ABSTRACTS.

Summary of Paper on "Airships," by Wing-Commander Cave, delivered to the Engineering Section, British Association.

The paper is intended to set out the present difficulties in development and the lines along which future research is required.

The principal difficulty experienced with the use of airships in tropical climates is the deterioration of the strength and gastightness of the fabric under the action of light. The gastightness of the bags of a rigid ship is obtained by goldbeaters' skin, the supply of which is very limited, and a substitute of equal gastightness and low weight is badly wanted.

An important function of the outer cover of a rigid ship is to reflect as much as possible of the light and heat which falls upon it. This is necessary in order to reduce the superheating of the gas to a temperature above that of the surrounding air thereby causing a false lift which decreases as soon as the intensity of radiant heat is reduced.

The reinforcement of non-rigid envelopes is discussed. It is suggested that fabric, which is usually of equal strength in both warp and weft directions, should be reinforced by circumferential bands of string tape which will supply the excess of the circumferential tension over the longitudinal tension.

Attention is drawn to the relative unimportance of permeability to hydrogen as compared with ability to resist the passage of air into the gas space, as air which has leaked in can only be eliminated by the discharge of large quantities of gas.

The importance of being able to take weight into the ship during flight to compensate for superheating or for petrol consumed is discussed.

Experiments have been made in using hydrogen as supplementary fuel. It is found that the use of hydrogen alone causes excessive detonation, but by suitably proportioning the mixtures of hydrogen and petrol, satisfactory running can be obtained and very considerable economy of fuel achieved.

Attention is drawn to the much greater relative importance of fuel economy than engine weight which obtains in an airship by reason of the much greater duration of flight. The need of accessibility and ease of repair during flight are discussed and also various minor aspects in which the ideal airship engine differs from that of the aeroplane.

The desirability of having a propeller of variable pitch and one capable of sufficient variation to produce reverse thrust is discussed.

Attention is drawn to the necessity of obtaining some method of determining the height of an airship by means other than barometric pressure, so that the reading of the barometer at a point on the ground below the airship can be taken for meteorological purposes.

Attention is drawn to the improved ratio of weight carried to fuel expended which results from increased size. It is shown that the limitation to the size of a rigid airship is set by the diameter of cross-section which is possible in view of the lateral pressure of the gasbags when unequally inflated. In the case of a non-rigid ship without effective transverse bulkheads the limitation to size is probably set by the accumulation of pressure at the upper end of a long ship when at a considerable angle of pitch.

It is shown that a non-rigid ship of 500,000 cubic feet capacity and a rigid ship of 2,000,000 cubic feet capacity are each capable of carrying a useful weight equal to about 50 per cent. of their displacement. The relatively high ratio in the case of non-rigid ships renders it most desirable that ships of this type should be developed and considered where the loads to be carried and the distances to

be covered are not so great as to render the more expensive rigid construction necessary.

Particulars are given of the recent success obtained in mooring out a rigid airship to a mast. She remained for three weeks in charge of watches, each consisting of one N.C.O. and five men, and experienced gusts up to 43 m.p.h., very heavy rain, bright sunshine, and several thunderstorms, including one of exceptional violence. This development is one of the greatest importance as it materially reduces the difficulties of landing and handling an airship.

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"Catalogue of Lewis's Medical and Scientific Library." London, 1918: H. K. Lewis and Co. Oct. pp. 492.

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"Le Grand Ballon Captif." G. Tirsandier. Paris, 1878: G. Marson.

"British Engineers' Association Directory." London, 1919.

"The British Aircraft Industry." 1919. London: "The Times." Oct. pp. 293. 7s. 6d.

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"Journal of the Royal Society of New South Wales." Vol. LI. 1917. Sydney. Oct. pp. 564. LXIII.

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