APPENDIX I.

CHECKING CENTRE OF GRAVITY.

Procedure. (i) Place the aircraft on platform scales, one scale under the wheels and the other under the tail skid, as shown at A, fig. 108. Adjust the jack under the tail until the angle of incidence of the bottom plane is zero. Check on port and starboard planes. Take scale readings, giving P for wheels and Q for skid after deducting the "zero" reading due to the weight of trestles, jacks, etc. The total weight of the aeroplane will be given by $P + Q = W$. Drop a plumbline from the point of support of the skid and measure the horizontal distance (l) between the axle centre line and the skid support. Measure the height (a) of the skid support above the axle centre line. Drop a plumbline from the leading edge of the bottom plane at the root and measure the distance D between the axle centre line and the leading edge. Measure the height H of the chord above the axle centre line.

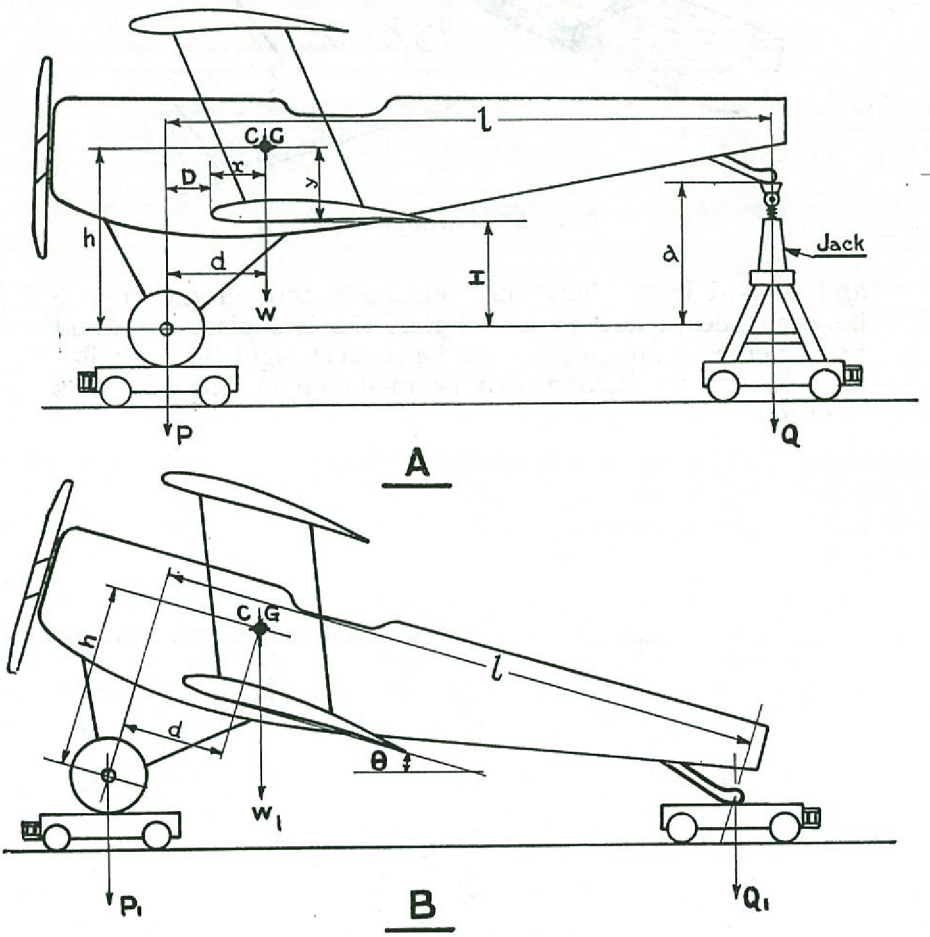

FIG. 108.—Checking C.G. of an aeroplane.

(ii) Lower the tail skid to the level of the point of support of the wheels as shown at B, fig. 108. Measure the angle of inclination to the horizontal of the bottom plane chord θ. Check on port and starboard planes. Take new weight readings, giving P_1 and Q_1 after deducting zero readings. Check the new total weight $W_1 = P_1 + Q_1$ and if different from W take the mean weight $= \frac{W + W_1}{2}$.

(iii) If d is the horizontal distance of the centre of gravity behind a straight line through the wheel centres, at right angles to the chord, then :—

$$d = \frac{lQ.}{W}$$

Also, if h is the perpendicular distance of the centre of gravity above the wheel centres, at right angles to the chord, then :—

$$h = \frac{aQ_1}{W} + \text{Cot}\ \frac{Q_1 - Q.}{W}$$

The position of the centre of gravity is quoted by its distance x along the chord line from the leading edge, and its height y at right angles to this line at point x. As will be deduced from fig. 108, when the wheel centre line is forward of the leading edge $x = d + D$ and when behind the leading edge $x = d - D$. Also, if the C.G. is above the plane of reference, normally the bottom plane of a biplane, $y = h - H$, but if the C.G. is below (as in a monoplane) then $y = H - h$.

(iv) The method employed by the Aeronautical Inspection Directorate of determining the centre of gravity of an aircraft is detailed in the Inspection Instruction No. A4. Either the method set out above or that given in the leaflet A4 can be used, and, if care is exercised and reliable weighing machines are employed, accurate results can be obtained. The method described in the A.I.D. inspection leaflet is more suited for new types of aircraft, or those in which modifications have been made affecting the weight distribution.

APPENDIX II.

THREAD AND TAPPING DRILL SIZES.

BRITISH ASSOCIATION STANDARD THREADS.

B.A. No.	Diameter.	Pitch of thread.	Dia. at root of thread.	Size of Tapping drill.
0	0·2362	0·0394	0·1890	No. 12
1	0·2087	0·0354	0·1662	
2	0·1850	0·0319	0·1467	No. 26
3	0·1614	0·0287	0·1269	
4	0·1417	0·0260	0·1105	No. 34
5	0·1260	0·0232	0·0981	
6	0·1102	0·0209	0·0852	No. 44
7	0·0984	0·0189	0·0757	
8	0·0866	0·0169	0·0663	No. 51
9	0·0748	0·0154	0·0564	
10	0·0669	0·0138	0·0504	No. 54

Whitworth Standard Threads.

Dia. in inches.	No. of threads per in.	Dia. at root of threads.	Tapping drill, size : in.	Dia. in inches.	No. of threads per in.	Dia. at root.	Tapping drill, size: in.
1/4	20	0·1860	3/16	7/16	14	0·3460	23/64
5/16	18	0·2414	1/4	1/2	12	0·3933	13/32
3/8	16	0·2950	19/64	5/8	11	0·5086	33/64

British Standard Fine Threads.

Dia. in inches.	No. of threads per in.	Dia. at root of threads.	Tapping drill, size : in.	Dia. in inches.	No. of threads per in.	Dia. at root of threads.	Tapping drill, size: in.
7/32	28	0·1731	17	9/16	16	0·4825	31/64
1/4	26	0·2007	7	5/8	14	0·5335	35/64
9/32	26	0·2320	A or 15/64	11/16	14	0·5960	39/64
5/16	22	0·2543	G or 17/64	3/4	12	0·6433	21/32
3/8	20	0·3110	0 or 5/16	13/16	12	0·7058	23/32
7/16	18	0·3664	U or 23/64	7/8	11	0·7586	49/64
1/2	16	0·4200	27/64	1	10	0·8719	7/8

Wire Gauge Drill Sizes.

No. Drill.	Size in inches.	No. Drill.	Size in inches.	No. Drill.	Size in inches.	No. Drill.	Size in inches.
1	0·2280	16	0·1770	31	0·1200	46	0·0810
2	0·2210	17	0·1730	32	0·1160	47	0·0785
3	0·2130	18	0·1695	33	0·1130	48	0·0760
4	0·2090	19	0·1660	34	0·1110	49	0·0730
5	0·2055	20	0·1610	35	0·1100	50	0·0700
6	0·2040	21	0·1590	36	0·1065	51	0·0670
7	0·2010	22	0·1570	37	0·1040	52	0·0635
8	0·1990	23	0·1540	38	0·1015	53	0·0595
9	0·1960	24	0·1520	39	0·0995	54	0·0550
10	0·1935	25	0·1495	40	0·0980	55	0·0520
11	0·1910	26	0·1470	41	0·0960	56	0·0465
12	0·1890	27	0·1440	42	0·0935	57	0·0430
13	0·1850	28	0·1405	43	0·0890	58	0·0420
14	0·1820	29	0·1360	44	0·0860	59	0·0410
15	0·1800	30	0·1285	45	0·0820	60	0·0400

LETTER DRILL SIZES.

Letter.	Dia. in inches.	Letter.	Dia. in inches.	Letter.	Dia. in inches.	Letter.	Dia. in inches.
Z	0·413	T	0·358	N	0·302	H	0·266
Y	0·404	S	0·348	M	0·295	G	0·261
X	0·397	R	0·339	L	0·290	F	0·251
W	0·386	Q	0·332	K	0·281	E	0·250
V	0·377	P	0·323	J	0·277	D	0·246
U	0·368	O	0·316	I	0·272	C	0·242
						B	0·238
						A	0·234

APPENDIX III.*

Possible extension of tolerances on blade angles for wooden airscrews.

Although the blade angles of certain wooden airscrews may be found to be slightly outside the tolerances allowed for new construction, it is possible that they may still be serviceable from considerations of rotational speeds. Whilst it is difficult to decide in the absence of extensive tests to what extent these tolerances may be increased for wooden airscrews in use, the following are suggested :—

Class A ± 1° on the angles given on the drawing over the outer two-thirds of the blade length.

Airscrew Drg. No.	*Aircraft.*	*Engine.*
S.88C/232	Rangoon	Jupiter XIF.
19044A	Flycatcher	Jaguar IV.
Z.129	Hinaidi	Jupiter VIII.
Watts 730	Horsley	Condor.
29967	Ripon	Lion XIA.
Watts 861 & Watts 869	Hart	F.XIB.
3895	Sidestrand	Jupiter VIII & VIIIF.
24738	Wapiti	Jupiter VI.

Class B ± ¾° on the angles given on the drawing over the outer two-thirds of the blade length.

Airscrew Drg. No.	*Aircraft.*	*Engine.*
Y.573	Avro 504N	Lynx.
Y.689	Tutor	Mongoose.
PD.8019	Blackburn or Dart	Lion.
P.3274	Bulldog	Jupiter VII.
P.3317A	Bulldog	Jupiter VIIF.
T.28925	D.H.9A	Liberty.
T.29334	Gamecock	Jupiter VI.
F.2567	Grebe	Jaguar IV.
DH.5180/5	Moth	Gipsy.
8820	Sidestrand	Jupiter VI.
SP.3420A	Siskin	Jaguar.
SP.4291A	Siskin	Supercharged Jaguar.
Watts 908	Tomtit	Mongoose.
10955	Vernon	Lion.
16273	Vimy	Jupiter IV.
3830	Southampton	Lion.

Difference of angles on the opposite blades must remain as for new construction, i.e., 1° over the outer two-thirds of the blade length.

* SPECIAL NOTE.—This Appendix applies only to wooden airscrews which have been in R.A.F. Depôts or in use for some time.