

APPENDIX No. 5.

A.F.C. TRAINING IN ENGLAND.

The system of training pilots of the Australian squadrons in England during the first eight months of 1917 is described by Captain E. G. Knox,¹ Recording Officer of No. 3 Squadron. In the main, what he says of No. 3 Squadron holds good also for the others.

Flying Officers.—Selected candidates, after medical tests, were despatched to either No. 1 School of Military Aeronautics, Reading, or to No. 2 School of Military Aeronautics, Oxford, for a six weeks' course, which included lectures on the theory of flight, aerial navigation, aero-engines, and construction of aeroplanes. In addition, practical experience was gained in aero-engines and in rigging, as well as in Morse-code buzzing, elementary artillery-observation, bombing, compass, map-reading, &c. At the conclusion of the course the candidates were subjected to a written examination and, if successful, were sent to an elementary training squadron for instruction in aviation.

Two types of machine were then in use in these elementary training squadrons—the Maurice-Farman (Shorthorn or Longhorn), and the Grahame-White. From 1917 onwards pilot-pupils began their training on Avros.

The average pupil after three-hours' dual instruction, split up into breaks of fifteen minutes, was considered ready for a first solo-flight. This successfully accomplished, the pupil was required to complete a total of five hours' solo in the elementary machine, including as many landings as possible, or until the instructor was satisfied that the pupil could land the machine. The solo time on "Rumpitees" (as the M.F. Shorthorns were generally called) was varied from time to time. In 1916, for example, pupils were required to do only two hours' solo before being sent on for higher training. The time was increased to five hours, and later, in 1917, reduced to four hours.

Some little idea was gained in these elementary squadrons of the capabilities which the pupils exhibited, and an indication was obtained of the aptitude for one or other of the types used on service. Pupils who did best in elementary machines were usually selected for higher training in a scout squadron, while those not considered suitable for fast and light machines were sent to two-seaters. Mistakes in selection were sometimes made. Many pilots of the two-seater squadrons were quite as good as the so-called scout-pilots. Pilots in fighting two-seaters, e.g., Bristol Fighters, were required to be just as efficient pilots as those in scouts.

Since No. 3 Squadron was destined for service in France as a two-seater corps squadron, training of pilots for this class of work was allotted to it. Here the pupil recommenced dual flying, but this time in a more difficult machine. About this period the Avro (80-h.p. Gnome) was used in the majority of higher-training squadrons for preliminary instruction. About two and a half to three hours' dual

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was necessary before the pupil was sent off solo. After doing about five hours' solo on an Avro, the pupil was given a few landings in a service machine and then sent solo in that.

A sum total of twenty-hours' solo (including the time in elementary machines) was necessary before a pupil could graduate as a pilot. But several further tests were introduced. He must perform a cross-country flight of at least forty miles and make two landings away from his own aerodrome. He had to climb to a height of 8,000 feet, shut off his engine, and land on his own aerodrome without assistance from the engine. He had to make two landings by night guided by flares. Among special tests were:—

Bomb dropping: to fly three times over a Bachelor mirror, an instrument for judging the exactitude with which bombs could be dropped.

Photography: to photograph from a height of from 1,500 to 5,000 feet six out of eighteen points given by map-reference.

Buzzing: to send and receive eight words a minute on a buzzer.

Artillery Observation: to conduct at least one successful shoot on a picture-target on the ground and one successful shoot from the air, with a puff-target, observations being sent down by wireless.

Formation Flying: to take part in at least one formation flight.

Fighting Practice: to carry out elementary fighting practice in the air.

Machine-gunnery: to satisfy examiners in knowledge of Vickers and Lewis guns, stripping and assembling, and shooting on ground range. The camera-gun generally used in practice was of the Lewis type. It was used both on the ground—for firing at machines in the air round the aerodrome—and on machines in fighting practice. They were of such great value that the fighting squadrons in France each had two allotted. Thus in the service squadrons pilots could, when opportunity offered, get further practice.

Having completed these tests and the twenty-hours' solo, the pupil was considered a graduated pilot, and was given permission to wear his "wings."

During the early months of 1917, the B.E.2e was still the principal machine used for corps work in France, and it was in this type that pupils in No. 3 Squadron graduated; but towards April and May, in consequence of the changing over in France to R.E.8's and A.W.'s, pupils were frequently sent to other training squadrons after graduation, in order to fly types of machines which they would eventually fly oversea. Frequently a pupil who, during his elementary training, was not regarded by his instructor as a likely scout-pilot, showed during later training for a corps squadron signs of playing that part with success. Such pupils were graduated in No. 3 Squadron, and were recommended for further training with scouts.

Mechanics.—The training of the mechanics of the squadrons was a highly important work. A mechanic could make or mar the efficiency of a machine in air fighting, and every successful pilot during the war learned the importance of having his machine well kept. The tradesmen of whom air-mechanics are composed are:—Acetylene-welders, blacksmiths, coppersmiths, fitters (engine), riggers, electricians, magneto-repairers, fitters (general), and machinists. The school at

Halton Camp, where the Australian air-mechanics were trained, was divided into eight technical sections, numbered 1 to 8, each of which, to facilitate records, technical returns, and administration, was allotted a distinctive colour.

Acetylene welders (Section 1) were instructed in all branches of acetylene-welding, and their course was of eight-weeks' duration. Blacksmiths' work (Section 1) consisted of making forgings of engine parts, preparing blacksmiths' tools, and all ordinary blacksmiths' work, in which they received twelve-weeks' instruction. Coppersmiths (Section 1) received eight weeks' instruction in all coppersmiths' work, and especially in the making of induction pipes and in tube bending. Included in this branch were also sheet-metal workers and tinsmiths, who instructed fitters (engine) in the making of engine-cowlings, sweating of joints, and metal-work repairs.

Fitters (engine) proceeded through three technical sections before they were ready for posting away for duty. On arrival at the school they entered Section 7, where they had five-weeks' instruction in bench-fitting to make them proficient in the use of tools and to teach them accuracy in, e.g., the making of simple engine-parts. For the more advanced work on aero-engines they were passed on to Section 2. Here pupils remained for eight weeks. They were first taught the principles of the internal-combustion engine, and later received advanced and specialising instruction in one engine only, so that each fitter (engine) was passed out classed as "Fitter (engine) Clerget," or otherwise, according to whatever engine he had been trained upon. In this section pupils had to pass a written as well as a practical examination at the end of their course, after which they proceeded to Section 5, for three weeks' instruction, which embraced erecting, i.e., mounting the engine into the aeroplane; squadron-routine, i.e., the marking of the aerodrome with wind-cones and flares, keeping the aerodrome clear of obstruction, &c.; engine-running and adjustments, i.e., swinging the propeller and methods of obtaining the best running-results out of an engine; handling the machine; how to start up a machine; the proper place available on the machine for holding and method of chocking it for the "get away"; how to receive a machine on landing; and gun-gears. During their course in Section 5 pupils attended classes in Section 1 for two-days' instruction in copper-smithing for simple repairs, and then finished training in Section 5 with one week on the workshop lorries—fitting, turning, and general repairs.

Riggers on arrival entered Section 3, and for seven weeks they received instruction in the rigging of a machine, splicing, sailmaking, instrument repairing, and general repairs to aeroplane. They then had a written examination and proceeded to Section 5 for a further week's instruction, which consisted of squadron-routine, engine-running and adjustment, and handling the machine.

Electricians and magneto-repairers were trained in Section 4. The electricians' course comprised elementary theory, internal and external wiring, accumulator charging and discharging, repairing and making, repair of instruments, car-lighting sets, handling, running and repair of motor and generators, telephone- and bell-wiring—twelve-weeks' instruction in all. Magneto-repairers received ten-weeks' training in elementary theory, working, repair, and testing of all makes and types of magnetos. They also received instruction in car-lighting sets.

Fitters (general) performed work entirely different from that of fitters (engine). They were employed in repair-parks and dépôts, working with machinists. Fitters (general) entered Section 7, for eight-weeks' instruction, and then passed on to Section 8. In this section machinists were trained for sixteen weeks in the use of machine tools, and fitters (general) remained for eight-weeks' instruction, working in conjunction with the machinists. This training was to enable them to carry out work on machine-tools which did not require specialists, such as drilling, plain turning, shaping.