You can certainly tell who was promoting air-rail service in this poster, and it wasn’t the airline! Stressing safety and comfort, marketing men at the railroad knew their potential customers still considered flying to be a dangerous undertaking and played to that fear. The blue areas represented the overnight rail service portions of the trip.

Whether they knew it or not, the railroad men of PRR were actually building an airline system from New York to Los Angeles and beginning the process of putting themselves out of business. Again, the blue sections of the route were by train, which were supplanted by round-the-clock air service as aids to night flying became reliable and plentiful. Note the near proximity to the Western Air Express (WAE, later Western Airlines) route system starting at Kansas City and going west. This overlap was not lost on the central planners of the Post Office Department in Washington, DC. See page 19. (Map by Craig Kodera)

An eager crowd at Glendale stands by to see Lucky Lindy pilot the first flight of TAT’s coast-to-coast service. In those days, crowd control was not nearly what it is today. (Photo Courtesy Museum of Flying Collection)

Charles Lindbergh is surrounded by TAT and PRR execs prior to first route-proving flights in the Ford. Best guess is William Atterbury, PRR president, standing just to Lindy’s right. It’s easy to see why the famed aviator was nicknamed “Slim.” Note the corrugated metal construction of the Ford Trimotor (Stout). (Photo Courtesy Smithsonian National Air and Space Museum 92-3117)
Flying was exciting in the roaring 1920s. These two young ladies have exuberant expectation and perhaps a little terror written all over their faces. The Colonial Airlines Ford Trimotor is heading from New York to Boston for a weekend frolic in the Bay City. In aviation’s early days, an airport was referred to as a “landing field” or “airfield.” Judging by the surface beneath the ladies’ feet, you can guess why such names were appropriate. Note the wicker seats.

Is that all there is to the Ford cockpit? Yes, with the exception of engine instruments located on the landing gear/engine strut just outside the pilots’ windows. Automotive and marine industrial design elements can be seen in the layout of this control cabin.

In all its turn-of-the-century luxury, this restored Ford interior provides an understanding of the appointments and ambiance of flying in a TAT trimotor. Note the wood paneling and individual sconce light fixtures above the seats. This configuration is actually a bit later in the airplane’s life as the seats are metal buckets with leather backs and seat cushions. Original delivery outfitting used wicker seats! (Copyright by David Schultz)

This poor-quality vintage photo shows in-flight mealtime aboard a TAT airliner: finger sandwiches, a relish side, a fruit cup, and a glass of milk. Note that all the place setting items were china, silver, and glass laid on linen tablecloths. Heaven knows where the steward kept all this in such a tiny airplane! Look too at the inlaid wood wall paneling, sconce fixtures, and curtains (also shown in the restoration). Noise levels were nearly deafening, however.
This diagram of the standard valve drive for a radial engine illustrates how the crankshaft powers a cam reduction gear, which drives the cam ring. Roller tappets ride tracks on the cam ring. Lobs on the track lift the tappet, which lifts the pushrod that actuates the valve via a rocker arm.

Designed by George Mead, the R-1 was the first radial engine built by Wright and the first high-power radial built in the United States. The engine’s four valves per cylinder and general layout resembled that of the British Bristol (Cosmos) Jupiter, which was first run in 1918. (Photo Courtesy Aircraft Engine Historical Society)

Sam Heron and Edward Jones incorporated many refinements into the Wright J-5. Unlike the J-4, the J-5’s valves were enclosed, and the basic cylinder shape and cylinder cooling fins exhibited a more sophisticated design. (Photo Courtesy Aircraft Engine Historical Society)
The next logical step for the world of air travel was the Douglas DC-1 (Douglas Commercial number one). This is the airplane that Jack Frye wanted, and it did not disappoint.

The DC-1 was a “flying laboratory” prototype airliner. The production version was actually the DC-2. Several refinements and a one-window fuselage stretch, and the airplane was ready for revenue service. This is a company cutaway highlighting everything from the capacious fuselage cabin to steam heating to reclining lounge chairs; all the comforts of home! (Photo Courtesy Mike Machat Collection)

TWA flew the airplane in all types of route-proving trials, and here is the ship sitting at Grand Central Air Terminal on its way east to New York via Kansas City. Fans of Buck Rogers will admit that this revolutionary airplane design might as well have come from outer space. Remember, this was mid-1933, a scant 15 years after the Great War with its strut-and-wire biplanes and coincident with the last gasp of the old days, the Curtiss Condor. (Photo Courtesy Museum of Flying Collection)
Carburetors had three settings: Auto Rich, Auto Lean, and Idle Cutoff. Takeoffs and climbs were performed in Auto Rich while cruise flight used Auto Lean. Incidentally, DC-3 carbs didn’t offer a method of manually leaning mixtures. The Wright R-1820s consumed more fuel per hour than the P&Ws, so a 10-percent increase was added to the P&W fuel-burn charts when pilots calculated fuel.

The maximum number of hours pilots could fly each month was 100 along with a maximum of 1,000 hours per calendar year. To achieve the maximum number of hours out of the pilots as well as the DC-3’s engines, Trans West had the pilots come close to the 1,000-hour maximum. Along with that, the pilot experience was, for the most part, flying all night or night weather time without autopilots.

Although I had developed a fondness for P&W engines before joining TransWest, it was obvious that the Wright Cyclone engines were more powerful. Granted, they didn’t run as smoothly as the 14-cylinder Pratts, and with only 9 cylinders each, the Wrights couldn’t compete for smoothness. Still, they had fewer moving parts to fail, so it was a trade-off, and the freight never complained about the ride.
Presenting the Ship as an Airplane

The 314 absolutely dwarfs visitors surrounding it on Treasure Island during an open house event. This is California Clipper, just prior to her adventure.

Built expressly for Pan American by Pan American, the Marine Air Terminal at the new LaGuardia airport in New York was a tour de force in its interior design and embellishments. Huge murals paid for by the Works Project Administration (WPA) were painted all along the upper portions of the walls, soaring to 25 feet. As with all PAA terminals, the omnipresent giant globe of the earth was smack in the middle of the rotunda. The building is used to this day for Delta’s East Coast shuttle between Washington, DC, New York, and Boston.

Pan American and the world it made.
This extremely rare shot of the Boeing 307A in color is TWA’s highly polished NC19905 at Chicago’s Midway airport on 10 October 1941. Notice the lineup of DC-3s behind the Stratoliner. Less than two months later, America was at war and the 307 was conscripted to military service, its luxury interior stripped. (Photo Courtesy Charles W. Cushman Collection, Indiana University)

Artist’s rendering of the TWA 307’s interior. What is striking about the 307 was its compartmentalized use of space. The airplane was not just a tube with seats in it, but rather more like a flying boat, cruise liner, or even one’s living room.

This promotional package sent to regular TWA customers included a multipage color spread in Collier’s magazine and postcards filled with corporate copy extolling the virtues of the airplane. Make no mistake about the significance of this aircraft in passenger service: The first pressurized cabin in the United States was a very big deal indeed, a fact not lost on the average passenger of the time.
to receive Constellations and flew seven airframes until 1950 when PAA acquired the division from American Airlines. This is NC90922, Flagship Copenhagen.

Modern airliner cockpit in 1945. Compare this collection of crowded instrumentation and levers, knobs, and switches to the Ford Trimotor in chapter 1. How far cockpit design had progressed, and yet, note the two small trays with cheesecloth over them atop the glare shield. I flew with a pilot who had many hours aboard early Constellations, and who made the point that these were reservoirs for alcohol that would be ignited by the crew with matches to defrost the windshield!

Airline business, and each successive step forward allowed one carrier to up the ante for the entire industry. Indeed, airplane order books were based upon this “firstest with the mostest” mentality, with the next biggest and best “thing” driving the tone and tenor of design shops everywhere.

In 1945–1946, it became possible to completely cross the United States, coast to coast, in a little more than the number of hours in a business day. On the Connie, it was 9 hours 15 minutes eastbound. Yes, there was a stop in the middle of the country (Kansas City for TWA, Chicago for United, or Fort Worth for American), but nevertheless, with the new Constellation and its slower counterpart the DC-4, businessmen were now unshackled to move about the country unimpeded and build the new postwar society. Air transportation was finally legitimate.
1) Oil transfer bearing ring carrier, 2) oil transfer bearing, 3) oil transfer bearing rings, 4) governor drive shaft gear, 5) reduction drive gear outer coupling, 6) spark advance control valve, 7) crankcase oil pressure line, 8) crankshaft front counterweight, 9) D-row master rod assembly, 10) cam small drive gear, 11) cam large drive gear, 12) crankshaft center main bearing, 13) crankshaft oil slinger, 14) B-row link rod, 15) inlet valve pushrod, 16) inlet valve rocker, 17) crankshaft, 18) inlet valve springs, 19) inlet valve, 20) piston pin, 21) piston and rings, 22) pushrod cover, 23) impeller drive damper, 24) impeller intermediate drive, 25) impeller and shaft assembly, 26) accessory drive shaft, 27) impeller shaft rear rings breather, 28) fuel feed valve, 29) tach drive gear, 30) fuel pump drive gear, 31) fuel pump intermediate drive, 32) rear oil distributor ring, 33) starter drive gear, 34) generator or accessory drive gear, 35) rear accessory drive gear, 36) rear accessory drive oil pressure reducing valve, 37) pressure oil strainer, 38) collector case oil pump, 39) crankcase scavenge oil line, 40) crankcase scavenger oil pump, 41) exhaust valve rocker, 42) exhaust valve springs, 43) exhaust valve, 44) C-row master rod, 45) cam drive gear, 46) cam, 47) exhaust port flanged coupling, 48) magneto intermediate drive gear, 49) propeller shaft reduction drive gear, 50) front accessory drive gear, 51) torquemeter pump, 52) front power section scavenge pump, 53) spacer section, 54) front section scavenge pump, 55) propeller shaft ball bearing, 56) propeller shaft roller bearing, 57) thrust cover, 58) propeller shaft thrust nut, 59) propeller oil feed tube, 60) propeller shaft reduction drive fixed gear, 61) torquemeter oil pressure transmitter, 62) magneto drive shaft, 63) spark advance oil feed tube, 64) magneto drive fixed gear, 65) spark advance cylinder, 66) propeller shaft, 67) magneto drive gear, 68) torquemeter master piston, 69) torquemeter oil pressure relief valve, 70) propeller shaft reduction pinion support, and 71) propeller shaft reduction pinion. (Photo Courtesy Overhaul Manual Wasp Major Models B6 and CB2, December 1957)
stopped at Chicago, Denver, or Dallas; TWA stopped at Albuquerque or Kansas City. And so, without the Rainbow to provide jet-speed travel, flying was still an all-day affair.

Each of the crosstown rivals had its attributes and detractions, but when it came to the bottom line, of the two original airframes, the Douglas airplane was the final winner. The Constellation looked shapely and beautiful, but all that beauty came at a price: The curvaceous fuselage and nacelles were more difficult to manufacture and took longer to assemble at the factory. The DC-6 had a virtually constant section cylindrical fuselage that provided consistent seating arrangements for its passengers and proved easy to stretch. But most important, it was all about the engines, again.

The Connie’s Wright Duplex engines were temperamental and nettlesome to maintain and service. The DC-6 used the marvelous Double Wasp. Operational economics, which included maintenance and reliability, were measurably better for the DC-6 than the Constellation. So, although the Lockheed was a showstopper in looks, the solid and reliable Douglas airliner carried the day within the airline industry.

**A candid shot shows busy American Airlines mechanics tuning a DC-6’s R-2800 engine.** This is one of the original DC-6s delivered with sleeping accommodations. Note the series of small sleeper berth windows above the main window line.
All of this advancing and pioneering by Douglas and Lockheed may very well have gotten ahead of itself once the proof of the pudding was at hand in everyday airline service. Both airplanes suffered difficulties, some normal teething for advanced airframes such as these, others were the result of enlarging the envelope, and still others were perhaps due to a bit of rapid zeal to meet the postwar market. Regardless, problems had to be addressed.

At Lockheed, the Constellation was having some major difficulties with its Wright engines and inflight fires thereof, the old problem from B-29 and C-69 days. Two problems were
Brand spankin’ new DC-6B on the ramp at Santa Monica. This airplane became the backbone for the airline industry and outlasted all other propliners in mainline airline use. (Photo Courtesy Mike Machat)

Western Air Lines used the DC-6B as its core airplane for years until the 707 and Electra arrived. This was the mid-1950s paint scheme, which fit this airplane like a glove. The light color on the top of all Western airplanes was not white, but rather an ivory or light tan. This photo places the airplane overhead Palmdale Air Force Production Facility in the upper desert of Southern California, just south of Edwards AFB.
The three PRTs, spaced 120 degrees apart, fed power back to the engine's crankshaft via a gear mounted to an extension shaft. A separate shaft coupled to the rear of that same gear powered the supercharger. (Photo Courtesy Aircraft Engine Historical Society)