AEROPLANE ACCIDENTS.

BY

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[Abstract.]

THE points to be considered in classifying aeroplane accidents are, first, the causes; secondly, the type or in which part of the flight the cause was initiated; and, lastly, the actual damaging factor.

Causes of Aeroplane Accidents.

These may be considered under the following headings:

- (1) Defect in the aeroplane.
- (2) Error of judgement in flying.
- (3) Loss of head.
- (4) Brain fatigue.
- (5) Fear.
- (6) Physical illness.
- (7) Unavoidable causes.

(1) This cause amounts to mechanical failure of some part of the aeroplane, and can be subdivided into (a) breakage in the air, and (b) engine failure. If the engine fails in the air a forced landing is compulsory, but given a fair height—2,000 feet or more—the pilot can usually select a good landing place. One of the commonest examples of aeroplane accidents is engine trouble just after leaving the ground, and in trying to turn back the pilot loses flying speed and the aeroplane falls to the ground.

(2) Error of judgement in flying is the commonest cause of aeroplane accidents, and of the many examples of this, perhaps the commonest is when on landing the pupil misjudges his distance from the ground and strikes the ground at a varying angle, usually overturning and wrecking the machine. It is difficult to estimate and account for these errors of judgement. In some cases the error may be due to insufficient instruction, and in other cases it may be found on examination that the pupil's standard of vision is below normal; but, on the other hand, the pupil may be physically fit, have normal vision and good balancing power, and in the latter cases it may be a case of delayed reaction times.

(3) Loss of head occurs fairly frequently and accounts for a considerable number of accidents. The pupil in his new occupation of flying is at high tension, and under the sudden strain of an emergency his power to reason and act synchronously may momentarily lapse, and there is seldom time to correct the error made.

(4) In contradistinction to loss of head the pupil in brain fatigue reaches the stage where he has neither the power to reason, decide, or act; a state of mental inertia supervenes. This is due to repeated stimuli received by his brain in rapid succession in his flight—he feels alone, and that he cannot manage to control the aeroplane; he feels helpless, and in a stupor awaits events and takes little part in the aeroplane's control. As a rule, if it occurs, the pupil, even if he should escape injury, soon gives up flying; he is not of a temperament suitable for flying.

(5) Fear, at least in a degree sufficient to disturb flying, is rarely experienced in the air on the first few solo flights, the mind being far too much occupied and concentrated on details of flying and watching the various instruments.

(6) At an air station medical inspection of the pilots and pupils at regular intervals reveals any organic disease that might lead to loss of consciousness in the air. Flying on an empty stomach may cause faintness, and as in schools flying commences at dawn all pupils are first provided with a good meal, while on long flights pilots are provided with tabloid forms of nourishment.

(7) From time to time unavoidable causes of accidents arise. The terrain in certain areas may be unsuitable and conceal obstacles, while in some aeroplanes the view of the ground in certain positions may be limited.

Type of Accidents.

The term "type of accidents" has been suggested to describe the part of the flight in which the cause of the accident was initiated. A flight may be divided arbitrarily into three parts: first, the getting off the ground into the air; second, in the air with the various turns, figures of eight, spirals, etc.; and third, the landing. The commonest type of accident is on landing.

Actual Damaging Forces in Aeroplane Accidents.

The injuries sustained are akin to most high velocity accidents, but are usually more severe, as greater speed is used in aviation. They include the following: (1) Injuries due to crushing, where some part of the pilot's body gets crushed between parts of the wrecked aeroplane or between the engine and the earth. (2) Injuries due to collision with the ground, as when the pilot is thrown out or hits the ground with his head in turning over in and with the aeroplane. (3) Injuries due to impact with different parts of the aeroplane, as when the head is violently jerked forward and strikes the edge of the nacelle on the aeroplane's impact with the ground. (4) Injuries from fire. (5) Drowning and immersion effects in seaplane work. (6) Suspension effects, as when the pilot is suspended head downwards in an overturned aeroplane and is unable to loosen his safety belt; in many crashes the sudden impact of the pilot's body on the safety belt causes abdominal injuries. (7) Poisoning from petrol fumes.

Safety Belts, Helmets, and Goggles.

With regard to the use of safety belts endless discussion has taken place among aviators. My own opinion is that before leaving the ground all aviators should see that their safety belts are fastened and should be familiar with the method of their quick release. The belts should never be undone in the air, but a difficult question arises whether to release the belt near the end of a glide before landing. Safety helmets are of undoubted value in school work and should be worn by all pupils. In a crash they certainly prevent scalp wounds and the side flaps protect the ears from injury. Most aviators wear goggles, but there are still some who prefer to fly without them. I certainly think that goggles should always be worn; there is no doubt that flying without goggles is apt to set up a spasm in the eyes.

First Aid at an Air Station.

The sick bay or dressing station should be in full view of the aeroplane, with a look-out man supplied with field glasses always on duty during flying hours. Immediately a crash or forced landing occurs the look-out man telephones to the sick bay, notifying the steward of the exact site of the occurrence, and proceeds with a stretcher to the accident. With the stretcher is taken an emergency tool-case, which includes crowbars, wire cutters, saw, fire extinguisher, etc. The steward dispatches the ambulance with which two sick-berth attendants go, and with them is a bag containing morphine, hypodermic syringes, chloroform, brandy, first-aid and picric acid dressings, etc. If the injured person is conscious and in much pain morphine should be injected and the patient conveyed quickly to the dressing station, where his injuries should be examined and treated; chloroform may have to be given, as it acts more quickly than morphine.

The Nature of the Injuries Received.

Surgical work in connexion with aviation in general differs but little from that in military and civil life. The difference is mainly one of degree, in that one is mostly called upon to deal with the results of high velocity accidents associated with falls at varying angles and from various heights. Burns are among the most severe forms of injury. The cold at high altitude is extreme, and aided by the rapid transit through the air is apt to cause frost-bite easily. In a large proportion of aeroplane accidents the occupants receive injuries to the face, owing to the impact throwing their heads forward. Fractures of both bones of the leg and fractures involving the ankle-joint are very common.