

THE CLASSIC LINES OF THE 880 ARE CAUGHT IN THIS SHOT OF 880M JA8021 (C/N 57) OF JAL. CONVAIR PHOTO.

CONVAIR 880*990

early jet-age glamour girls

by

JON PROCTOR

"As airliners, the 880 and 990 rank among the best of all time. As commercial products, they rank among the all-time corporate disasters." So admits, of all sources, the builders of these two jet transports, which have nearly disappeared from the airports of the world. The Convair division of General Dynamics eventually lost a staggering \$450 million producing only 102 examples, an average loss of nearly \$4.5 million on each airplane, an amount greater in some cases than their selling price, brand new.

The cause of this tremendous financial catastrophe can be traced to several factors, many of which will come out quite readily in the history of the aircraft. But the reader is encouraged to not let this overshadow the fact that a couple of first-class jetliners emerged and served the public faithfully for over fifteen years. Just ask the pilots who flew them, of the passengers who rode them, and you will get the same answer most of the time: a good airplane.

THE CONVAIR 880

The 880 was designed for medium-range routes, and was aimed, for the most part at attracting U.S. domestic operators. Smaller in size than the emerging 707 and DC-8, it was not intended to compete with them. The main attraction offered was speed, with a planned cruising velocity of 609 miles per hour. It was to "clean the clock" of any other airliner in existence or on the drawing board. The

fact that it would also guzzle kerosene with similar rapidity seemed of little significance at the time. After all, fuel was cheap....

The second major selling point was the performance planned for the 880 in areas of take-off, landing, and climbout ability. It was to be able to get in and out of 5,000-foot runways, common to many existing fields of the time, including very popular ones, such as New York's LaGuardia, Washington's National and Chicago's Midway airports. Combining the high cruise speeds with use of closein airports, 880 operators would hold enviable competetive edges on some heavily travelled routes.

Initial plans called for the exterior metal to be of gold color, rather than silver, and the name of "Golden Arrow" was used, replacing the first name of "Skylark 600." But it was dropped, along with the novel idea to incorporate the gold anodized finish. Early tests revealed that matching of the various skin sections, cast from different batches of molten metal, would be impossible. This probably saved Convair millions more, as the planned process was extremely expensive as well. Some of the gold anodized interior cabin trim did survive however, and could be found in many of the airplanes, in the form of individual passenger air vents, windowshade trim, ashtray lids, door handles, and lavatory appointments. With "Golden Arrow" having to be forgotten, the name that would stick, "880" finally was chosen, from the intended cruise speed of 880 feet per second.



LEFT: The Sunfari Travel Club operated this single 880M, N5866, purchased from Boeing. Photo by Arnold F. Swanberg.

707 and DC-8 aircraft use) the 380 burned as much fuel as an Intercontinental 707, with only half the revenue capacity.

But the Convair 880 had some qualities which mad it quite unique, and should be mentioned. For one thing, it was built "like a tank", as some put it. Over the years, the aircraft showed little wear in numerous areas, such as corrosion, metal fatique, etc. Its physical integrity was reflected in extremely low cabin interior noise levels at cruise, which won the favor ot its passengers and crew. And its five abreast coach seating was popular as well.

The 880's basic strength was given the supreme test early in the certification program, while high speed flutter tests were being conducted. A side-to-side rolling of the fuselage was introduced at 28,000 feet, which produced forces of a higher intensity than the aircraft could cope with. The cockpit crew reported feeling a sharp jolt. They were further jolted when they received a report from the chase plane behind them that most of the vertical stabilizer was missing (...uh, say again please?). After checking the plane's controls and essential systems, the crew requested permission to return to Lindbergh Field at San Diego, but they were instructed to make a precautionary landing at nearby Edwards Air Force Base, which was uneventful.

From the basic 880 came a variation, the model 880-22M, designed for overseas operations. And it

The optimistic attitude of Convair prompted a decision to put the 880 into production with only 40 orders on the books; 30 from Howard Hughes for TWA, and 10 from Delta. But the first blow came in the early 1960's, when traffic was booming with the advent of the jets. Speed became much less important to carriers than capacity. Instead of ordering medium capacity equipment, like the 880, second orders went to more spacious Boeing and Douglas jets. By the time the 880 entered service in 1960, Convair still had but 52 orders. And as if this wasn't a serous enough problem, performance goals so optimistically set by Convair were not met in the crucial area of runway performance. The 880 required 8600 feet at sea level for landing and stopping at maximum payload, and even at minimum landing weight its realistic limit was about 6000 feet, eliminating

those close-in airports.
Additionally, the approach and stall speeds for the 880 were quite high when compared with the 707 and DC-8. Maximum weight landing speed was 34 miles per hour greater than the 707.

Lack of capacity and performance effectively eliminated the orders Convair so desperately needed, and ultimately only 65 ships were built, far short of the breakeven number. The sharp rises in fuel costs forced airlines to retire their Convairs early, with good reason. Even when flown at mach .82 (the speed most





THE PROTOTYPE 880 FLIES OVER THE PACIFIC ON ITS MAIDEN FLIGHT. A CONVAIR PHOTO.

did attract some customers; 18 of the 65 ships were built in this configuration. Along with additional fuel capacity, the "880M" incorporated leading edge slats and Krugor inboard flaps, along with an increase in the flap extension from 50 to 55 degrees. These changes gave it improved short field take-off and landing capabilities, plus an insignificant reduction in cruising speed.

TWA and Delta were the chief domestic operators of the 880, and Cathay Pacific and Japan Air Lines operated the majority of the 880M models. Additionally, the ships saw service with Northeast Airlines, VIASA, Alaska Airlines, CAT (China), LANICA, and the FAA. They also served briefly, through interchange or lease arrangements, with KLM, Japan Domestic Airlines, and Swissair. An order for Capital Airlines was cancelled when the carrier merged with United.

One of the Convair's most impressive accomplishments was its amazing safety record. While in scheduled service, only three accidents with passenger fatalities occured, one of which was caused by sabatoge, while another involved a single death. But the ship also proved itself most unforgiving, as evidenced by the inordinate number of training mishaps. No less than five aircraft were destroyed during crew proficiency flights in the first five years of service. The first, a Delta ship, was lost only eight days after the 880 inaugural. All five training accidents were attributed to errors in the execution of specific maneuvers which were being conducted for training purposes. One pilot, flying for JAL, was involved in two of the accidents.

Most of the 880's still flying have been relegated to cargo service, although a few still carry passengers, on a charter basis. A program which may rejuvenate the frequency with which we see the old gals has been undertaken by the Gulfstream American (American Jet Industries), a company that is converting surplus 880's into pure freighter configurations. To be marketed as the "Airlifter", the conversion involves installation of a freight door on the forward port side of the fuselage, plus a cargo floor, stressed to 9g, and a reinforcement of the fuselage frame. With an estimated sale price of \$1.6 million each, the product will be a "mid-life" plane, with plenty of hours left on it. Sixteen ex-TWA ships are involved, most of which are in the 30,000 hour range. (Some Boeing and Douglas jets are still in active service today with over 60,000 hours.) Several options are available from Gulfstream American, including APU installations, livestock/bulk cargo barrier packages, etc. The Airlifter will be able to move a 50,000 1b payload over 1800 nautical miles at a speed of 450 knots, and a 3,000 mile range is advertised for reduced payload when a 400 knot cruise speed is introduced. It is hard to imagine what was to be the world's fastest jetliner lumbering along at 400 knots, but the fuel savings involved will enable the Airlifter to become an econimical intermediate range jet freighter. And the low purchase price, along with the availability of the ships should attract customers.

NEW! Starting October 15

First and only Convair 880 Jets San Francisco to Dallas

Only Delta offers the all-luxury 880 at the low tourist fare of Flight continues thru to New Orleans and Atlanta, connecting all the Southeast.



The first aircraft to be converted was expected to be certified by the end of April, 1979, after which a production line was to commence conversion of 22 ships at the Gulfstream American facility at Harlengen, Texas. The first two conversions were completed at Van Nuys, California. Unfortunately, TWA and Gulfstream were unable to come to an agreement on the remaining eight Convairs still at TWA's overhaul base, and they have been scheduled for scrapping.

Probably the most significant tribute to the Convair in the eyes of its admirers came when the first of the ships purchased by Gulfstream American from TWA left the overhaul base at Kansas City for the conversion facility in California. After sitting forlornly for over four years, through hot summers and cold winters, ship 12, N818TW roared down the runway once again, climbed directly to 31,000 feet, and flew non-stop and without inciden to Van Nuys, and a new career. "Just a good airplane," as one of her fans explained:

THE CONVAIR 990

If the Convair 880 was financially disastrous, the 990 cataclysmic! But, like its little sister, it served its masters faithfully for many years, and proved to be a very popular plane in the eyes of the passengers it carried, and crews that flew it.

The 990 was basically a growth version of the 880, incorporating an improved aft-fan engine and an increase in length of just over 10 feet. Also known initially as the "Model 600", its specifications were developed to meet the requirements of American Airlines, who placed the first order in July, 1958, for 25 ships, with an option on 25 more. Interestingly, the same ability to operate into and out of the Chicago, Washington and New York airports that the 880 was to have also was promised for the 990, and was a major consideration which convinced American to place the launch order. Swissair had contracted for five 880's initially, and in October, 1958 converted the order to seven 990's. Varig and

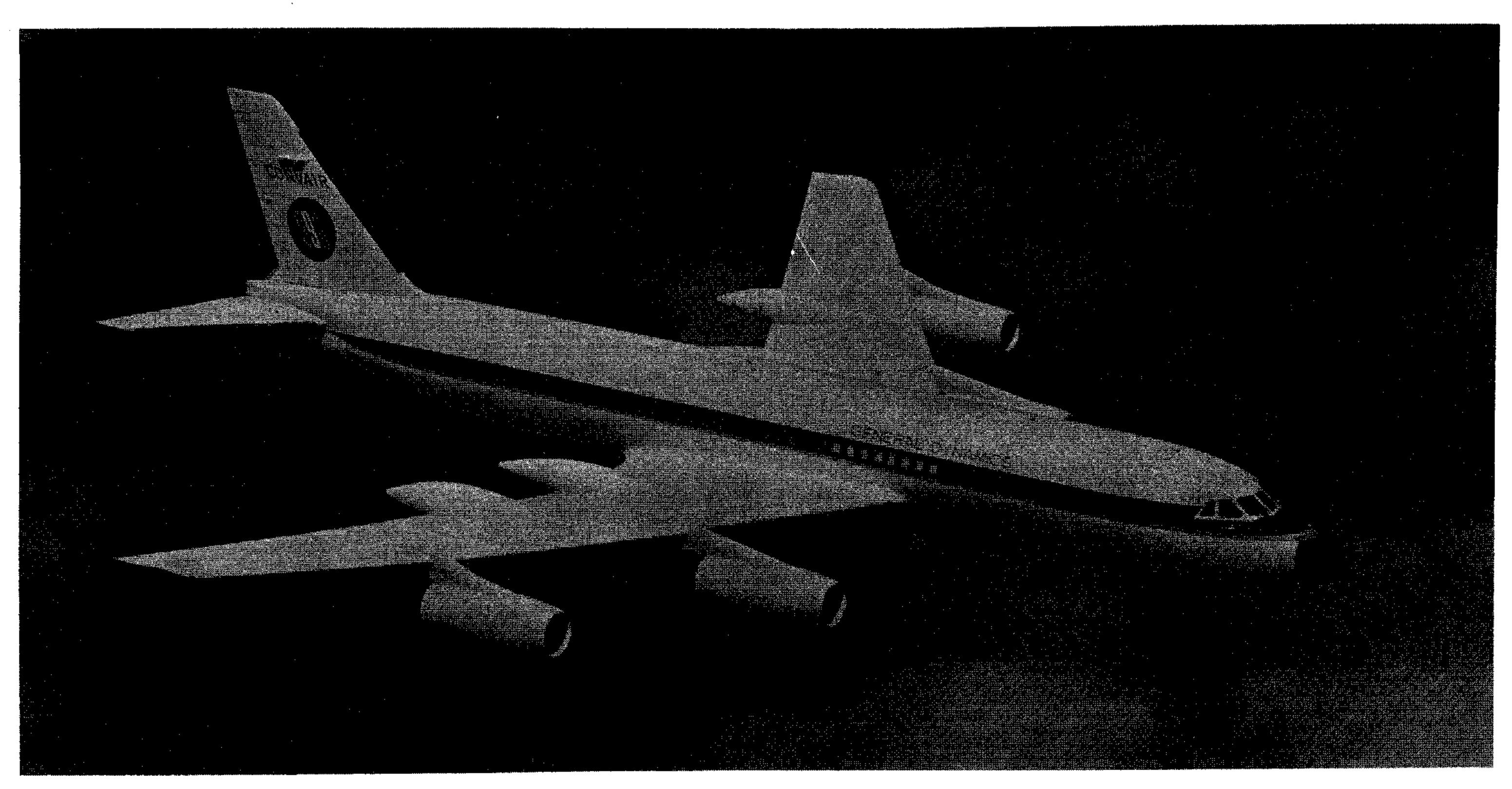
and Garuda bought three each, and NASA, APSA and Garrett Airesearch took one each.

The 990 design incorporated improved landing and takeoff capabilities, as well as increased speed. General Electric CJ-805-21 aft-fan engines, along with a superthin wing, allowed a top speed of mach .91. But along with this came increased drag, caused by air flowing over the thin wings at a supersonic rate, and Convair engineers eventually came up with a design incorporating two anti-shock bodies extending back from the trailing edge of each wing. These "speed pods", which resembled overturned canoes, diminished or delayred the shock wave effect to reduce drag, and also allowed for storage of additional fuel.

The prototype 990 rolled out in November, 1960, and ran into deep trouble almost from the day it first flew, January 24, 1961, following several postponements. Wing vibrations caused the outboard engines to shudder at high speeds. The only solution was a complete engine realignment, which seriously delayed the test program timetable, and then resulted in increased drag. It didn't take long to realize that the top cruise speed of 629 mph would be unobtainable without extensive research and testing, and the range Swissair had been guaranteed was in doubt. The entire 990 program was very nearly scrubbed at this point. In retrospect, this undoubtedly would have been a cheaper way out for Convair. But they immediately retrenched, and in the Fall of 1961 worked out an agreement with the customers to accept the 990 at 584 mph cruise speed, and deliveries further delayed, and the price tag lowered. Swissair took two 880M's on lease to fill the gap until their 990 deliveries began.

Meanwhile, extensive nacelle modifications were completed, plus installation of a leading edge "glove" over the mount and a large terminal fairing, extending aft of the nacelle on the inboard side. Some of the modifications varied between the American and Swissair models. Completion of the changes

THE PROTOTYPE 990 IS SHOWN ON ITS MAIDEN FLIGHT. A CONVAIR PHOTO.





THE FIRST DELIVERY TO AN AIRLINE, N5605 (C/N 9) IS SHOWN ON ITS MAIDEN FLIGHT, DEPARTING SAN DIEGO IN THE COLORS OF AMERICAN AIRLINES, A CONVAIR PHOTO.

brought the airplane up to the "990A" configuration. The airlines were so hard-pressed for deliveries that they accepted initial deliveries unmodified and flew them at reduced speeds until the "A" configuration changes could be made. Even doing this, Swissair's first 990 was hand over eight months behind schedule.

The name "Coronado" was given to the 990, but Swissair and SAS were the only ones to use the title. American kept "990", the name they had insisted upon; changed from "600" to denote a design supposidly superior to "880".

At one point, 55 ships were on the delivery schedule, including 12 for Howard Huges, and 5 for KLM (on a speculative basis). When they did not materialize, the schedule slipped back, and only 37 ships were built.

Three operators had sizable fleets of secondhand 990's. Spantax of Spain acquired 13 ships altogether, and still have 12 in service. General Electric came up with a modification to the engines for Spantax, which provided a "clean burning" feature, to meet environmental standards.

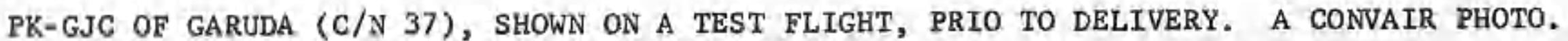
Modern Air Transport, a supplemental carrier, operated a total of 10 before the company was dissolved. Denver Ports of Call Travel Club acquired six ships, and now operates four of them, with the other two purchased for spare parts.

Middle East Airlines, of Lebanon, operated a total six 990's, purchased for American Airlines, and later traded them back on the purchase of 720B's. Lebanese International (LIA) also had bought two from American. Both were destroyed at Beirut Airport during an attack by Israeli troops.

Additionally, the 990 has been in service with a number of carriers, both throught purchase as well as lease. SAS, THAI, Air France, Iberia, Ghana, El Al, Air Ceylon, Balair, Northeast and Alaska Airlines all have operated the airplane at one time or another, as well as the Nomads Travel Club.

Today, only Nomads, Denver Ports of Call, NASA and Spantax use the 990. But she stirs a lot of memories for the author, who saw her fly for the first time and hitched a few rides, including a record two hour and forty-eight minute flight from San Diego to Chicago.

All photos in this article were provided by the author Jon Proctor. Some of his photos also will appear in several other articles in this issue of the LOG. Myself and other members of the staff would like to thank Jon for this real nice look at two of the favorites of the airline enthusiast.







DECAL CAPERS

STEVE KENYON

This issue's drawings deal with the delightful subject of Convair's efforts to penetrate the commercial airliners. As we are aware, the early "fiftys" spawned considerable units of airborne personnel carriers. The World had suddenly grown smaller and everyone was clamoring for new places to see and visit. Thus was born the "jet set" and the airlines found themselves short of conveniences through which the layman could satisfy his curosity and cravings. The demand for new and faster forms of transportation--especially through the air-became the cry of the times.

By this time Vickers of Great Britian had definitely established her aviation position with the Viscount--the forerunner of the pure jet engine. Proving the point of kerosine and high engine whines, Lock-heed as well as several other manufacturers, continued to pour fuel on the fire. This fire became so intense that Boeing took a

bold step and announced their creation of the 707 and was proven as their prototype took to the air and was certified shortly thereafter as an all pure "jet engine" airliner. Thus, the race was on. The cards were down and the betting began in earnest.

Following the introduction of Boeing's "707", General Dynamics decided to enter the race. Not to be outdone, GD's design was to be used on the shorter domestic routes but was to be faster than any of the others. Unfortunately, design problems arose and the aircraft failed to produce engineering forecasts. However, in spite of the problems, General Dynamics provided us with two examples which have become history but nevertheless are worthwhile and noteworthy of modeling.

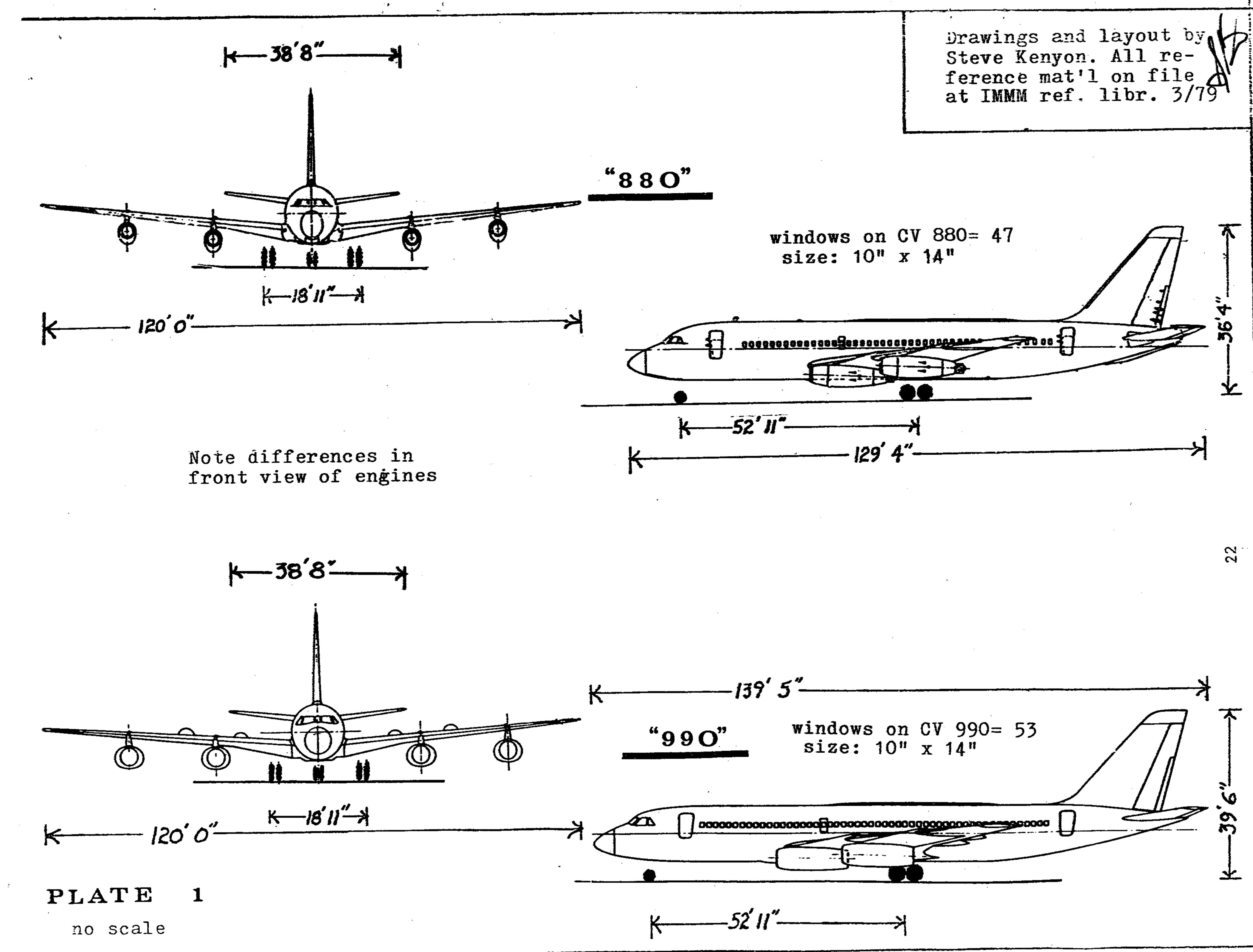
The two GD models examined here and projected into drawings are the 880 and 990. Both examples are classic replicas of history and no modeler should exclude them from his/her exhibits.

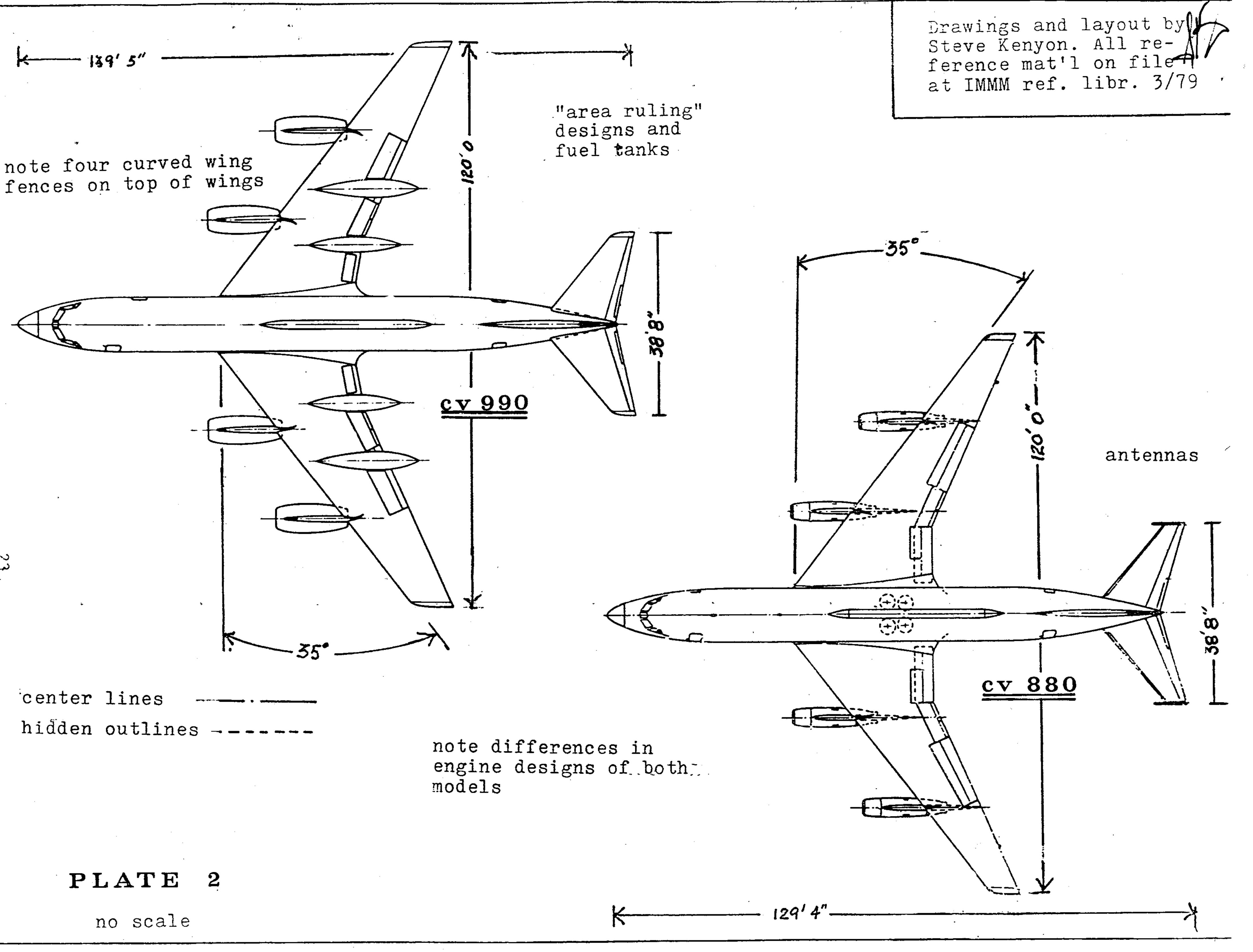
Lets first see what the aircraft look like.

The first drawing (refer to Plate 1) is a composite of side and front views. It is primarily designed to provide the modeler with dimensions and engine appearances. From an overall appearance, the design approaches the DC-8; yet there is a considerable difference.

The next drawing (refer to Plate 2) is a top view drawing of both models. The purpose here is to show you the varying designs of flap structure and top appearances of the engine designs. It is also worth out time to closely examine the 990 since the engine pylon fixtures are brought up over the top of the wings and are curved to provide wing fences. These fences provide a wind-flow which benefits and are correlated to the "canoe shaped" pods which are stationed midway on the trailing edges of the wing(canoe shaped is a coined phrase of Jon Proctor). These odd-shaped formations are known techincally as "area ruling" designs to increase speed. They were also designed and constructed in such a manner that they hold fuel and thus became known as ex-







Note that the speed pods and the engine center lines are perfectly parallel and there is no off-set as sometimes occurs with other engineering designs.

Now, before we get into the discussion of the various airline liveries, I want to make a statement. And, I would like some comments from our readers as to the useability of the drawings as applies to the main colorings of the examples. I have submitted these next four drawings to our editor with the colorings of the cheatlines and other extremities colored exactly as they appear on the real-life examples. What I need to know is wheather these drawings assist you readers in understanding the colors used? Or do they tend to confuse you? Let me hear your comments.

Figure 1 comes to you be special request. A member called me and made the request, so since this magazine is for our members, here is the request.

The airline represented needs no introduction since its colors are currently prominent throughout the world. However, this example may need some explanation since it differs from most of the 880's seen. The first item that differs is the radar nose. A small black tip shows and then the ramaining portion of the radar section appears to be light grey. All other reference items and pictures I have show this entire area as black. The second big difference is the wording on the aft section of the fuselage which is inscribed, "Star Stream 880" with the small word Convair appearing directly beneath. Again from the examples (slides and pictures) I have on file, this wording does not appear on any other models. Therefore, I am assuming this example when the aircraft reached Kansas City--home of TWA maintenance and redesign.

The remainder of the livery markings remain the same for all other pictures and reference materials I have on file.

The design of the cheatline starts at the bottom of the pilot's window and runs aft in an arrow-shaped design. Note that the top part of the widening arrow design stops midway at the rear passenger door and then culminates to a point at the lower aft section of the fuselage. The registration number is authentic and appears on the forward, lower section of the vertical stabilizer. All other colorings are as shown.

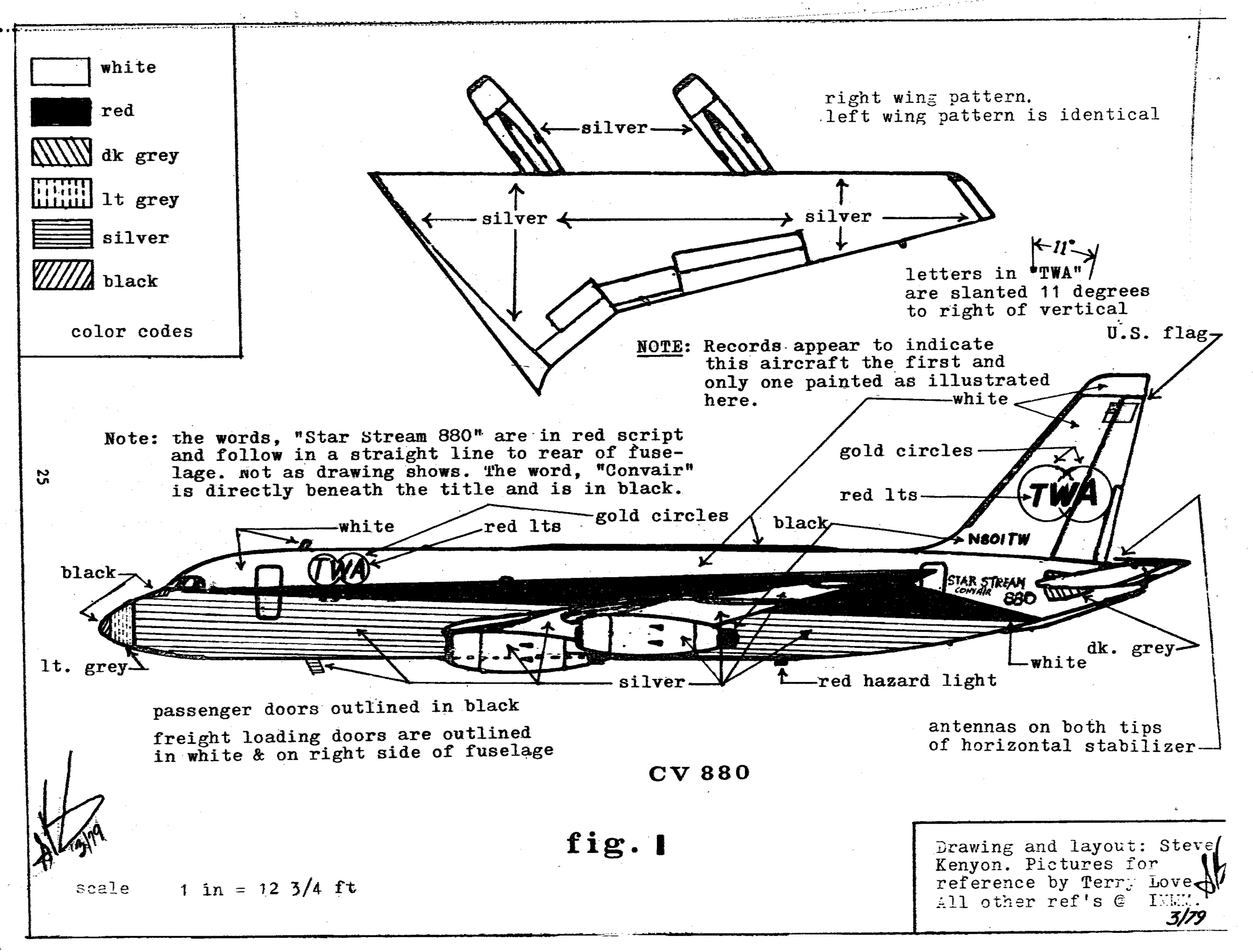
The slant of the letters in "TWA" are eleven degrees off vertical and are slanted to the right. TWA has, traditionally, placed the USA flag on their aircraft, and in this instance, it appears at the top and rear of the vertical stabilizer. Be sure and check your own reference photos for size, location and shape. It has been known to vary.

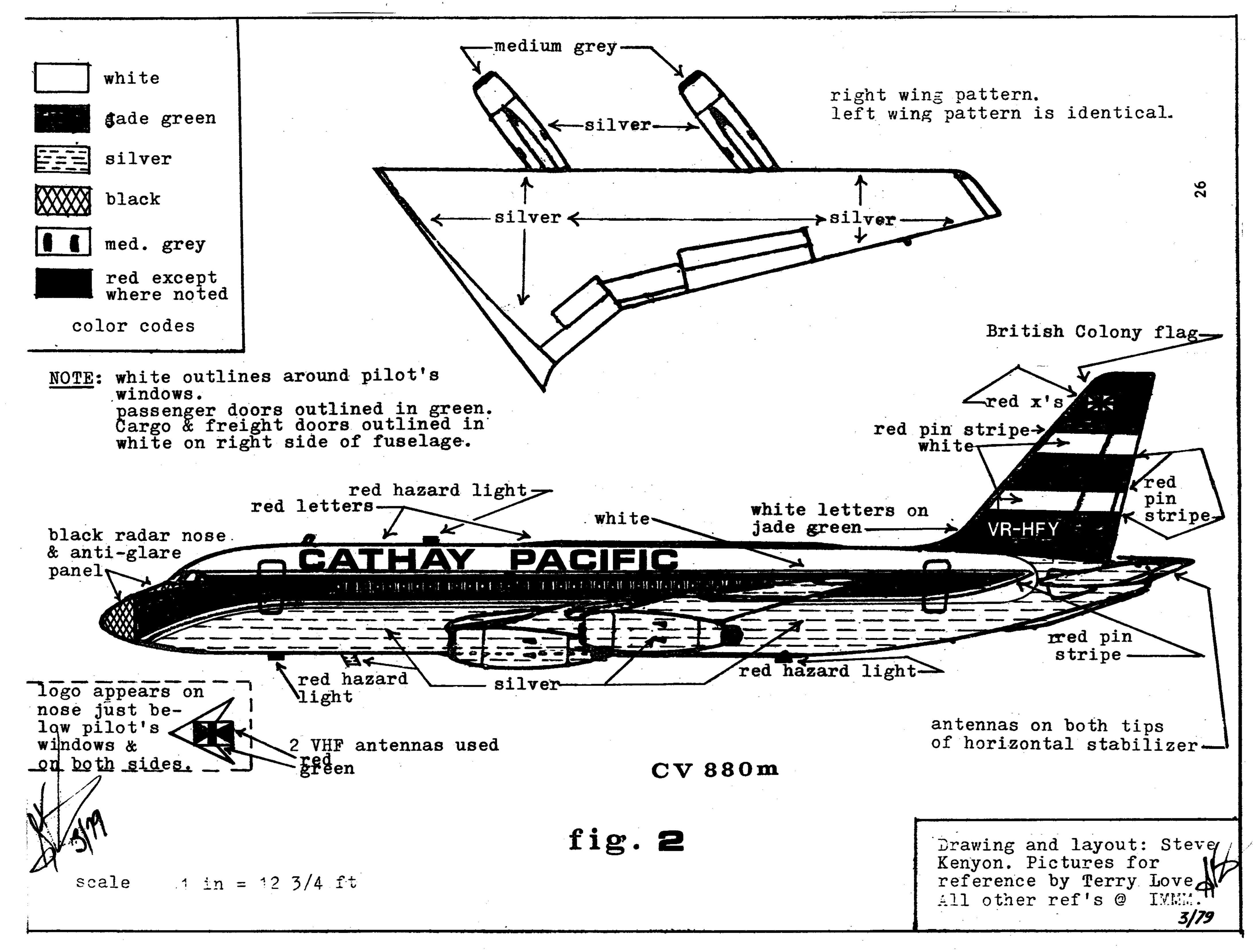
Figure 2 is pretty well self-explanatory. I will call your attention to the small pin stripe in red that surrounds the main cheatline of green. Also, this same red pin-stripe outlines the two broad white stripes on the vertical stabilizer. The British Colony flag appears on the forward and top portion of the vertical stabilizer while the logo of the Union Jack appearing on the nose of the aircraft is of a special design (refer to insert on drawing). All other colors and items are as shown per my references.

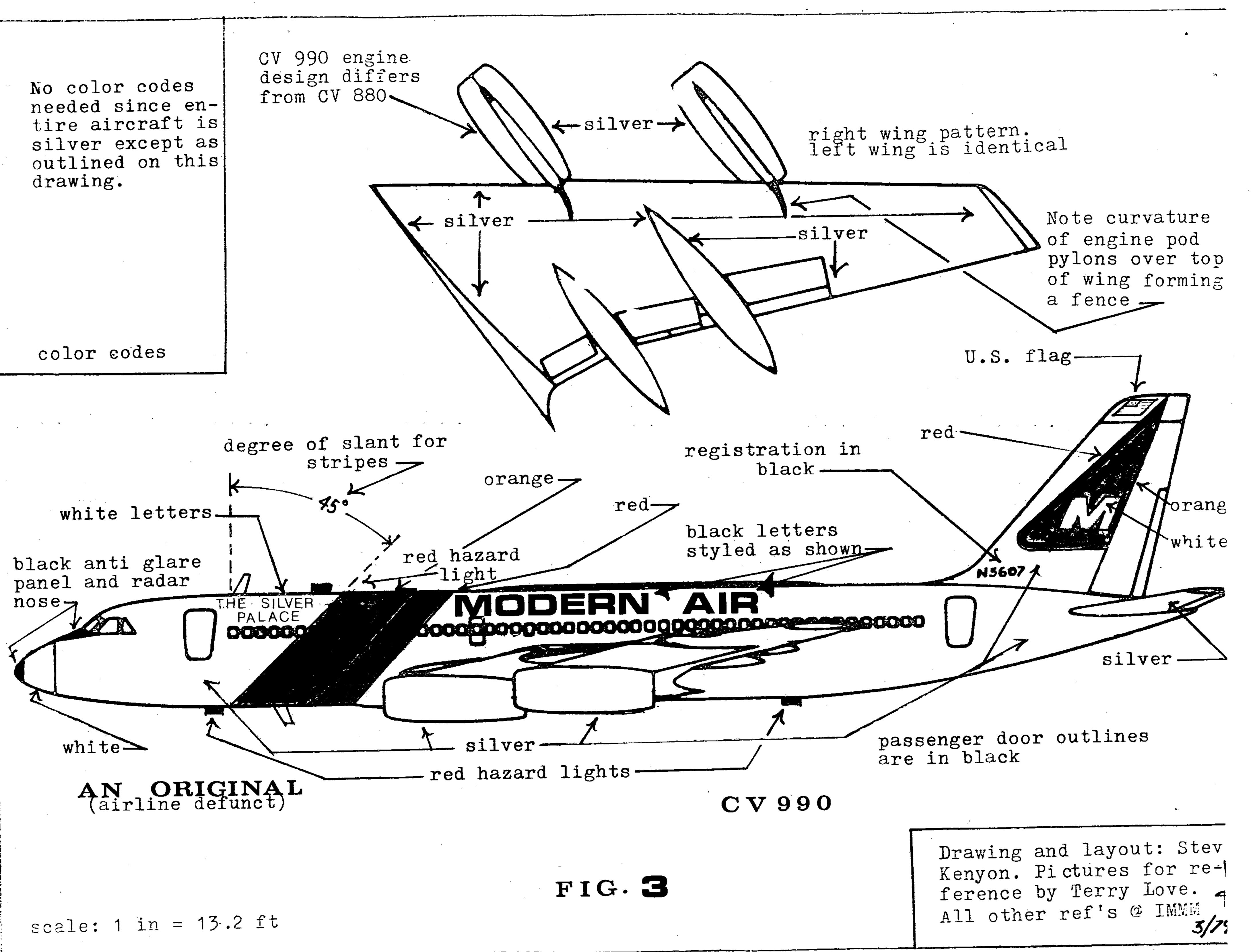
I chose figure 3 for its simplicity of design; of being an original; and for its ease of completion. While the airline it depicts is now defunct, this example is still worthy of modeling and certainly bears a functional position in our airline exhibits.

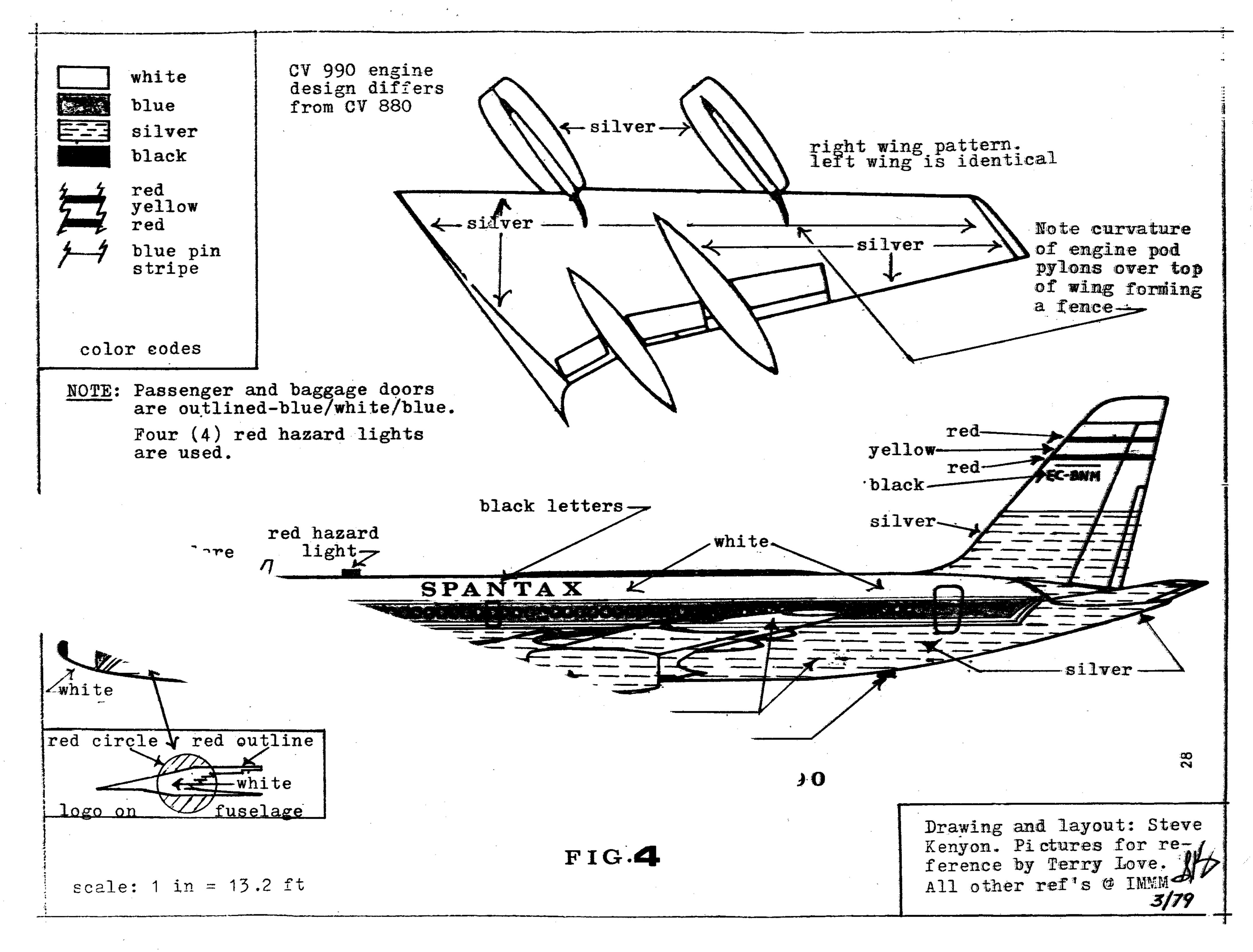
The entire aircraft is natural metal (silver) except as indicated by the bands on the fuselage and the paintings on the vertical stabilizer. The colors of the airline name and the registration are also exceptions to the all silver theme. One note: when this color scheme was first introduced, the wording "The Silver Palace" was placed on the top of the fuselage forward of the airline name. This wording disappeared shortly after the color scheme was introduced. So if you omit it on your model, you would be correct. Personnally, I like it there since it adds color and variety to the example.

The degree of slant to the letter "M" on the vertical tail logo seems to have varying degrees of slant. Therefore, I









could not adequately determine any set degree to portrait for your use.

Figure 4 takes us international. The cheatline is medium blue outlined with a fine pin stripe blue line of the same color but separated by a white line between the pin stripe and the blue cheatline. Note that a section of the rada nose is also white and the aircraft has been modified to carry four red hazard lights. The logo appearing on the nose of the aircraft has been outlined with the insert shown on the drawing. Insofar as the size of this logo is concerned, there seems to be no special scale. All of my examples (slides) differ in scale. So I would presume you would be correct with the area in which you place it.

Don't overlook the narrow red, broad yellow, narrow red striping that appears on the vertical stabilizer and the registration letters which are located immediately below. The registration is authentic but I am unable to verify that this aircraft is currently on Spantax's current aircraft roster.

And so ends another chapter of DECAL CAPERS. As usual, I am in a quandry. Am I getting through to the membership with these drawings? Are they explicit enough to enable you to accomplish a model with exacting precision? Do you need more information? Would you like information on how to mix the paints when an off color is required for a certain livery? These questions, and many more, always pour through my mind. So to help me out, why don't you take a few minutes and drop me a line to let me know your feelings. I can only help you if you let me know that I am accomplishing some of the goals that were set forth in the first series of DECAL CAPERS, which seems like years ago. Please write--let me know if I am getting through to you.

(The following appeared in the Cincinnati Enquirer on Sunday, March 4, 1962 under a by-line of Robert J. Serling, UPI Aviation Editor. Material from the collection of member Pete Krey.)

Not too long ago, a U.S. airline official came back from the Orient and committed the ultimate sin for any airline official.

He raved about another carrier's plane.

"I've never seen an aircraft cabin interior like it," he marveled. "It's got everything in this country beat a mile."

The airliner in question was a Convair 880 jetliner, operated by Civil Air Transport (CAT), the Formosa-based airline founded by the late Gen. Claire Chennault of Flying Tiger fame.

CAT's Convair is dubbed the "Mandarin Jet."
And its unique interior has impressed more people
than just the aforementioned official.

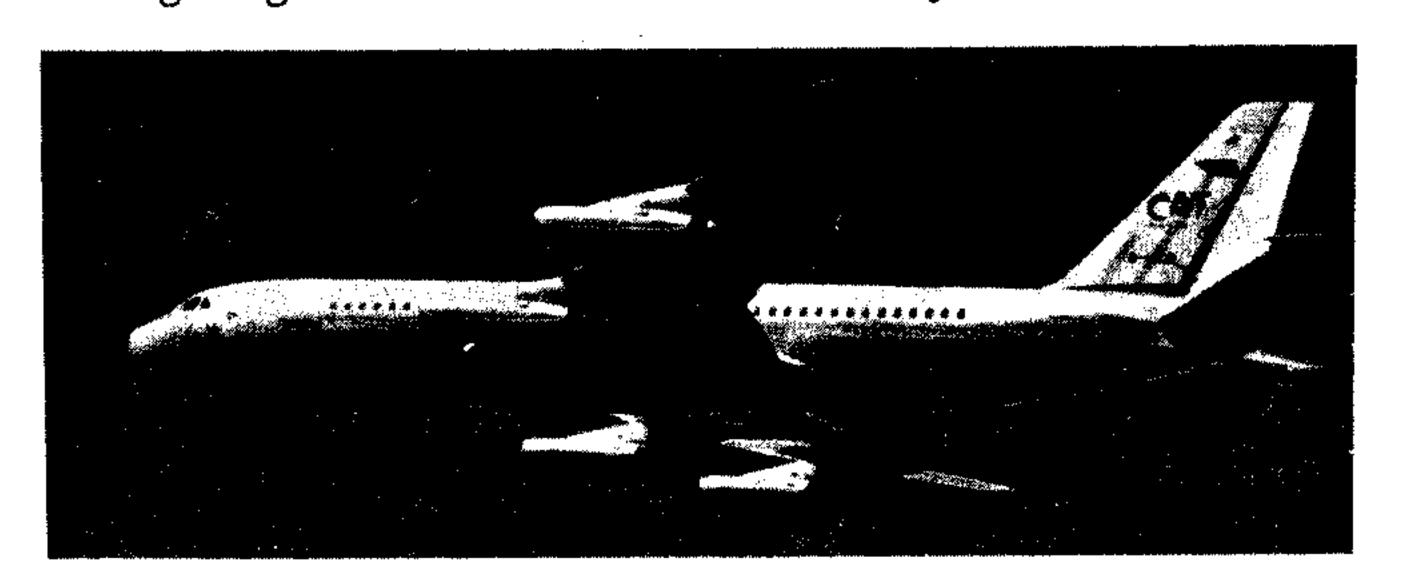
The predominant color is brushed gold. The seats are a deep black threaded with silver and gold. Above the windows, splashed in rich colors of Chinese black, red and peacock blue, is a series of murals depicting the story of Confucius' travels.

There are nine central figures in the procession ranging from a two-wheel cart to flag and pike-carrying Oriental knights.

The cabin bulkheads are decorated with authentically-styled moon-gates, dragons, lion-knobs and a Chinese Phoenix. The jet's exterior is only slightly less colorful. The big plane is painted in CAT's traditional colors of beige, silver and gold with a five-toed Dragon emplazoned on the front end of the fuselage just under the cockpit window.

The interior of this flying Oriental palace is so unusual that when the 880 was being built, Convair employees kept sneaking over to the assembly line to see if it was true.

The "Mandarin Jet" was c/n 44 and was a 880M type. The last record of this aircraft was on Sept. 11, 1975 going to Orient Pacific Airways.







ABOVE: Known as the "Manderin Jet", B-1008 (C/N 44) was the first 880M to be delivered to an airline -- CAT.

BELOW: Exotic interior of Civil Air Transport's 880M. Convair photo, as is the one above.

