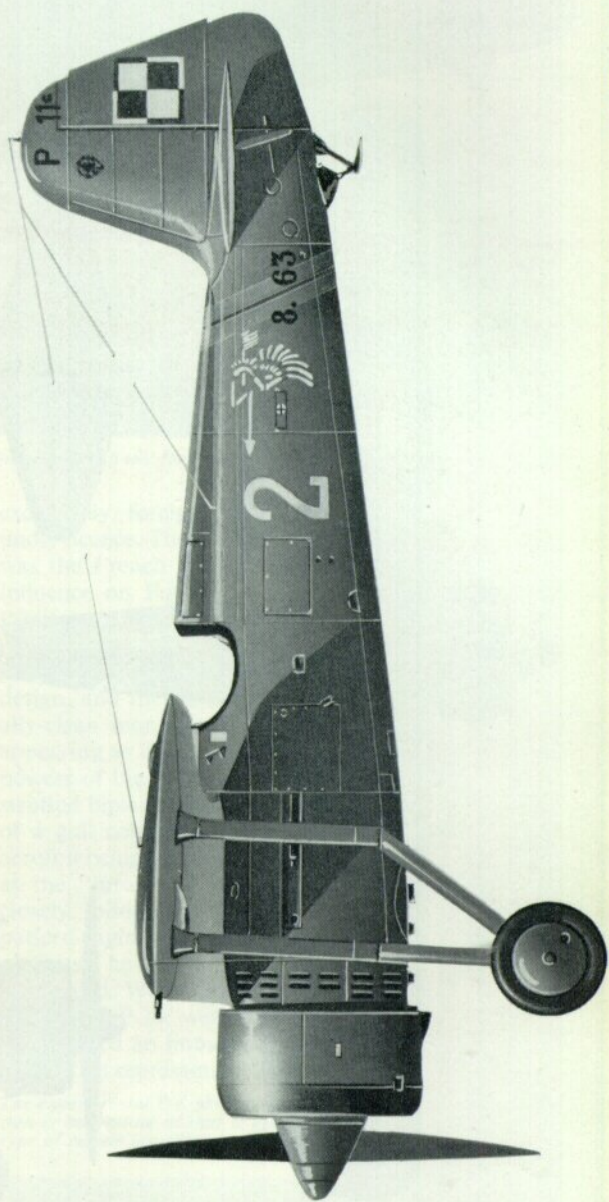
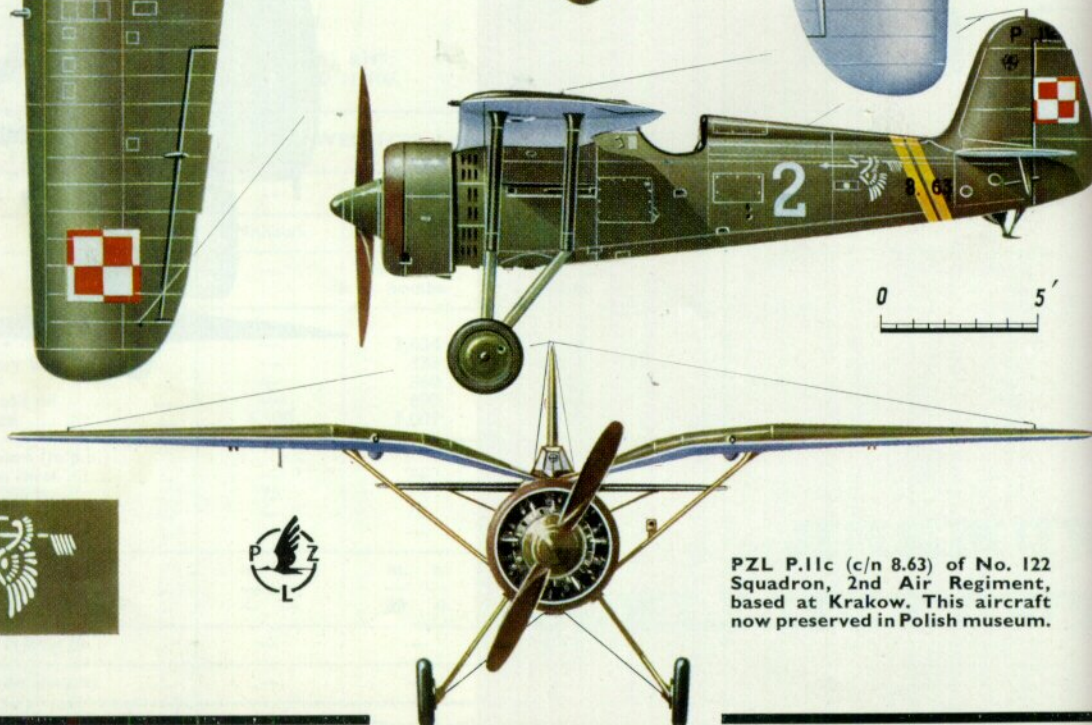
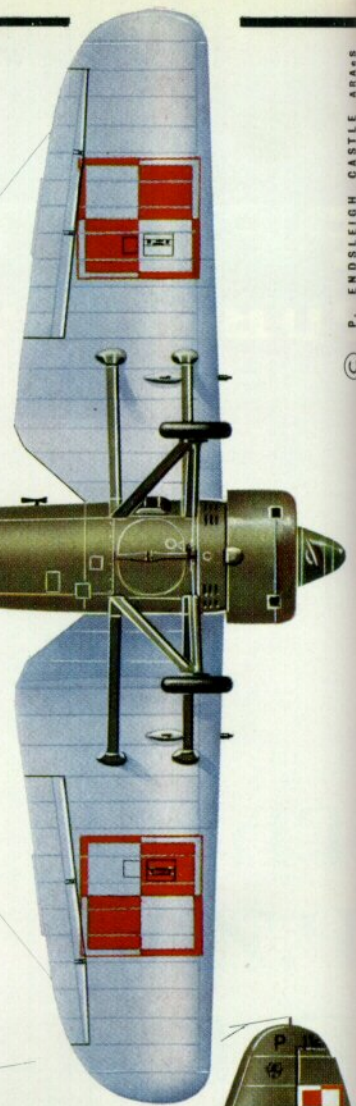
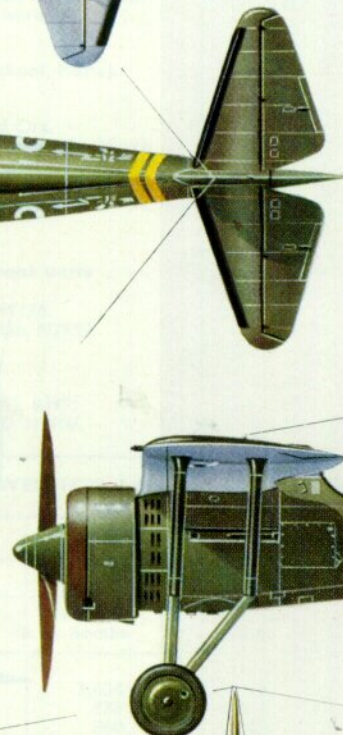
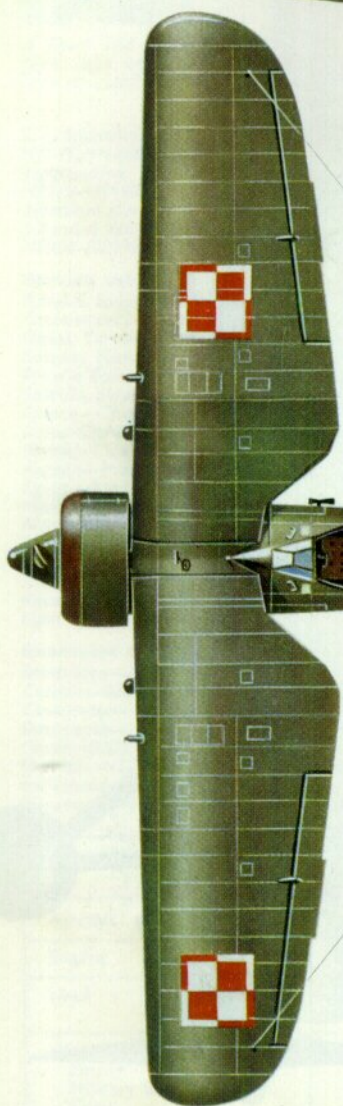
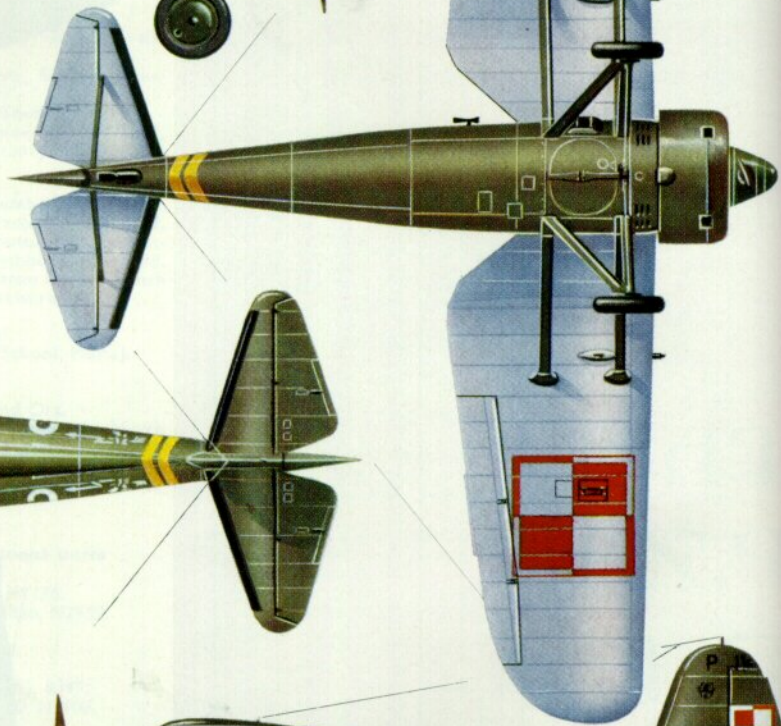
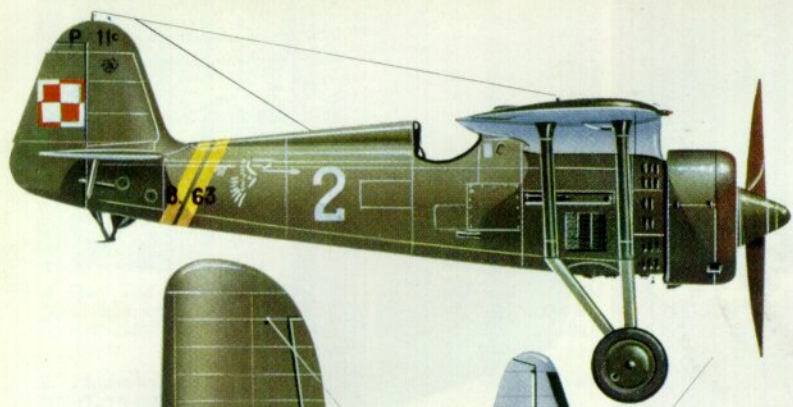


PROFILE PUBLICATIONS

The
P.Z.L.
P-11

NUMBER 75
TWO SHILLINGS





0 5'



PZL P.11c (c/n 8.63) of No. 122 Squadron, 2nd Air Regiment, based at Krakow. This aircraft now preserved in Polish museum.

The P.Z.L. P-11



by Witold Liss

P.Z.L.s of the 1st Air Regiment photographed at Warsaw in 1939. The machine in the foreground is a P-11a, the remainder P-11c's. (Photo: J. B. Cynk)

The reasons for an aircraft being particularly remembered by the historian and enthusiast are many and varied; but the most frequent include unusual beauty or peculiarity of appearance, particular achievement in service, or the marking of some historic point in design progress. The Spitfire had beauty; the P-51 gained immortality through its widespread and successful service; the Me 262 is remembered as the world's first jet fighter in squadron service. The P.Z.L. P-11 *Jedenastka* represents a mixture of qualities which won it a special place in the hearts of the Polish nation, and all others who traced the agony and the triumphs of that tortured country during the Second World War. It would not be easy to name an aircraft which at its birth represented a greater step forward in design, and yet was so nearly obsolete in the days of its greatest test; or an aircraft of more beauty which despite the great odds against it performed its work so well, and won such affection from its pilots. To her pilots the little gull-winged P-11 was essentially feminine; "She—the Eleventh"; and they remember her as they would remember a woman.

THE P-SERIES FIGHTERS

All the P-series fighters were designed by Ing. Zygmunt Pulawski, born in Lublin in 1901, and a graduate of the *Politechnika Warszawska* Technical University. In 1924, the Aviation Department of the Polish War Ministry proposed a contest for the best combat aircraft design; Pulawski entered and tying in third place was enabled to go to France for further technical education. On his return he passed through the Polish military pilots' school and later joined the P.Z.L. (*Panstwowe Zaklady Lotnicze*, State Aircraft Factory) in Warsaw.

The Polish aircraft industry was given an excellent incentive to progress when in 1928 the Skoda works-Polish branch began production of aircraft engines; up to that date the industry had produced almost

exclusively foreign machines of wooden structure under licence. The first all-metal design built in Poland was the French Vibault 70 fighter, which had some influence on Pulawski when he came to design his P-series. Although displaying features of the "French school", his machines introduced several original innovations, notably the highly characteristic wing design, and the general concept of the aerodynamically-clean monoplane, which was a significant step, appearing as it did at a time when the major aviation powers of the world were still wedded to the idea of strutted biplanes. Pulawski's "Polish Wing" consisted of a gull configuration with two parallel struts, the aerofoil being thinnest at the fuselage join and thickest at the "break". The angle of the inboard sections closely followed that of the cylinders of the Vee-pattern engine. The advantages of the gull layout were obviously headed by the unobstructed forward vision it afforded. When later models in the series, from the P-6 to the P-24, were fitted with radial engines, this necessitated an immediate lowering of the thrust line and in fact represented a distortion of Pulawski's idea.

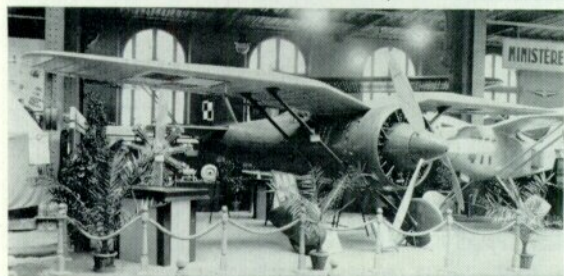
The experimental P-8 never reached production, but this illustration is interesting in that it gives an impression of the original type of engine installation by Pulawski.

(Photo: via the author)





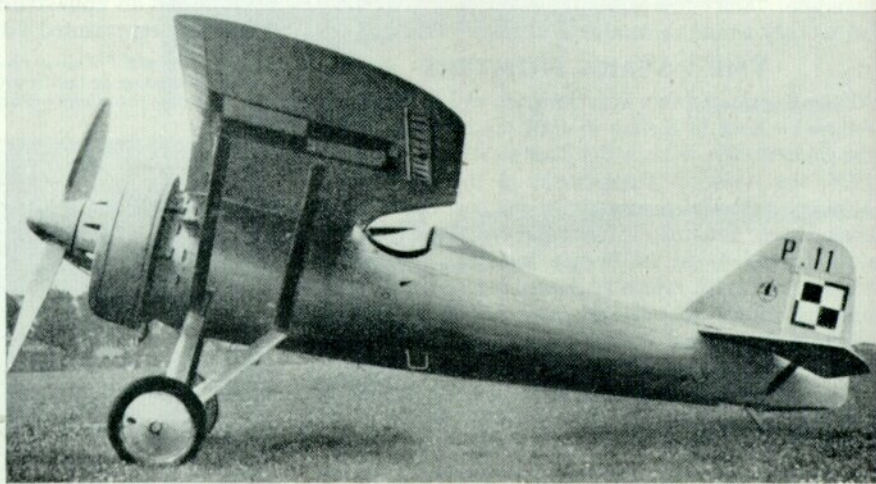
Left, top to bottom: *The P-11 was first examined by the aeronautical world at large in December 1932 during the Paris Salon. It excited favourable comment and great interest at a time when most of the major powers still retained confidence in the strutted biplane as a first-line fighter.* (Photos: via G. Cattaneo)



The Polish Wing consisted of a two-spar duralumin structure with ribs riveted to spars and skin, the latter being made up of finely corrugated Vibault duralumin sheeting. The slotted ailerons were of metal construction, fabric covered. The wing aerofoil was the Polish Bartel BM 37 IIa, with an inboard thickness of 6.5%, reaching 16% at the junction of wing and strut and 8% at the tip. The Hispano Suiza V liquid-cooled engine of 600 h.p. was selected for the P-1; and the first prototype flew in September 1929. The design was fully vindicated when in 1930 it won first place in the Bucharest competition against such aircraft as the Bristol Bulldog and the Dewoitine D.27. Unfortunately, the Polish War Ministry raised objections

The third and production prototype of the P-11, which participated in the 1932 National Air Races in the United States.

(Photo: J. B. Cynk)



to the Hispano powerplant on economic and practical grounds; and as a result all P-series machines powered by in-line engines remained in the prototype stage.

The first radial-engined variant, powered by a 500-h.p. Bristol Jupiter VI FH cowled in a Townend ring, was designated P-6. Engine overheating problems rendered the P-6 rather troublesome in service, and several changes were made which eventually resulted in the appearance of the P-7, the most significant forerunner of the later models. Tragically, Pulawski was killed on 21st March 1931 due to control malfunction during a test flight of a light amphibian of his own design. The death of this brilliant pilot and designer was a great loss to the Polish aviation industry; but work on the P-series continued under the direction of Ing. Wsiewolod Jakimiuk, later designer of the SE 5000 Baroudeur, the DHC Chipmunk and the DHC Beaver. As the head of P.Z.L.'s fighter team, Jakimiuk finished the P-7 project; this was the first of the series to see serial production. It was a development of the P-6 powered by a 585-h.p. Bristol Jupiter VII F; some 150 machines were produced, remaining in service with the Polish Air Forces until 1939, and some 30 aircraft were still in squadron service during the Polish campaign of that autumn.

THE P-11 APPEARS

The first prototype of the next (and for Polish units, final) model in the P-series, the P-11/1, flew for the first time in September 1931, and it immediately became obvious that for its time this fighter was a world-beater. The prototype was powered by a Gnôme-Rhône (Bristol) Jupiter, similar to those used in the P-7. The P-11/2 and /3 were powered with Bristol Mercury engines (P-11/2 fitted with a G-R Mistral K.9 in 1932). The fourth and fifth machines were similar to the P-11/3, and the P-11/6 was the production prototype, with an exhaust collector ring. All prototypes were tested with several different pro-

plers, and the final configuration of the P-11/6 was retained for the initial production batch of 30 P-11a's. This batch was completed in one year—1934—and all aircraft were fitted with the Bristol Mercury IV S2 built by the Polish Skoda works.

In December 1932 the P-11/2 was exhibited at the *Salon International d'Aeronautique* in Paris, where it had excited much favourable comment as a revolutionary modern design. In July 1932 the P-11/3 had been sent to the International Contest at Zürich. In a speed contest for single-seat fighters round a 367-km. triangle, Jerzy Bajan, the Challenge pilot, placed the P-11/3 second to the Hawker Fury flown by the Yugoslavian Captain Sintic. The Fury recorded a speed of 318 km./h. against the P.Z.L.'s 310 km./h.; however, the Polish Aero Club authorities protested at the addition of lead ethyl to Sintic's fuel. In Zürich the P-11 came up against its old adversaries, the Bulldog, D.27 and also the Fokker D.XVI. One of the later prototypes took part in the U.S. National Air Races in 1932, and won the admiration of many interested spectators.

The P-11a was introduced to service units in 1935 and almost immediately Roumania, concluding negotiations in hand since 1931, placed an order for one batch. Fifty machines were produced in slightly modified form and designated P-11b (see below "The P-11 Abroad").

During this period the P-11/3 underwent various tests to determine the best airscrew, those tested including the Chauvier, Bristol, Ratier and Letoviszomanski, the last-mentioned being eventually adopted for the further developments of the P-11. A side-effect of this programme was valuable information gained regarding power unit selection for the P-24.

After completing the P-11a order the P.Z.L. plant at Paluch Okęcie, Warsaw, immediately undertook production of a new version, the P-11c. The first examples quickly passed service acceptance tests and reached the fighter units during 1935. By 1936 monthly output of P-11c's reached 25 machines, and continued until 1936-37. The full production order was for 175 machines; and after the completion of delivery in 1937 the type gave place on the production lines to the P-24. During 1936, however, some trouble occurred over the production of fuel tanks. Made by a private sub-contractor, these tanks were assembled with riveted joint-lines covered with a resin sealer. This type of seam proved very sensitive to vibration, however, and was therefore replaced by a welded joint.



P-11/3 at the 1932 Zürich Meeting.

(Photo: courtesy of Skrzydlata Polska)



This close-up of the tail of a damaged P-11a of No. 113 Squadron, 1st Air Regiment ("Owls" Squadron) shows to advantage the flatter silhouette of the P-11a's tail and the squadron emblem.

(Photo: J. B. Cynk)



P-11c during construction.

(Photo: via the author)

This proved a disastrous change; the welded joints began to fail early in the aircraft's service life, and eventually the acceptance commission began to reject deliveries of machines with this type of installation. Extensive experiments with various types of seam led eventually to a satisfactory welding technique,



A P-11c (foreground) and P-11a's of No. 113 Squadron.

(Photo: J. B. Cynk)

THE P-11 DESCRIBED



Standard production P-11c, with four-gun armament.

(Photo: J. B. Cynk)



Line-up of the 1st Air Regiment's P-11c's at Warsaw Air Base in summer, 1939.

(Photo: J. B. Cynk)



P-11c of the Commanding Officer of Fighter Dyon III/6, comprising Nos. 161 and 162 Squadrons of the 6th Air Regiment. (Photo: via Sqdn. Ldr. F. Kornicki)

and the problem was completely overcome at the cost of some delay in service deliveries.

The story of the P-24 does not fall within the scope of this work, and will be covered in a future *Profile*; however, it is pertinent to record here the story of the *Kobuz* project. Due to the inability of the War Ministry to obtain delivery of the MS 406, Hurricane or Spitfire during 1938, and the hold-ups in the P.Z.L. 50 *Jastrzab* programme, the original P-11 airframe was stressed and tested for a new engine, the P.Z.L. (Bristol) Mercury VIII of 840 h.p. The new variant, named *Kobuz*, was ordered from the P.W.S. Biala Podlaska works in July 1939. The type was planned for an armament of four 7.7 mm. Wz.36 machine guns and was expected to retain the P-11's excellent manoeuvrability while achieving a higher speed. First machines were scheduled for completion in May-June 1940; according to some reports the prototype was completed and flown in August 1939; but the War put paid to this project, and the Polish Air Forces faced the swarms of enemy still mounted in P-11a's and P-11c's.

All versions of the P-11 were built with very similar techniques, and the following description of the P-11c, as the major production variant, may be taken as representative. The aircraft was an all-metal shoulder-wing monoplane with fixed undercarriage. Powerplants used were the P.Z.L. (Bristol) Skoda Mercury V S2 of 560 h.p. and later the Mercury VI S2 of 645 h.p. driving a wooden two-blade fixed-pitch airscrew produced by the firm Szomanski. Armament varied from two to four 7.7 mm. Vickers (later Polish 7.7 mm. Wzor 37) machine guns. The fuselage, of all-metal construction with duralumin skinning, had the engine bay forward with an engine bearer in the form of a duralumin ring strengthened by L-shaped frames; the engine itself was mounted on rubber vibration absorbers of the "Lord" type. The fuel installation comprised the main jettisonable 213-litre tank placed in a fuselage bay aft of the firewall, and an additional 11-litre gravity tank in the port wing, all joined by fuel lines and Le Bosc-type fuel cocks. The oil tank, of 27-litre capacity, was placed near the oil cooler on the aft face of the firewall. The wings were of two-spar all-metal construction, the double-T section main spars being skinned with corrugated duralumin sheets of Vibault patent, riveted to spars and ribs with Daude-type rivets. Tail surfaces and ailerons were of similar design. The wing/fuselage joint was a steel component fixed to duralumin bearers on the upper part of the first and second fuselage frames; each wing was also supported by two parallel struts of duralumin with streamlined cross-section, the forward struts being additionally strengthened with duralumin plate. Single struts supported the horizontal tail surfaces. The undercarriage was of the "scissors" configuration, an original P.Z.L. patent, consisting of two V-struts streamlined with tin-plate, and two Avia-type oleo pneumatic shock absorbers were attached to the first fuselage frame; both undercarriage legs were braced with steel wire. The tail skid was fitted with a similar Avia shock absorber.

Apart from the Wz.37 guns, manufactured by the Warsaw National Armaments Factory (P.W.U.) a camera gun and four bomb-racks each capable of

P-11c's of No. 142 "Wild Ducks" Squadron, 4th Air Regiment, in flight in the summer of 1939. The machines with white-painted fin tips were the aircraft of Flight Commanders.

(Photo: J. B. Cynk)



Detached K.O.P. (Border Protection Corps) Flight from No. 161 Squadron stationed at Sarny for firing practice in the spring of 1939. Note upper wing markings denoting service with the K.O.P.; the squadron's "Turkey" emblem was applied later in the year to the fuselage sides. (Photo: via Sqdn. Ldr. F. Kornicki)



carrying one 12.5-kg. bomb were fitted. In four-gun machines, two guns were mounted in the wings, one just outboard of each wing "break", to fire obliquely upwards at a 3° angle; the other two guns were mounted in side fuselage bays, with barrels exposed, firing inside the nose-skinning and Townend ring. Only the fuselage guns were synchronised; wing guns carried 300 r.p.g., fuselage guns 500 r.p.g., all ammunition in steel-link belts loaded in the sequence armour-piercing/incendiary/explosive/armour-piercing, etc.

The open cockpit was protected by a plexiglass windshield, and equipped with a complex of Polish navigational and engine control instruments and a German Züru compass. Safety equipment comprised three "knock-out" flame dampers, one Salva Ra flame damper, a fuel-tank jettisoning device and Siebe-Gorman Mk. VIII oxygen equipment. Theoretically all P-11c's should have been radio-equipped but in practice only about one in three were. All machines carried a flare pistol and twelve cartridges, but the majority of pilots used the classic communication techniques of wing-rocking and hand signals. Additional engine equipment comprised the Viet 200 starter with Bth ASZ-type starter switches.

The P-11a differed mainly in power plant—the 9-cylinder air-cooled radial Skoda Mercury IV S2 of 500 h.p. with supercharger. Armament comprised two 7.7-mm. guns in fuselage bays with 700 r.p.g., and the most visually characteristic difference was the lower, flat-topped fin and rudder assembly. The engine in the P-11a was mounted 100 mm. higher, the pilot's seat 50 mm. lower and 300 mm. farther forward. The dihedral of the inboard wing sections was slightly less than in the P-11c; all these differences had slight effects on the performance figures. The Roumanian Air Force P-11b corresponded closely to the P-11a, and the P-11f to the P-11c, with slight armament and installations differences.

THE P-II ABROAD

The *Jedenastka* was produced in two countries only, Poland and Roumania, and served only with these two air forces. During 1936 the Spanish Republican Government entered negotiations to buy a batch of P-11s, and the sale of an initial batch of 15 machines was almost finalised when a Polish diplomatic note of 29th July 1936 put a stop to the discussions.

The first batch of aircraft ordered by Roumania consisted of 50 machines, and to fill this order P.Z.L. developed the P-11b, which was, as stated above, a



The emblem of No. 161 "Turkeys" Squadron. (Photo: via Sqdn. Ldr. F. Kornicki)

modified P-11a with the Roumanian-built Gnôme-Rhône K.9 Krse engine of 595 h.p. and Roumanian instruments. The first deliveries took place in 1934, and negotiations for licence production in Roumania opened the same year. These discussions did not in fact reach a conclusion until the entire P-11b order had been completed, and it was the modified P-11c designated P-11f that was built in Roumania. In 1934 a group of technicians led by Ing. Timesencu came to the P.Z.L. plant from the Roumanian I.A.R. concern (*Industria Aeronautica Romana*) to study construction techniques, and after some six months they returned home to supervise the programme; no members of the Roumanian industry had any experience in the construction of all-metal aircraft. However, many problems arose, and despite considerable assistance from P.Z.L. (in the early stages taking the form of deliveries

A P-11c of the "Fighting Cocks" in flight. (Photo: J. B. Cynk)





A flight of No. 121 Squadron P-11c's running-up.

(Photo: J. B. Cynk)

of half-completed wings and entire fuselages) production was extremely slow. During the period 1935-37 I.A.R. built only 120 P-11s and P-24s, with a yearly production of about 40 P-11f's. Various small systems changes were made in Roumania; all P-11f models were four-gun aircraft, and special low-pressure tyres were fitted for use from unprepared airstrips.

After September 1939 numerous Polish workers from the P.Z.L. plant were evacuated to Roumania to avoid the German onslaught; Poles formed several teams in I.A.R. especially in the technical control divisions, and played a large part in the production of the P-24. Although the entire strength of Roumanian P-11s never exceeded 120 machines, they equipped five fighter squadrons and were still in service when Germany and Roumania allied against the U.S.S.R. in 1941. Several types of aircraft of Polish origin served with the R.R.A.F., the P-37, P-23 and P-43 as well as the P-11. It was only through experience gained while producing the P-11 and P-24 under

licence that I.A.R. was able to produce the first indigenous fighter monoplane, the I.A.R. 80. No less than 26 Polish technicians held key posts in I.A.R. at this time, and after the cessation of P-24 production the tail assembly and aft fuselage of this design was used, unchanged, on the I.A.R. 80. All Polish workers were made welcome by I.A.R. and later the company helped them to leave Roumania to escape purges by the SS and SD.

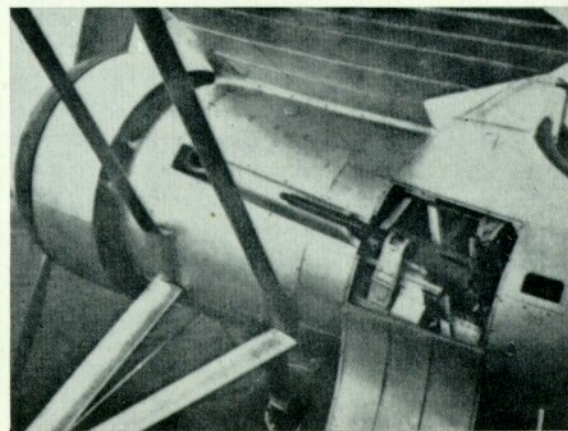
It has been rumoured that some captured P-7s and P-11s were test-flown by the Germans during the last months of 1939. No evidence can be found to support this claim, however; the only known cases of use by the Germans are the rough re-assembly of parts of wrecked machines for purposes of staging mock "kill" photographs for the propaganda services. However, these were by no means perfect replicas and the modern researcher can identify the fakes without difficulty.

DEFIANCE AND ANNIHILATION

The organisation of the Polish Air Forces changed several times in the pre-war years to accommodate the varying rôles it was called upon to perform; but after the late 1920s the strength of the service was

Details of the P-11c: (left) Wing strut attachment point, showing empty cartridge ejector chute for wing gun, and corrugated skin effect; (below) Fuselage gun installation, with cover plate swung open.

(Photos: via the author)





Details of the P-11c: (above) Cowling (note jettisonable fuel tank visible on underside of fuselage); (right) Main undercarriage gear.
Photos: via the author.



divided into Air Regiments composed of units of various types of machines. Each of the six regiments included a fighter force of two or three squadrons; on 1st September 1939 the fighter force had 158 first line fighters, 128 P-11s and 30 P-7s. The 1st Air Regiment was based on Warsaw, the 2nd at Krakow, the 3rd at Poznan, the 4th at Torun, the 5th in the Wilno/Lida area, and the 6th at Lwow. Until the beginning of hostilities the fighter units were rigidly attached to the regimental organisations, but during the brief fighting they were detached in order to give the maximum support to ground forces. The units were numbered according to the following sequence. Fighter and bomber squadrons carried a three figure designation, reconnaissance units a two figure code. The first

Cockpit of the P-11c.

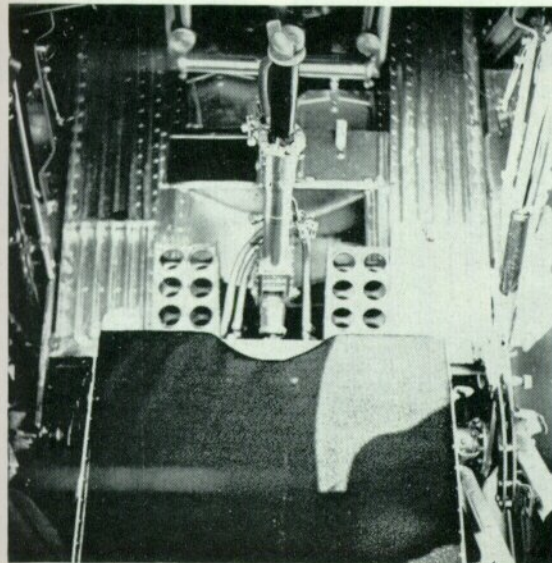
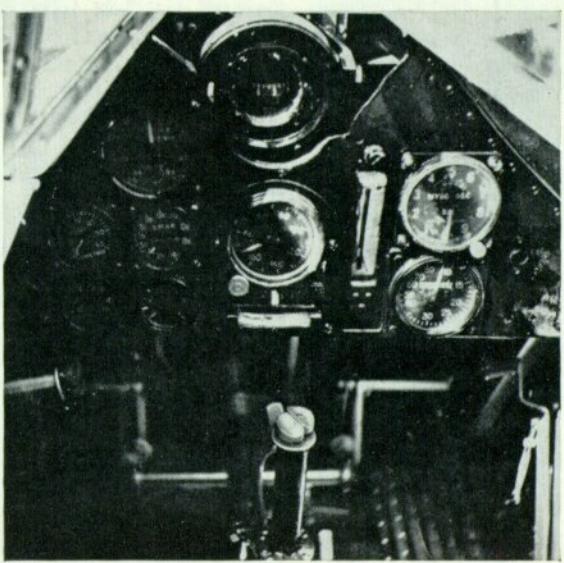


figure referred to the type of unit, "1" denoting fighters, "2" denoting bombers. The second figure denoted the regiment, and the third the squadron within the regiment. Thus 124 Fighter Squadron was the designation of the 4th fighter squadron of the 2nd Air Regiment at Krakow. Virtually all squadrons had a colourful emblem painted on the fuselage side corresponding to the popular name of the unit, e.g. "Owls", "Wild Ducks", etc. After about the 6th September 1939, these markings were usually over-painted with the standard olive shade, as were wing upper-surface insignia.

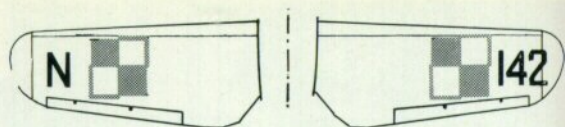
During the ominous spring months of 1939, the fighter squadrons were re-grouped in the following manner. A central fighter establishment, the *Brygada Poscigowa* or Pursuit Brigade, was formed of five squadrons, Nos. 111, 112, 113, 114, and 123, based around Warsaw for the defence of the capital and to

(Photos: J. B. Cynk)





The P-11c's Mercury engine bursts into life. (Photo: J. B. Cynk)



Underwing detail of a/c "3" No. 111 "Kosciuszko" Squadron. "N142" radio call sign in black. National insignia red only on pale blue undersurface.



P-11c, serial 8.63, of the 2nd Air Regiment's No. 122 Squadron, based at Krakow. This machine, no longer airworthy, is preserved in Poland as a museum exhibit. (Photo: F. Pawlowicz)

serve as a reserve pool for the C-in-C of the P.A.F. Squadrons drawn from the 2nd, 3rd, 4th, 5th and 6th Regiments were assigned as fighter cover to various ground formations; 121 and 122 to Army Krakow, 161 and 162 to Army Lodz, 131 and 132 to Army Poznan, 141 and 142 to Army Pomorze, and 152 to Army Modlin.

Operations had started in the summer of 1939 for the *Jedenastka*; German Dornier reconnaissance aircraft had begun to violate Polish airspace on photo-rece missions, and after warning fire from anti-aircraft batteries failed to deter them the fighters were ordered to intercept and force them to land. This was not in fact such an easy task as it may have appeared from the Staff offices of the War Ministry. The P-11 was a brilliant "pilot's aircraft" and had been a formidable weapon in 1934; but by 1939 was frankly obsolescent and no match for even a Dornier in performance. With a top level speed of 380 km./h. and an 8,000-m. ceiling, the P-11 was inadequate for intercepting Dorniers of the *Fernaufklärer Gruppen* which had a 20-km./h. speed advantage and a ceiling of 9,000 to 10,000 m. Combat experience at the outbreak of open hostilities showed that with the



Roumanian P-11b's, powered by the K.9 engine. Note early Roumanian Air Force roundel markings under wing-tips. (Photo: via the author)

exception of the Hs 126 and Ju 87, German machines could avoid action at will. The high numbers of kills achieved by Polish fighter pilots may be put down to their high determination and fighting spirit, and also to the fact that the *Luftwaffe*, confident of the superiority of their aircraft, seldom sought to avoid combat.

The cat-and-mouse interception attempts of the summer months ended abruptly immediately after 4.45 a.m. on the morning of 1st September. Great numbers of German aircraft appeared; there were 10 *Luftwaffe* machines, including three fighters, for every Polish fighter available. The Bf 109E had a 150-km./h. speed advantage and a 2,000-m. higher ceiling than the P-11, and they were no longer bothering to avoid combat. The first German aircraft to be shot down during the entire Second World War was a Ju 87 destroyed near Olkusz at 5.30 a.m. by Lt. W. Gnys of the 2nd Air Regiment; and the first Allied pilot to score two kills in one sortie was Lt. Gedymin of the 3rd Air Regiment. During the 1st, 2nd and 3rd September, 46 P-11s and P-7s were lost; but a fair proportion were repaired and returned to their units. In the same period 60 *Luftwaffe* machines were shot down. Even the P-7s scored some successes, a great tribute to the pilots of these obsolete fighters. On the 3rd September, P-11s made the first attack on a German armoured column, with small results and heavy losses.

During the fighting the P-11 proved itself most versatile, performing tactical reconnaissance and liaison sorties as well as fighter missions, and carrying a passenger on at least one occasion. However, the quantity and quality of German types committed to the campaign was too great for this brave but hopeless resistance to be prolonged more than a matter of days. Contrary to many reports, the main losses suffered by the fighter units were not caused by destruction on the ground. The entire Polish fighter force was exhausted

P-11a, No. 113 "Owl" Squadron, 1st Air Regiment, Warsaw.

No. 113 "Owl" Sqdn.



No. 152 Sqdn., 5th Air Reg., Wilno/Lida.

P-11c, No. 142 "Wild Ducks" Squadron, 4th Air Regiment, Torun.



P-11c, No. 111 "Kosciuszko" Squadron, 1st Air Regiment, Warsaw.



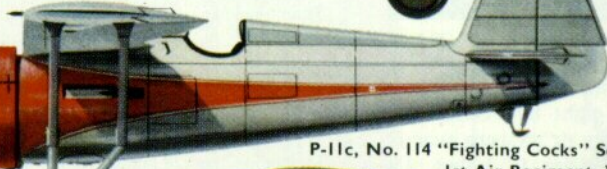
P-11c, 500 h.p. Gnome-Rhone 9 Krse. Mistral radial engine. Salon International d'Aeronautique, Paris.



P.Z.L. factory marking.



No. 111 "Kosciuszko" Sqdn.



P-11c, No. 114 "Fighting Cocks" Squadron, 1st Air Regiment, Warsaw.

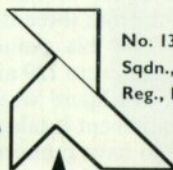


No. 114 "Fighting Cocks" Sqdn.

P-11c, No. 112 "Swallows" Squadron, 1st Air Regiment, Warsaw



No. 131 "Raven" Sqdn., 3rd Air Reg., Poznan.



No. 122 "Paper Horse" Sqdn., 2nd Air Reg., Krakow.



No. 132 "Raven" Sqdn., 3rd Air Reg., Poznan.



No. 161 "Turkeys" Sqdn.



P-11c, No. 161 "Turkeys" Squadron, 6th Air Regiment, Lwow, detached to K.O.P. (Border Protection Corps), Sarny

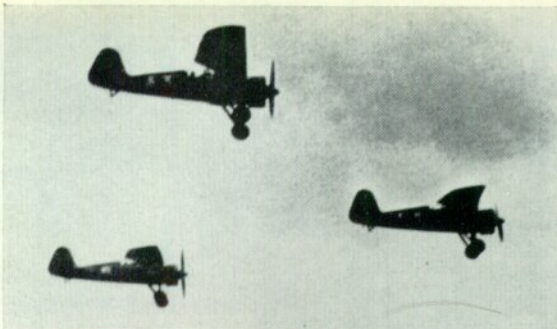


P-11f, Royal Roumanian Air Force.

Roumanian wing insignia.



K.O.P. identification markings, upper surfaces only.



A flight of No. 121 Squadron P-11's in the air.

(Photo: J. B. Cynk)



One of the few P-11's destroyed on the ground, in this case by a bombing raid during maintenance. (Photo: via the author)

in action. Of 166 fighters of all types, 116 were destroyed in combat, including eight by Polish and three by German ground fire. Fifty or so were evacuated to Roumania. Pilot losses were 12 killed, 15 wounded, and seven missing—giving the surprisingly low figure of 15% losses. This is all the more heartening when one recalls the distasteful fact that as early as 2nd September cases were recorded of German airmen attempting to kill adversaries who were descending by parachute; Lt. Szyszko of 142 Sqn. was seriously wounded by gunfire from three Bf 109s on that date while hanging from his parachute. German losses during this campaign were 129 aircraft destroyed in the air, an impressive figure when the great superiority of *Luftwaffe* equipment is taken into consideration. Poles are known to have rammed as a last resort on several occasions; a notable example is Lt.-Col. Pamula of 114 Sqn., who shot down one Ju 87, one He 111, and when attacked by Bf 109 escort fighters rammed one and baled out without injury.

The P-11 was in her day a revolutionary aircraft, and even in the twilight of her career put up a resistance against overwhelming odds which will always be remembered by an admiring world. Pilots who first joined battle mounted in the *Jedenastka* outlived her, and went on to fight on all fronts in aircraft better matched to those of the enemy, until they contributed at last to the victory they had earned so well.

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Units equipped with P-series fighters during the Polish campaign of September 1939.

	Squadron No.	Type	Quantity
1st A.R.	111	P-11	11
	112	P-11	11
	113	P-11	11
	114	P-11	11
2nd A.R.	121	P-11	10
	122	P-11	10
	123	P-7	10
3rd A.R.	131	P-11	10
	132	P-11	10
4th A.R.	141	P-11	11
	142	P-11	11
5th A.R.	151	P-7	10
	152	P-11	11
6th A.R.	161	P-11	12
	162	P-7	10

SPECIFICATIONS

	P-11c	P-11f
Span ...	10-719 m. (30-2 ft.)	10-719 m. (30-2 ft.)
Length ...	7-55 m. (25-19 ft.)	7-55 m. (25-19 ft.)
Wing area		
Weight:		
Empty ...	1,147-5 kg. (2,530 lb.)	1,108 kg. (2,440 lb.)
Fuel ...	272 kg. (600 lb.)	272 kg. (600 lb.)
Pilot and parachute	88 kg. (194 lb.)	88 kg. (194 lb.)
Loaded ...	1,590 kg. (3,500 lb.)	1,586 kg. (3,490 lb.)
Static stress coefficient...	16	16
Top speed at:		
Sea level	300 km./h. (186 m.p.h.)	280 km./h. (173 m.p.h.)
5,000 m. (0,000 ft.)	390 km./h. (242 m.p.h.)	360 km./h. (223 m.p.h.)
Climb to:		
16,400 ft. ...	6 min.	6½ min.
24,400 ft. ...	13 min.	13½ min.
Service ceiling	8,000 m. (24,400 ft.)	7,500 m. (22,800 ft.)
Absolute ceiling ...	11,000 m. (33,600 ft.)	10,500 m. (32,000 ft.)
Landing speed	98 km./h. (61-5 m.p.h.)	98 km./h. (61-5 m.p.h.)
Landing roll ...	343 m. (1,050 ft.) in 18-7 sec.	
Take-off roll ...	99 m. (302 ft.) in 6-5 sec.	
Engine ...	Licence-built Bristol Mercury VI S2	Licence-built Gnôme-Rhône 9 Krse.

A faked German propaganda photograph of a P-11 "destroyed in combat". Note unconvincing damage and strange "tail-plane". (Photo: via the author)

