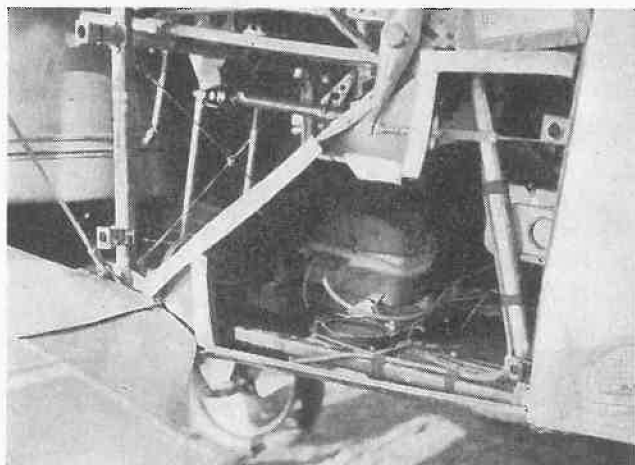


THE STRATEGIC EYE—I

AIR RECONNAISSANCE was the first military task entrusted to the aeroplane. The ultimate employment of aircraft as major weapons of attack has never dimmed their value as the modern counterparts of the cavalry scout. Upon the results of photographic air reconnaissance largely depends the successful planning, not only of strategic bombing offensives, but also of tactical air sorties in support of ground forces. The aerial camera is rightly named the eye of the Royal Air Force. It is used to find and pin-point the prospective target, to record the attack and, finally, to corroborate details of the injury caused to the enemy, or to his military installations.

Aerial photographs are published from time to time which show the great destruction wreaked upon many of Germany's vital War industries. The clarity of these photographs is



["The Times" photograph
FOR THE EVEREST FLIGHT.—This photograph shows a Williamson Eagle III camera in position in the Westland aeroplane, connected to the electric heating apparatus.

impressive. With stereoscopic aids to vision every small detail can be thrown up into relief with remarkable sharpness. Not the least pleasing part of the story is that this striking technique, which is now universal practice in all countries of the World, was initiated by cameras of British design and manufacture.

The Williamson Manufacturing Co. was established in 1887 to design and construct photographic apparatus. Its pioneering work was turned to good use in the War of 1914/18, and its experience in the cinematograph world proved invaluable. Under the leadership of Mr. C. M. Williamson, C.B.E., F.R.P.S., its energies were diverted to the evolution of aerial cameras. With the object of catering for any possible condition of air survey, the Eagle series of aircraft cameras were produced. Air survey calls for a high degree of photographic accuracy. Almost any undertaking of that character calls for individual treatment. For example, the special requirements of the Houston-Everest Expedition were afterwards standardised in the camera employed, the Eagle III. It was electrically driven, heated internally, and externally by a muff, and thermostatically controlled. The Houston-Everest flight was a milestone in high-flying photography, and much of the data collected was to prove of some service in the early days of this War.

All cameras in the Eagle series are of similar design and operation. Unit construction is adopted and many parts are interchangeable between the different marks. This keeps production at a high rate. Units are also planned to present an instrument with clean lines and complete in itself with the minimum quantity of external leads and connections. This unit system has been still further developed in the Eagles Mark V, VII and IX.

One of the most important characteristics of the Eagle aerial camera is the provision of an optical unit in which the focal plane register glass is mounted in fixed relation to the lens. To meet the needs of military reconnaissance the optical system is so arranged that the focal length can be quickly changed to suit varying requirements by interchangeable lens cones. Accurate maintenance of the optical constant, the

prime essential of air survey work, can be attained on the other hand by securing of the lens and focal plane in one inseparable unit.

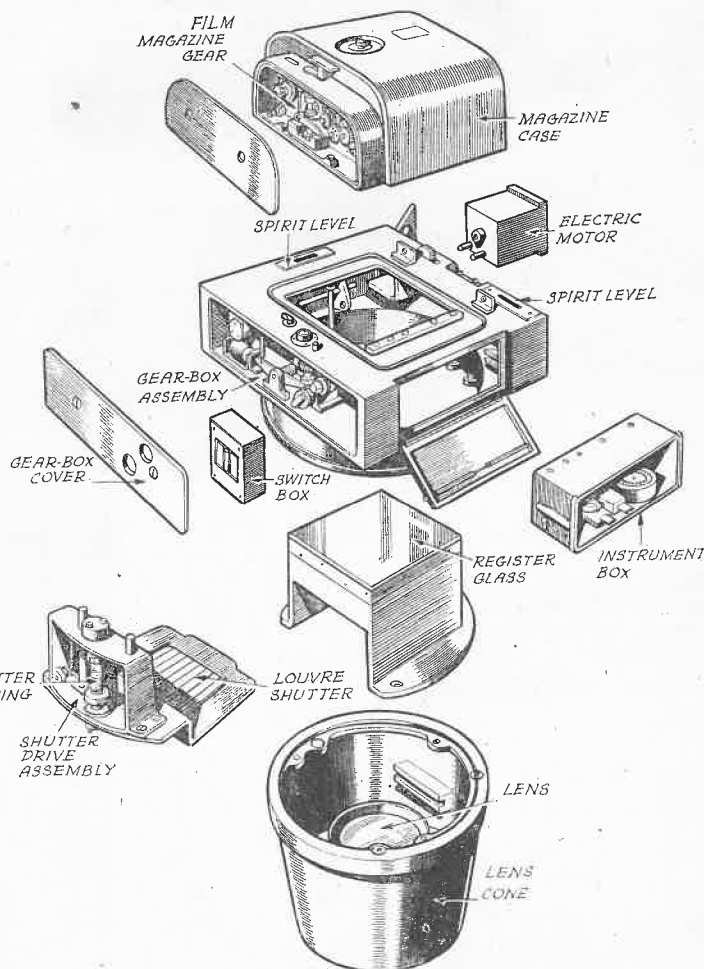
A rectangular aluminium casting forms the camera body. In this is housed the operating mechanism, such as the electric driving motor, the control switch, the instrument recording box and the illuminated spirit levels. The shutter drive mechanism is standard and interchangeable in all Eagle cameras. It is of the Williamson louvre type with the driving mechanism and control gear mounted as a completely interchangeable and detachable component.

This louvre shutter is invariably used on air survey work. It obtains a complete exposure of the film by the positive movement of the "venetian blind" blades to the fully open position. Freedom from distortions of the image and high light efficiency can be obtained with the shutters at speeds up to 1/300th of a second and with lens up to 5 in. in diameter.

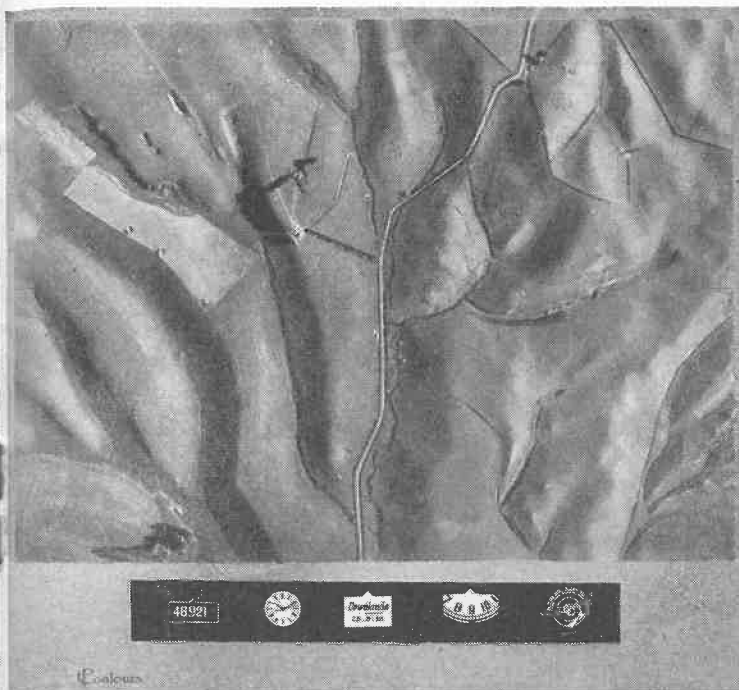
Fitted to the top surface of the focal plane support is the register glass, accurately bedded down on the top of the casting and secured by a metal fence. In order to prevent any possible damage to or distortion of this glass, two adjacent sides only are rigid for accurate alignment. The other two sides are detachable and slotted at half-inch intervals to provide flexibility and so remove any chance of injuring the edges of the glass.

The lens cone is attached by three screws to the lower face of the camera body. It contains the lens, the shutter, and the shutter-operating gear. The size of this unit is determined by focal length of the lens in use. The focal length in the "five-seven-nine" series may vary from the special survey wide angle lens of 4½-in. focus, to the 30-in. long focus narrow angle type.

At the junction of the lens cone and the camera body another unit is located which incorporates the register glass support with a light tunnel. The film in the camera magazine



["Aeroplane" copyright
FOR AIR SURVEY.—Exploded view of the Williamson Eagle Series.

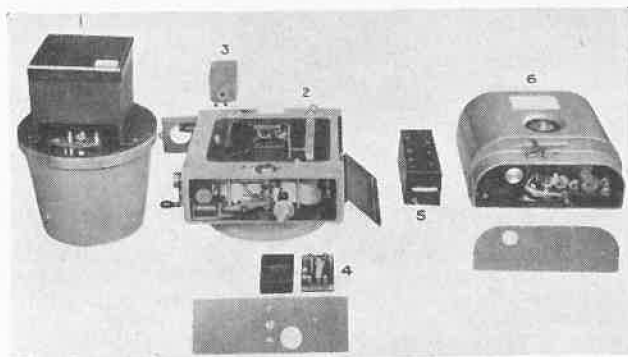


ANTIPODEAN RELIEF.—New Zealand as seen by a Williamson air survey camera on May 23, 1938. The technical details shown under the photograph are recorded on the film by simultaneous photographing of instruments. Photograph by N.Z. Aerial Mapping, Ltd.

is held in contact with the register glass at the moment of exposure. Baffle plates rigged internally around the upper surfaces of the lens cone prevent light from flares from fogging the image.

Electrical control is used in all types of Eagle aerial camera. The control is remotely situated, usually in the observer's station. It gives complete control of the camera wherever it may be fixed in the aeroplane. It registers at a glance the number of exposures "shot" as well as indicating the precise moment of exposure. Three separate leads connect control to camera.

On the face of the control box a green light appears while



DETAILED UNITS.—Eagle camera parts for types V, VII and IX. Item 1—Optical unit. Item 2—Camera body. Item 3—Electric motor. Item 4—Switch for motor and instrument box. Item 5—Instrument box. Item 6—Film magazine.

the shutter is being set. A red light shows five seconds before the exposure and operates concurrently with the pilot's camera indicator lamp.

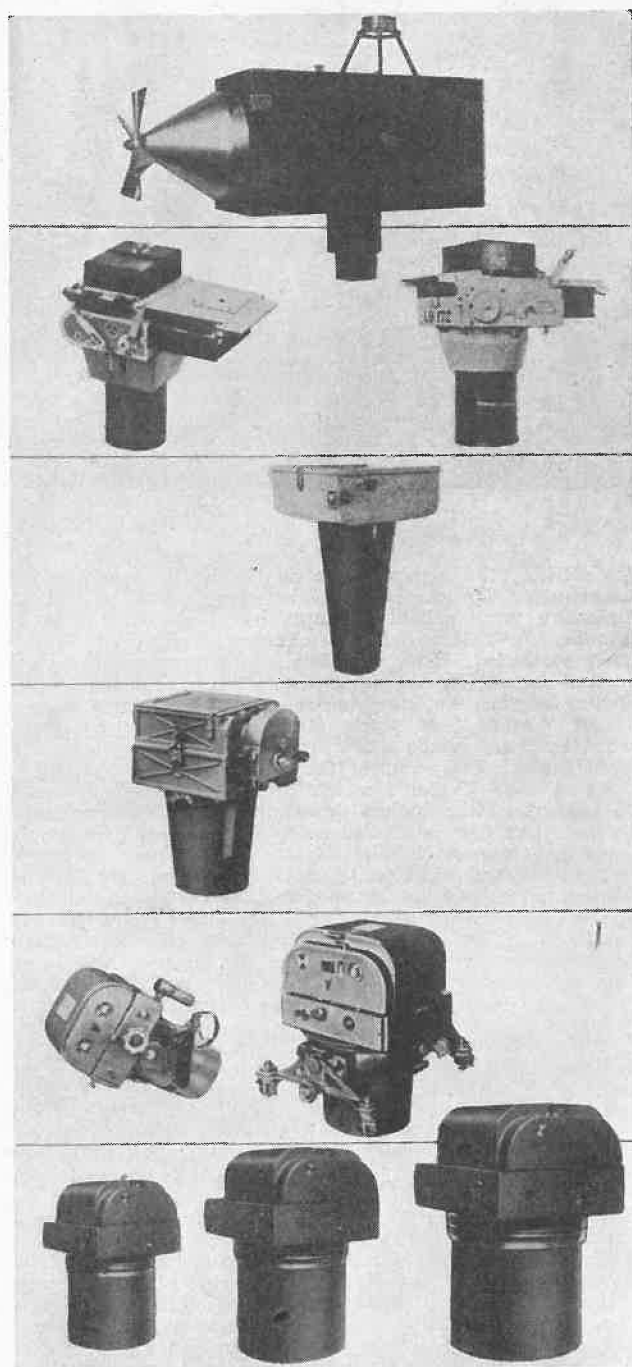
A dial also indicates the number of seconds to elapse before the next exposure. Surrounding this dial is an ebonite knob with which the periods between exposure are varied at will. Recorded on photographs taken with Eagle aerial cameras are instrumental data such as time, height, level and other information desired for air survey or reconnaissance.

Most scientific developments have their popular and supporting counterpart, and Air Survey Photography is no exception. The massive demands for cameras for military reconnaissance far outweigh air survey requirements, and call for the mass

production of air photographs to be taken under all and any conditions, ignoring instrument data recording, distortionless image and similar points which are of vital importance to the air surveyor.

For military purposes the focal plane shutter with its practically limitless speed has naturally been retained, together with electric operation and control. Mechanically, cameras now in service differ very little in principle but greatly in size.

(To be concluded)



HISTORICAL DEVELOPMENT.—Outstanding milestones of the Williamson type aerial camera are shown in this pictorial sequence. At the top is the "Aerocam" of 1916 (type F.1), the first automatic air camera with perforated roll film and instrument recording. Next in order are shown the L. and L.B. of 1917 (types P.6 and P.7) automatic plate cameras. The next type shown, with prominent lens cone, is the L.F. of 1918 (type F.2) which gave a large picture. In 1919 the first Eagle was produced under the designation type F.8. This was electrically driven. Eagles III and IV (1920-1938) are shown together and the three cameras at the bottom of the picture are Eagles V, VII and IX of 1941, which are electrically-operated automatic instruments with self-contained motor and instrument records.

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