PROFILE PUBLICATIONS

The P.Z.L. P-24

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P.Z.L. P-24G of the Royal Hellenic Air Force, 1940-41.

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The P.Z.L. P-24

by J. B. Cynk

In October 1933, P.Z.L. P.7a's of the Polish Air Force made an official visit to Rumania. The aircraft of Col. L. Rayski, C.-in-C. of the Polish Air Force, is in front. (All photos: the author)

Development of the P.24 provided the last, and most colourful, chapter in a story of the world-famous Państwowe Zaklady Lotnicze's line of fighter designs. For almost a decade the nimble little Pulawski-wing "P" monoplanes, in constantly refined form, had provided the backbone of the *Lotnictwo Wojskowe* (Military Aviation) interceptor squadrons; they had seen extensive use by air forces of four other countries, blooded in hectic battles with the *Luftwaffe* and the *Regia Aeronautica*, and their order book, including outstanding orders at the beginning of the World War II, exceeded a thousand.

With the appearance of the all-metal "P" fighters at various international competitions and exhibitions, foreign interest in the P.Z.L. design exceeded all expectations. As early as the end of 1929 the French Mureaux company approached P.Z.L. to discuss the possibility of purchasing licence rights for the P.1 fighter, and later, when the radial-powered P.6, P.7 and P.11 began to steal the show practically everywhere they went, export enquiries flooded the P.Z.L. offices. In 1930-33 interested customers included Bulgaria, Czechoslovakia, France, Greece, Hungary, Japan, Portugal, Rumania, Sweden, Turkey and Yugoslavia, and orders totalling some 250 "P" interceptors were under discussion.

There were two main stumbling-blocks standing in the way of successful conclusion of the negotiations: a question of finance, and a problem of power plant. Poland was unable to find capital resources needed to finance large scale production for export orders, and the potential customers sought payments by instalments and preferred to pay in goods rather than in exchangeable currencies. Because of these difficulties several deals fell through and others were postponed. As to the power plant problem, a ten-year licence agreement with Bristol forbade Poland to export home-manufactured engines and also put restrictions upon the sale of Bristol-powered Polish aircraft, even if the engines for them were to be supplied by the customers.

The P.Z.L. P.1/I as rolled out for the first time early in August 1929.

P.24 DEVELOPMENT

To free itself from the limitations imposed by Bristol, P.Z.L. decided to evolve an advanced fighter powered by an engine of a different make, aimed specifically at export markets. Gnome-Rhône seemed to be the obvious choice, and when first details of the new 700 h.p. Gnome-Rhône 14 Kds were made available to Poland, Wsiewolod Jakimiuk, who succeeded Zugmunt Pulawski after his tragic death on 21st March, 1931, evolved initial proposals for such a machine. The project, designated the P.24, was submitted for approval in February, 1932, and authorization to proceed with the detailed study was given in April.

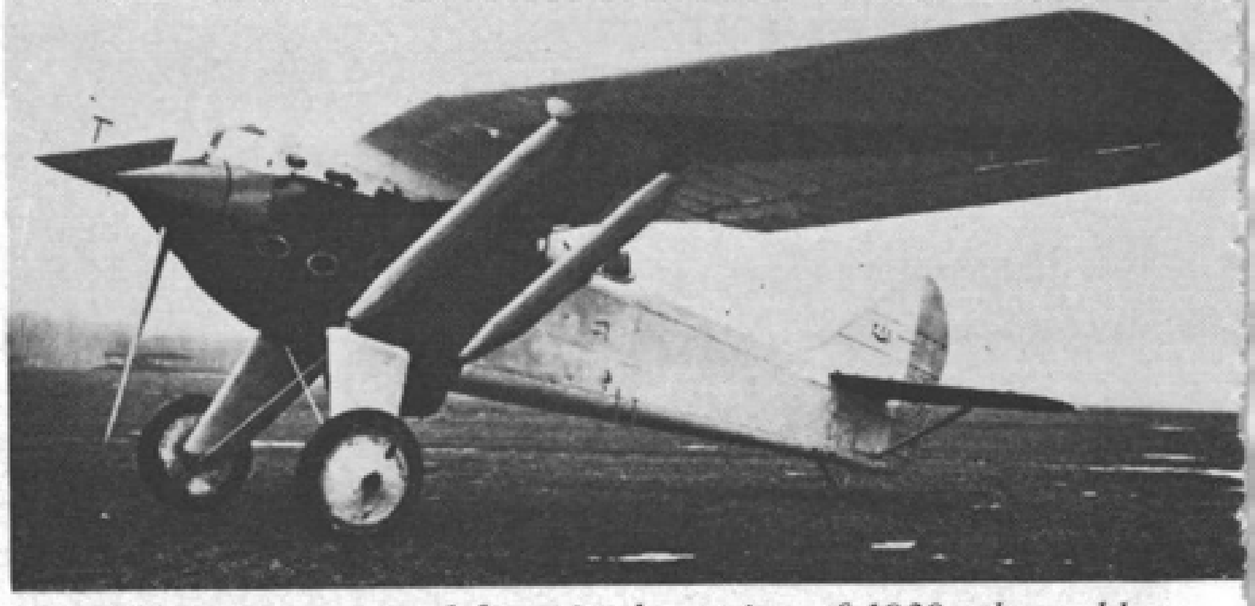
At that time France was engaged in an ambitious programme of fighter development, which proved very rich in variety of its progeny. The resulting aircraft utilized almost every configuration conceived for single-seat fighters, yet they were all evolved around the Hispano-Suiza 12Xbrs twelve-cylinder liquid-cooled engine. In addition to the indigenous projects, which included at least four designs employing the Pulawski-wing monoplane configuration, the French Air Force was also examining foreign fighters as possible candidates for licence-manufacture in France, and the Polish P.11 was at the head of its list. Gnome-Rhône, developing a new range of powerful 14K Mistral-Major radials, was extremely anxious to enter the fighter field and the P.Z.L. fighter presented itself as the firm's only opportunity. Gnome-Rhône therefore approached P.Z.L. with proposals concerning development of the 14K-powered version of the P.11, offering to contribute up to 150,000 francs towards the cost, supply the engine for the prototype free of charge, and sponsor the Polish design in the French fighter design contest. The French proposal was exactly in line with the work already undertaken by Jakimiuk, and, needless to

say, was immediately accepted. In June, 1932, Gnome-Rhône was asked to deliver the 760 h.p. 14Kds fourteen-cylinder double-row supercharged radial in December, and construction of three P.24 prototype airframes commenced in July.

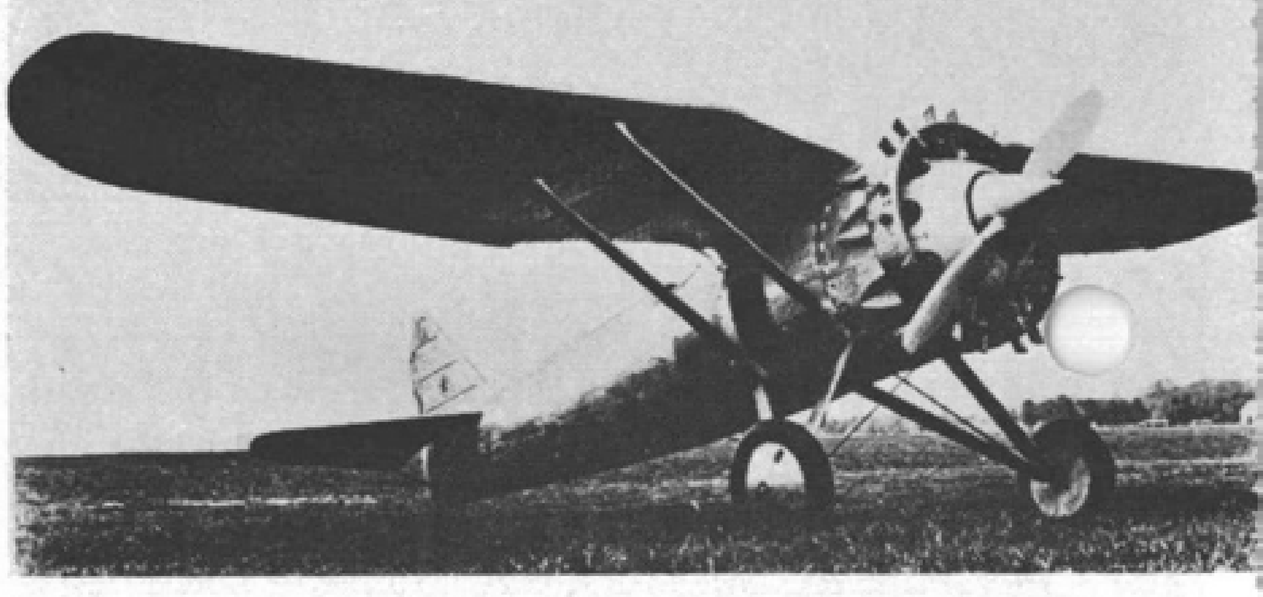
The engine was delivered three months late, but the promised three-blade metal Gnome-Rhône airscrew did not arrive with it, and a special two-blade fixed-pitch wooden airscrew was ordered for the fighter from Szomański. Flight trials of the P.24/I prototype, which had been waiting for its power plant since January, 1933, were considerably delayed, and when the 14K was at last installed in the airframe and ground tests begun, serious troubles were encountered; a new fuel system was installed, but the engine still appeared to be starved of fuel. Eventually the P.Z.L. mechanics pulled off the engine seals and found seized fuel pumps. The P.24/I took-off for its first flight in May, 1933, with Capt. Boleslaw Orliński at the controls, but the flight ended in mishap. The Szomański airscrew proved unsuitable for the supercharged Mistral-Major and some three minutes after leaving the ground severe vibrations developed, and the hub fairing, similar to that of the P.11, disintegrated, smashing the airscrew. Orliński managed to bring the aircraft down, and it was afterwards discovered that the engine bearing structure and fuel tank attachments were seriously damaged; as a result the whole forward fuselage had to be rebuilt and reinforced.

The flight testing of the P.24/I was resumed in October, 1933, after the machine had been fitted with the Gnome-Rhône airscrew. The test programme dictated the need for over 150 modifications, and these were introduced in the second prototype, the P.24/II, also known as the Super P.24. The changes included the use of a new long-chord NACA cowling, revision of cooling and exhaust systems, and redesign and reinforcement of a cannon bearing structure, which failed on the P.24/I during early firing trials at the Groty firing range. The Super P.24, also powered by the 760 h.p. 14 Kds radial, first flew in March, 1934, and put up an excellent performance, easily exceeding 400 km./h. (248·5 m.p.h.) in level flight. On 28th June, 1934, the fighter, flown by Orliński, achieved a maximum speed of 414 km./h. (257·2 m.p.h.) over the base, establishing the new F.A.I.-recognised International Speed Record for Radial-powered Fighters.

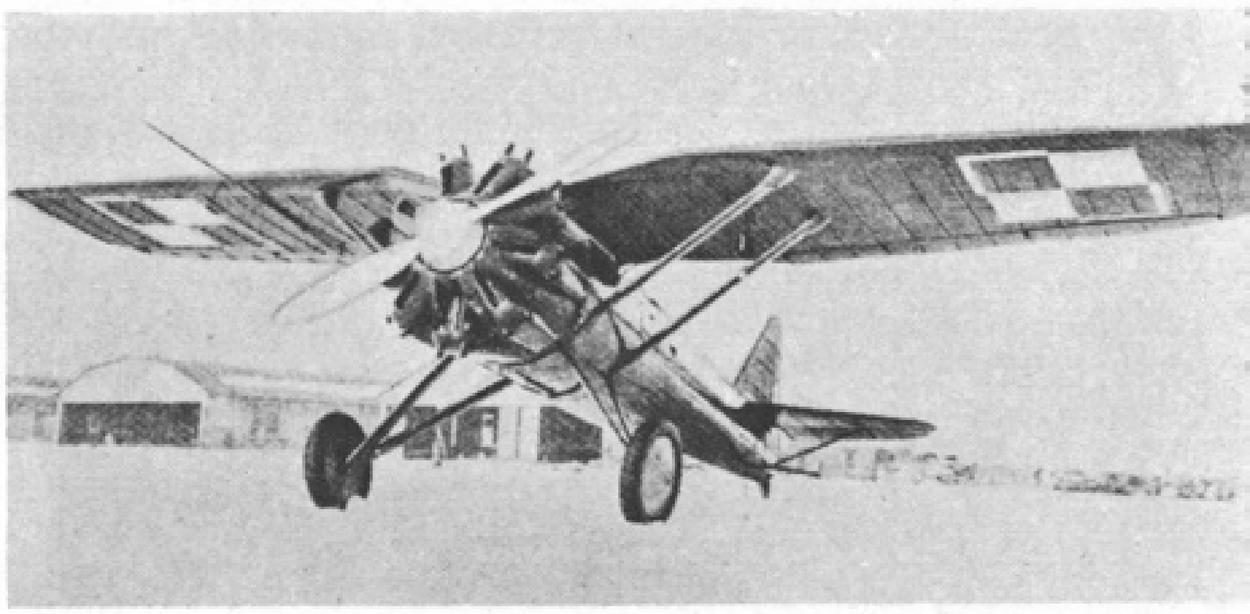
When the existence of the more powerful 900 h.p. Gnome-Rhône 14 Kfs had been announced, P.Z.L.



The P.1/II in its original form in the spring of 1930; the rudder was later modified.



The P.6/I was powered by a 450 h.p. Bristol Jupiter VI HF.



Seen here in the winter of 1930/31 is the P.7/I with a Jupiter VII F enclosed in a helmeted cowling.

decided to fit this power plant to the later P.24 prototypes, but at first the Polish request for delivery of one engine of this type before the end of 1933 was refused as the French company insisted that a quantity

One of the two P.6's, at the 1931 National Races in the U.S.A.

(Photo: via E. Vagi)

P[illegible]perated by the S.P.L., Deblin, as a fighter-trainer.

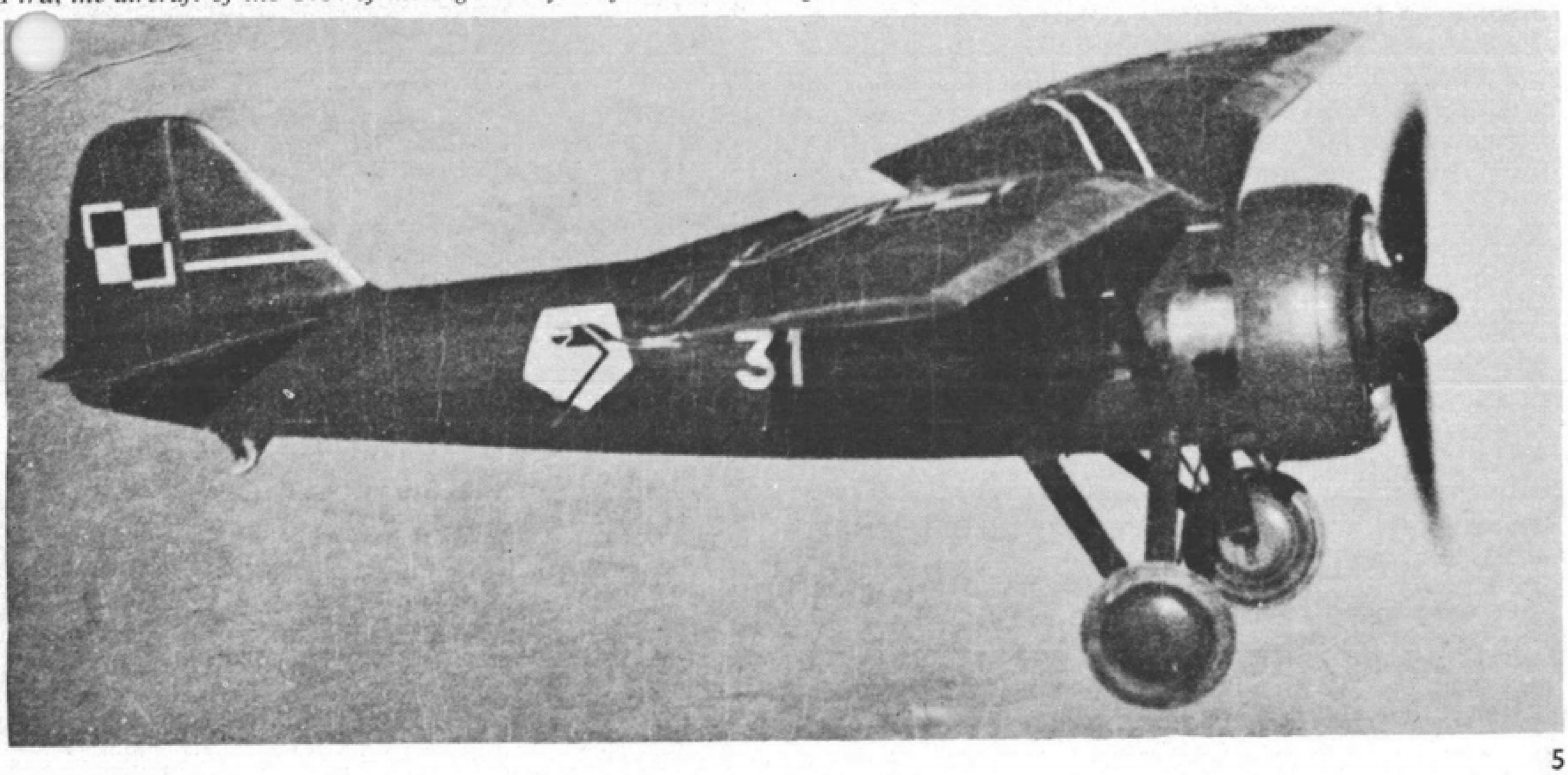
(Photo: Copyright R. Lopacki)

should be ordered. Later an agreement was reached and the anxiously awaited 900-930 h.p. 14 Kfs radial arrived in July, 1934, to be installed in the P.24/III, sometimes also referred to as the Super P.24*bis*, which was to be shown at the 1934 Salon de l'Aeronautique in Paris. The machine, generally similar to the second prototype, took the air in August and was demonstrated in October to Polish officials and members of foreign missions residing in Warsaw. Exhibited at the end of the year in Paris the aircraft, with its two-cannon and two-gun armament and guaranteed maximum speed of 416 km./h. (258·5 m.p.h.), was regarded as the best armed and fastest interceptor in the world. The French Air Force continued to show interest in the fighter but due to strong resistance in many French quarters to aircraft of foreign origin and the fact that several French manufacturers developed fighters copied from the P.Z.L. design, the P.24 did not have much chance of being adopted by France.

PRODUCTION AND EXPORT

In the winter of 1934/5 the P.24/III was evaluated in Warsaw by the Turkish and Rumanian Air Force missions and flew on a demonstration tour to Hungary and Bulgaria. In view of a promising sales outlook, work on a batch of six pre-production P.24 fighters commenced at the new P.Z.L. *Wytwórnia Platowców 1* (Airframe Plant 1) at Warsaw-Okecie in the spring of 1935. The aircraft had enclosed cockpits, wings and tail surfaces exactly similar to those of the P.11c, and various other modifications, including rearrangement of armament, which, in contrast to the prototypes' two guns on the forward fuselage decking, was carried entirely in the wings. The pre-production machines were provided with various combinations of armament, setting patterns for the proposed production A, B and C versions. Two fighters of this batch were delivered to the *Lotnictwo Wojskowe* for evaluation, and another one, representing the P.24A model, was shown at the 1936 Paris Salon and was

P.7a, the aircraft of the C.O. of the Fighter Dyon of the 4th Air Regiment based at Torun.

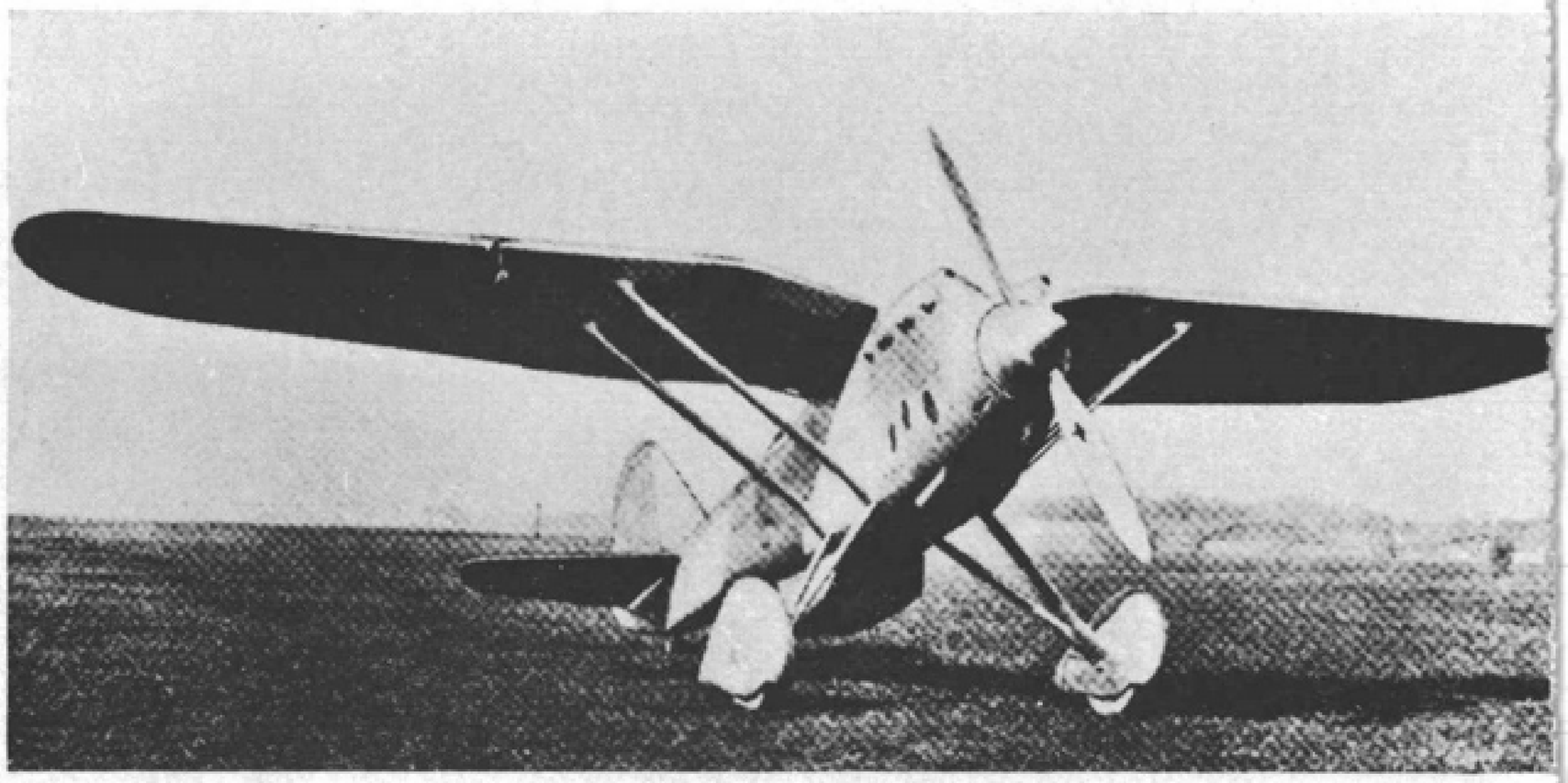


later demonstrated at various French Air Force stations. The factory-owned pre-production aircraft were later progressively modified to standards of successive P.24 variants and were extensively flown in comparison trial programmes fitted with 970 h.p. Gnome-Rhône 14 N01, 1,030 h.p. Gnome-Rhône 14 N21, 1,020 h.p. Renault 14T, and the 1,030 h.p. Fiat A.80 RC41 radial engines, which were supplied to P.Z.L. by manufacturers as free samples.

From the early months of 1936 onwards a number of foreign evaluation teams visited P.Z.L. to fly the P.24, and Turkey was the first to commit itself firmly. In the late spring of 1936, agreement was concluded between the Turkish Ministry of National Defence and P.Z.L. in accordance with which Turkey purchased licence rights in the P.24, forty P.Z.L.-built P.24A fighters, and raw materials and semi-prepared parts for a further twenty machines. The Turkish specification asked for fourteen P.24A fighters armed with two Oerlikon "FF" cannon and two 7·9 mm. Colt-Browning guns, equipped with racks for four 10 kg. (22 lb.) bombs, two under each wing; and twenty-six aircraft armed with four 7·9 mm. Colt-Browning guns, carrying two 50 kg. (110 lb.) bombs under their wings. The later variant subsequently became known as the P.24C. The W.P.1 plant immediately began production of the Turkish series and deliveries to Turkey commenced towards the end of 1936 and extended well into the following year.

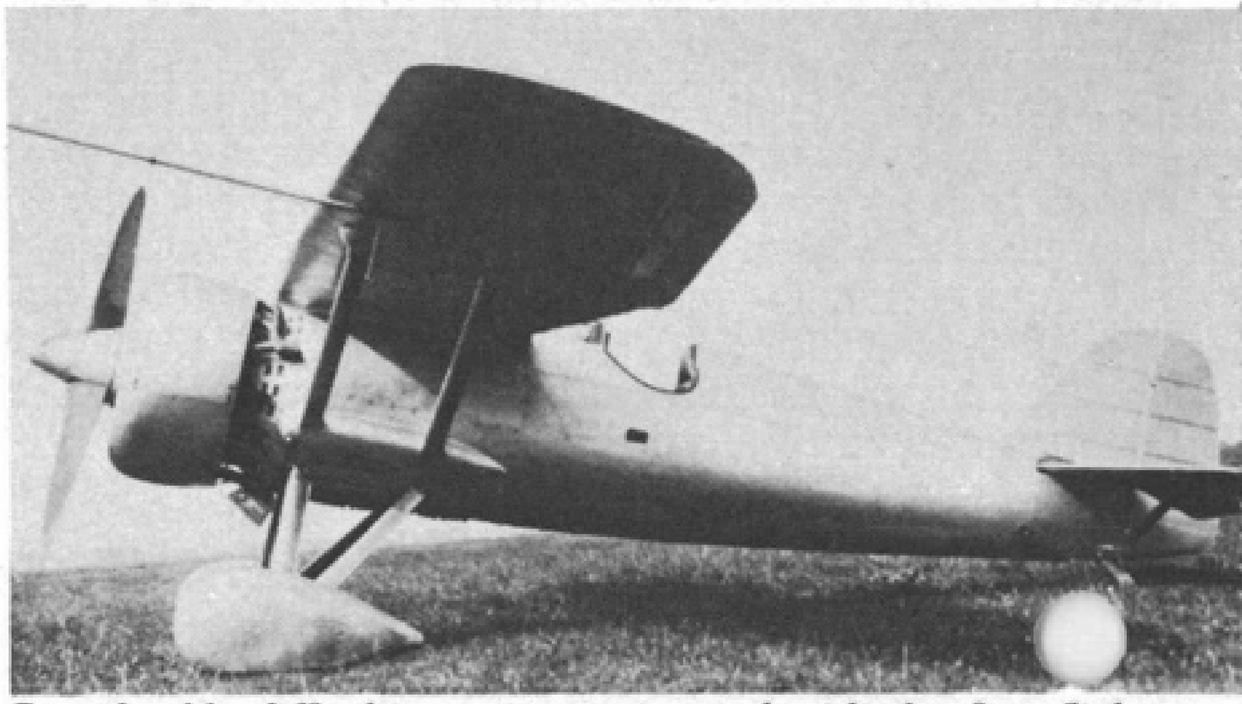
The Turkish fighters were almost exactly similar to the pre-production P.24, but some unexpected increase in drag was experienced when the early production machines began tests, particularly in the case of the four-gun P.24C, the maximum speed of which fell below the 400 km./h. (248·5 m.p.h.) mark. Minor aerodynamic improvements were introduced to the later production P.24Cs to improve performance, and these were mainly concentrated on the cleaning up of strut/fuselage joints and gun installations; introduction of the modifications delayed deliveries. At the end of October, 1936, Wilhelm Gibalka, Chief of the P.Z.L. Technical Mission, arrived in Turkey to organize production of the P.24A at the *Tayyare Febricasi Kayseri*, and the first Turkish-built P.24A took the air for the first time on 29th May, 1937, with Lt. Izfam Bey of the Turkish Air Force at the controls. By September five fighters had been completed and production continued at a rate of four aircraft per month, this being doubled in 1938. In 1938-39 more advanced P.24 fighters of the F/G series were manufactured at Keyseri. It is believed that a total of over 100 P.24s were built in Turkey. Many of the machines were later re-equipped with Pratt & Whitney Twin Wasp radials and served with the Turkish Air force for many years as fighter trainers. At least one P.24G is now being preserved at the Etimesgut Training Centre.

Meanwhile Greece and Bulgaria signed contracts for the P.24. First five Greek P.24As, generally similar to the Turkish model, but having some modifications to suit the Greek requirement (calling among other things for increased range) were deli-



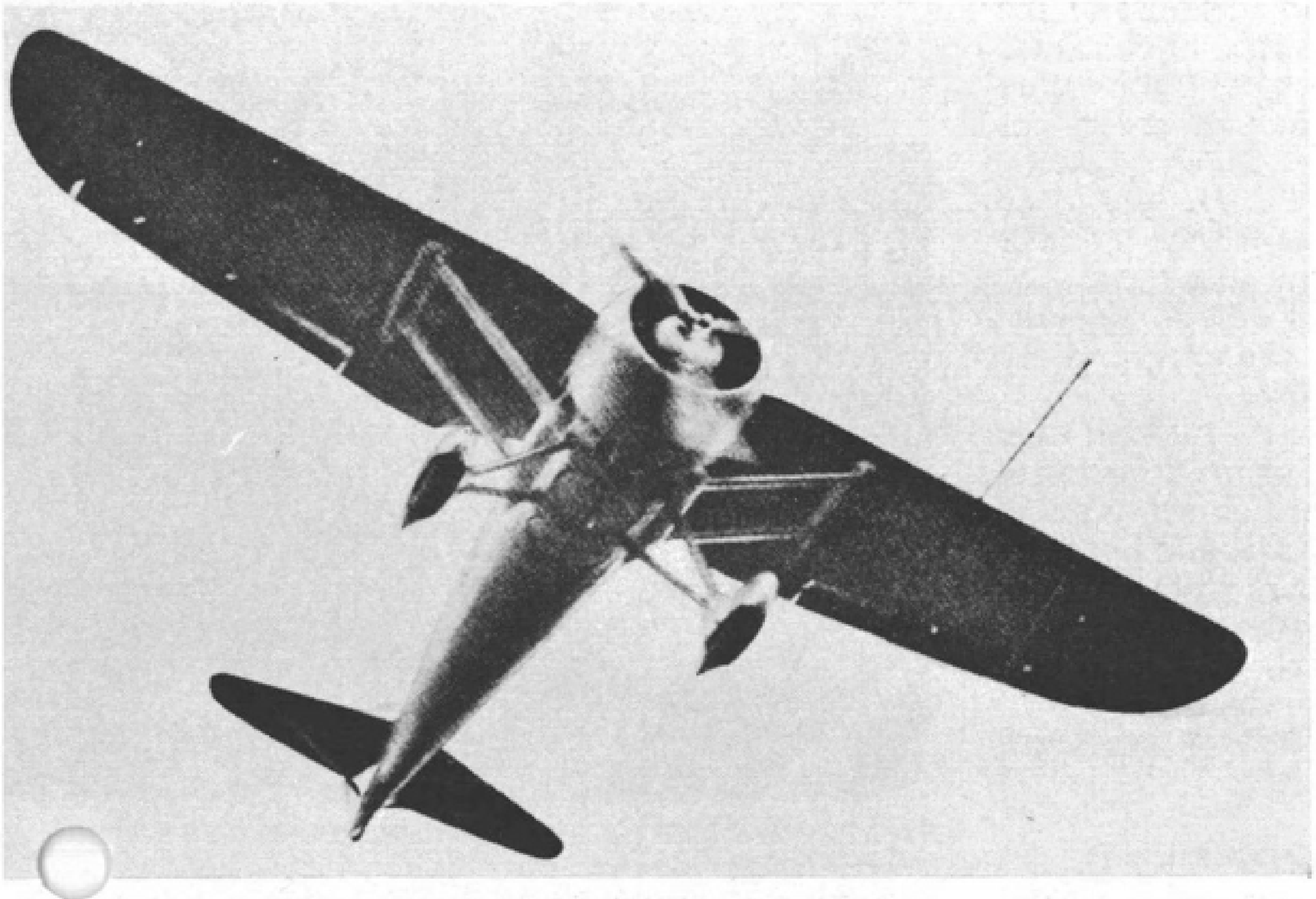
First P.8 prototype, the P.8/I, was powered by the Hispano-Suiza 12 Mc.

The Lorraine Petrel-powered P.8/II was sometimes referred to as the P.9.



Considerable difficulties were encountered with the first flight of the P.24/I. After waiting for three months for an engine, vibration problems terminated the first flight and the forward fuselage had to be redesigned. Here is the aircraft after redesign late in 1933.

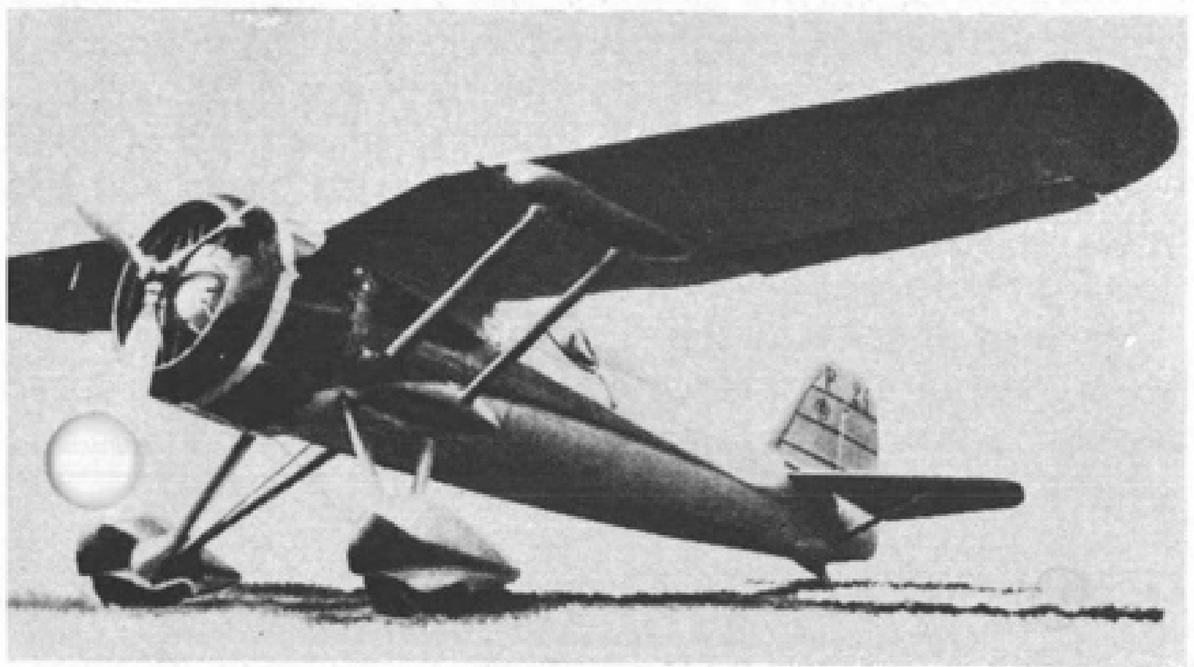
The P.24/II, Super P.24, which established an International Speed Record for radial-engined fighters at 414 km./h. (257·2 m.p.h.).



The Super P.24 in flight.

vered to the Royal Hellenic Air Force in the autumn of 1937. In the meantime the whole Greek order was renegotiated and increased to total thirty cannon-armed and six four-gun interceptors, and all the remaining machines were to be of the improved P.24 F/G series. The initial Bulgarian order called for fourteen interceptors which, equipped in accordance with the Bulgarian specification with four guns and racks for four 10 kg. (22 lb.) bombs, were known as P.24Bs. The fighters, completed towards the end of 1937, were delivered to the Bulgarian Air Force early the following year.

Towards the end of 1936 Rumania obtained a licence for the production of P.24 fighters and ordered six pattern aircraft from P.Z.L. The Rumanian variant, designated the P.24E, was adapted to accommodate the specified I.A.R.-built 14K radial engines, embodied two-cannon and two-gun armament and a number of aerodynamic improvements. The six P.Z.L-. built machines were powered by the I.A.R. 14 KIIc32 radials supplied from Rumania, and in 1937 the P.24E began to supersede the P.11f on production lines of the I.A.R. Brasov factory. At least fifty P.24Es were completed at Brasov before production terminated in the first half of 1939. These, together with the earlier P.11fs constituted the backbone of Rumania's fighter force at the beginning of World War II. The P.24 played an important part in the development of indigenous Rumanian I.A.R.80/81 low-wing cantilever fighter monoplane which evolved in the years 1937-39, employed a fuselage derived from that of the P.24E, and almost unchanged P.24 tail surfaces married to a new cantilever wing provided with inwardly-retracting undercarriage.



The P.24/III was shown at the Paris Show in 1934 fitted with the 930 h.p. Gnome-Rhône 14 Kfs engine and armed with two cannon and two guns.

The four-gun pre-production P.24 used as a demonstration machine, finished in sky-blue and olive-green.

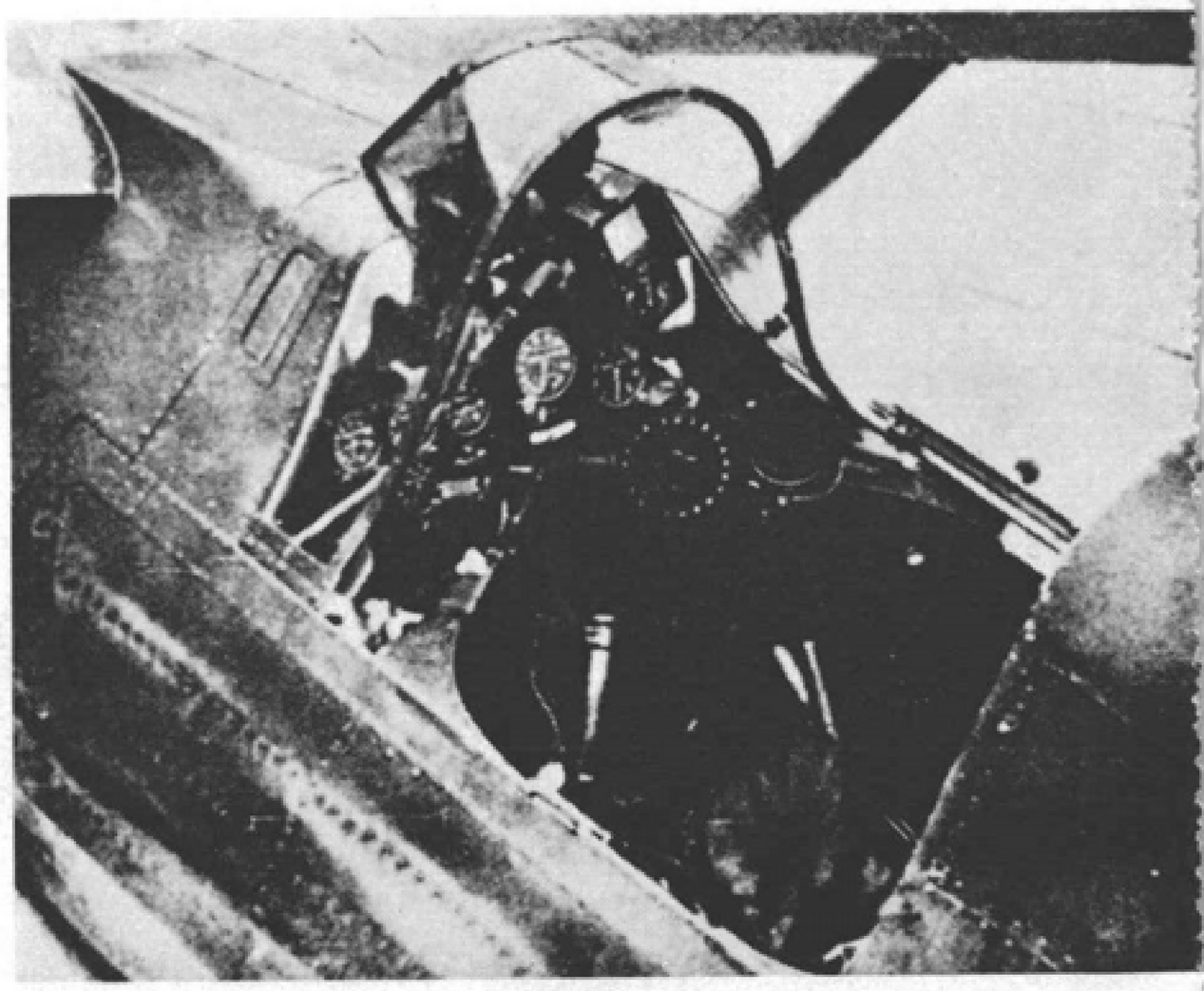
In 1937 an advanced version of the P.24 was developed. The new variant was evolved around the improved smaller-diameter Gnome-Rhône 14N radial engine with increased output, enclosed in a new low-drag NACA cowling incorporating revised collector ring, and the airscrew hub was provided with a neat spinner. The forward fuselage was improved aerodynamically and the wing inner sections were modified again. The cockpit received 35 mm. armoured glass and steel armour plates protecting the pilot's head and body, and all installations and equipment were considerably modernized. These changes resulted in the P.24F armed with two Oerlikon "FF" cannons and two guns, and the P.24G armed with four guns. The new model, powered by the 970 h.p. 14 N07 radial, entered production at the W.P.1 plant towards the end of 1937, and the twenty-five P.24Fs and six P.24Gs, built to complete the revised Greek order, were despatched to Greece in the spring of 1938.

Meanwhile Bulgaria placed a repeat order for twenty 14 Kfs-powered P.24Cs, to be delivered by the end of 1938, followed by a contract for a further twenty-six 14 N07-powered P.24Fs to be ready by September, 1939, this bringing the total of P.24 interceptors sold to that country to sixty. Twenty-two P.24Fs were sent to Bulgaria in July and August, 1939, the last four waiting for airscrews which were late in arriving from France.

The *Lotnictwo Wojskowe* gave little thought to the P.24, which was based upon an engine not manufactured at home and offered little overall improvement over the P.11c. However, in view of delays and difficulties experienced with the P.50 Jastrzab low-wing cantilever fighter monoplane, Gen. Józef Zajac recommended immediate production of the P.24 for Polish use, this being made feasible by the French armament loan permitting large purchases of Gnome-Rhône engines from France. After the resigna-

tion of Gen. Ludomil Rayski from the post of the C.-in-C. *Lotnictwo Wojskowe* in March, 1939, orders were placed for seventy P.24 interceptors, this being supplementary to substantial production orders for the Mercury VIII-powered P.11g *Kobuz* fighters. The Polish model, designated the P.24H, was to be powered by the 1,050 h.p. Gnome-Rhône 14 N21 radial, and its estimated maximum speed was 460 km./h. (285·8 m.p.h.). Two variants were to be built; one armed only with two 20 mm. cannons, and the other with two cannons and two guns.

Further developments of the basic P.24 design were being studied in 1939, including a machine armed with four 20 mm. cannon, and a fighter-bomber version, these believed to be designated the P.24K and L respectively. Substantial new export orders from Estonia, Finland, Greece, Hungary and Yugoslavia, amounting to 120 P.24 fighters, were either placed, or in advanced stages of negotiation in 1939, so that the P.Z.L. production programme for the years 1939-40 envisaged manufacture of 190 P.24 monoplanes.



The cockpit of the P.24; the cockpit canopy has been removed.

CONSTRUCTION AND EQUIPMENT

The P.24 was a single-seat Pulawski-wing fighter interceptor of all metal construction. The aircraft was basically a more powerful edition of the P.11, and the production P.24 was essentially a refined version of the P.11c, development of both models being closely co-related.

The wings, of modified Bartel 37/IIa aerofoil section, were built up of two sheet duralumin "I"-section spars, duralumin ribs and finely corrugated sheet duralumin skin. Wing tips and "D"-type leading-edges were of smooth duralumin. Following the Pulawski-wing principle, each half, with depth of section of 16 per cent. in the strut-support region, sharply tapered in chord and thickness towards the tips and roots, its very thin inner portion sloping down to the points of attachment on upper fuselage longerons, and its aerofoil section near the fuselage modified by an upward twist of the trailing-edge to provide better visibility for the pilot. The narrow chord, slotted, balanced ailerons, were duralumin box-girders, and also acted as landing flaps. The wing area of the production model was 17·9 m^2 (192·7 sq. ft.).

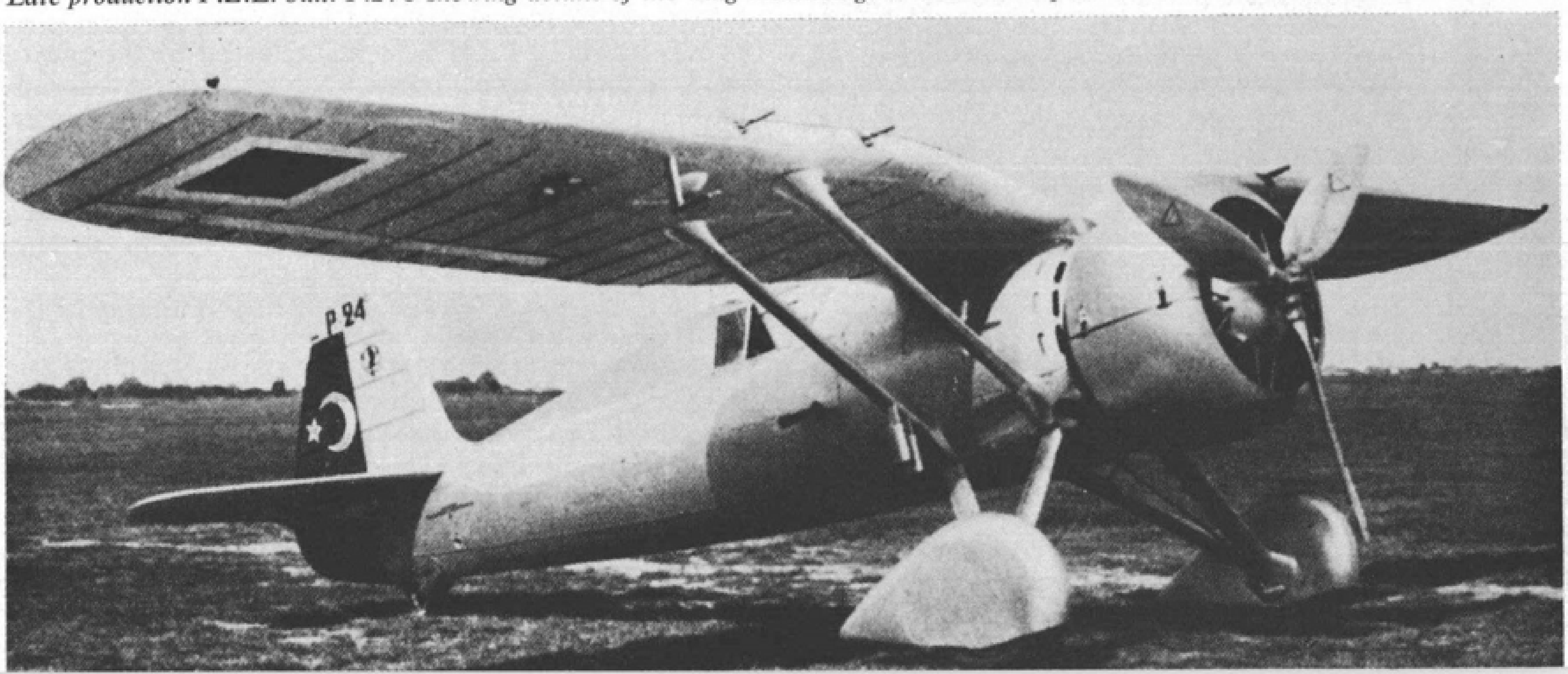
The fuselage was an all-metal structure of oval section, its forward portion being of girder construction of built-up sections, and the rear one, of smooth duralumin stressed-skin construction with a number of transverse duralumin bulkheads. The enclosed cockpit offered exceptionally good visibility due to the Pulawski-wing layout. The adjustable pilot's seat accommodated a back or seat-type parachute and was provided with the Borkowski self-adjusting safety-belt system.

The tail unit, a duralumin structure similar to that of the wings, comprised cantilever fin, fixed, braced tailplane, rudder and elevators provided with Flettner tabs.

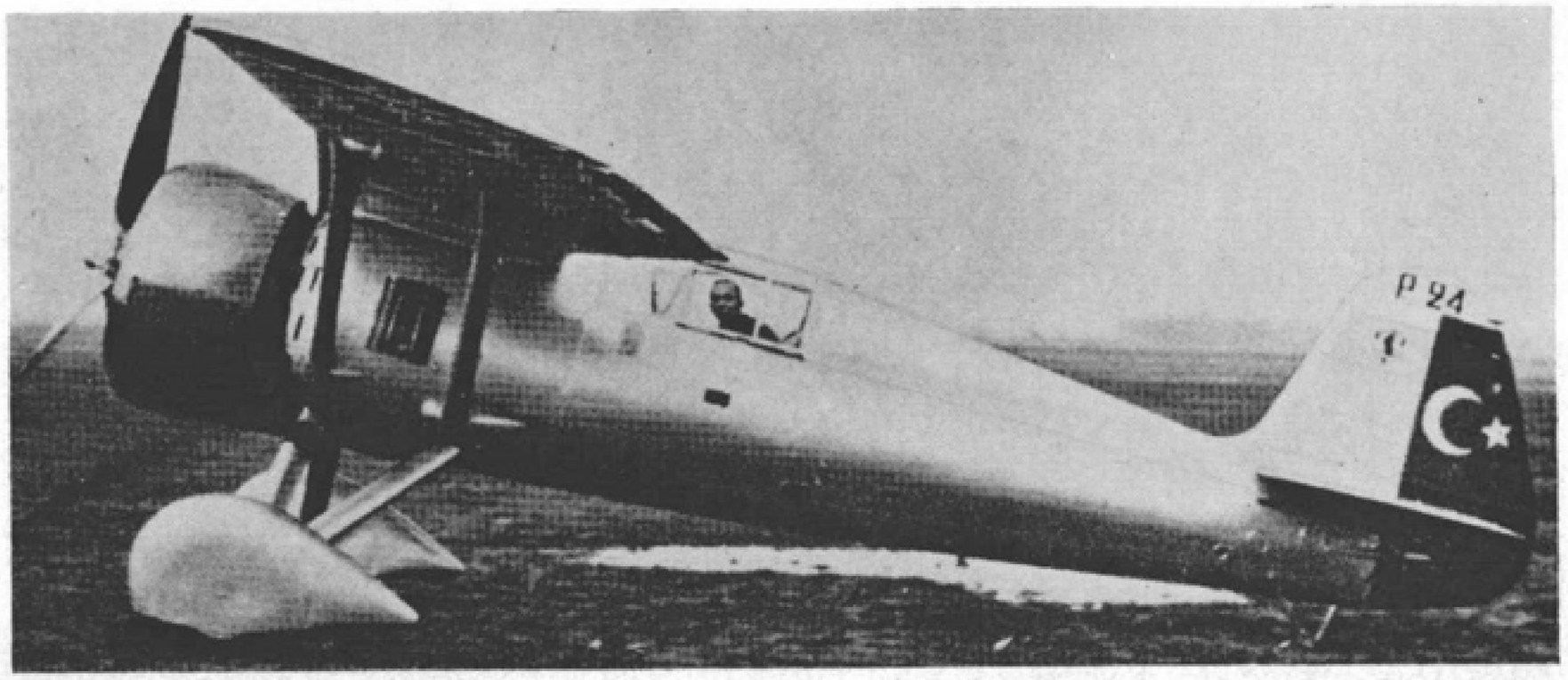
The patented "scissor-type" undercarriage consisted of two side Vees and two streamline wires attached at one end to the apexes of the Vees and at the other to horizontal extension levers running across the interior of the fuselage. Each leg was independently sprung with Avia-manufactured P.Z.L. oleo-pneumatic shock-absorbers, placed on the opposite side inside the fuselage and operated by way of an extension lever. The wheels were provided with spats. The tailskid was equipped with a P.Z.L. oleo-pneumatic shock-absorber.

Various marks of the Gnome-Rhône 14K or 14N Mistral-Major fourteen-cylinder double-row air-cooled geared and supercharged radial engines, ranging in output from 900 to 1,050 h.p., were fitted

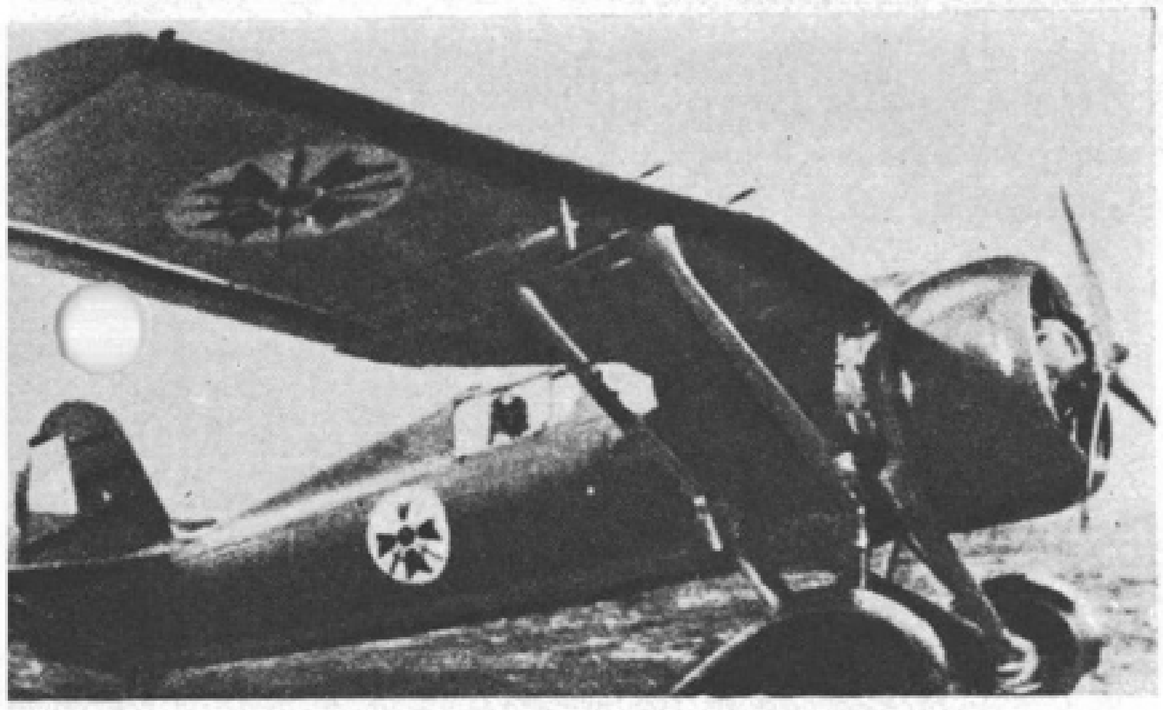
Late production P.Z.L.-built P.24C showing details of the wing-mounted guns and the airspeed indicator venturi.



Early production P.Z.L.-built P.24C of the Turkish Air Force.



A P.24B of the Bulgarian Air Force photographed during factory tests during the winter of 1937/38.



as standard, and three-blade adjustable-pitch metal airscrews were employed on all models. The jettisonable double tank in the forward fuselage had a capacity of 330-360 litres (72·5-79·1 Imp. gal.), according to version. A 6-litre (1·3 Imp. gal.) gravity tank was carried in the leading-edge of the left wing, and an injection tank, in the fuselage. Oil capacity was 25-30 litres (5·5-6·6 Imp. gal.). On the P.24F and G both electric and compressed-air starters were provided.

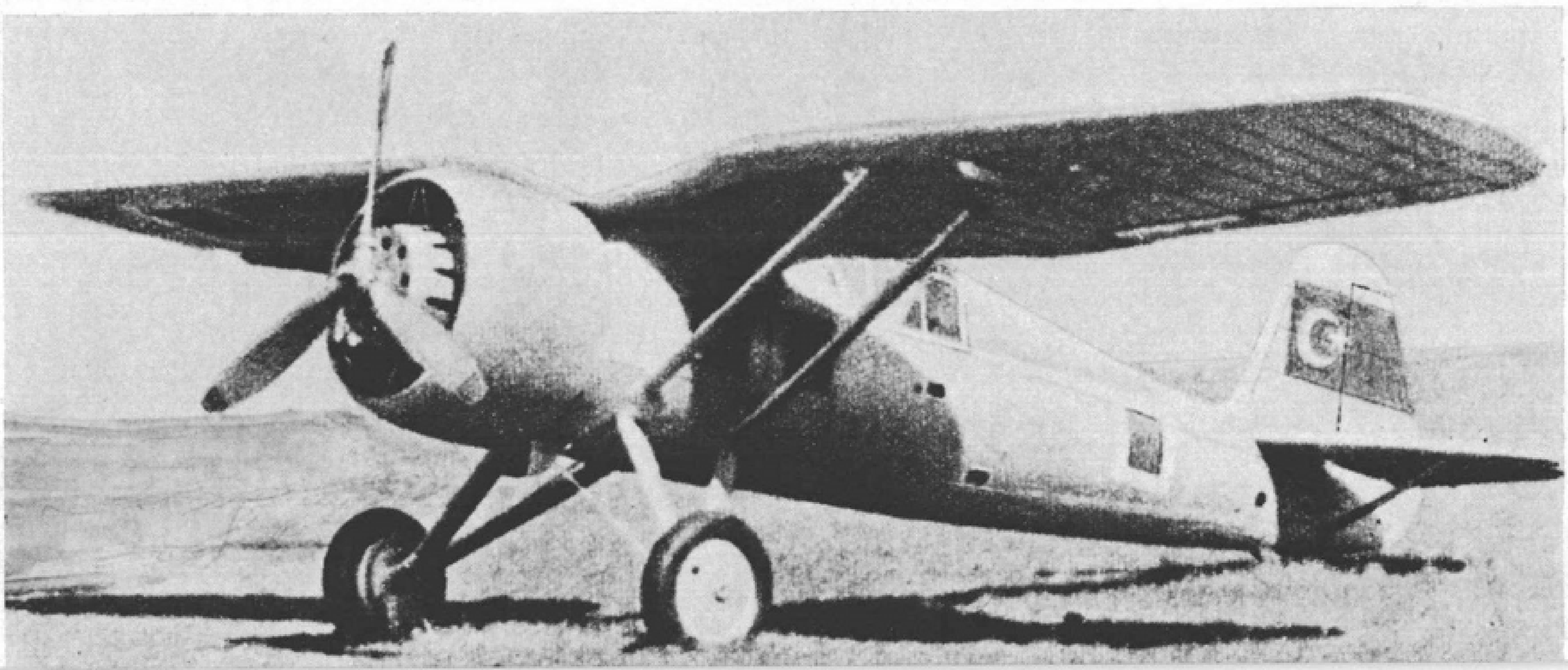
THE P.24 IN OPERATIONAL USE

One Polish P.24 fighter took part in the September Campaign. The aircraft, probably one of the *Lotnictwo Wojskowe's* two pre-production P.24s, was at the Centre of Aviation Training at Deblin when the w[illegible]began. The fighter was armed by Lt. Szczesny and flown by him operationally in the spontaneously formed fighter unit called the Deblin Group. On 14th and 15th September the P.24 flown by Szczesny shot down two *Luftwaffe* aircraft.

Details of combat activities of the Bulgarian and Rumanian P.24s are lacking, although it is known that the P.24Es of the Rumanian Air Force were briefly used on the Russian front and that the fighter was extensively used for local defence. However, the record of the P.Z.L. fighters of the Royal Hellenic Air Force was a very impressive one. In October, 1940, at the time of the Italian attack, the Greek fighter force consisted of thirty-six P.24s, nine Bloch MB-151s and two Gloster Gladiators. All the P.24 fighters are believed to have been armed with four 7·9 mm. guns and racks for two 50 kg. bombs, refitting of the cannon-armed P.24s to this new standard configuration being carried out some months earlier. The P.24 interceptors equipped Nos. 21, 22 and 23 Squadrons, with some ten serviceable machines per squadron, while No. 24 Sqdn., operating newly-delivered Blochs, was still in training. The task of d[illegible]fending Greece from the *Regia Aeronautica* fell therefore almost entirely upon the P.24 units.

The first major air encounter between the Italian and Greek air forces took place on 1st November, 1940, resulting in one enemy aircraft being shot down north of Ioannina by a P.24 of No. 21 Sqdn. During the following days the Greek P.24s achieved notable successes against formations of the *Regia Aeronautica* attacking Salonica. In one of these actions Lt. Mitralexis of No. 22 Sqdn., running out of ammunition, smashed the tail of a Savoia-Marchetti S.M.79 *Sparviero* bomber with the airscrew

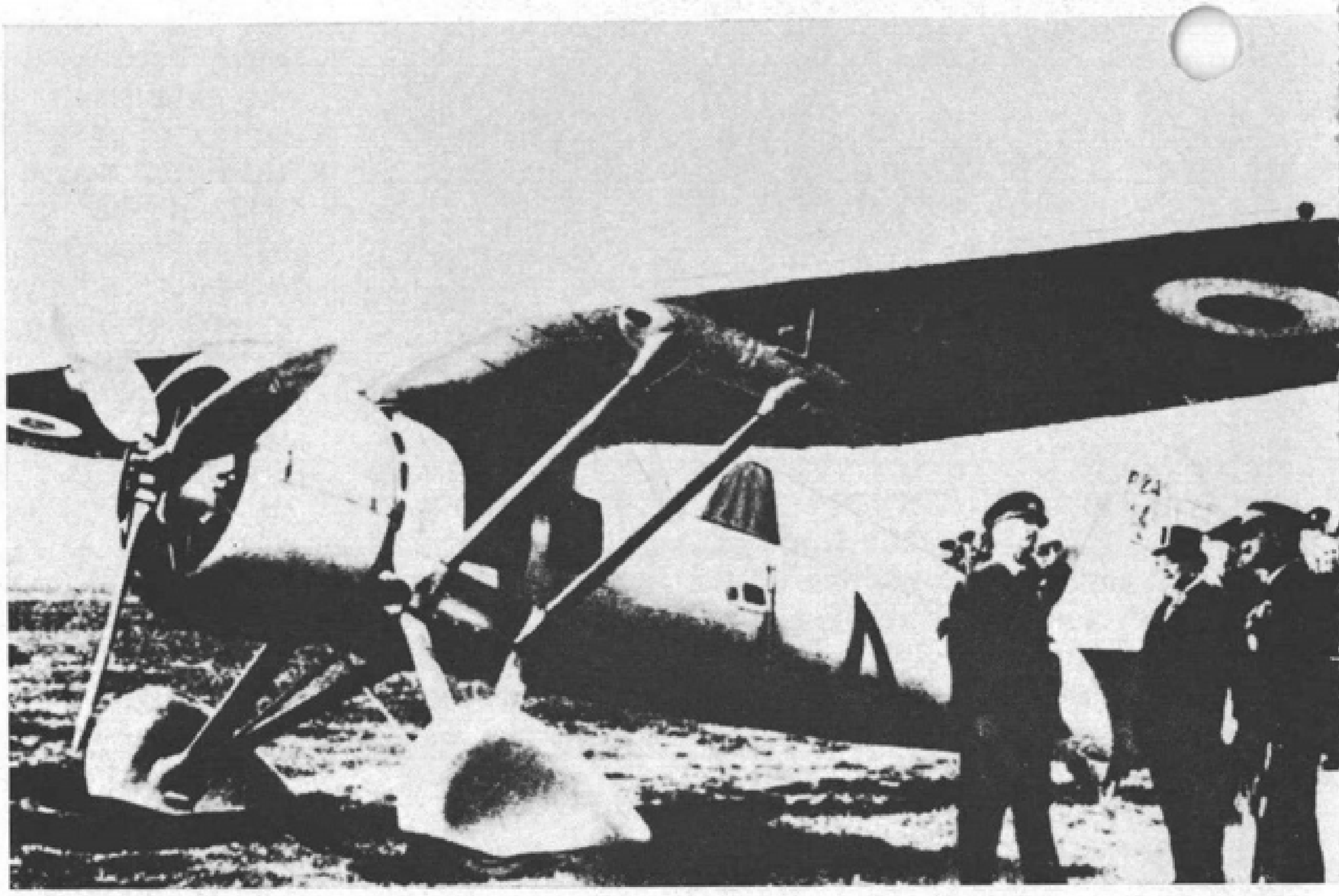
This Turkish-built P.24G has been re-engined with a Pratt & Whitney Twin Wasp and is now preserved at the Etimesgut training centre.



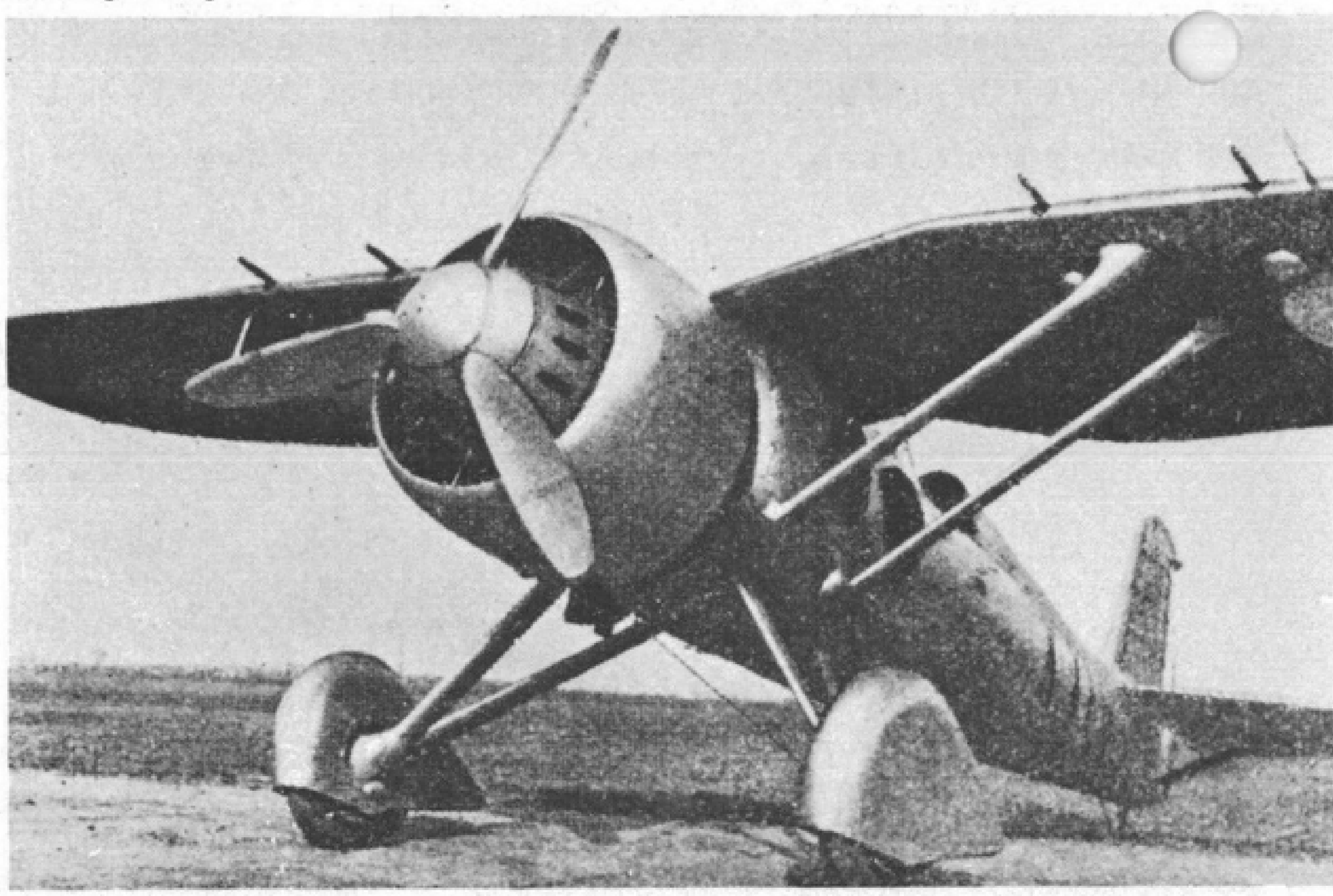
The Gnome-Rhône 14N 7-powered P.24G during tests at the P.Z.L. factory airfield.

of his P.24, forcing the Italian crew to bale out. 14th November was again a day of exceptional air activity and all four Greek squadrons operating jointly in the region of Koritsa in support of the Greek ground offensive encountered several enemy formations, destroying a number of Italian machines, Lt. G. Laskaris flying a P.24 achieving fame by destroying a S.M.79 *Sparviero* bomber and a Fiat C.R.42 *Falco* fighter in one sortie. Fantastic skill and determination of heroic defenders of the Hellenic skies gained them immediately a very healthy respect from the *Regia Aeronautica*, adding to the embarrassment of the Duce and the Fascist top brass. Later the Greek air defences were substantially reinforced by the arrival of R.A.F. squadrons, but the P.24 continued to play a major rôle in hindering the Italian attempts to establish air supremacy.

In spite of a diminishing number of operational P.Z.L. fighters and tremendous difficulties arising from lack of spares, the machines achieved an impressive score of air victories in January, February and March, 1941, flying interceptor and bomber escort missions, although the bad winter weather considerably limited air activities. Only some twenty P.24s were still



One of five P.24A aircraft delivered to the Royal Hellenic Air Force surrounded by an admiring throng.



A P.24G of the Royal Hellenic Air Force in the original natural metal finish; the cockpit enclosure is not fitted in this picture.

P.24/III, Paris Salon, 1934.

P.Z.L. trademark.

I.A.R. trademark (in white).

P.24, four gun pre-production demonstration aircraft, 1936.

P.24B, Bulgarian Air Force, 1938-39.

Bulgaria.

Bulgaria.

P.24F, Bulgarian Air Force, 1942.

Rumania

P.24E, Rumanian Air Force, 1941-43.

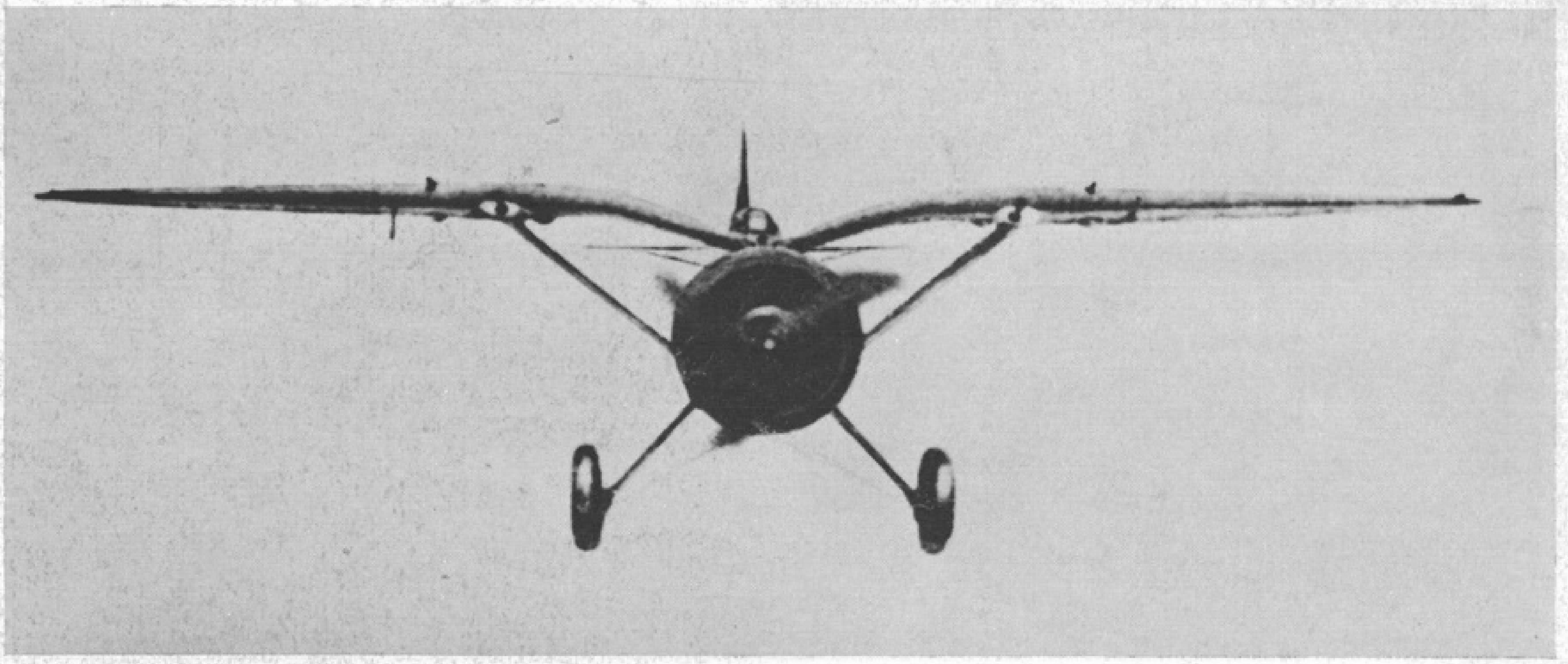
P.24A, Royal Hellenic Air Force, 1938.

Greece.

Keyseri P.24A, Turkish Air Force.

Turkey; (left) wing, (right) rudder.

Keyseri P.24G fighter trainer, Turkish Air Force, 1945-48.



Head-on view of a P.24E for the Rumanian Air Force.

serviceable when the Germans launched a mighty assault on Greece at the beginning of April. These defied the *Luftwaffe* until 23rd April, 1941, when the valiant Greeks, who amazed the world by their astonishing resistance, were finally defeated. According to available information, the last airworthy P.24s left on that day for Crete. Due to loss of most official war documents it is impossible to give figures indicating the Greek air victories, but it has been estimated that about a third of all enemy aircraft destroyed in the Greek Campaign fell to the guns of the agile and robust P.Z.L. Pulawski-wing warriors, which gained the everlasting admirat[illegible] of the Greek pilots.

Although by 1940 the P.24 was approaching obsolescence, the aircraft was universally acknowledged as a potent weapon, its fame being derived not only from the heroism of pilots who flew it, but also from the exceptional qualities of the design.

The author gratefully acknowledges the assistance given in the preparation of the history of Greek P.24 fighters by Group Captain M. J. Fragiskos, RHAF, Air Attache to the Royal Greek Embassy in London.

P.Z.L. PULAWSKI-TYPE FIGHTERS DATA

TYPE	ENGINE	DIMENSIONS			WEIGHTS		PERFORMANCE			PRODUCTION
		Span m. (ft. in.)	Length m. (ft. in.)	Height m. (ft. in.)	Empty kg. (lb.)	Normal Loaded kg. (lb.)	Max. Speed km./h. (m.p.h.)	Service Ceiling m. (ft.)	Normal Range km. (miles)	
P.1/II	1 × 600 h.p. Hispano-Suiza	10·850 (35′ 7½″)	6·980 (22′ 11″)	2·780 (9′ 1½″)	1,118 (2,465)	1,580 (3,482)	302 (187·6) at S/L	8,600 (28,214)	600 (373)	P.1.—2 prototypes only
P.6/I	1 × 450 h.p. Bristol Jupiter VI HF	10·300 (33′ 9¼″)	7·160 (23′ 5¾″)	2·750 (9′ 0½″)	883 (1,946)	1,340 (2,954)	292 (181·4) at S/L	9,000 (29,527)	700 (435)	P.6—2 prototypes only
P.7a	1 × 485 h.p. Polish Skoda Jupiter VII F	10·300 (33′ 9¼″)	7·160 (23′ 5¾″)	2·750 (9′ 0½″)	935 (2,061)	1,382 (3,047)	322 (200·1) at 3,800 m. (12,467 ft)	10,000 (32,808)	700 (435)	P.7—2 prototyp[illegible] 150 production aircraft
P.8/II(P.9)	1 × 500/ 800 h.p. Lorraine Petrel	10·500 (34′ 5½″)	7·560 (24′ 9¾″)	2·750 (9′ 0½″)	1,102 (2,430)	1,573 (3,467)	350 (217·4) at S/L	9,100 (29,855)	700 (435)	P.8—2 prototypes only
P.11c	1 × 640 h.p. P.Z.L. Mercury VI S2	10·719 (35′ 2½″)	7·550 (24′ 9½″)	2·850 (9′ 4¼″)	1,147 (2,529)	1,800 (3,968)	390 (242·3) at 5,500 m. (18,044 ft)	11,000 (36,089)	700-810 (435-503)	P.11—5 prototypes and development aircraft; 225 P.Z.L.-built production aircraft; 70 (approx.) I.A.R.-built aircraft; P.11g Kobuz on order in 1939.
P.24A and B	1 × 930 h.p. Gnome-Rhône 14 Kfs	10·719 (35′ 2½″)	7·500 (24′ 7½″)	2·690 (8′ 10¼″)	1,328 (2,928)	1,890 (4,167)	410 (254·7) at 4,500 m. (14,763 ft)	9,000 (29,527)	700-800 (435-497)	P.24—9 prototypes and development aircraft; 142 P.Z.L.-built production aircraft; 100 (approx.) Keyseri-built aircraft; 50 (approx.) I.A.R.-built aircraft; 190 on order in 1939.
P.24F and G	1 × 970 h.p. Gnome-Rhône 14 N07	10·680 (35′ 0¾″)	7·600 (24′ 11½″	2·690 (8′ 10¼″)	1,332 (2,937)	1,915 (4,221)	430 (267·1) at 4,250 m. (13,953 ft)	10,500 (34,448)	700-800 (435-497)	

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