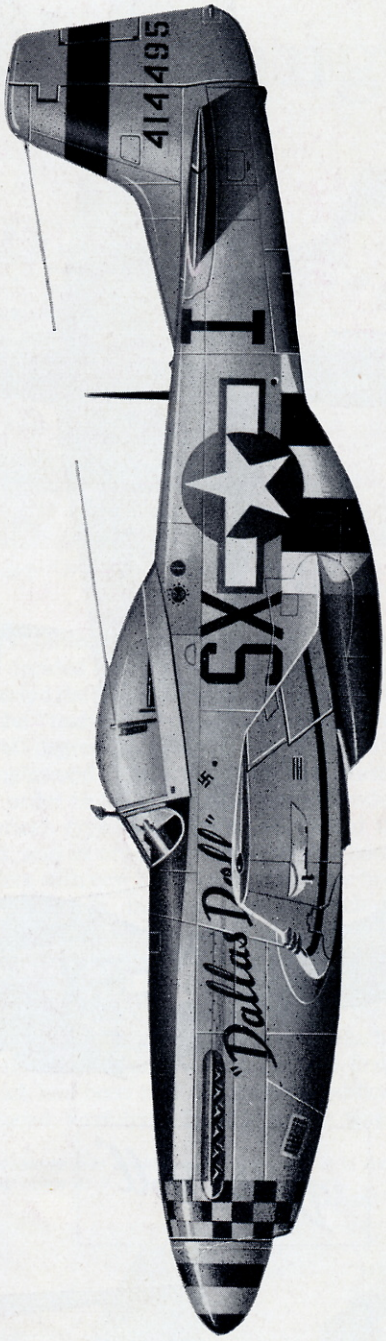
PROFILE
PUBLICATIONS

The North American P-51D Mustang



NUMBER 8
TWO SHILLINGS

"Dallas Doll"

P-51D-NA-15 Mustang of the 352nd Fighter Squadron, 353rd Fighter Group, 8th Air Force.

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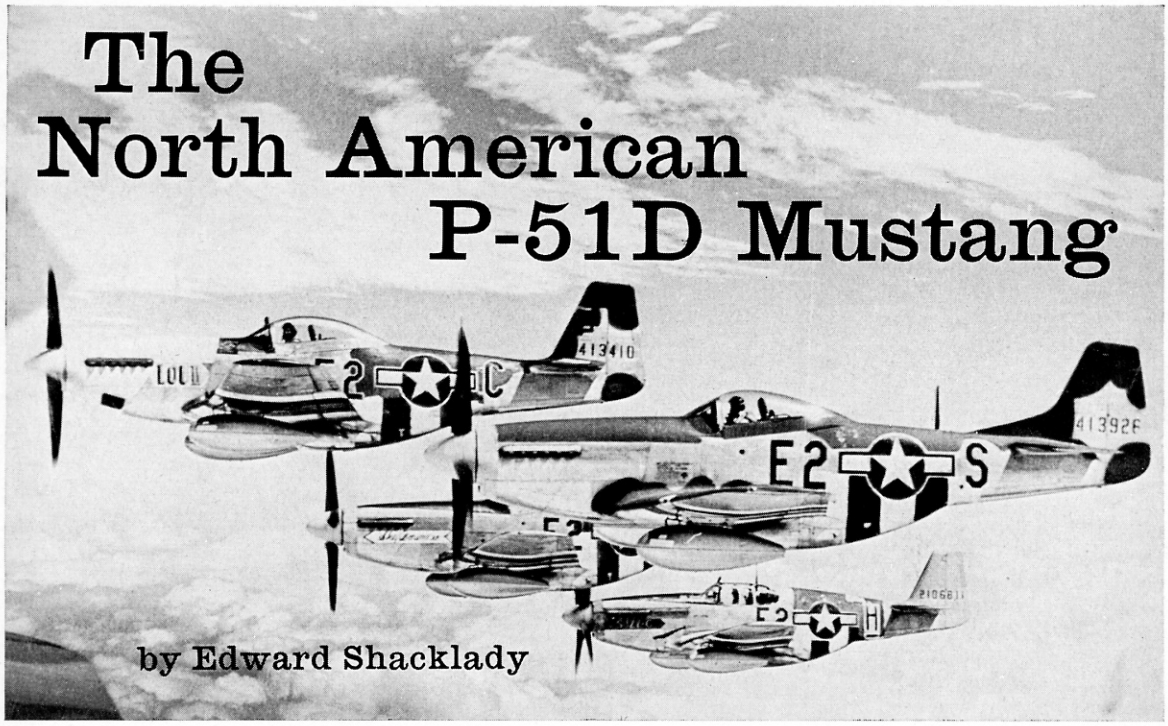
The North American P-51D Mustang

by Edward Shacklady



Eighth Air Force P-51D Mustangs. Note three distinct models: 413410 (D-5) an early "D" without fin strake, 413926 (D-25) has strake while 2106811 is a 51B-15 with original canopy. (Photo: Roger Freeman)

Of all the piston-engined fighters that took part in the great conflict that was World War II, perhaps the finest was the North American P-51 Mustang. Pilots swore by this sleek machine that looked right and whose performance outshone the majority of its contemporaries. That the basic design was fundamentally right can be seen in how the speed increased from the prototype's 382 m.p.h. to the final model's, the P-51H, 487 m.p.h. without too radical a change in outline or construction.

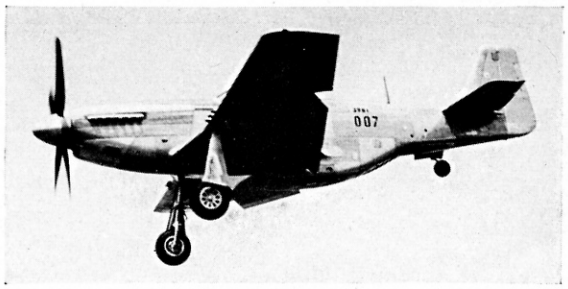
The story of how the Mustang was designed and constructed in one hundred days need not be told again in these columns, but it is not quite the whole truth, as the old story goes, that the Mustang was almost an inspiration of its designer James H. "Dutch" Kindelberger. The idea behind the Mustang design began, almost unintentionally, when Kindelberger went to Europe in 1938 for a tour of the aircraft industries of Great Britain and Germany. What he saw led him to sketch some plans of a fighter he thought would be able to better any other machine, should the United States become embroiled in the war that was imminent between Germany and the rest of Europe. He returned to his home state of California, but still maintained his oversea contacts.

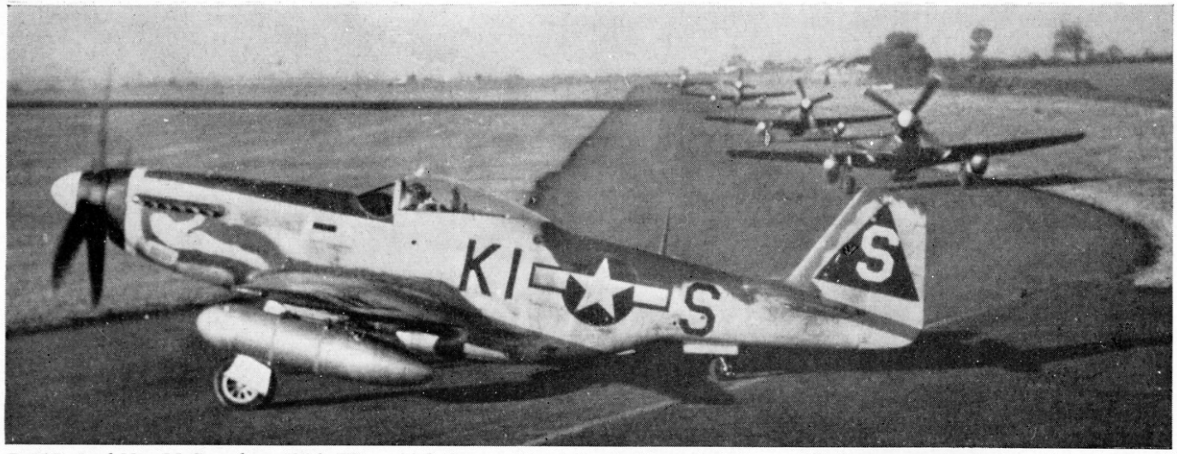
The immortal P-51 Mustang was born two years later, and the most widely used variant was the P-51D. A grand total of 7,956 aircraft was constructed before the last machine rolled off the line.

The immediate predecessor of the 51D was the P-51C of which 1,750 examples were built. The "C" was an excellent aircraft but it lacked sufficient rearward view, and in spite of a number of them being fitted with the R.A.F.'s famed Malcolm cockpit canopy the U.S.A.A.F. decided that a new hood was required. At about this period the first Hawker Typhoons were flying fitted with the "tear-drop" transparent canopy which afforded a 360-degree view. Two P-51B-10s were taken from the Inglewood production line and drastically modified in order to fit the Typhoon-type hoods. The North American type number for this hybrid fighter was NA-106, and in order to test the P-51D configuration complete with new hood both 51Bs were brought up to 51D standards, the modifications including a cut-down fuselage aft of the cockpit, the new "blown" canopy, provision for six wing-mounted 0·5 in. machine guns and 1,800 rounds of ammunition.

The first fully equipped P-51D appeared in the latter half of 1944 with all the new innovations, which were introduced to the production line, and the first four aircraft, which had been built before the modifications were introduced, were retro-fitted at a later stage.

The P-51D Mustang was a clean aeroplane, but it is seen here with everything down as it completes landing pattern. (Photo: Richard Ward)





P-51D-5 of No. 55 Squadron, 67th Wing, 20th Group, U.S.A.F., taxiing out at Kingscliffe for an escort mission. Note girl motif on KI-S. (Photo: Richard Ward)

A total of 6,502 P-51D-5-NA to 25-NA were built at North America's Inglewood factory and 1,454 P-51D-5-NT to 20-NT at Dallas. Production models soon began to stream into U.S.A.A.F. squadrons in the Pacific, and it is interesting to record that the new 51D was the first American fighter to take part in strikes on the Japanese homeland. When the 51D reached Europe it was used primarily as a long-range interceptor, but as resistance of the Luftwaffe decreased they were used more and more in the ground-attack rôle.

As production increased the inevitable modification programme brought further changes to the basic airframe, one major modification being the introduction of a dorsal fin to compensate for loss of area of the cut-down rear fuselage. Tail warning radar was added at a later stage.

ROYAL AIR FORCE MUSTANGS

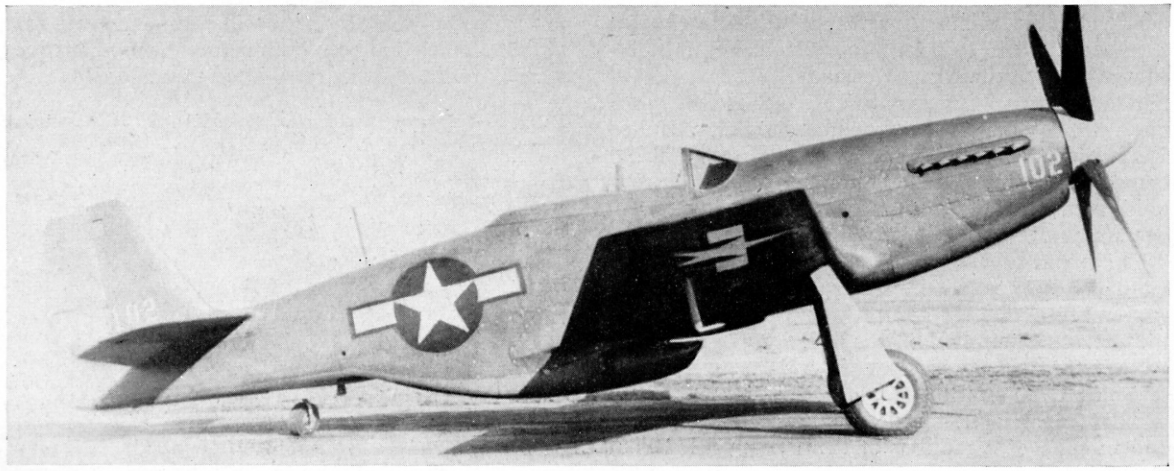
A large number of P-51D Mustangs was supplied to the R.A.F. under Lend-Lease. An initial batch of 281 aircraft was delivered in 1944 and carried the designation Mustang Mark IV. They became standard equipment with the Nos. 19, 64, 65, 112, 118, 122, 154, 213, 249, 250, 303, 306, 442, and 611 Squadrons. The Mustang F.B.IV served with Nos. 26, 237 and 442 Squadrons. An additional 594 Mustang Mark IVs served with the R.A.F., but they were P-51Ks not 51Ds.

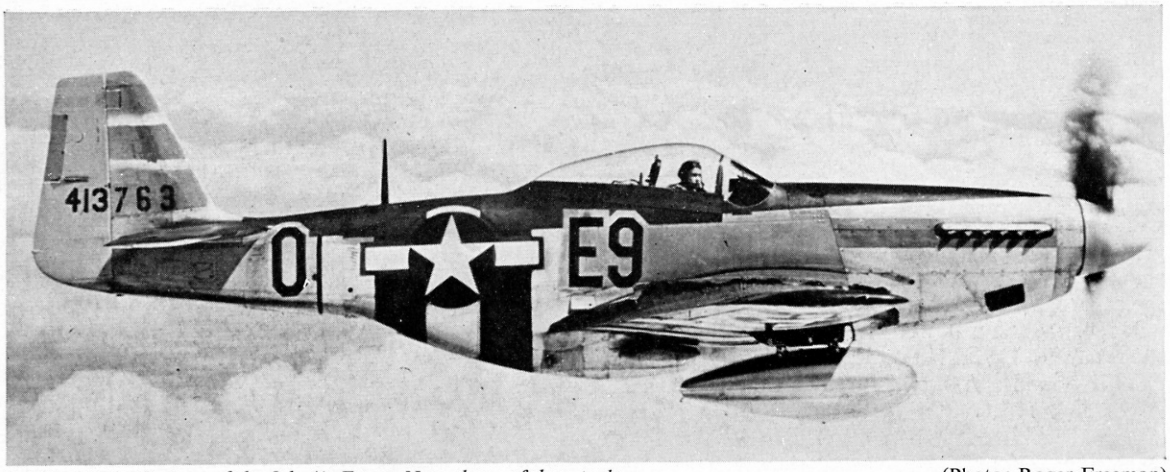
During the invasion of Normandy the Mustang IVs were used in the fighter-bomber rôle with the 2nd Tactical Air Force, but by the end of 1944 they had rejoined Fighter Command's strength in England. Other Mustang IVs used for the interceptor rôle were kept busy during 1944 by the V-1 flying bombs, shooting down 232 of these missiles by 5th September. On 16th April 1945, Mustangs of No. 611 Squadron were the first R.A.F. aircraft to greet their Russian Allies over Berlin. A large number of Mustangs were sent to the Middle East to re-equip Hurricane and Kittyhawk squadrons in the Desert Air Force.

After the war a large number of Mustangs were returned to America, but a number continued to serve with the R.A.F. as late as May 1947.

Serial numbers of the Mustang Mark IVs supplied to the R.A.F. under Lend-Lease arrangements were: Mustang IV (P-51D) (one Packard-built Rolls-Royce V-1650-7 Merlin engine) *KH641* to *KH670*, 30 aircraft; *KM493* to *KM743*, 251 aircraft. Mustang IV (P-51K) (one V-1650-7 engine) *TK589*, this being an

This is the P-51B-1-NA used to flight test the bubble canopy. (Photo: Richard Ward)





P-51D-5-NA Mustang of the 8th Air Force. Note shape of drop tank. (Photo: Roger Freeman)

ex-U.S.A.A.F. aircraft (*44-13332*) and used for trials at A. & A.E.E.; *KN671* to *KN870*, 200 aircraft; *KM100* to *KM492*, 393 aircraft. The last two batches were fitted with the 4-bladed Aeriproducts propeller. An additional three P-51Ds were taken over in the Middle East from the 12th Army, U.S.A., and re-numbered *HK944* to *HK946*.

FOREIGN MUSTANGS

The P-51D was built in *Australia* under licence, but before the first licence-built aircraft appeared, enough machines to equip one squadron, No. 8, were supplied direct from America. It was during February 1944, that the first erection jigs and tools were constructed, but the first of eighty aircraft assembled by the Commonwealth Aircraft Corporation did not fly until May 1945, too late to take part in the final assault on Japan. These eighty aircraft were constructed from components imported from America and as such were designated the CA-17 Mustang 20. Subsequent aircraft, 120 in all, built from Australian-made components, were designated CA-18 Mustang 21. Fifteen Mark 21s (A68–81 to 95) were modified to the Mark 22 standard with the addition of F.24 cameras and used for tactical reconnaissance duties. One hundred and seventy CA-18s were ordered but with the end of hostilities this was reduced to 120 aircraft.

The Australian contribution to the occupation of Japan consisted of three squadrons, Nos. 76, 77 and 82, of No. 81 Wing, equipped with P-51Ds, and they were shipped to Iwakuni and Bofu in the spring of 1946. They remained there until 1949 when Nos. 76 and 82 were withdrawn to Australia leaving No. 77. The latter was on the spot when the Korean conflict broke out in 1950 and it was immediately seconded to the U.S. Fifth Air Force for use as a fighter-bomber. In the first six months of operations in Korea No. 77 flew 2,600 sorties, and they flew their Mustangs against tremendous odds until they took delivery of a number of Gloster Meteors in 1951.

It was inevitable that *Canada* would be interested in the P-51D and one hundred machines were supplied shortly after the war ended in 1945. These served with the Royal Canadian Air Force until the last went out of service in 1956.

The *Chinese Air Force* was re-equipped, with U.S. assistance, in 1946 and three squadrons of P-51Ds were supplied. With the overthrow of General Kai-

"Little Lady" of the 55th Fighter Squadron, 20th Fighter Group, 8th Air Force, based on Kingscliffe, Northants. Compare with P-51Ds on pages 4, 11 and 12.

shek's government in 1949, most of the Mustangs were evacuated to Formosa, but a number were left behind and they formed part of the Red Chinese Air Force. Some of these Mustangs were still in service when the Korean War broke out, but it is not known whether they were ever used against the United Nations forces.

Of the 160 aircraft that were evacuated to Formosa with the *Chinese Nationalist Air Force*, the majority were P-51Ds. By December 1954 two Mustang squadrons remained in service, one with F-51Ds and the other with RF-51D reconnaissance fighters.

Under the terms of the Rio Pact of 1947, *Cuba* was supplied with F-51D Mustangs, and these remained in front-line service until replaced by Russian equipment in the early 1960s.

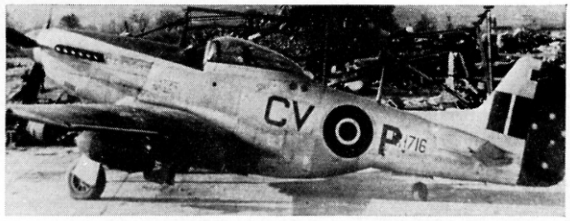
Dominica introduced the P-51D to its Air Force when, in October 1952, it purchased 32 surplus machines from Sweden, and they were still in service in 1962.

Guatemala bought a small number of F-51Ds in 1945, just after the war ended, but spares were a problem and as the Mustangs went out of service they were never replaced.

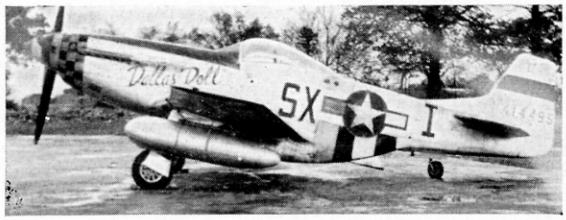
Six North American F-51Ds were purchased by *Haiti* just after the war, and some were still in service in 1961.

On signing the Rio Pact of 1947 *Honduras* received a number of Kingcobra and Lightning aircraft, but these were replaced a few years later by F-51Ds, a number of which were in service in the early 1960s.

During the war the Dutch forces in the Pacific were operating out of Australia with the P-51D, and on cessation of hostilities the Mustangs were used against the Indonesian Nationalists. Two squadrons, Nos. 121 and 122 fought the rebels, but to no avail for in June 1950, the Netherlands Indies Air Force was disbanded and its aircraft transferred to *Indonesia*. The Mustangs served for nine years with the I.A.F. until replaced by Russian equipment.



Mustang Mk. IV (P-51D) of No. 3 Squadron R.A.A.F., 239 Fighter Bomber Wing, Desert Air Force, Lavarino, Italy.
(Photo: Richard Ward)



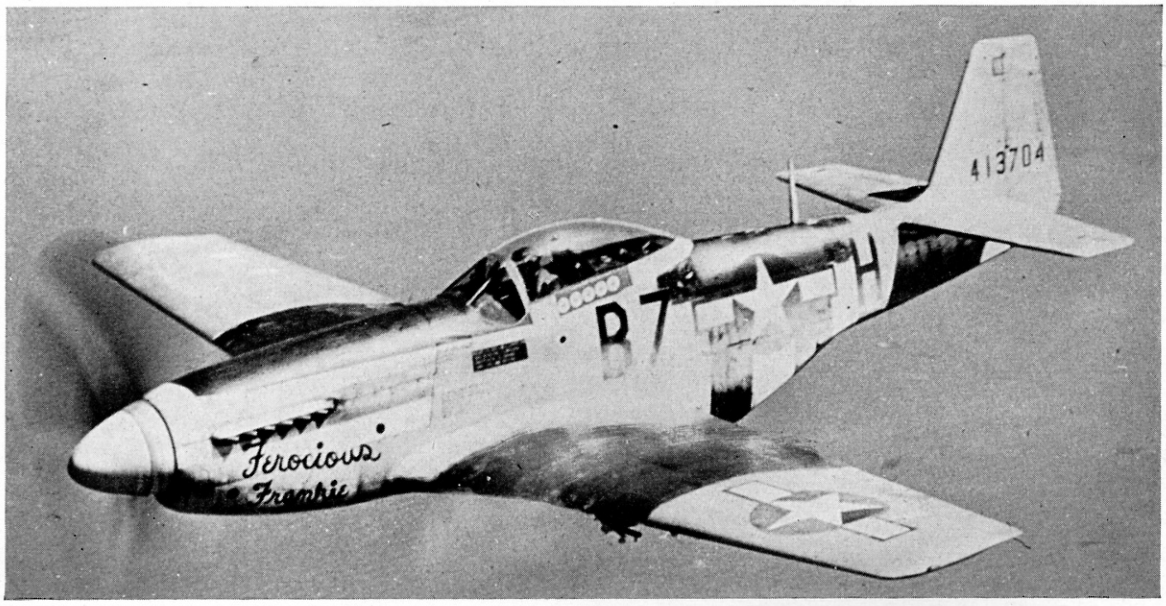
"Dallas Doll" P-51D-15-NA, subject of the five-view drawing on page two. Flew with the 352nd Fighter Squadron.
(Photo: G. J. Letzer, via Richard Ward)

Despite restrictions imposed by the Western Powers *Israel* obtained 25 F-51D fighter-bombers from Sweden in 1952, these serving with the Israel Defence Force/Air Force until superseded by jet equipment in the late 1950s.

After the defeat of *Italy* the air force was supplied with American equipment, including P-51Ds. By October 1948, 48 were in service and they remained as front-line equipment until replaced by Vampires and Sabres in 1953.

The *South Korean Air Force* first operated the F-51D in 1950, when they were used to stem the North Korean advance when the latter invaded South Korea. At first the Mustangs were used for defensive purposes, but as their numbers increased they went over to the ground-attack rôle. The Mustangs were

P-51D-5 "Ferocious Frankie" of the 8th Air Force. (Photo: Roger Freeman)



P-51D-25 of the 457th Fighter Squadron, 506th Fighter Group, 20th Air Force based on Iwo Jima.
(Photo: G. J. Letzer, via Richard Ward)

phased out of service in 1960 with the arrival of the North American Sabre jet fighter.

Netherlands forces fighting in the Pacific in 1944–45 were equipped with the North American F-51D, and these same aircraft were used to try to crush the Indonesian Nationalists in the four years following VJ-Day. With the sovereignty of Indonesia recognised the Mustangs were transferred to the I.A.F.

Thirty P-51Ds were supplied to the *Royal New Zealand Air Force* in 1945, but they were not introduced into service for several years. The Mustangs were themselves replaced by Vampires in 1950.

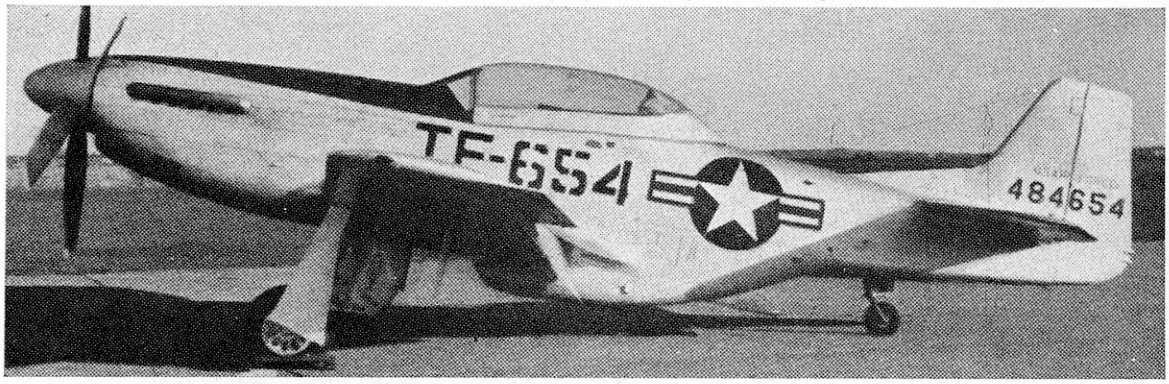
In 1947 *Nicaragua* took delivery of a small batch of P-51Ds and a few were still in service in 1964.

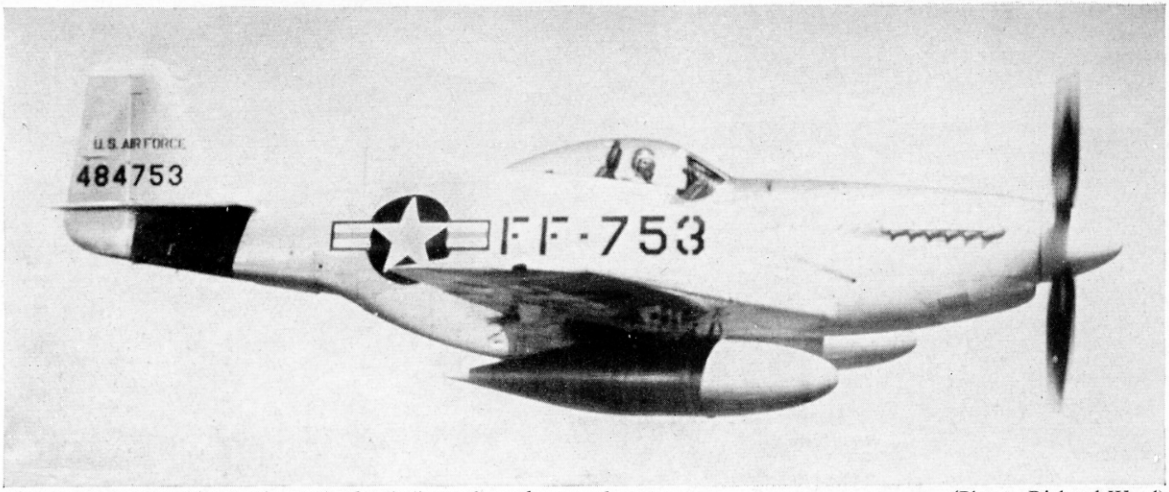
The *Philippine Air Force* took delivery of a number of F-51Ds in 1946 and they formed the equipment of one fighter-bomber squadron until phased out of service in 1960.

The *South African Air Force* did not operate the F-51D until 1950 when, as part of the United Nations Forces in Korea they took delivery of a number of ex-U.S.A.F. machines at Johnson Air Force Base, Tokyo. On 16th November five Mustangs, plus personnel, were flown to K-9 airfield, Pusan, in South Korea, and three days later the S.A.A.F. flew its first sortie against the North Koreans. No. 2 Squadron, the one in question, was attached to the U.S. 18th Fighter-Bomber Wing, and with this Wing they moved to a number of airfields until settling down at K-10, near Chinhae, where they remained until re-equipped with Sabres in January 1953.

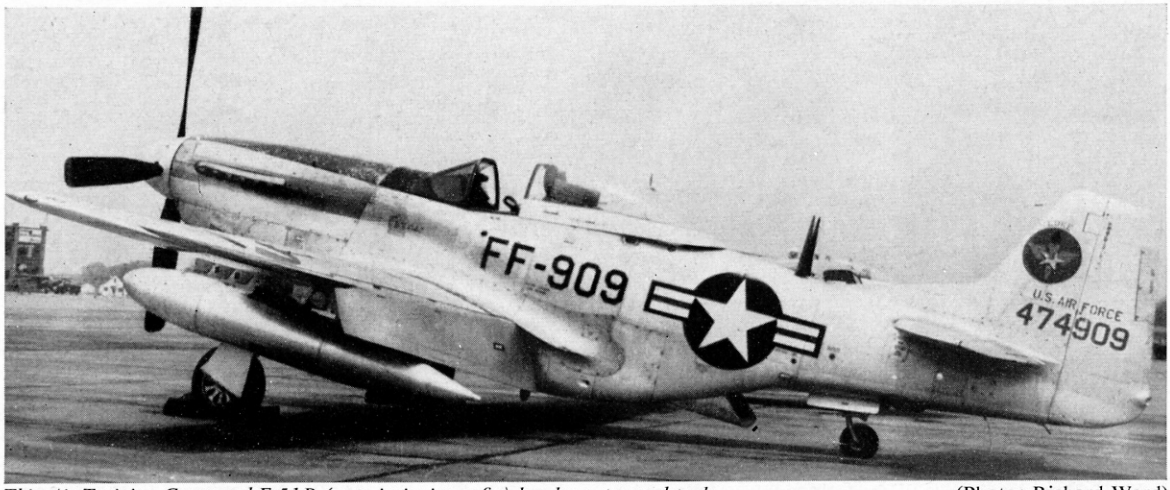
During the early part of 1945, it appeared that *Sweden* would at last become involved in the war that was still raging in Europe, and in an effort to bolster air defences the government bought fifty P-51D Mustang fighters from America. Towards the end of the year the Swedish-built SAAB-21As, were coming off the production lines, but their introduction into service was slow and a further 90 Mustangs were bought as an interim measure until the 21A became available in greater quantities. Eventually enough Swedish-built equipment became available and the

TP-51D trainer with dual seats under single bubble canopy.



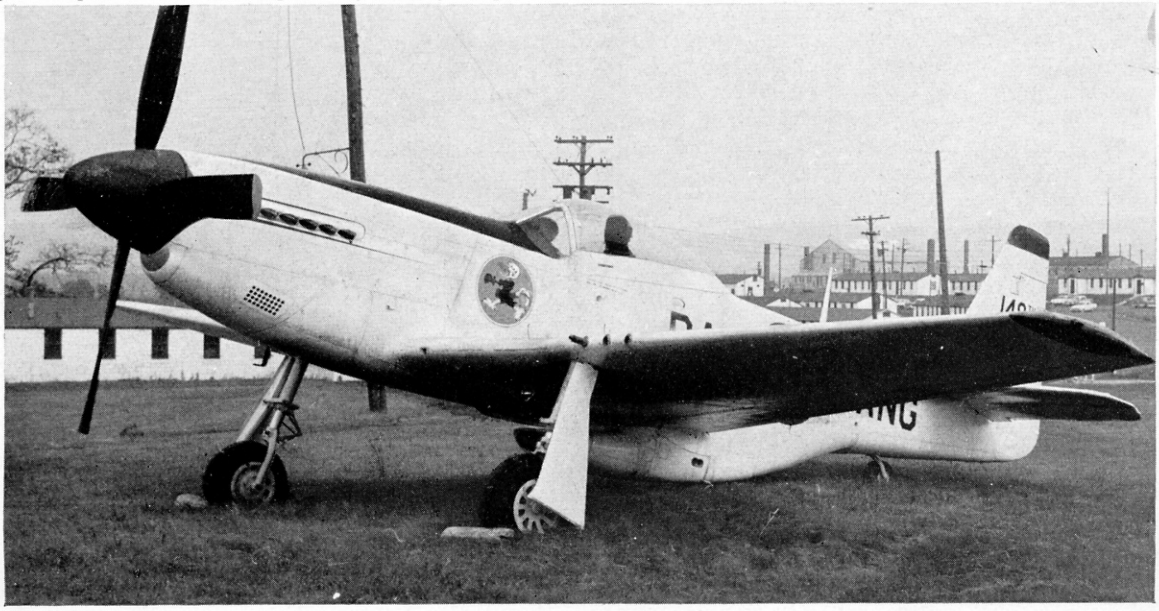


Study in fuel tanks. Above: *the F-51D has bulky tanks and new style insignia.* (Photo: Richard Ward)



This Air Training Command F-51D (note insignia on fin) has long, tapered tank. (Photo: Richard Ward)

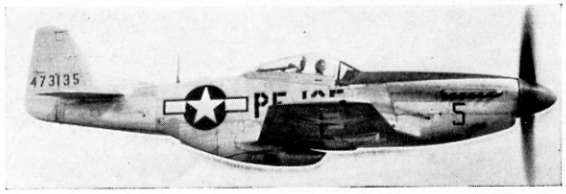
ETF-51D-25NT of Air National Guard. Tall fin was introduced on the P-51H and several F-51Ds were retro-fitted during the early post-war period. Note "Bald Eagle" motif ahead of cockpit. (Photo: R. F. Beseker, via Roger Freeman)

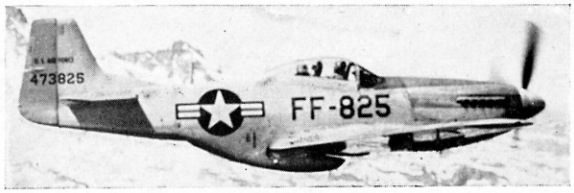


Mustangs were either sold or phased out of service.

The *Swiss Air Force* just after the war consisted of mainly German aircraft, and with the advent of the jet fighter in the early post-war years the decision was taken to convert to this new form of propulsion. Whilst waiting for deliveries of the de Havilland Vampire the Air Force took delivery of 100 surplus F-51D Mustangs, these being phased out of service in 1956.

Uruguay took delivery of a limited number of P-51Ds just after the close of World War II, and these were still in service in the 1960s.





Above and below: *F-51Ds of the post-war period showing* (top) *old-style insignia and* (below) *contemporary-style insignia.*

P-51 VARIANTS

A number of variations of the basic P-51D airframe were built and performed useful service. One major modification was the F-6D-20-NT to F-6D-25-NT tactical-reconnaissance aircraft built mainly at the Dallas plant. One hundred and thirty-six F-6Ds were built and they differed principally from the interceptor version in having oblique and vertical cameras installed in the rear fuselage. Other extra equipment included additional radio and D/F gear.

Another major modification was the TP-51D trainer, of which only a token batch of ten was constructed. An additional seat was installed behind the normal seat and was fitted with full dual control (the pupil sat in the front seat). The extra seat was accommodated under the normal bubble canopy, and the radio moved from its usual position to a place in the rear fuselage. One very special TP-51D was modified further for use as an observation aircraft and used by General Eisenhower, the Supreme Allied Commander in France, for inspection of the Normandy beach-head in June 1944.

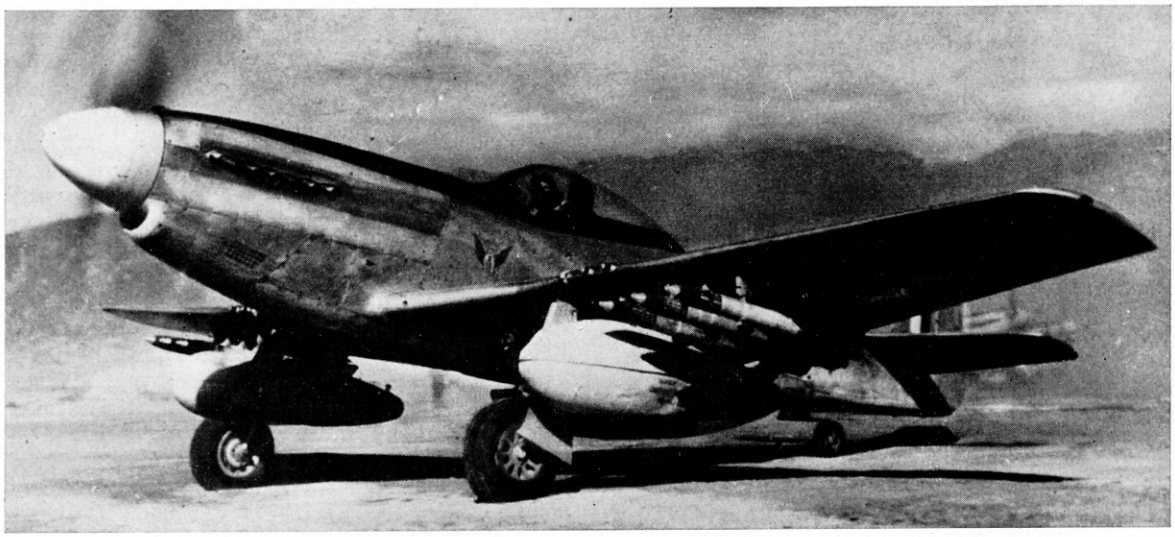
Another "one-off" P-51D was 44-84900, a war surplus machine that was used for testing the feasibility of using the Mustang as a ship-board fighter. The tail unit was modified by the addition of an extra-large fin strake, and the wings strengthened to absorb the landing loads of an arrester-hook deceleration. A series of deck-landing and take-off tests were initiated on the U.S.S. *Shangri-La*, the pilot, one Lt. R. M. Elder.

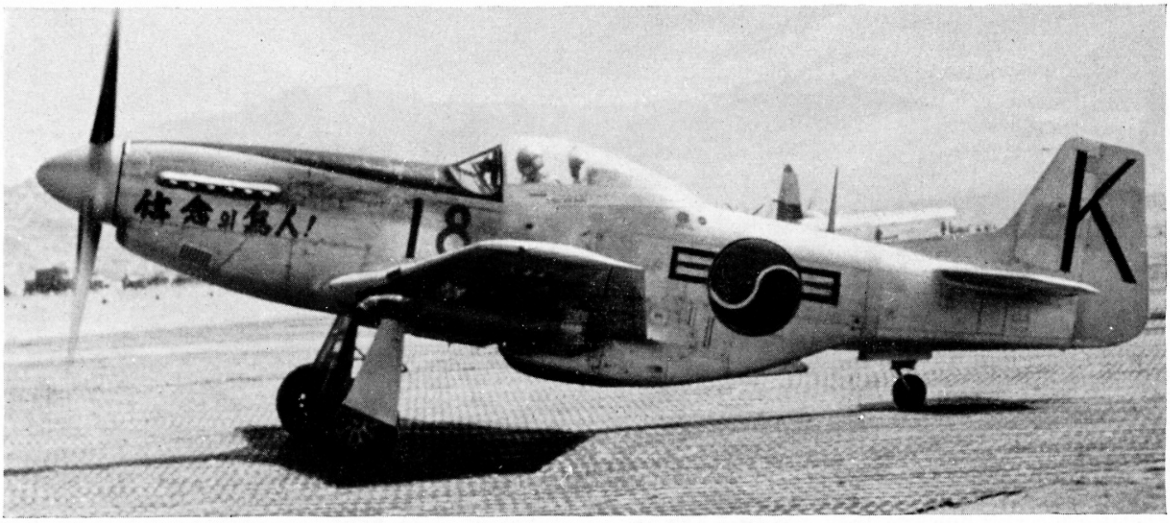
For the tests it bore the designation ETF-51D-25-NT, indicating that it had been constructed at Dallas. After the war it was allocated to the Pennsylvania National Air Guard, and for some curious reason re-designated TF-51D-NA (Inglewood), and as such served with the 148th Fighter Interceptor Squadron.

THE P-51D DESCRIBED

Structurally the Mustang was a low-wing cantilever monoplane with a N.A.A.—NACA laminar-flow wing section. The wing was built in two sections and bolted together on the fuselage centre-line, the upper surface forming the cockpit floor. It was a two-spar, all-metal structure with flush-riveted Alclad skin, the spars having single plate flanges and extruded top and bottom booms. The remaining structure was pressed ribs with lightening holes and extruded spanwise stringers.

F-51D of the South African Air Force is seen in Korea prior to take-off on raid. Note bulky tank, wing rockets and Cheetah motif under cockpit. Aircraft flew with the "Flying Cheetahs". (Photo: S.A.A.F.)



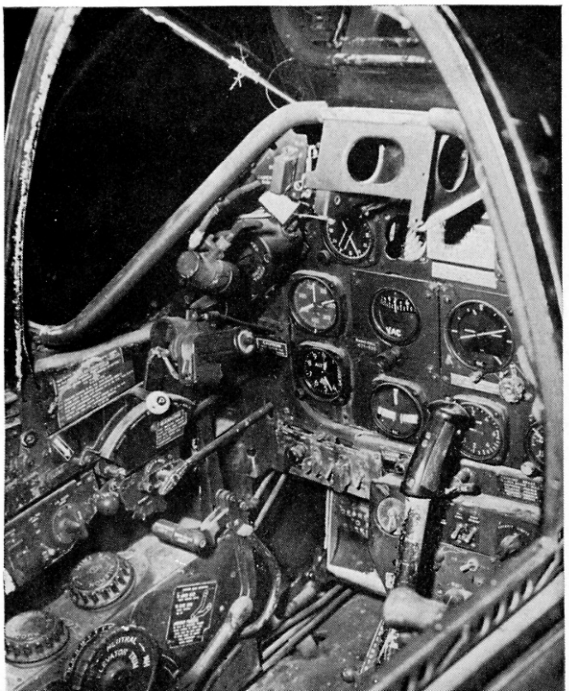


F-51D of the South Korean Air Force with rocket projectiles under wing.

Metal-covered ailerons were hinged to the rear spar, the port aileron having a controllable trim tab. Trailing-edge flaps were installed between the ailerons and fuselage.

The fuselage was an all-metal, semi-monocoque structure built in three sections—engine, main cockpit and tail section. The engine was mounted on two V-type cantilever bearers built up of plate webs and top and bottom extruded members, each attached at two points to the front fireproof bulkhead of the main section. The latter was made up of two beams, each comprising two longerons which formed the caps. The skin, reinforced with vertical frames, formed the webs. Aft of the cockpit the longerons extended into a semi-monocoque structure reinforced with vertical frames.

Cockpit detail of P-51D Mustang.

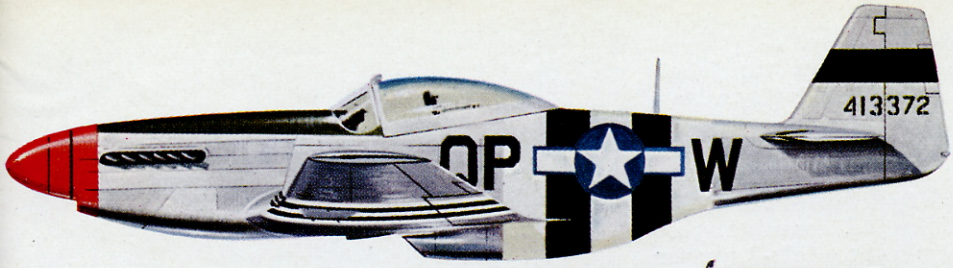


The detachable tail section was similar in construction to the main section.

The tail plane was a cantilever monoplane built in one piece with detachable tips. Structurally it comprised two spars, pressed ribs and extruded stringers, the whole covered with a stressed Alclad skin. The fin was virtually similar. Rudder and elevators had aluminium-alloy frames with fabric covering. The control surfaces were dynamically balanced and had trim tabs. Two self-sealing fuel tanks were fitted as standard—one in each wing situated between the spars and each containing 92 gallons of fuel. An auxiliary tank containing 85 gallons was installed in the fuselage aft of the cockpit, and there was provision for two jettisonable tanks under the wings. These were of either 75- or 110-gallon capacity, and radii of action with various fuel loads were as follows: internal tanks only, 475 miles; with two 75-gallon tanks, 650 miles; with two 110-gallon tanks, 850 miles.

ARMAMENT

Main armament of the P-51D was six 0·5-inch Browning machine guns installed three per wing, with a maximum ammunition capacity of 400 rounds per gun for each of the inboard and 270 rounds for the centre and outboard guns, providing a total of 1,880 rounds. The centre guns could be removed, reducing armament to four guns and the same amount of ammunition, but the Mustang could then carry either two 1,000-lb. bombs; ten 5-inch, high-velocity rockets or six bazooka-type rocket launching tubes installed in banks of three under each wing. As the potency of the unguided rocket became known they were fitted to the P-51D and for the record the final 1,100 P-51D-25-NAs constructed had two zero-length launching stubs for the 5-inch rockets installed under each wing, thus obviating the need for the weighty rocket tubes. The machine guns were adjusted to converge at 300 yards range, but some pilots preferred to narrow the range to as little as 250 yards and adjusted their guns to suit.

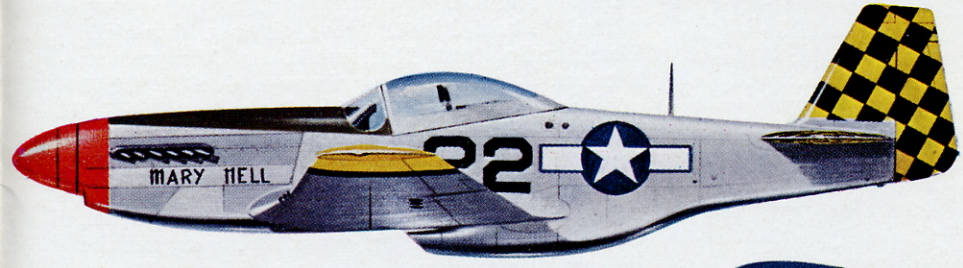


P-51D Mustang of the 334th Fighter Squadron, 4th Fighter Group, 8th Air Force. Stationed at Debden, Essex.

P-51D Mustang of the 55th Fighter Squadron, 20th Fighter Group, 8th Air Force. Station — Kingscliffe, Northants.
'Little Lady'

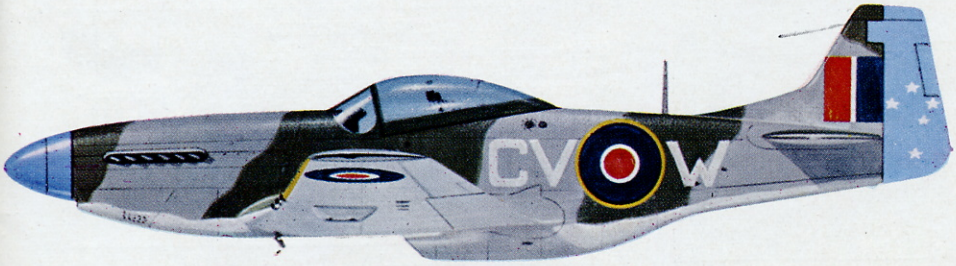
P-51D Mustang of the 343rd Fighter Squadron, 55th Fighter Group, 8th Air Force. Little Walden, Herts.
'The Millie G'

P-51D Mustang of the 307th Fighter Squadron, 31st Fighter Group, 15th Air Force. Mondolfo, Italy.



P-51D Mustang of the 317th Fighter Squadron, 325th Fighter Group, 15th Air Force. Vincenzo, Italy.

Mustang IV, No. 112 Fighter Squadron, 239 Fighter Bomber Wing, Desert Air Force. Lavariano, Italy.

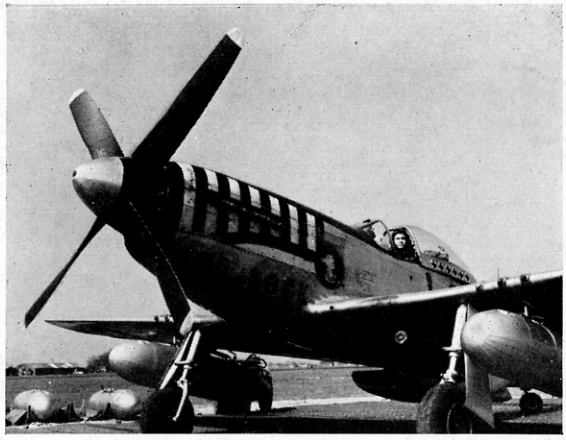


Mustang IV, No. 3 R.A.A.F. Fighter Squadron, 239 Fighter Bomber Wing, Desert Air Force. Zarro, Yugoslavia.

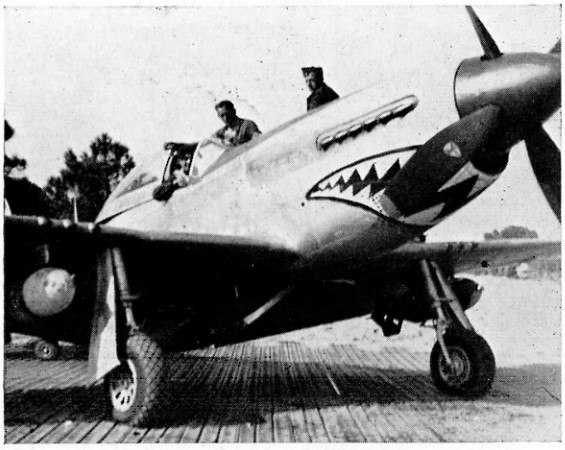
THE MUSTANG ENGINE

Standard engine for the P-51D was the liquid-cooled, 12-cylinder, Packard-built, Rolls-Royce Merlin V-1650-3 or -7 developing 1,400 h.p. at take-off. The original Mustangs were fitted with the low-altitude rated Allison engine, but as the possibilities of the Mustang as an high-altitude fighter became realised it was decided to fit a Merlin engine. For this purpose four Mustang Mark Is were sent to Rolls-Royce for use as development aircraft—*AL963*, *AL975*, *AM203* and *AM208*. They had Merlin 61 series engines installed with a frontal radiator in addition to the normal ventral scoop. The Mustang/Rolls-Royce combination was an instant success and it was adopted as standard for all the Mustang variants. To increase the flow of engines the Packard Car Company of America built the Merlin under licence.

The Merlin was fitted with an injection-type carburettor and a two-stage super-charger. With the super-charger working, the -3 engine cut-in at 19,000 feet and on the -7 between 14,500 and 19,000 feet. The super-charger was automatic but could be manually over-ridden. In order to give the engine an extra burst of power during an emergency, the throttle could be pushed past the gate stop, breaking the safety wire. If used longer than five minutes there was a risk of severe engine damage.



"Sad Sack", P-51D of the 55th Fighter Squadron, 20th Fighter Wing, 8th Air Force. Based on Kingscliffe, Northants. Compare with colour side views, page 11 and "Little Lady" also pages 11 and 5. (Photo: Richard Ward)



Study in shark's smile, the latter pioneered by No. 112 Squadron, Desert Air Force. (Photos: Richard Ward)

Mustang pilots were left in no doubt when the super-charger cut into the high-blower position for the aircraft shuddered violently. They had to learn to anticipate the cut-in and reduce throttle. When descending the change to low-blower took place at about 14,500 feet, and the only indication of the event was a drop in manifold pressure.

The Packard Merlin drove either a four-blade Hamilton-Standard Hydromatic or Aeroproducts automatic, constant-speed airscrew. Coolant (30/70 ethylene-glycol/water) and oil radiators were installed in the pronounced belly scoop radiator fairing under the fuselage.

One weakness of the Merlin was that it could be put out of action by a single bullet or piece of shrapnel, but this applied to all liquid-cooled, in-line engines and did not detract from the Mustang's all-round capabilities, and the aircraft was a welcome sight to the Fortress crews as they plunged deep into German skies during the daylight offensive against the Nazi armament industries.

Price of the P-51D Mustang with the Packard-Merlin engine was 50,985 dollars, a remarkably low figure for such an efficient and graceful aeroplane.

SPECIFICATION

Dimensions: Wing span 37 ft. $\frac{5}{16}$ in.; length 32 ft. $3\frac{1}{4}$ in.; height 13 ft. 8 in.; wing area 233·19 sq. ft.
Weights: Empty 7,125 lb.; gross weight 10,100 lb.; maximum weight (with 489 gallons of fuel) 11,600 lb.
Performance: Maximum speed at 25,000 ft.—437 m.p.h., at 15,000 ft.—413 m.p.h., at 5,000 ft.—395 m.p.h.; cruising speed 362 m.p.h.; landing speed 100 m.p.h.; service ceiling 41,900 ft.; climb rate 3,475 ft. per min.; range 950 miles with minimum 269 gallons, 2,300 miles with maximum 489 gallons.

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