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Tests on a 5-per-cent Biconvex Aerofoil in the Compressed Air Tunnel

By

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of the Aerodynamics Division, N.P.L.

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Summary.—A symmetrical 5 per cent. biconvex aerofoil has been tested from $R = 0 \cdot 3 \times 10^6$ to $R = 7 \cdot 5 \times 10^6$. No scale effect was found on C_L. To show the effect of camber, comparative curves are given for circular-back aerofoils. $C_{L\ max.}$ increases linearly with camber from 0·7 for the symmetrical wing to 1·18 for a wing with 6 per cent. camber. The aerofoil was also tested with a 15 per cent. split flap. With flap, $C_{L\ max.}$ was 1·35.

Tests have been carried out in the Compressed-Air Tunnel on a symmetrical biconvex aerofoil, 5 per cent. thick, over a range of Reynolds number from $R = 0 \cdot 3 \times 10^6$ to $R = 7 \cdot 5 \times 10^6$. The upper and lower surfaces were circular arcs.

The model was made of steel with a good buffed surface. The span was 48 in. (1·219 *m*), the chord was 7·94 in. (0·202 *m*). The aerofoil was designed to have a chord of 8 in., but, to avoid razor edges, 0·03 in. was cut from each end of the chord and the leading and trailing edges were rounded to a radius of 0·003 in. (0·0004*c*).

Tests were also made on the aerofoil fitted with a 15 per cent. flap at 90 deg. fixed at 0·15*c* from the trailing edge.

The results are given in the tables, which include the values for infinite aspect ratio, derived from the formulae

$$\alpha = \alpha_0 + 3 \cdot 55\, C_L \text{ (degrees)},$$
$$C_D = C_{D0} + 0 \cdot 0555\, C_L^2.$$

Very little scale effect was found. Lift curves are plotted in Fig. 1 against α_0 at $R = 0 \cdot 3 \times 10^6$ and $R = 7 \cdot 5 \times 10^6$. The main feature of the curves is the flat top of the lift curve. C_L remains at 0·7 from $\alpha_0 =$ 9 deg. to $\alpha_0 = 22$ deg., then rises to 0·8 at $\alpha_0 = 32$ deg., after which it begins to fall. The effect of camber may be seen in the same figure, where corresponding lift curves are drawn for a 5 per cent. circular-back aerofoil (camber 2·5 per cent.). These are taken from results carried out in the Compressed-Air Tunnel for Dr. G. S. Baker[1] on a series of circular-back aerofoils with flat undersurfaces. To find the effect of rounding the leading edge, the leading edges of the circular-back aerofoils were rounded in stages. No scale effect was found with slight rounding and it was only when a considerable amount of the forward part had been cut off that any scale effect was observed. From this it is assumed that the amount of wounding carried out on the biconvex aerofoil would not affect its characteristics over the range of the experiments. In Fig. 1, the lift curves for the biconvex wing with flap are also known.

Figs. 2 and 3 give the profile drag and moment coefficients for the biconvex and 5 per cent. circular-back aerofoils, plotted against C_L. The very rapid rise of profile drag with lift coefficient should be noted, a rise which is several times greater than that of the induced drag on a conventional aerofoil of aspect ratio 6.

In Fig. 4, $C_{L\ max.}$ has been plotted against camber ratio for sharp-nosed aerofoils based on circular arcs. These are the biconvex (zero camber) and circular-back aerofoils of thicknesses 5, 10, 15 and 20 per cent. (cambers 2·5 per cent. 5 per cent., 7·5 per cent. and 10 per cent. respectively). Maximum lift coefficient increases linearly with camber from 0·7 for the symmetrical wing to 1·25 for 7·5 per cent. camber. Some of the circular-back aerofoils had irregularities in the lift curves, they had an early stall followed by a drop in lift coefficient, and then C_L increased again to a higher value. These irregularities disappeared at the high Reynolds numbers and there was no scale effect on the final stalling angle. In all cases, it is this final value of $C_{L\ max.}$ that has been given.

REFERENCE

No.	*Author*	*Title, etc.*
1	G. S. Baker	The Efficiency of Marine Screw Propellers and the Drag Coefficient. Transactions of the North-East Coast Institution of Engineers and Shipbuilders. March, 1945.

TABLE 1

5 per cent. Biconvex Aerofoil

$R = 0\cdot30 \times 10^6$, $P = 1$ at., $V = 72\cdot8$ f./s. (22·2 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
−0·403	−5·6	0·0388	−0·0092	0·0298	−4·2
−0·310	−4·3	0·0295	−0·0050	0·0242	−3·2
−0·226	$-3\cdot0_5$	0·0187	+0·0009	0·0159	$-2\cdot2_5$
−0·143	$-1\cdot7_5$	0·0133	+0·0048	0·0122	$-1\cdot2_5$
−0·034	−0·5	0·0079	0	0·0078	−0·4
+0·076	$+0\cdot7_5$	0·0093	−0·0049	0·0090	+0·5
0·164	2·0	0·0134	−0·0042	0·0119	1·4
0·246	$3\cdot2_5$	0·0191	−0·0009	0·0158	$2\cdot3_5$
0·328	4·5	0·0278	+0·0038	0·0218	$3\cdot3_5$
0·414	5·7	0·0393	0·0083	0·0297	$4\cdot2_5$
0·501	$6\cdot9_5$	0·0545	0·0102	0·0406	5·2
0·585	8·2	0·0770	+0·0032	0·0580	$6\cdot1_5$
0·657	9·4	0·1040	−0·0184	0·0800	7·1
0·692	10·7	0·1313	−0·0433	0·1147	$8\cdot2_5$
0·698	$11\cdot9_5$	0·155	−0·0627	0·128	9·5
0·699	$13\cdot2_5$	0·176	−0·0742	0·149	10·8
0·691	$14\cdot5_5$	0·196	−0·0799	0·170	12·1
0·689	$15\cdot8_5$	0·214	−0·0837	0·188	13·4
0·696	17·1	0·235	−0·0882	0·208	$14\cdot6_5$
0·700	18·4	0·257	−0·0917	0·230	15·9
0·697	19·7	0·276	−0·0926	0·249	$17\cdot2_5$
0·696	$21\cdot0_5$	0·296	−0·0930	0·269	18·6
0·695	$23\cdot6_5$	0·336	−0·0947	0·309	21·2
0·732	26·3	0·394	−0·1054	0·364	23·7
0·787	$28\cdot8_5$	0·468	−0·1191	0·434	$26\cdot0_5$
0·825	$31\cdot4_5$	0·541	−0·1342	0·503	$28\cdot5_5$
0·833	33·6	—	—	—	$30\cdot6_5$
0·832	$34\cdot9_5$	—	—	—	32·0
0·826	36·4	—	—	—	$33\cdot4_5$
0·814	37·8	—	—	—	34·9
0·782	39·3	—	—	—	36·5
0·747	$40\cdot6_5$	—	—	—	38·0
0·681	$42\cdot1_5$	—	—	—	$39\cdot7_5$

TABLE 1—*continued*

$R = 0\cdot73 \times 10^6$, $P = 2\cdot7$ at., $V = 67\cdot7$ f./s. (20·6 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_o°$
−0·179	$-2\cdot4_5$	0·0136	−0·0014	0·0118	−1·8
−0·075	$-1\cdot2_5$	0·0092	−0·0033	0·0089	−1·0
+0·006	$+0\cdot0_5$	0·0053	+0·0007	0·0053	$+0\cdot0_5$
0·091	$1\cdot3_5$	0·0088	0·0029	0·0083	$1\cdot0_5$
0·186	2·7	0·0132	0·0046	0·0113	$2\cdot0_5$
0·364	5·1	0·0304	0·0074	0·0231	3·8
0·528	7·6	0·0618	+0·0118	0·0463	$5\cdot7_5$
0·672	$10\cdot0_5$	0·1115	−0·0229	0·0865	$7\cdot6_5$
0·696	$11\cdot3_5$	0·1384	−0·0471	0·1116	8·9
0·705	12·7	0·160	−0·0641	0·132	10·2
0·699	$13\cdot9_5$	0·182	−0·0719	0·155	11·5
0·698	15·2	0·203	−0·0809	0·176	$12\cdot7_5$
0·689	16·5	0·222	−0·0848	0·196	14·1
0·702	19·0	0·263	−0·0922	0·236	16·5
0·702	21·6	0·299	−0·0936	0·272	19·1
0·705	$24\cdot2_5$	0·345	−0·0972	0·317	$21\cdot7_5$
0·737	26·8	0·406	−0·1072	0·376	24·2
0·792	$29\cdot4_5$	0·476	−0·1222	0·441	$26\cdot6_5$
0·817	$32\cdot1_5$	0·555	−0·136	0·518	$29\cdot2_5$
0·835	$34\cdot9_5$	0·628	−0·150	0·589	32·0
0·785	$37\cdot7_5$	0·664	−0·146	0·630	35·0
0·692	$42\cdot0_5$	0·668	−0·139	0·641	39·6

$R = 1\cdot31 \times 10^6$, $P = 4\cdot9$ at., $V = 67\cdot4$ f./s. (20·5 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_o°$
−0·162	−2·5	0·0120	−0·0076	0·0105	$-1\cdot9_5$
−0·067	−1·3	0·0081	−0·0063	0·0079	$-1\cdot0_5$
+0·003	0	0·0064	+0·0016	0·0064	0
0·085	+1·3	0·0084	0·0055	0·0080	+1·0
0·174	$2\cdot6_5$	0·0125	0·0070	0·0108	$2\cdot0_5$
0·354	5·1	0·0293	0·0120	0·0224	$3\cdot8_5$
0·524	7·6	0·0618	+0·0152	0·0466	$5\cdot7_5$
0·676	10·0	0·1148	−0·0223	0·0895	7·6
0·700	11·3	0·1408	−0·0464	0·1137	$8\cdot8_5$
0·711	$12\cdot5_5$	0·165	−0·0645	0·137	$10\cdot0_5$
0·709	13·8	0·186	−0·0756	0·158	11·3
0·698	$15\cdot1_5$	0·203	−0·0814	0·176	12·7
0·702	$16\cdot4_5$	0·223	−0·0870	0·196	$13\cdot9_5$
0·706	$18\cdot9_5$	0·265	−0·0927	0·237	$16\cdot4_5$
0·711	21·5	0·306	−0·0973	0·278	19·0
0·709	$24\cdot1_5$	0·347	−0·0980	0·319	$21\cdot6_5$
0·752	26·7	0·409	−0·1098	0·378	$24\cdot0_5$
0·819	$29\cdot3_5$	0·483	−0·130	0·446	$26\cdot4_5$
0·840	$32\cdot0_5$	0·552	−0·138	0·513	29·1
0·852	$34\cdot8_5$	0·619	−0·154	0·579	$31\cdot8_5$
0·813	37·6	0·647	−0·155	0·610	$34\cdot7_5$
0·693	$41\cdot9_5$	0·676	−0·141	0·649	39·5

TABLE 1—*continued*

$R = 2{\cdot}18 \times 10^6$, $P = 8{\cdot}3$ at., $V = 67{\cdot}1$ f./s. ($20{\cdot}5$ m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
−0·174	−2·5	0·0121	−0·0041	0·0104	−1·9
−0·084	−1·3	0·0079	−0·0017	0·0075	−1·0
+0·008	0	0·0079	−0·0001	0·0079	$-0{\cdot}0_5$
0·097	+1·3	0·0096	+0·0015	0·0091	$+0{\cdot}9_5$
0·184	2·6	0·0131	0·0041	0·0112	$1{\cdot}9_5$
0·358	5·1	0·0304	0·0119	0·0233	$3{\cdot}8_5$
0·529	7·6	0·0620	+0·0147	0·0465	5·7
0·676	10·0	0·1127	−0·0227	0·0873	7·6
0·704	$11{\cdot}2_5$	0·1395	−0·0465	0·1120	$8{\cdot}7_5$
0·705	13·8	0·182	−0·0733	0·153	11·3
0·700	16·4	0·221	−0·0848	0·194	13·9
0·712	$18{\cdot}8_5$	0·261	−0·0936	0·233	$16{\cdot}3_5$
0·711	$21{\cdot}4_5$	0·304	−0·0963	0·276	$18{\cdot}9_5$
0·704	$24{\cdot}1_5$	0·347	−0·0984	0·320	$21{\cdot}6_5$
0·734	26·7	0·406	−0·1049	0·376	24·1
0·811	29·3	0·487	−0·130	0·451	26·4
0·833	$31{\cdot}9_5$	0·560	−0·141	0·521	29·0
0·864	34·7	0·630	−0·159	0·589	$31{\cdot}6_5$
0·798	$37{\cdot}5_5$	0·656	−0·155	0·621	$34{\cdot}7_5$
0·684	$41{\cdot}8_5$	0·660	−0·138	0·634	39·4

$R = 4{\cdot}83 \times 10^6$, $P = 17{\cdot}9$ at., $V = 71{\cdot}8$ f./s. ($21{\cdot}9$ m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
−0·088	−1·3	0·0087	−0·0017	0·0083	−1·0
+0·007	0	0·0076	+0·0003	0·0076	0
0·093	+1·3	0·0088	0·0021	0·0083	$+0{\cdot}9_5$
0·188	$2{\cdot}6_5$	0·0131	0·0043	0·0111	2·0
0·365	$4{\cdot}9_5$	0·0300	0·0124	0·0226	$3{\cdot}6_5$
0·537	7·4	0·0634	+0·0142	0·0475	5·5
0·676	10·0	0·1140	−0·0234	0·0886	7·6
0·706	11·2	0·140	−0·0471	0·112	8·7
0·712	13·7	0·179	−0·0730	0·151	11·2
0·708	16·2	0·217	−0·0865	0·189	13·7
0·711	$18{\cdot}6_5$	0·260	−0·0952	0·232	$16{\cdot}1_5$
0·713	$21{\cdot}2_5$	0·302	−0·0991	0·274	$18{\cdot}7_5$
0·710	23·9	0·346	−0·1011	0·318	21·4
0·754	$26{\cdot}4_5$	0·399	−0·1118	0·367	$23{\cdot}7_5$
0·795	$29{\cdot}0_5$	0·444	−0·129	0·409	$26{\cdot}2_5$
0·849	31·7	0·551	−0·146	0·511	28·7
0·851	34·5	0·606	−0·145	0·566	$31{\cdot}4_5$
0·817	37·3	0·650	−0·146	0·623	34·4
0·735	$40{\cdot}1_5$	0·659	−0·138	0·629	$37{\cdot}5_5$

TABLE 1—*continued*

$R = 7 \cdot 46 \times 10^6$, $P = 24 \cdot 2$ at., $V = 82 \cdot 6$ f./s. (25·2 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
−0·084	−1·4	0·0092	−0·0016	0·0088	−1·1
+0·012	0	0·0079	+0·0007	0·0079	$-0 \cdot 0_5$
0·106	$+1 \cdot 3_5$	0·0092	0·0013	0·0086	$+0 \cdot 9_5$
0·197	2·7	0·0126	0·0039	0·0105	2·0
0·372	$5 \cdot 2_5$	0·0326	0·0124	0·0250	$3 \cdot 9_5$
0·543	7·9	0·0672	+0·0137	0·0509	6·0
0·678	10·0	0·1144	−0·0243	0·0889	7·6
0·706	$11 \cdot 1_5$	0·137	−0·0456	0·109	$8 \cdot 6_5$
0·712	$12 \cdot 3_5$	0·159	−0·0627	0·131	9·8
0·708	13·6	0·179	−0·0738	0·151	11·1
0·699	16·1	0·221	−0·0855	0·194	13·6
0·698	18·5	0·263	−0·0945	0·236	16·0
0·704	21·1	0·303	−0·0984	0·276	18·6
0·711	$23 \cdot 7_5$	0·339	−0·0933	0·311	21·2
0·716	$26 \cdot 2_5$	0·371	−0·0827	0·343	23·7
0·763	$29 \cdot 1_5$	0·420	−0·0783	0·388	$26 \cdot 4_5$
0·795	$31 \cdot 8_5$	0·469	−0·0678	0·434	$29 \cdot 0_5$
0·797	$34 \cdot 7_5$	0·514	−0·0582	0·479	31·9
0·776	$37 \cdot 6_5$	0·550	−0·0439	0·517	34·9
0·653	42·0	0·586	−0·0247	0·562	39·7

TABLE 2

5 per cent. Biconvex Aerofoil with 15 per cent. Split Flap at 90 deg. fixed at 0·15c from Trailing Edge

$R = 0 \cdot 30 \times 10^6$, $P = 1$ at., $V = 73 \cdot 6$ f./s. (22·4 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
−0·247	−11·6	0·155	−0·039	0·152	$-10 \cdot 7_5$
+0·187	$-9 \cdot 0_5$	0·160	−0·149	0·158	−9·7
0·407	−6·4	0·182	−0·162	0·173	$-7 \cdot 8_5$
0·598	−3·9	0·198	−0·169	0·178	−6·0
0·748	−1·3	0·217	−0·158	0·186	$-3 \cdot 9_5$
0·923	$+1 \cdot 2_5$	0·239	−0·151	0·192	$-2 \cdot 0_5$
1·139	3·7	0·267	−0·162	0·195	$-0 \cdot 3_5$
1·354	$6 \cdot 1_5$	0·325	−0·219	0·223	$+1 \cdot 3_5$
1·354	7·4	0·363	−0·243	0·261	2·6
1·323	$8 \cdot 6_5$	0·399	−0·255	0·302	$3 \cdot 9_5$
1·247	$9 \cdot 9_5$	0·431	−0·258	0·345	$5 \cdot 5_5$
1·160	$12 \cdot 5_5$	0·482	−0·256	0·407	$8 \cdot 4_5$
1·143	$15 \cdot 2_5$	0·549	−0·260	0·477	11·2
1·187	$17 \cdot 8_5$	0·634	−0·273	0·556	$13 \cdot 6_5$
1·296	20·4	0·739	−0·293	0·646	15·8
1·284	23·0	0·795	−0·294	0·704	$18 \cdot 4_5$
1·260	25·6	0·817	−0·286	0·729	21·1
1·181	$28 \cdot 2_5$	0·806	−0·284	0·729	$24 \cdot 0_5$

TABLE 2—*continued*

$R = 0 \cdot 76 \times 10^6$, $P = 2 \cdot 9$ at., $V = 65 \cdot 8$ f./s. (20·1 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
0·186	—9·1	0·165	—0·155	0·163	$-10 \cdot 7_5$
0·376	$-6 \cdot 4_5$	0·176	—0·159	0·168	—7·8
0·599	$-3 \cdot 9_5$	0·203	—0·179	0·183	$-6 \cdot 0_5$
0·770	$-1 \cdot 3_5$	0·225	—0·173	0·192	—4·1
0·953	+1·2	0·245	—0·167	0·195	—2·2
1·158	$3 \cdot 6_5$	0·267	—0·174	0·193	$-0 \cdot 4_5$
1·358	6·1	0·327	—0·226	0·225	+1·3
1·371	$7 \cdot 3_5$	0·365	—0·251	0·261	2·5
1·324	8·6	0·401	—0·262	0·304	3·9
1·209	$11 \cdot 2_5$	0·456	—0·266	0·375	$6 \cdot 9_5$
1·177	$13 \cdot 8_5$	0·517	—0·270	0·440	$9 \cdot 6_5$
1·185	16·4	0·592	—0·278	0·514	12·2
1·335	$18 \cdot 9_5$	0·726	—0·313	0·627	14·2
1·301	21·6	0·747	—0·314	0·653	17·0
1·170	$24 \cdot 2_5$	0·803	—0·292	0·727	20·1
1·076	$26 \cdot 9_5$	0·865	—0·285	0·801	$23 \cdot 1_5$

$R = 1 \cdot 28 \times 10^6$, $P = 4 \cdot 8$ at., $V = 68 \cdot 7$ f./s. (20·9 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
0·182	—9·2	0·163	—0·155	0·161	$-10 \cdot 8_5$
0·375	$-6 \cdot 5_5$	0·173	—0·157	0·165	$-7 \cdot 8_5$
0·599	$-4 \cdot 0_5$	0·200	—0·176	0·180	$-6 \cdot 1_5$
0·773	$-1 \cdot 4_5$	0·223	—0·172	0·190	—4·2
0·951	$+1 \cdot 0_5$	0·244	—0·168	0·194	$-2 \cdot 3_5$
1·156	3·6	0·264	—0·171	0·190	—0·5
1·361	6·0	0·321	—0·220	0·218	$+1 \cdot 1_5$
1·370	7·2	0·362	—0·248	0·258	$2 \cdot 3_5$
1·328	$8 \cdot 4_5$	0·398	—0·260	0·300	$3 \cdot 7_5$
1·225	11·1	0·454	—0·269	0·371	$6 \cdot 7_5$
1·157	13·7	0·508	—0·266	0·434	9·6
1·174	$16 \cdot 2_5$	0·585	—0·276	0·509	12·1
1·297	$18 \cdot 8_5$	0·722	—0·309	0·629	$14 \cdot 2_5$
1·361	$21 \cdot 3_5$	0·822	—0·334	0·719	$15 \cdot 5_5$
1·237	$24 \cdot 0_5$	0·867	—0·314	0·782	$19 \cdot 6_5$
1·068	26·8	0·840	—0·277	0·777	23·0

TABLE 2—*continued*

$R = 2{\cdot}16 \times 10^6$, $P = 8{\cdot}2$ at., $V = 67{\cdot}6$ f./s. (20·6 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
0·175	$-9{\cdot}2_5$	0·146	−0·148	0·144	$-10{\cdot}8_5$
0·377	$-6{\cdot}6_5$	0·180	−0·160	0·172	−8·0
0·581	$-4{\cdot}1_5$	0·200	−0·172	0·181	−6·2
0·762	−1·5	0·225	−0·171	0·193	−4·2
0·942	+1·0	0·244	−0·163	0·195	$-2{\cdot}3_5$
1·169	$3{\cdot}4_5$	0·270	−0·172	0·194	−0·7
1·336	5·9	0·324	−0·217	0·225	$+1{\cdot}1_5$
1·371	7·1	0·361	−0·246	0·257	$2{\cdot}2_5$
1·356	8·3	0·397	−0·262	0·295	3·5
1·311	$10{\cdot}8_5$	0·461	−0·275	0·366	6·2
1·230	$13{\cdot}4_5$	0·536	−0·284	0·452	9·1
1·323	16·0	0·660	−0·312	0·563	11·3
1·388	$18{\cdot}5_5$	0·756	−0·328	0·649	$13{\cdot}6_5$
1·388	$21{\cdot}1_5$	0·842	−0·338	0·735	$16{\cdot}2_5$
1·292	$23{\cdot}8_5$	0·875	−0·329	0·782	$19{\cdot}2_5$
1·050	26·7	0·842	−0·265	0·781	23·0

$R = 4{\cdot}96 \times 10^6$, $P = 18{\cdot}2$ at., $V = 70{\cdot}6$ f./s. (21·5 m./s.)

C_L	$\alpha°$	C_D	C_m	C_{D0}	$\alpha_0°$
0·144	−9·6	0·161	−0·151	0·160	−11·1
0·368	$-6{\cdot}9_5$	0·178	−0·164	0·171	$-8{\cdot}2_5$
0·553	−4·4	0·192	−0·166	0·175	$-6{\cdot}3_5$
0·726	−1·8	0·217	−0·165	0·188	−4·4
0·918	+0·8	0·239	−0·160	0·192	$-2{\cdot}4_5$
1·138	$3{\cdot}2_5$	0·263	−0·168	0·191	−0·8
1·331	$5{\cdot}5_5$	0·313	−0·213	0·215	$+0{\cdot}8_5$
1·381	6·6	0·350	−0·241	0·244	1·7
1·361	$7{\cdot}8_5$	0·385	−0·260	0·282	3·0
1·286	10·4	0·457	−0·273	0·365	$5{\cdot}8_5$
1·278	$12{\cdot}9_5$	0·514	−0·275	0·423	8·4
1·343	15·5	0·610	−0·280	0·510	$10{\cdot}7_5$
1·433	$18{\cdot}0_5$	0·683	−0·302	0·569	$12{\cdot}9_5$
1·476	$20{\cdot}5_5$	0·800	−0·312	0·679	15·3
1·394	$23{\cdot}2_5$	0·839	−0·297	0·731	18·3
1·099	$26{\cdot}1_5$	0·808	−0·252	0·741	$22{\cdot}2_5$

TABLE 2—*continued*

$R = 6{\cdot}44 \times 10^6$, $P = 23{\cdot}8$ at., $V = 71{\cdot}4$ f./s. (21·8 m./s.)

C_L	α°	C_D	C_m	C_{D0}	α_0°
0·143	−9·8	0·159	−0·150	0·158	−11·3
0·371	$-7{\cdot}1_5$	0·179	−0·164	0·171	$-8{\cdot}4_5$
0·548	−4·6	0·190	−0·166	0·173	$-6{\cdot}5_5$
0·726	−2·0	0·213	−0·164	0·184	−4·6
0·909	$+0{\cdot}6_5$	0·236	−0·160	0·190	$-2{\cdot}5_5$
1·127	3·1	0·261	−0·167	0·190	−0·9
1·322	5·3	0·313	−0·215	0·216	+0·6
1·365	$6{\cdot}4_5$	0·344	−0·240	0·240	1·6
1·350	7·6	0·376	−0·256	0·275	2·8
1·290	$10{\cdot}1_5$	0·435	−0·262	0·343	$5{\cdot}5_5$
1·252	$12{\cdot}8_5$	0·488	−0·248	0·401	8·4
1·348	15·4	0·557	−0·251	0·456	10·6
1·423	18·0	0·629	−0·248	0·517	$12{\cdot}9_5$
1·437	$20{\cdot}6_5$	0·700	−0·239	0·585	$15{\cdot}5_5$
1·347	$23{\cdot}3_5$	0·770	−0·222	0·669	$18{\cdot}5_5$
1·071	$26{\cdot}3_5$	0·789	−0·171	0·725	$22{\cdot}5_5$

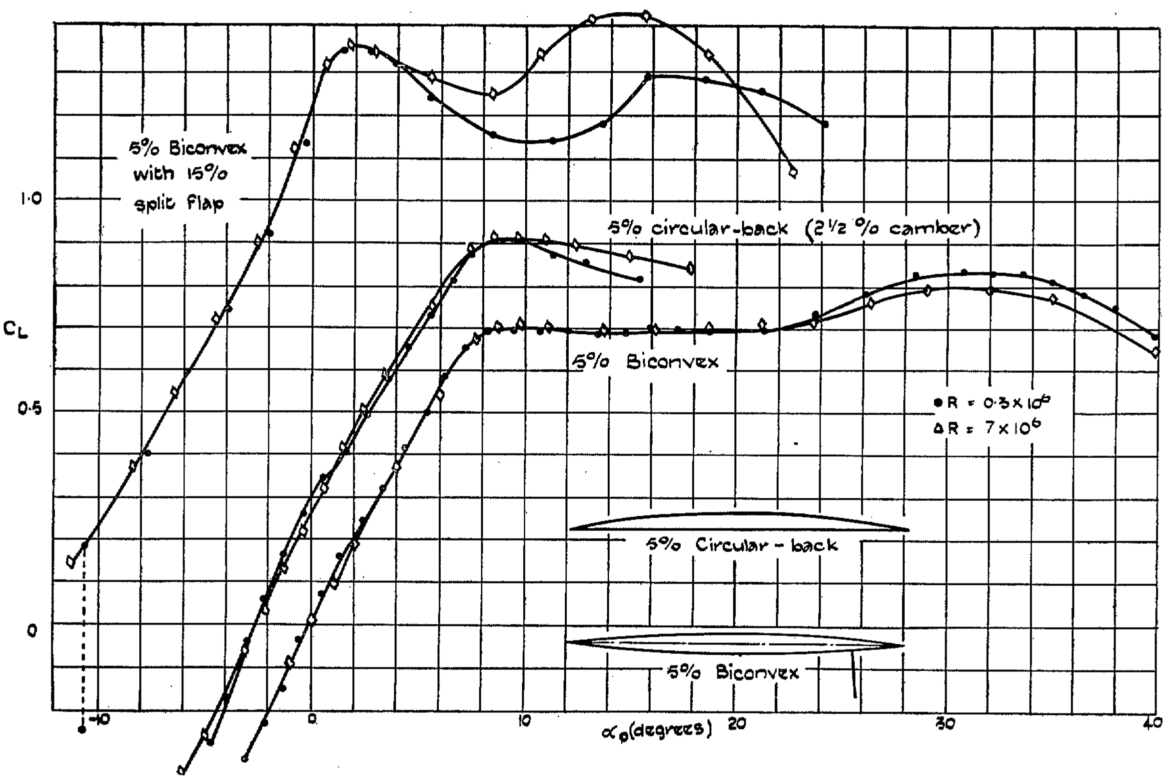

FIG. 1. Five per cent. Biconvex Aerofoil. Lift Coefficient against α_0.

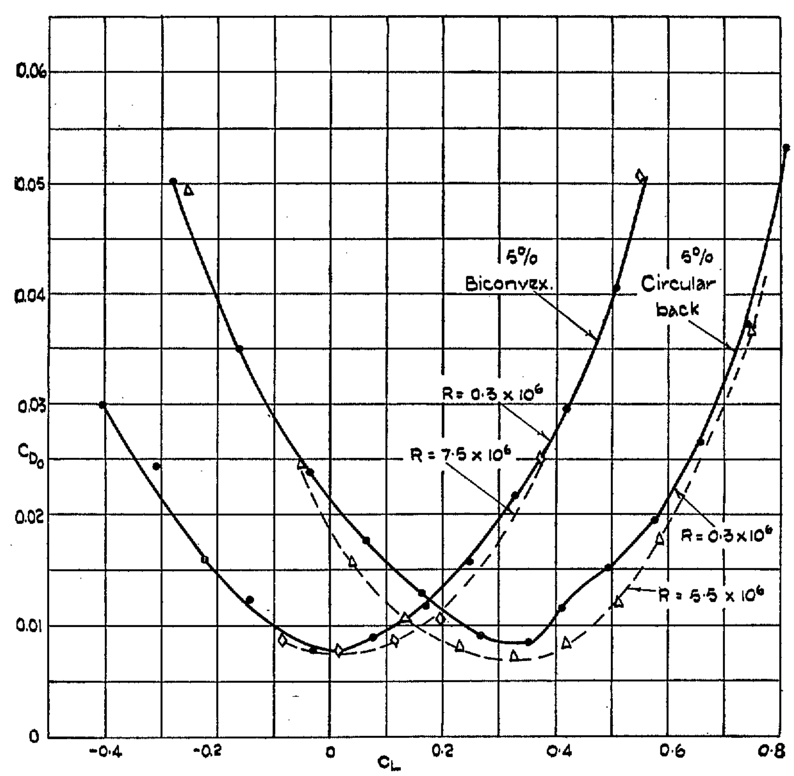

FIG. 2. Profile Drag Coefficient.

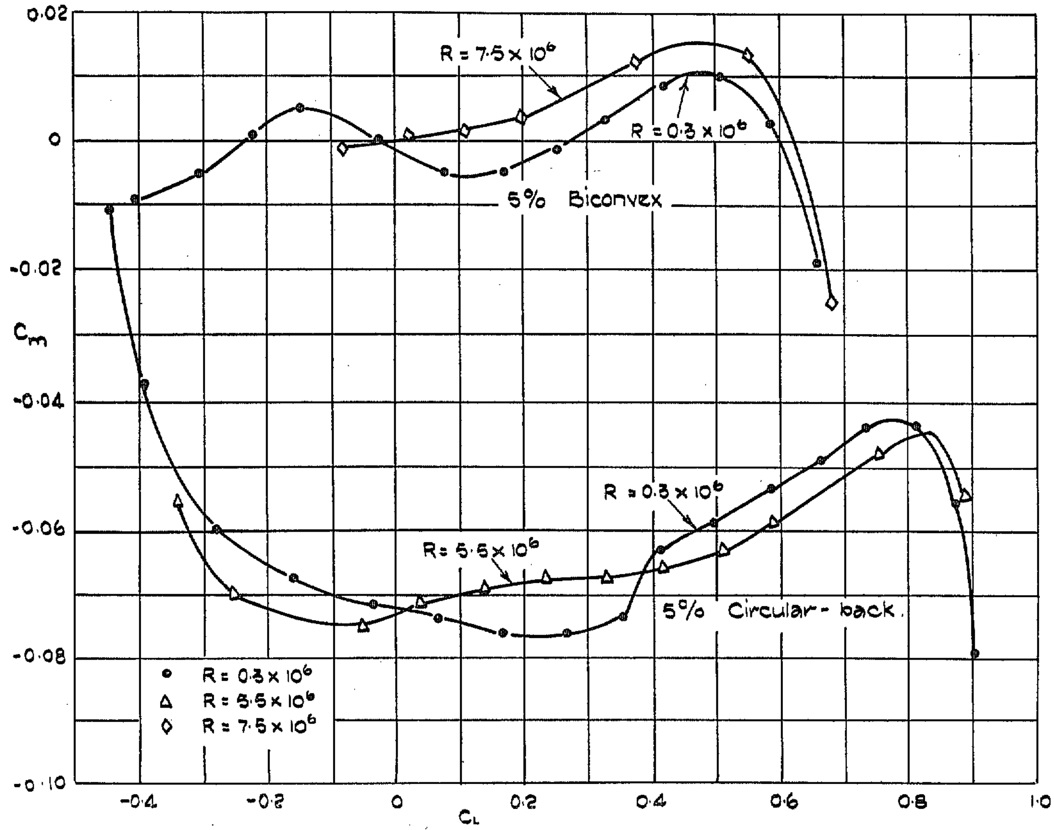

FIG. 3. Moment Coefficient.

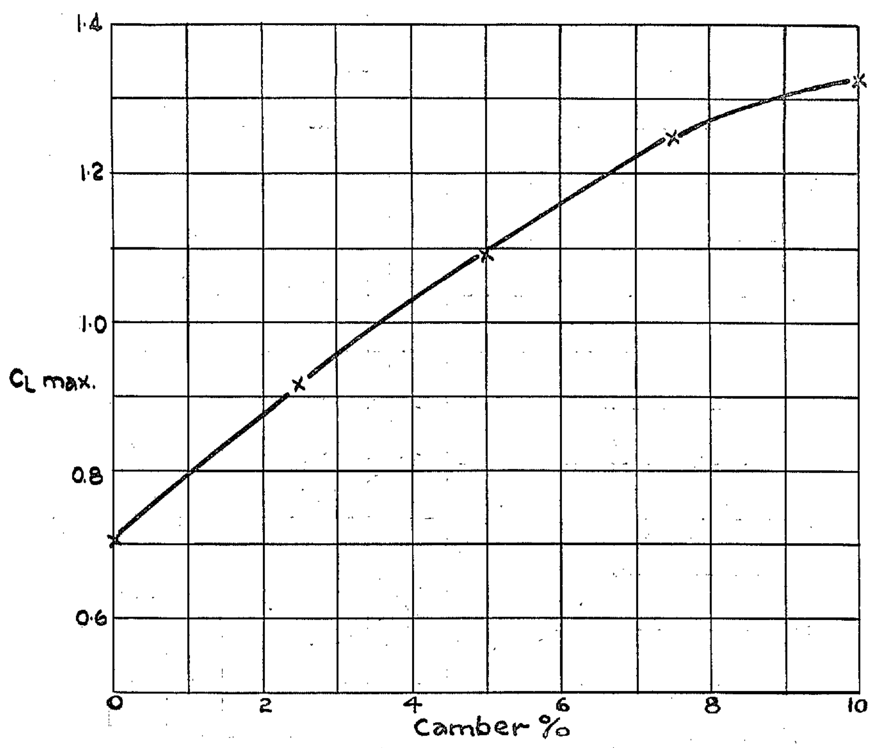

FIG. 4. Effect of Camber on Circular-arc Aerofoils.

(89598) Wt. 13/806 K.5 10/50 Hw.

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