short flight Burcham landed for a minor adjustment. Then *Lulu-Belle* took off again. Making one low pass across the field, she whistled up out of sight.

Test Pilot Tony LeVier, now California Division director of flying operations, was among the anxious observers.

"Pretty soon we saw a tiny speck at the horizon," he recalled. "Before we had time for another thought, that speck was a full-sized airplane that roared over us with a swish that became a green blur and disappeared. We were jumping up and down. Kelly Johnson and some of the others were crying unashamedly. We knew we'd done it."

A New Sound Sensation

When the plane's trailing roar hit the spectators, it was, in Johnson's words, "a blast of sound that surrounded us without seeming to originate anywhere. It was a new sensation."

Burcham's comment when he landed after that first flight was to the point.

"What an airplane!" he said.

Watching Air Force officers agreed. They called for more jets—this time with a more powerful General Electric engine that packed more thrust and required a beefed-up airframe.

In 132 days Lockheed's engineering experimental group whipped out an XP-80A prototype called the *Gray Ghost*. Heavier and with a slightly bigger wing

Sky Streak

In early postwar years P-80s toppled speed marks. One flew west-east (top) in 1946 in 4 hours, 13 minutes. Next year another (lower photo) returned world record to the U.S. for first time in 24 years at 623.8 mph.

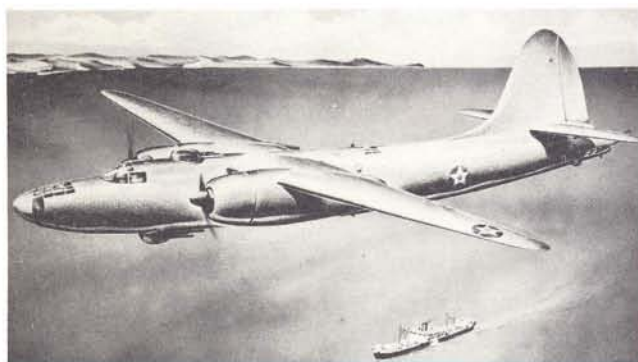


(Hap) Arnold approved. And the race against the 180-day schedule began.

The XP-80 went together in utmost secrecy in a ramshackle canvas-and-packing-case lean-to near the wind tunnel at what is now the California Division's Factory B-1. Johnson chose as assistant project engineers W. P. Ralston, later project engineer on the F-104, and Don Palmer, now assistant project engineer on that supersonic jet fighter. Art Viereck, then as now head of the engineering experimental division, supervised the shop. At peak the picked crew

Navy's Neptune

Better than ever after 12 years
is famed Lockheed P2V.



As roughed out by preliminary designers in 1941, the original P2V looked like this.



On its first flight in May 1945 prototype XP2V-1 revealed outstanding stability.



Late Mac Short (left) nurtured Neptune. At right, P2V-6 had "snap-on" jet pods.



Neptune wrote history in 1948 as biggest plane yet to make takeoff from a carrier.



With enlarged cockpit, "stinger" tail, new P2V-7 illustrates design progress.



Lockheed Aircraft Service fitted P2Vs with skis for 1957-58 Antarctic explorations.

span, the XP-80A exceeded *Lulu-Belle's* 502 mph top speed by a generous 80 mph. It clawed skyward to its service ceiling of 39,500 feet at a blistering 7000 feet per minute.

The *Gray Ghost* first flew in June 1944 with LeVier at the controls. Immediately the Air Force placed an initial order for 13, called the YP-80A. Lockheed assigned Harvey Christen, now Georgia Division director of quality control, as production superintendent. He began operations in a room about the size of a large closet—a factory within a factory—and Lockheed quickly prepared for all-out production.

Gross picked its appropriate name of Shooting Star. Disdaining false modesty in favor of the truth, he called it "the finest airplane of its type in the world" and predicted it would be "bought in peace as well as war because it is the best." Hibbard predicted—also correctly—it would "open new horizons in avia-

The Constitution... MODEL 89 WAS SKY COLOSSUS OF ITS DAY



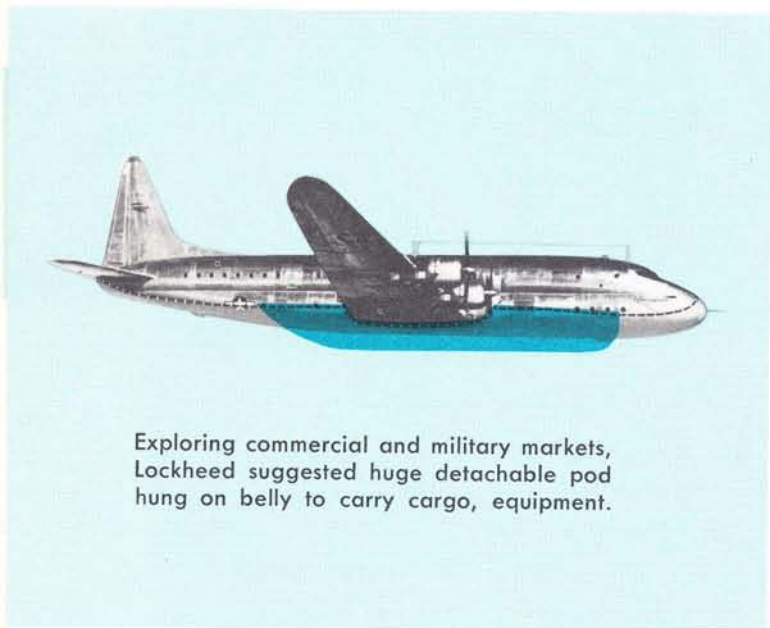
Six JATO bottles installed in Model 89's wing roots boosted mammoth plane's rate of climb.



Constitution's upper deck was reached by staircase (center).



Full Navy crew, 180 men, lined up to show airplane's capacity.



Exploring commercial and military markets, Lockheed suggested huge detachable pod hung on belly to carry cargo, equipment.



Constitution was star attraction for Lockheed employees at 1948 open house (above). At left, six-story hangar built for Model 89 assembly work dwarfed giant plane.

tion." One national magazine appraised it as "the most exciting aircraft development since Kitty Hawk." As to its ease of flying, veteran Test Pilot Herman ("Fish") Salmon summed up: "I push my throttle ahead and I go. I pull it back and I don't. It couldn't be much simpler than that."

But when LeVier hailed it as "a great airplane because there's practically nothing wrong with it" he wasn't quite accurate. He was seriously injured when an engine turbine wheel split and ripped off the tail, forcing him to bail out. Burcham, one of aviation's great test pilots, died in a crash when the fuel system failed. And although engineers installed an emergency fuel system, Major Richard Bong, America's leading ace in World War II, went to his death when he forgot to switch on the auxiliary system and his engine quit shortly after takeoff.

As the air war in Europe got hotter, Lockheed began tooling for mass production of Shooting Stars, and North American started second-source tooling in Kansas City. Total output was to be 30 a day. The Air Force shipped four overseas to demonstrate to Allied flyers that planes capable of outperforming Germany's new Messerschmitt, Heinkel, Arado, and other jets were on the way.

Shooting Star Writes History

But the Shooting Star never saw combat in World War II. Nazi military might collapsed when Allied ground forces overran Germany in early months of 1945.

In peacetime the Shooting Star added pages to jet history. After V-J Day production of most military models halted abruptly, but not the P-80. It took up where the P-38 left off, and went into postwar service as first of the Air Force's growing all-jet fighter force.

In January 1946 Colonel William H. Council of

Wright Field lifted a Shooting Star off the runway at Long Beach and streaked east. Four hours and 13 minutes later he set down before amazed newspapermen at La Guardia Field, New York, with a new nonstop transcontinental speed record—a mark that remained unchallenged for seven years. His P-80 traveled 2470 miles at an average of 584 mph.

Record after record fell to Shooting Stars. In the 1946 National Air Races at Cleveland Major Gus Lundquist flew one over a 180-mile course at an average speed of 516 mph and won the jet division event. Another covered the 361 airline miles between San Francisco and Los Angeles in a shade over 42 minutes. Still another hurtled from Los Angeles to San Diego in 10 minutes. In 1947 a stripped-down P-80 nicknamed *Racey* brought the world's speed record back to the U.S. for the first time in 23 years when Colonel Albert Boyd averaged 623.8 mph over a measured course at Muroc.

The jet age had arrived. It was ushered in on the glistening wings of the Shooting Star, an airplane that brought \$213 million from deliveries of nearly 1700 units. It mothered a whole family based on its original design that kept production lines humming more than 13 years.

Along Comes the Neptune

Third member of Lockheed's postwar team of breadwinners was the P2V Neptune, named after the mythological sea god. On the day before Pearl Harbor came the first work order. As submarine hunter-killer planes P2Vs have remained in steady production for a dozen years, a record unmatched by any other aircraft.

Like the Constellation and Shooting Star, the P2V enabled Lockheed to keep on the payroll hundreds who might otherwise have lost their jobs in the reconversion period after World War II.

Although no one man deserves exclusive credit for

the Neptune's success, Lockheed management and design engineers are quick to agree it would never have materialized had it not been for the foresight, persistence, and aggressiveness of the late Mac V. F. Short. In 1941 Short was vice president-engineering of Lockheed's subsidiary Vega. He pursued a simple, straightforward philosophy of airplane design:

"Get out with the customer," he emphasized, "and find out what his problems are. Then try to help him with those problems."

In this case the customer was the Navy. Short learned that for patrol squadrons it needed aircraft with longer range, slower landing speed, and greater armament load. To Jack Wassall, then Vega chief engineer, now California Division director of engineering, Short assigned duties of project engineer on the plane to fulfill those requirements.

Eyes of the Navy

But by then the U.S. was in a shooting war. The Navy wanted planes fast—and it was reluctant to divert its efforts to an untried design it could not obtain immediately in quantity. Short, however, pointed out the necessity for future planning, and the Navy agreed.

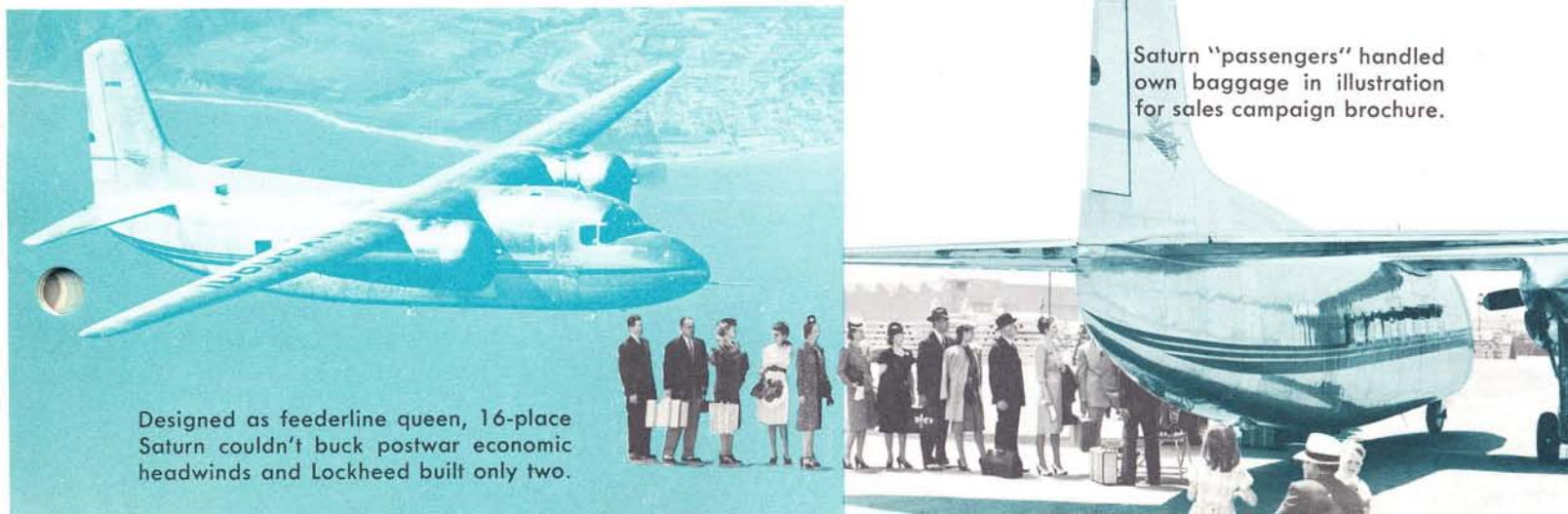
The original Neptune, powered by two 2300-hp Wright Cyclones, had a wing span of 100 feet. It had a top speed of 303 mph, and a 5000-mile nonstop range. It bristled with armament and could carry depth bombs, torpedoes, rockets, or mines. Unescorted, its duties were long-range reconnaissance, rescue, aerial survey, and antisubmarine warning. And it could operate from small unprepared fields, a characteristic vital to the success of its missions.

Because of war production pressure, work on the P2V progressed slowly. Not until May 17, 1945, shortly after V-E Day, did Test Pilot Joe Towle take the XP2V-1 Neptune on its maiden flight. Performance and maneuverability proved excellent.

Airborne Interurban

Designed as feederline queen, 16-place Saturn couldn't buck postwar economic headwinds and Lockheed built only two.

Saturn "passengers" handled own baggage in illustration for sales campaign brochure.



During its development Gross characterized the Neptune as "an airplane that has some stretch to it." He was conservative in his appraisal. Because of soundness of its basic design, the P2V has advanced through seven major versions, each an improvement. From 1944 through 1957 the Navy placed a total of 24 orders with a dollar volume, including spares, of almost \$750 million. Altogether Lockheed has built nearly 900 of them from the XP2V-1 through the P2V-7s. And they serve around the world under the flags of Canada, Australia, Netherlands, Japan, Britain, France, and soon Brazil and Argentina.

While airlines showed keen interest in Constellations, Lockheed pushed ambitious commercial plans for two other transports—the Navy's giant Constitution and the small feeder line Saturn.

Biggest of the Big

Largest transport of its day, the Model 89 Constitution began development in 1942. Pan American Airways, operating Navy transports in the Pacific, wanted a military transport more efficient than flying boats then in use and adaptable for strictly commercial service in peacetime.

The Navy liked the idea so well it ordered two prototypes. Pan American engineers served as consultants, and W. A. Pulver, now Georgia Division assistant chief engineer, was project engineer. Willis Hawkins, then chief of preliminary design, now assistant general manager of Lockheed's Missile Systems Division, headed the Model 89 design team. Herb Von Streain was production superintendent and George H. Prudden, now California Division director of quality control, supervised final assembly.

A four-engine monoplane, the Constitution had a double-deck fuselage shaped in cross-section like a figure eight. That design gave utmost strength for pressurization and provided maximum capacity for 168 passengers and a crew of 12. It was roomy enough to hold a Pullman car, a boxcar, and a flatcar, with space left over for a passenger bus. Wings were so thick that a catwalk enabled crew members to crawl to inboard engines in flight. About the only thing the Constitution could not carry, as things turned out, was its own weight in economic stability.

New Hangar Built

The wing spanned 189 feet and the huge single tail towered 50 feet. So large was the plane that, to build two prototypes, Lockheed constructed a new six-story hangar that pioneered cantilever bridge-type steel girder construction. This is now Building 309 at California Division's Plant B-6.

To power the Constitution engineers selected newly designed 3000-hp Pratt and Whitney engines. They

calculated that with normal development the power plants could increase about 25 per cent in horsepower. On the Model 89's first flight in November 1946 the four engines pulled the plane along at a top speed of 303 mph and cruised at 269 mph.

Departing from the usual Lockheed practice of calling its planes after heavenly bodies, Robert Gross named the craft the Constitution for two reasons. "It seemed fitting," he explained later, "that the largest plane we had yet produced should be named after America's Constitution, a symbol of our nation's greatness and strength. Secondly, there was the Navy ship Constitution—'Old Ironsides'—with its historical interest and naval tradition."

Along with Gross, everybody at Lockheed took immense personal pride in the Model 89. On first flight day nearly 10,000 spectators, most of them employees and their families, gathered to see the air leviathan take off. And other thousands walked

L. K. Schwartz,
now marketing
director in
California
Division, managed
sales team that
penetrated foreign
markets in early
postwar years.



through the plane on Constitution Day in 1948 when it was displayed at an open house.

But the Constitution was too far ahead of available power resources. Its payload, although nearly 35 tons, wasn't enough for a 92-ton airplane. The engines failed to grow as fast as needed. Turboprop engines had not yet materialized. There was no way to boost performance.

"Even if we could have hung bigger engines on it, the Model 89 faced a dim future in the commercial market," Chappellet commented later. "Pan American, although seriously interested at first, reappraised its operations at the end of the war and decided the airplane was too big for immediate traffic needs."

For a time the Navy used the two completed Constitutions as troop transports and on recruiting tours that attracted phenomenal crowds. But the problem of spare parts grew difficult. In 1955 the Navy sold the Model 89s as surplus for \$98,000.

A commercial project that appeared to have bright prospects was the Saturn. Lockheed evolved it as a 16-place, twin-engine, high-wing monoplane in the 225 mph class with a range from 60 up to 600 miles.

That set of specifications did not materialize by accident. Teams of market research analysts and sales engineers in 1944 traveled 22,000 miles in four months. They talked to farmers, merchants, bankers, businessmen, and housewives. They queried regional airline carriers and trunkline operators. They asked questions by the hundreds about postwar air travel, siphoning answers back to Lockheed's management and preliminary design groups.

The result was the Saturn. The sales department proudly told prospective customers the new airplane would "bring air travel to Main Street...and to the world's byways." "Designed to do the big business of the little airline and the little business of the big airline," the publicity releases said about the plane.

Quickly Lockheed obtained conditional sales contracts for nearly 500 with a maximum price tag of \$85,000 each. But they weren't firm orders, and too many obstacles barred the Saturn's path to success.

Squier, who with Leonard K. Schwartz, now California Division director of marketing, conducted the sales survey, admitted later the Saturn was ill-starred almost from the beginning.

"It ran up against one setback after another," he said. "When the war ended, we found ourselves confronted with supplier strikes, tooling troubles, and rising costs. As design progressed the airplane got heavier and more complicated. We had to increase

its price to \$100,000 a copy. And our analysis of the potential market didn't prove out."

That survey had not foreseen other adverse developments. Airport construction lagged in smaller cities where Lockheed had hoped the Saturn would serve profitably. Many regional carriers had little backing and weren't prepared for lean years. There were failures and consolidations. And the biggest handicap of all in this shrinking market was availability of war surplus transports. They could be readily converted to commercial operations, they could be bought for one fourth to one third as much as the Saturn, and they could do the job adequately if not so well. By February 1946 the War Assets Administration reported sales of more than 31,000 aircraft usable in civil aviation—including scores of Lockheed Lodestars.

The Saturn Sinks

The straw that broke the Saturn's back piled on after one prototype first flew in June 1946. Because of its increased weight, engineers concluded more powerful engines would be required for needed improvement in performance. A year later a Saturn with bigger engines flew—but by then it was too late. Management had already decided not to throw more money into the project. And the two Saturn prototypes went to reclamation crews to be chopped up as scrap.

In the first two postwar years 1946-47 Lockheed

BIG



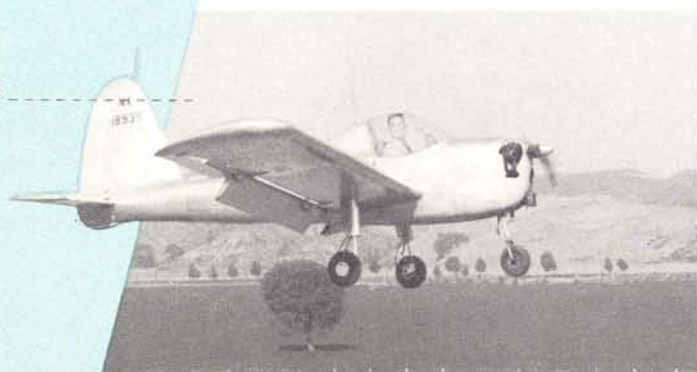
Two-place Big Dipper had clean design, propeller behind tail.



Dipper team included Mac Short (left), Pilot Prentice Cleaves.

The Dippers

LITTLE



Little Dipper puttied along at 40 mph, could hit 100 mph top.



Army envisioned flying cavalry, called midsize plane Airtrooper.

lost \$33 million on the Saturn and other projects, disregarding tax and other credits. But it was not the only aircraft company that found the going tough in the unpredictable reconversion market. Martin, for example, lost \$73 million on two airliner models. On its Convair transports and Stinson private planes Convair lost nearly \$52 million. Douglas lost \$23 million on several designs, including the Super DC-3 and a commercial version of its "Mixmaster" bomber, a twin-engine pusher. Boeing wrote off a \$14 million loss on the Model 417, a feederline transport, and the long range Stratocruiser. Northrop was unable to stimulate commercial interest in the Pioneer, a trimotor transport. And a Curtiss-Wright design, the CW-32, a large cargo craft, failed to develop beyond mockup stage.

Another plane that grew out of Mac Short's wartime special projects groups was the one-place Airtrooper, developed from a design conceived by John Thorp, then a Lockheed engineer. Envisioning an aerial cavalry in which every trooper would have his own flying mount, the Army ordered two prototypes. By "locust-swarming" attacks Airtroopers would be able to take almost any strong point through sheer numbers and maneuverability.

Airtrooper Performs Well

Powered by a 50-hp two-cylinder aircooled engine, the Airtrooper first flew late in 1944. Every pilot who handled it praised the plane's outstanding performance. It was airborne within 100 feet, climbed 800 feet a minute, had top speed of 100 mph, cruised at 90, and landed easily within 75 feet. With an empty weight of 425 pounds and a 25-foot wing span, the craft was, in the opinion of almost everyone who viewed it, "the cutest little airplane we've ever seen."

As the war drew to a close, the Army wrote off its plans for a flying cavalry. But Lockheed officials didn't forget the Airtrooper. For many years Robert Gross had talked somewhat wistfully about the "little" airplane. "The airplane for everybody," he had called it. "The little one that can get in anywhere and get out

of anywhere—that can be made and sold by the hundreds, by the thousands, and some day by the millions."

Enthusiastically management and sales officials turned to the Airtrooper as the answer to market surveys that for a time indicated tens of thousands of pilots and other servicemen who gained a liking for flying during the war would demand their own peacetime airplanes. Gross even proposed the plane be called the Little Dipper and it was so appropriate that the name stuck.

But when war ended, Gross again carefully reviewed the craft's prospects and shook his head regretfully.

"The Little Dipper is good," he decided, "but it won't satisfy the needs of the average man. There just isn't the mass market we must have for profitable production." Besides, he predicted, the zooming popularity of light aircraft in immediate postwar months would level off within two years.

Marketing Prospects Fade

History proved him right. The light plane market, also glutted by war surplus trainers, dropped dead in 1947. Exponents of "a hangar with every home" found their dreams punctured. Most families had no real need for personal air transportation. Their Ford sedans were, for normal purposes, more practical and convenient.

To justify writing off the project as an investment loss the flying model of the Little Dipper and a partially completed second prototype had to be destroyed.

"We cried tears as big as billiard balls," said one of the experimental mechanics, "when those two little airplanes were chopped up and sold as scrap."

Another plane actually through before it flew was Lockheed's Model 34, the Big Dipper. Thorp worked out the design under supervision of Robert Reedy, then chief project engineer, now California Division sales engineering manager. The two-place Big Dipper shaped up as a "flying jeep" for the military or as a "flying automobile" for civilians.

Lockheed scheduled the Big Dipper as basically a

Service

From modest start in mid-1930s, service organization grew rapidly in war years. During postwar era it has become increasingly important factor in Lockheed operations.

Lockheed established Eire base at Shannon in 1946 to service Constellations for Irish airline, had plans for global network.

Early postwar headquarters for service operations in east was Long Island's MacArthur Field. Base later moved to Idlewild.



research project incorporating advanced design ideas. The prototype hung close to the ground so passengers could step into it as easily as into a car. It featured fixed tricycle landing gear, an all-movable horizontal stabilizer, and a 100-hp Continental engine buried in the mid-fuselage. A rigid driveshaft ran aft to the propeller, located behind the tail.

On its first flight in December 1945 the Model 34 cruised comfortably at 119 mph and hit a top of 136 mph. Thorp and Reedy designed the clean-lined low-wing monoplane for a 16,000-foot service ceiling. Test Pilot Prentice Cleaves called the craft "an aerodynamic dream" that needed only one simple fix to eliminate a bad stall characteristic. But before that fix was made the Big Dipper stalled on takeoff at Lockheed Air Terminal early in 1946. With the crack-up the company closed the books, at least for a time, on its personal plane proposals.

Lockheed was not alone among airframe manufacturers in exploring the light plane market. From other companies came designs that progressed to the production stage. For example, North American entered the field in 1946 with its Navion. But within a year it wrote off an \$8 million loss and sold design and manufacturing rights to Ryan. And shortly after war ended Republic marketed the Seabee, a four-place amphibian, but discontinued its manufacture in 1947.

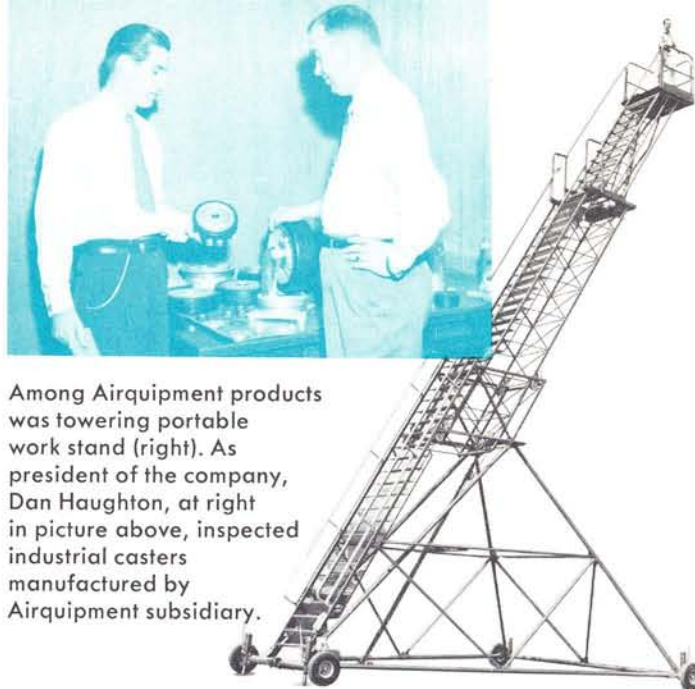
New Service Concept

In early postwar months Lockheed explored many other avenues—and even peered up and down a by-way or two—in efforts to cushion the period of transition back to peacetime operations.

With a sharp eye on additional revenue sources to supplement sales of Constellations, Shooting Stars, and Neptunes, the company remembered that modification, repair, spare parts sales, and customer service—all integral phases of operations since the 1930s—had expanded phenomenally in wartime. Among Lockheed's first moves after V-J Day was to resume production of spare parts for its transports. And management decided that by establishing a chain of major overhaul stations and parts warehouses scattered strategically throughout the world the company could help airlines reduce spares inventories and capital investment in maintenance.

It was a good idea—but at first it didn't work.

In the spring of 1946 two such service bases—one in Linden, New Jersey, another at Shannon Airport near Limerick in Eire—began operations. But Lockheed quickly found it advisable to move the Linden facility to MacArthur Field on Long Island. Then it had to move again—this time because the international airport at Idlewild began operations earlier than expected. When Lockheed's airline customers moved there the service base had to go with them.



Among Airquipment products was towering portable work stand (right). As president of the company, Dan Haughton, at right in picture above, inspected industrial casters manufactured by Airquipment subsidiary.

At Shannon the operation proved unprofitable. Lockheed contracted to service Constellations intended for trans-Atlantic schedules by Aer Linte Eirann. But Irish politics came into the picture. A new government tabled the proposed ocean flights. Subsequently British Overseas Airways bought the Constellations.

These were dismaying developments—particularly the MacArthur operation, which ended in a loss of \$750,000. But Lockheed didn't try to sweep the unfortunate results under the rug and forget them. Instead it backed up for a fresh start.

The two bases at first confined their repair work to Lockheed planes. But the company recalled that during the war its British reassembly division, Lockheed Overseas Corporation, and Dallas and Van Nuys modification centers worked profitably on thousands of aircraft made by other companies. Why couldn't the same diversified program be practiced with equal success in peacetime?

Lockheed Aircraft Service Formed

No logical argument against that idea appeared. So at the end of 1946 Lockheed took a far-reaching step to broaden scope of its service work by establishing Lockheed Aircraft Service as a separate but wholly-owned subsidiary. Chappellet became president, Robert Gross was chairman of the board, and J. Kenneth Hull—now LAS president—was vice president and general manager.

Creation of LAS was the first such move by any U.S. aircraft company. It opened the way for millions of dollars' worth of business that Lockheed otherwise could not have gotten. Since its formation LAS has accounted for sales of more than \$300 million. About 40 per cent of this revenue has come from work on airplanes bearing other companies' nameplates.

Another sally into the realm of diversification came

in October 1945 with formation of the subsidiary Airquipment Company to engineer, design, and merchandise ground handling equipment for airlines, airports, and private plane owners. It operated another subsidiary, Aerol Company, to make industrial wheels and casters.

But sales of Airquipment and Aerol products did not grow as rapidly as expected. And by 1951 Lockheed was again deeply involved in national defense work as a result of the outbreak of hostilities in Korea. So to help free Lockheed's management to take on those added responsibilities, the company sold Airquipment in June 1951 to the Weber Showcase and Fixture Company. It sold Aerol separately.

"Gold Plate" Constellation

While Lockheed was busy selling Model 049 Constellations to equipment-starved airlines at the end of World War II, engineers hustled development of a luxurious new version, the Model 649. This was the company's payoff plane—one that would provide unsurpassed luxury through deluxe air conditioning, super soundproofing, and other passenger comfort items. So luxurious were the specifications that the Model 649 quickly earned the nickname "Gold Plate."

Production planners hoped that Model 049 assembly could be telescoped into output of the later Constellation, enabling the company to retain its work force during the model changeover. By February 1946 Lockheed officers realized they couldn't make such a transition schedule work.

Lockheed's reconversion was "way ahead" of the rest of the nation, Courtlandt Gross pointed out at the time. Strikes and other causes created shortages



Stressing luxury and safety of new Model 649 "Gold Plate" Constellation, 1946 advertisement quoted Eastern Air Lines' Eddie Rickenbacker after that carrier placed large order.

of purchased parts and materials, delayed production programs, and "seriously impeded" company planning. Another contributing factor was the decision to install more and greater improvements in the Model 649 than originally contemplated.

These complications, plus an aggressive program to reduce overhead and improve efficiency, resulted in layoffs for about 4700 early in 1946, cutting the work force to about 28,000. And Robert Gross reported to shareholders late in April that the number of Constellations delivered in 1946 would "inevitably" be less than originally planned.

In eight months since V-J Day Lockheed delivered 37 Model 049s, and the backlog stood at almost \$200 million. But Gross foresaw keen competition for greatly reduced postwar markets and predicted the next few years would be "difficult and crucial ones."

That summation was accurate in all but one respect.

For Lockheed the "difficult and crucial" times were only weeks away—not years.

Coming Next Month / AN AFFAIR WITH CONNIE

In those early postwar years the U.S. economy boomed. Loaded with defense bonds and cash they couldn't spend during the war, the public in a buying frenzy turned in their weary prewar jalopies on shiny new automobiles. Television sets, dishwashers, garbage disposers, and scores of other appliances and goods on which production had halted during the war flooded the markets to fill the pent-up demand. New houses and huge subdivisions sprouted.

Prices and wages spiraled in an inflationary spree. These were times of full employment and a postwar prosperity that caught napping scores of economists and other experts who had predicted joblessness, uncertainty, and gloom during the conversion period.

But for aviation the postwar years were lean. Predictions of skyrocketing air travel and private flying fell flat. Commercial and personal flying did rise, but slowly rather than sharply. Military buying all but collapsed.

Lockheed led the airframe industry in sales for three

consecutive postwar years. Yet not until 1948 could the company report profitable operations. While globe-girdling salesmen brought in a trickle of orders for Constellations, designers redoubled efforts to develop new military models and began their first work on missiles.

Then came the presidential and Congressional probes of the nation's air weakness. And the Berlin blockade that left only the skyways open for the free nations to supply one of the world's great cities.

Air power demonstrated its value anew throughout the years of the cold war. And it threw up a shield of winged might when hostilities, flaring in Korea, brought the threat of a third world conflict.

How Lockheed pushed forward during those years of turmoil, tension, and thrill is told in the next chapter of our *Of Men and Stars* series. Watch for it next month at your gate boxes. And if your set of earlier chapters isn't complete, call your division public relations office.