



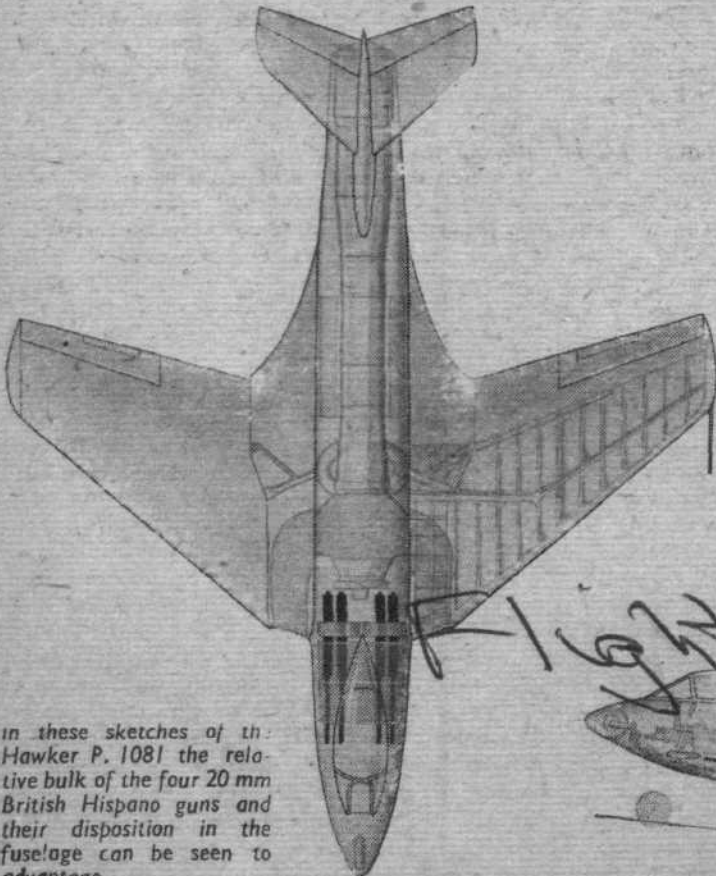
Part VI: Gun Design and Installation

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DURING the First World War the conviction was often expressed that the primary purpose of the fighter aircraft was to achieve air superiority by defeating the enemy's fighters. This led to the interesting but strategically useless *mêlées* so often experienced in 1917-1918. Today it is more generally recognized that the front-line fighter's duty is that of strategic defence, and that the chief targets must always be bombers and observation and/or ground-attack aircraft; the defeat of enemy fighters comes last, as a sort of spare-time job. Hence the choice of armament has to take into account that the least important potential target will be an enemy fighter.

There is no such thing as a "general-purpose" fighter; any attempt to mate the interceptor with a type intended for ground-attack may well produce only a hybrid of little operational use. This applies also to the armament. (It is amazing to what lengths a misguided trend to economy can lead: instead of trying to mix fire and water, so to speak, far more money might be saved by making Service training aircraft less complicated and less lavishly expensive than they have now become.)

For ground-attack, a high muzzle-velocity is imperative,



In these sketches of the Hawker P.108 the relative bulk of the four 20 mm British Hispano guns and their disposition in the fuselage can be seen to advantage.

In the first part of this article (August 24th) Mr. Weyl reviewed the history of aircraft armament; in the second (September 21st) he discussed German equipment; in Part III (October 5th) he analysed the respective claims of guns versus rockets; on November 23rd he dealt with the effectiveness of various types of shells and fuses; and in Part V (December 7th) he analysed Luftwaffe combat experiences, particularly with the use of the R.4/M air-to-air rocket missile. In the present instalment he deals with some further aspects of gun design, discusses sights, and shows how installation problems indicate the use of rockets rather than guns in the newest interceptors. A final instalment will deal with rocket design and summarize conclusions.

to give impact penetration at the target and short times of projectile flight.

Since the bomber now nearly equals in performance the single-seat interceptor, and because at very high speeds the manoeuvrability of the latter is poor (solely on account of the resulting centrifugal accelerations), it might well be argued that large, heavily armed multi-seaters—i.e., "destroyer" jet bombers with long-range armament in lieu of bombs—could improve upon the single-seat interceptor. The idea is intriguing, but the problem of the heavy "battle-plane" versus the single-seat fighter has been found insoluble as often as it has been raised. At the end of the last war the Germans also had it in their mind, both for the reasons stated and because of the technical difficulties encountered with the installation of large-calibre, rapid-firing shell-guns.

However, a single-seat interceptor retains better manoeuvrability at reduced speeds, and there is always advantage in numbers. Four interceptors should always be tactically more useful than one four-engined "battle-plane." Besides, a sufficiently large fleet of up-to-date "battle planes" might be economically prohibitive.

Muzzle Velocity and Rate of Fire.—For air-combat armament, inter-relation must be considered between muzzle velocity, rate of fire and weight and bulk of the gun, on the basis of a given calibre, a given shell, and otherwise identical design features. Admittedly, such comparison is somewhat academic, since a high-velocity gun differs basically from a medium-velocity but quick-firing one: the former type of weapon would preferably be recoil-operated, the latter gas-operated.

Generally, the gas-pressure loader is more sensitive and

