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RESEARCH MEMORANDUM

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO UNSWEPT WINGS HAVING NACA 2-006 AND NACA 65A006 AIRFOIL SECTIONS

By Stanley F. Racisz

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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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SUMMARY

An investigation has been made in the Langley low-turbulence pressure tunnel to determine the lift, drag, and pitching-moment characteristics of two unswept wings with aspect ratios of 4 and taper ratios of 0.2. One of the wings had airfoil sections designed for high maximum lift at low speeds (NACA 2-006) and the other wing had NACA 65A006 airfoil sections. Each wing was mounted on a slender body of revolution. The effects of varying the Reynolds number from 1.0×10^6 to 7.5×10^6 and of leading-edge roughness were determined at low Mach numbers for the wings with and without split flaps. The aerodynamic characteristics of the plain wings were determined at Mach numbers up to 0.92 at Reynolds numbers from 1.0×10^6 to 7.5×10^6.

As was the case for a 45° sweptback wing previously investigated, the increments in low-speed inflection lift coefficient obtainable by the use of the NACA 2-006 airfoil section as compared with the NACA 65A006 airfoil amounted to about 0.3 for the wing with and without flaps. Lower drag coefficients at lift coefficients ranging from 0.2 to 0.6 were obtained for Mach numbers up to about 0.65 for the wing with the NACA 2-006 airfoil section as compared with those obtained for the wing with the 65A006 airfoil section. At Mach numbers above 0.65, the wing with the NACA 65A006 airfoil section had lower drag coefficients.

Varying the Reynolds number from 1.5×10^6 to 5.0×10^6 caused marked reductions in drag coefficient for lift coefficients between 0.2 and 0.6 at Mach numbers up to 0.85 for both wings.

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INTRODUCTION

An attempt to find thin airfoil sections capable of producing high maximum lift coefficients without use of high-lift devices resulted in the derivation of the new sections reported in reference 1. These sections were derived by finding an approximate relation between the airfoil pressure distribution and the low-speed maximum lift coefficient by analysis of available airfoil data. Two-dimensional data at high and low subsonic Mach numbers for several of the derived airfoil sections (NACA 1-006, 2-006, 3-006, and 4-006) presented in references 1 and 2 show that maximum lift coefficients of the order of 1.3 may be obtained with 6-percent-thick symmetrical airfoil sections.

The results of subsequent investigations (refs. 3 and 4) indicated that with a 45° sweptback wing composed of NACA 2-006 sections the low-speed inflection lift coefficient $\left(C_{L_i}\right)$ and maximum lift coefficient were about 0.30 and 0.10 higher, respectively, than those for a similar wing with NACA 65A006 sections, although there was little difference in the high-speed characteristics of the two wings. Additional investigations are needed, however, to determine if gains in maximum lift coefficient and inflection lift coefficient are obtainable by the use of the NACA 2-006 airfoil sections for other plan forms.

In the present investigation the aerodynamic characteristics of a straight wing with aspect ratio of 4, taper ratio of 0.2, and NACA 2-006 sections are compared with those of a similar wing composed of NACA 65A006 sections. The investigation was made in the Langley low-turbulence pressure tunnel. The effects of Reynolds number for Reynolds numbers ranging from 1.0×10^6 to 7.5×10^6, and of leading-edge roughness on the lift, drag, and pitching-moment characteristics of each wing were determined at Mach numbers below 0.2 for the wings with and without half-span split flaps. The effects of compressibility were determined for the wings without flaps at Mach numbers up to about 0.92 for several Reynolds numbers up to 5.8×10^6.

SYMBOLS

C_L lift coefficient, L/qS

$C_{L_{max}}$ maximum lift coefficient (measured at lowest angle of attack at which $C_{L_\alpha} = 0$)

C_{L_i}	inflection lift coefficient, highest lift coefficient obtained before the pitching-moment curve begins to break
C_{L_α}	lift-curve slope per degree, measured near zero lift
C_D	drag coefficient, D/qS
C_m	pitching-moment coefficient measured about quarter-chord point of wing mean aerodynamic chord, $M/qS\bar{c}$
$\frac{\partial C_m}{\partial C_L}$	slope of pitching-moment curve, measured near zero lift
L	lift, lb
D	drag, lb
M	pitching-moment, ft-lb
q	free-stream dynamic pressure, $\frac{1}{2}\rho V_o^2$, lb/sq ft
ρ	free-stream mass density, slugs/cu ft
V_o	free-stream velocity, ft/sec
S	wing area including area extending through fuselage, 1.00 sq ft
b	wing span, 2.00 ft
$\bar{c}$	mean aerodynamic chord, 0.574 ft
A	aspect ratio, b^2/S
c	wing chord at any spanwise station, parallel to longitudinal axis, ft
α	angle of attack of wing chord line, deg
R	Reynolds number, $\rho V_o \bar{c}/\mu$
μ	coefficient of viscosity, lb-sec/sq ft
M	free-stream Mach number, V_o/a_o
a_o	free-stream speed of sound, ft/sec

APPARATUS AND TESTS

Apparatus

The investigation was conducted in the 3- by $7\frac{1}{2}$-foot rectangular test section of the Langley low-turbulence pressure tunnel (ref. 5). Air and Freon-12 were used as test mediums for the low-speed and high-speed tests, respectively. With Freon-12 as a test medium and a stagnation pressure of 28 inches of mercury absolute, the corresponding Reynolds number is 9.75×10^6 per foot of chord for a Mach number of 1.00. With air as a medium, Reynolds numbers of the order of 12×10^6 per foot of chord can be obtained at Mach numbers below 0.20. For the present investigation, a balance equipped with electrical resistance gages was used to measure the normal force, axial force, and pitching-moment about the quarter-chord point of the mean aerodynamic chord. The internal balance was supported on a sting and enclosed in a body of revolution.

Models

The two steel wings investigated had unswept quarter-chord lines, aspect ratios of 4.0, and taper ratios of 0.2. The area of each wing including the area enclosed by the supporting body was 1.00 square foot. Sketches and photographs of a typical model installation are presented as figures 1 and 2, respectively. The wing ordinates used were the NACA 2-006 and 65A006 airfoil sections (see table I). For most of the tests, the models had aerodynamically smooth surfaces. The condition with leading-edge roughness was obtained by spreading carborundum grains of approximately 0.003-inch diameter over a coat of shellac extending over a surface length of approximately $0.07\bar{c}$ from the leading edge on each surface. The carborundum grains were spread in such a manner as to cover from 5 to 10 percent of the specified area. For the tests with $0.20c$ split flaps, a $\frac{1}{16}$-inch steel plate bent in the form of a "V" with a deflection of 60° from the chord line in the streamwise direction was used to simulate the flaps. As shown in figure 1, the flaps extended from the wing-body juncture to the midpoint between the plane of symmetry and wing tip.

Tests

The plain wings and wings with flaps were tested at Reynolds numbers ranging from 1×10^6 to 7.5×10^6 at Mach numbers below 0.20 in order to determine scale effects on the lift, drag, and pitching-moment characteristics. The effects of leading-edge roughness were determined at a Reynolds number of 3×10^6.

The high-speed tests of the plain wings were made for a range of Mach number extending from 0.35 to 0.92 for several values of stagnation pressure. The lift, drag, and pitching-moment characteristics were determined for a range of angle of attack extending from -4° to about 40° for most of the tests. For Mach numbers higher than about 0.8, the angle-of-attack range was limited by the operational range of the tunnel and related equipment.

Corrections

The low-speed data obtained with air as the test medium were converted to equivalent free-air data by the application of the tunnel-wall-induced upwash correction determined from reference 6. In addition to the correction for induced upwash, a small correction for blockage and conversion factors obtained from reference 7 was applied to the high-speed data obtained in Freon-12 to correct the results to equivalent free-air data. In cases where choking occurred, data obtained at Mach numbers within 0.03 of choke have not been presented. Although no adjustments for base pressure have been made to the drag data, the comparison of drag coefficients for the two wings should be unaffected inasmuch as the same support system was used for both wings.

Precision of Measurements

The accuracies within which the forces and moments were measured by the balance are estimated to be 3 pounds for the lift force, 1/4 pound for the drag force, and $9\frac{1}{2}$ inch-pounds for the pitching moment. The corresponding accuracies of the force and moment coefficients are listed in the following table:

Mach number (approx.)	Reynolds number (approx.)	C_L	C_D	C_M
0.13	2.0×10^6	±0.02	±0.001	±0.007
.15	6.0	±.01	±.001	±.002
.35	1.0	±.04	±.002	±.014
	3.0	±.02	±.001	±.005
.50	1.4	±.02	±.002	±.009
	4.1	±.01	±.001	±.003
.85	2.0	±.01	±.001	±.004
	5.9	±.01	±.001	±.001

RESULTS AND DISCUSSION

The wing with the NACA 2-006 airfoil section will hereinafter be referred to as wing 1; whereas that with the 65A006 airfoil section will be referred to as wing 2.

Low-Speed Characteristics

Lift and pitching-moment of plain wing.- Data indicating the scale effects upon the aerodynamic characteristics of the plain wings are presented in figure 3. From figure 3(a), it can be seen that, in general, variations of Reynolds number between 2.0×10^6 to 7.5×10^6 caused only small changes in the type of stall, angle of attack for maximum lift, and lift-curve slope for each wing. The most apparent differences in the lift curves for the two wings are slightly higher maximum lift coefficients for wing 1 in comparison with wing 2. The curves of pitching-moment coefficient against lift coefficient (fig. 3(b)) indicate that the inflection lift coefficients for wing 1 are higher than those for wing 2. In general, variations of the Reynolds number caused only small differences in the nearly linear portions of the pitching-moment curves.

For Reynolds numbers up to 6.0×10^6, the free-stream Mach number was 0.16 or less. Inasmuch as the tests at a Reynolds number of 7.5×10^6 required a free-stream Mach number of about 0.2, the question exists as to whether variations of Mach number between 0.16 and 0.2 have any significant effects upon the aerodynamic characteristics. The Mach number for a Reynolds number of 6.0×10^6 was therefore increased from 0.16 to 0.20 or 0.21 and, as may be seen from figure 4, this change in Mach number caused a decrease in the maximum lift coefficient and inflection lift coefficient for wing 1 whereas no significant differences were obtained for wing 2.

Several of the more important lift parameters as a function of Reynolds number for the two wings without flaps are shown in figure 5(a). At a Reynolds number of 2×10^6, although the maximum lift coefficient for wing 1 is only 0.07 higher than for wing 2, the difference in inflection lift coefficient is 0.20; at a Reynolds number of 6×10^6 the difference in $C_{L_{max}}$ is 0.15 and the difference in C_{L_i} is 0.33. The increment in inflection lift coefficient at the higher Reynolds number represents a 57-percent increase in C_{L_i} for the wing composed of NACA 2-006 sections over that for the wing composed of NACA 65A006 sections. The differences in the inflection lift coefficients of the two straight wings of the present investigation are shown to be about the same as those of the two swept wings with similar sections reported in reference 3. The lift-curve slopes of the two straight wings of the present investigation are essentially the same and independent of Reynolds number.

Effects of roughness on lift and moment of plain wings.- Leading-edge roughness (fig. 6) reduced C_{L_i} for wing 1 to nearly that for wing 2. In the investigation reported in reference 3, the low-speed values of C_{L_i} and $C_{L_{max}}$ obtained with the forward edges of the transition strips at the 0.05c station on the upper and lower surfaces of the swept wing with the NACA 2-006 airfoil section were essentially the same as those obtained for the smooth condition. Therefore, it is probably necessary to maintain smooth surfaces on only the leading-edge portions of wings composed of NACA 2-006 or other thin related airfoil sections in order to realize the high values of C_{L_i} and $C_{L_{max}}$ associated with those airfoil sections.

Drag of plain wings.- The drag coefficient as a function of lift coefficient for each of the two wings investigated is presented in figure 3(c). The variations of drag coefficient with Reynolds number for several lift coefficients are presented in figure 5(b). For lift coefficients of 0 and 0.2, increasing the Reynolds number from 2.0×10^6 to 7.5×10^6 caused only small variations in drag coefficient and the drag coefficients were nearly the same for both wings. For lift coefficients of 0.4 and 0.6, however, marked reductions in drag coefficient for wing 2 were obtained by increasing the Reynolds number from 2.0×10^6

to 7.5×10^6 whereas only small reductions in drag coefficient were obtained for wing 1.

The drag coefficients for wing 1 were much lower than for wing 2 for intermediate lift coefficients. For example, at a Reynolds number of 7.5×10^6, the drag coefficient for wing 2 is about twice as much as that for wing 1. The maximum lift-drag ratios for the two wings were nearly the same for Reynolds numbers between 1.5×10^6 and 4.0×10^6; whereas at Reynolds numbers between 4.0×10^6 and 7.5×10^6, the maximum lift-drag ratios were higher for wing 1 than for wing 2. Changes in Reynolds number and airfoil section had little effect on the lift coefficient for maximum lift-drag ratio.

Effects of roughness on drag of plain wings.- The drag data plotted to two scales in figure 6(b) indicate that leading-edge roughness increased the drag coefficients at low lift coefficients by about 0.005 for both wings. Although a somewhat more rapid increase in drag coefficient with increasing lift coefficient resulted from leading-edge roughness on wing 1 than on wing 2, the drag coefficients at moderate lift coefficients were lower for wing 1.

Wing with flaps.- As was the case for the wings without flaps, increasing the Reynolds number for the wings with flaps had only small effects on the linear portions of the lift and pitching-moment curves (fig. 7) but resulted in increases in $C_{L_{max}}$ and C_{L_i} for both wings (fig. 5(a)). The main effects of deflecting the flaps for both wings were increases between 0.3 and 0.4 in the values of lift coefficient at zero angle of attack, maximum lift coefficient, and inflection lift coefficient, with large negative increases in the pitching-moment coefficients (fig. 6). In general, the gain in inflection lift coefficient obtainable by the use of the NACA 2-006 airfoil section was nearly the same as that obtained without flaps and within 0.02 of the value obtained for the 45° sweptback wing. As was the case without flaps, wing 1 had lower drag coefficients at intermediate and high lift coefficients and, consequently, higher maximum lift-drag ratios (fig. 5(b)). The effects of leading-edge roughness were generally similar to those obtained for the plain wings (fig. 6).

High-Speed Characteristics

The basic wing data consisting of the lift, drag, and pitching-moment characteristics at constant values of the Mach number for three stagnation pressures are presented in figure 8. Inasmuch as the effects of Reynolds numbers upon some of the more important aerodynamic characteristics are not readily apparent from the basic wing data, the data were cross plotted in order to obtain the variation with Mach number for several constant values of the Reynolds number (fig. 9). A comparison of some of the data for the two wings is shown in figure 10.

Lift and pitching moment.- The data presented in figure 9 indicate that increasing the Reynolds number generally caused larger increases in inflection lift coefficient for wing 1 than for wing 2. The data presented in figure 10 indicate that the maximum lift coefficient of wing 1 was higher than that of wing 2 by values ranging from about 0.1 at the lowest Mach number investigated to only 0.02 at Mach numbers of about 0.7. The inflection lift coefficient of wing 1 generally decreased with increasing Mach number for Mach numbers between 0.13 and 0.70; whereas for the same range of Mach number the inflection lift coefficient of wing 2 varied not more than 0.05 (fig. 10(a)). The increment of inflection lift coefficient ranged from 0.31 at a Mach number of 0.13 to 0 at a Mach number of 0.65. At Mach numbers higher than 0.65, wing 2 had higher inflection lift coefficients than wing 1. A slightly higher lift-curve slope was obtained for wing 1 than for wing 2 throughout the range of Mach number investigated. The slopes of the pitching-moment curves (measured at zero lift) for the two wings shown in figure 10(c), were nearly the same.

Drag.- For lift coefficients of 0 and 0.2, increasing the Reynolds number generally caused only small decreases in the drag coefficients for both wings (fig. 9(b)). For lift coefficients of 0.4, 0.5, and 0.6, however, it is apparent that increasing the Reynolds number from 1.5×10^6 to 5.0×10^6 caused large decreases in the drag coefficients of both wings for an extensive range of Mach number. For a lift coefficient of 0.5, which generally was below the inflection lift coefficient of either wing (fig. 8), increasing the Reynolds number from 1.5×10^6 to 4.0×10^6 at a Mach number of 0.5 decreased the drag coefficient for wing 1 by nearly 30 percent whereas that for wing 2 was decreased by nearly 20 percent at the same Mach number. For a lift coefficient of 0.6, which was generally higher than the inflection lift coefficient, the drag coefficients of both wings were reduced by approximately 50 percent by increasing the Reynolds number from 1.5×10^6 to 4.0×10^6 or 5.0×10^6. At the low Mach numbers where a lift coefficient of 0.6 was less than the inflection lift coefficient of wing 1, the reductions in drag coefficient resulting from the increases in Reynolds number were still considerable. Of interest is the fact that the effects of Reynolds number upon the drag coefficients for lift coefficients of 0.4 to 0.6 diminished as Mach numbers of approximately 0.85 were approached.

The data presented in figure 10 indicate that for a Reynolds number of 4.0×10^6 wing 1 generally had lower drag coefficients (fig. 10(b)) and higher lift-drag ratios (fig. 10(c)) for Mach numbers up to about 0.65

in comparison with those for wing 2. For Mach numbers between about 0.65 and the maximum investigated, wing 2 generally had lower drag coefficients and much higher lift-drag ratios. It has been shown in reference 4 that, at a Mach number of 1.2, the 45° sweptback wing with the NACA 2-006 airfoil section had essentially the same aerodynamic characteristics as the 45° sweptback wing with the NACA 65A006 airfoil section. For that wing, the gains in low-speed inflection lift coefficient obtainable by the use of the NACA 2-006 airfoil section should be obtainable without large penalties in the high-speed characteristics for an extensive range of Mach number. Additional data are needed to determine whether the use of the NACA 2-006 airfoil section on an unswept wing may result in compromises in performance for Mach numbers higher than those investigated.

SUMMARY OF RESULTS

An investigation has been conducted in the Langley low-turbulence pressure tunnel to determine the lift, drag, and pitching-moment characteristics of two unswept wings with aspect ratios of 4 and taper ratios of 0.2. The wings having NACA 2-006 and NACA 65A006 airfoil sections were investigated at Mach numbers from about 0.10 to 0.92 and at Reynolds numbers from 1.0×10^6 to 7.5×10^6. Some of the more pertinent results of the investigation can be summarized as follows:

1. At a Reynolds number of approximately 5×10^6, the wing composed of NACA 2-006 airfoil sections had low-speed inflection lift coefficients of about 0.3 higher than those for the wing composed of NACA 65A006 airfoil sections for the conditions with and without flaps. With leading-edge roughness, the inflection lift coefficients were nearly the same. The increases in inflection lift coefficient obtainable by the use of the NACA 2-006 airfoil section decreased with increases in Mach number.

2. The slopes of the lift curves and of the pitching-moment curves for both wings were nearly the same throughout the range of Mach number investigated. The maximum lift coefficients for the wing with the NACA 2-006 sections were up to 0.1 higher than those for the wing with the NACA 65A006 airfoil sections at Mach numbers less than 0.70.

3. For Mach numbers between 0.1 and about 0.65 for a Reynolds number of 5.0×10^6, the wing with the NACA 2-006 airfoil section had lower drag coefficients at lift coefficients between 0.2 and 0.6 as compared with those for the wing with the NACA 65A006 airfoil section. At Mach numbers higher than 0.65, the wing with the NACA 65A006 airfoil section had the lower drag coefficients at lift coefficients between 0 and 0.6. Increasing the Reynolds number from 1.5×10^6 to 5.0×10^6 reduced the

drag coefficients for both wings by as much as 50 percent for lift coefficients between 0.4 and 0.6 at Mach numbers less than 0.85.

Langley Aeronautical Laboratory,
National Advisory Committee for Aeronautics,
Langley Field, Va., October 8, 1953.

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3. Racisz, Stanley F., and Paradiso, Nicholas J.: Wind-Tunnel Investigation at High and Low Subsonic Mach Numbers of a Thin Sweptback Wing Having an Airfoil Section Designed for High Maximum Lift. NACA RM L51L04, 1952.

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TABLE I.- ORDINATES FOR THE TWO SYMMETRICAL AIRFOIL SECTIONS

[Stations and ordinates in percent airfoil chord]

NACA 2-006	
Station	Ordinate
0	0
.501	.937
2.008	1.769
4.541	2.413
8.114	2.818
12.717	2.983
18.292	2.962
24.727	2.810
31.828	2.561
35.000	2.442
40.000	2.254
45.000	2.066
50.000	1.878
55.000	1.691
60.000	1.503
65.000	1.315
70.000	1.127
75.000	.939
80.000	.751
85.000	.564
90.000	.376
95.000	.188
100.000	0
L. E. radius: 0.805 percent c	

NACA 65A006	
Station	Ordinate
0	0
.500	.464
.750	.563
1.250	.718
2.500	.981
5.000	1.313
7.500	1.591
10.000	1.824
15.000	2.194
20.000	2.474
25.000	2.687
30.000	2.842
35.000	2.945
40.000	2.996
45.000	2.992
50.000	2.925
55.000	2.793
60.000	2.602
65.000	2.364
70.000	2.087
75.000	1.775
80.000	1.437
85.000	1.083
90.000	.727
95.000	.370
100.000	.013
L. E. radius: 0.229 percent c T. E. radius: 0.014 percent c	

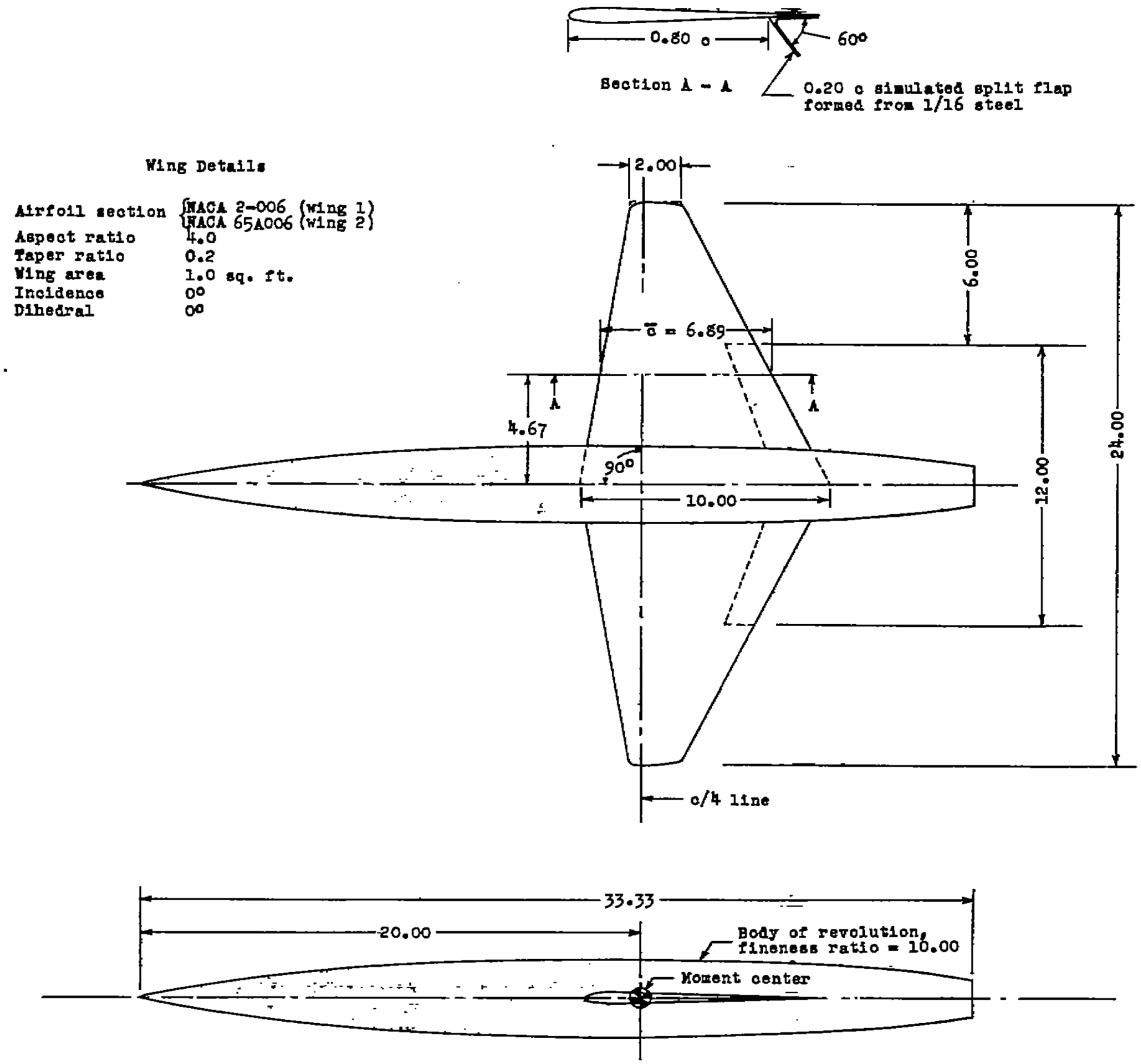

Figure 1.- Model details. All dimensions in inches.

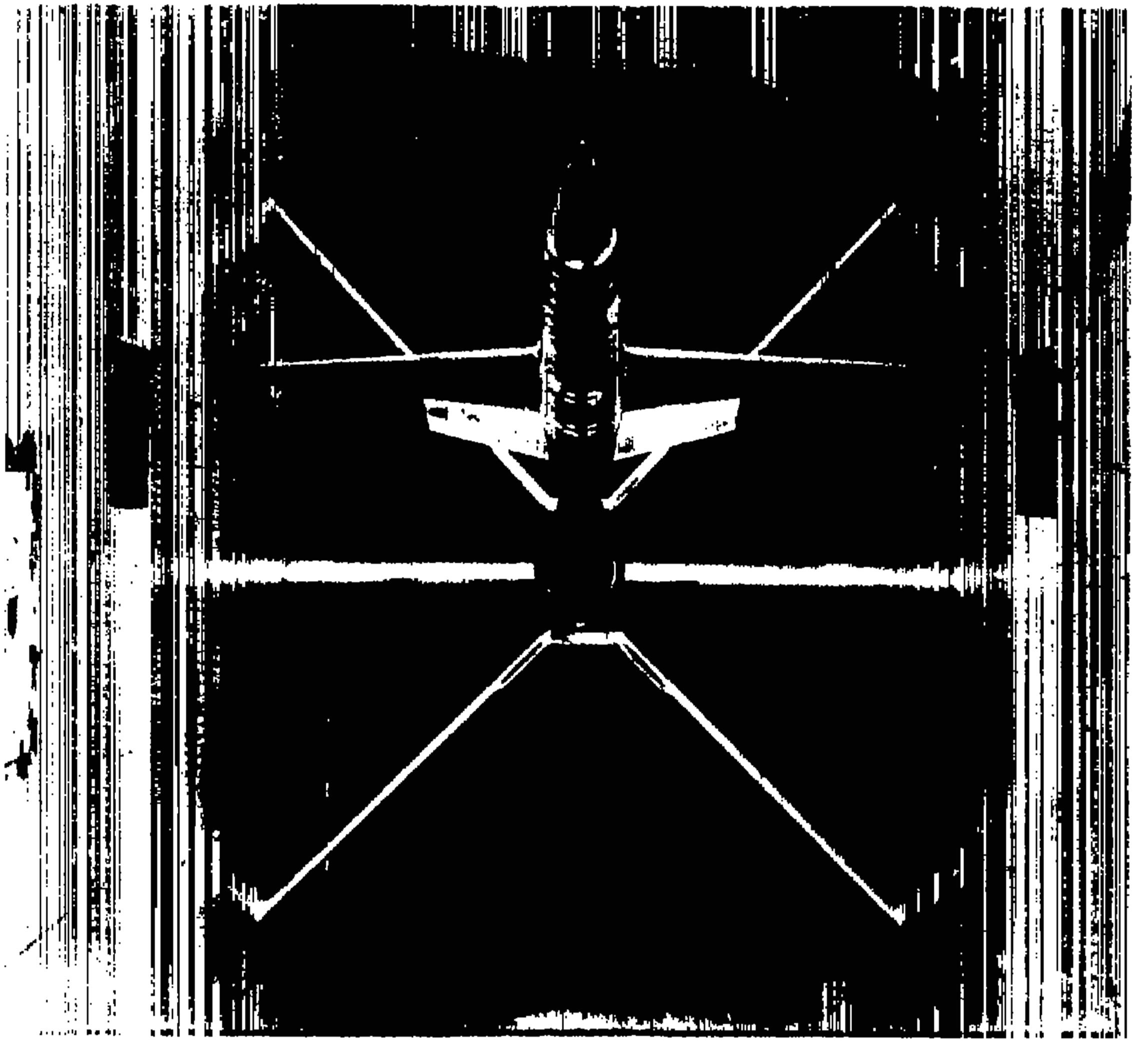

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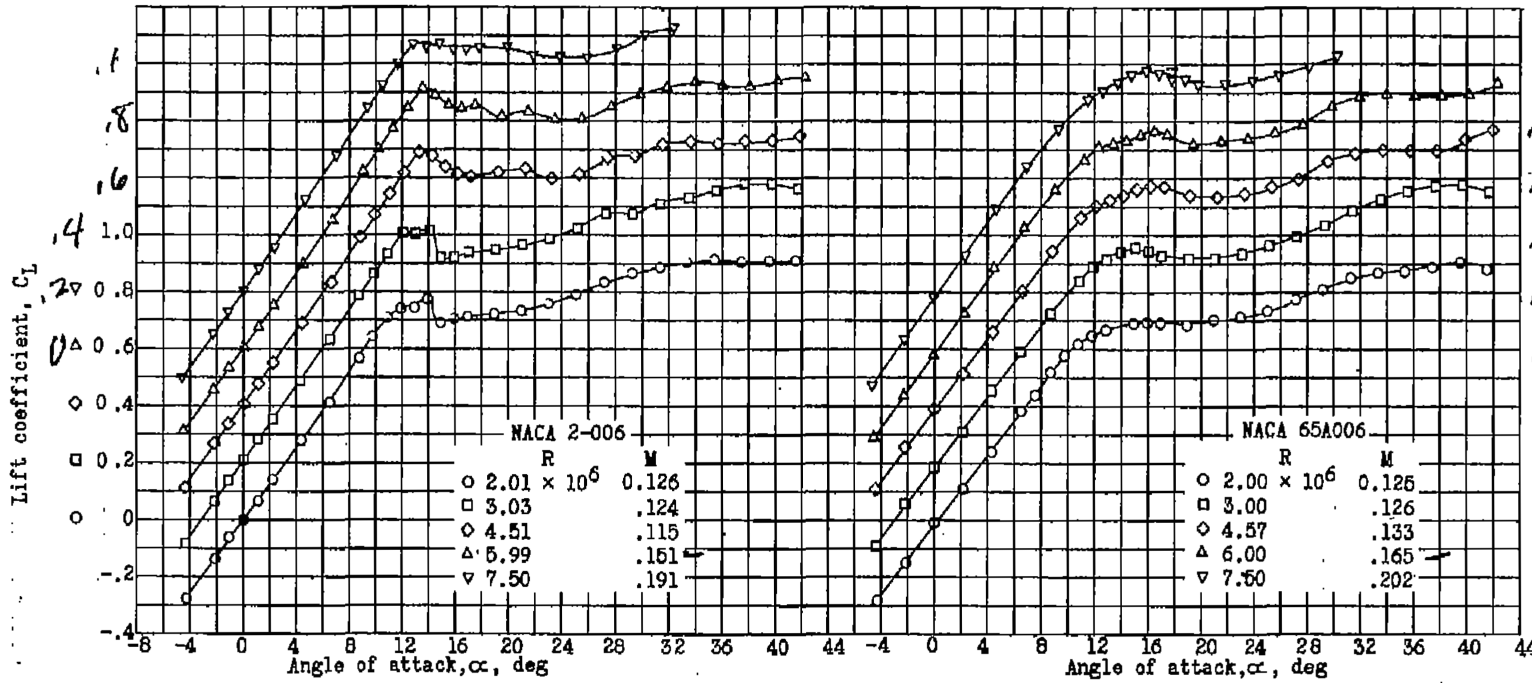
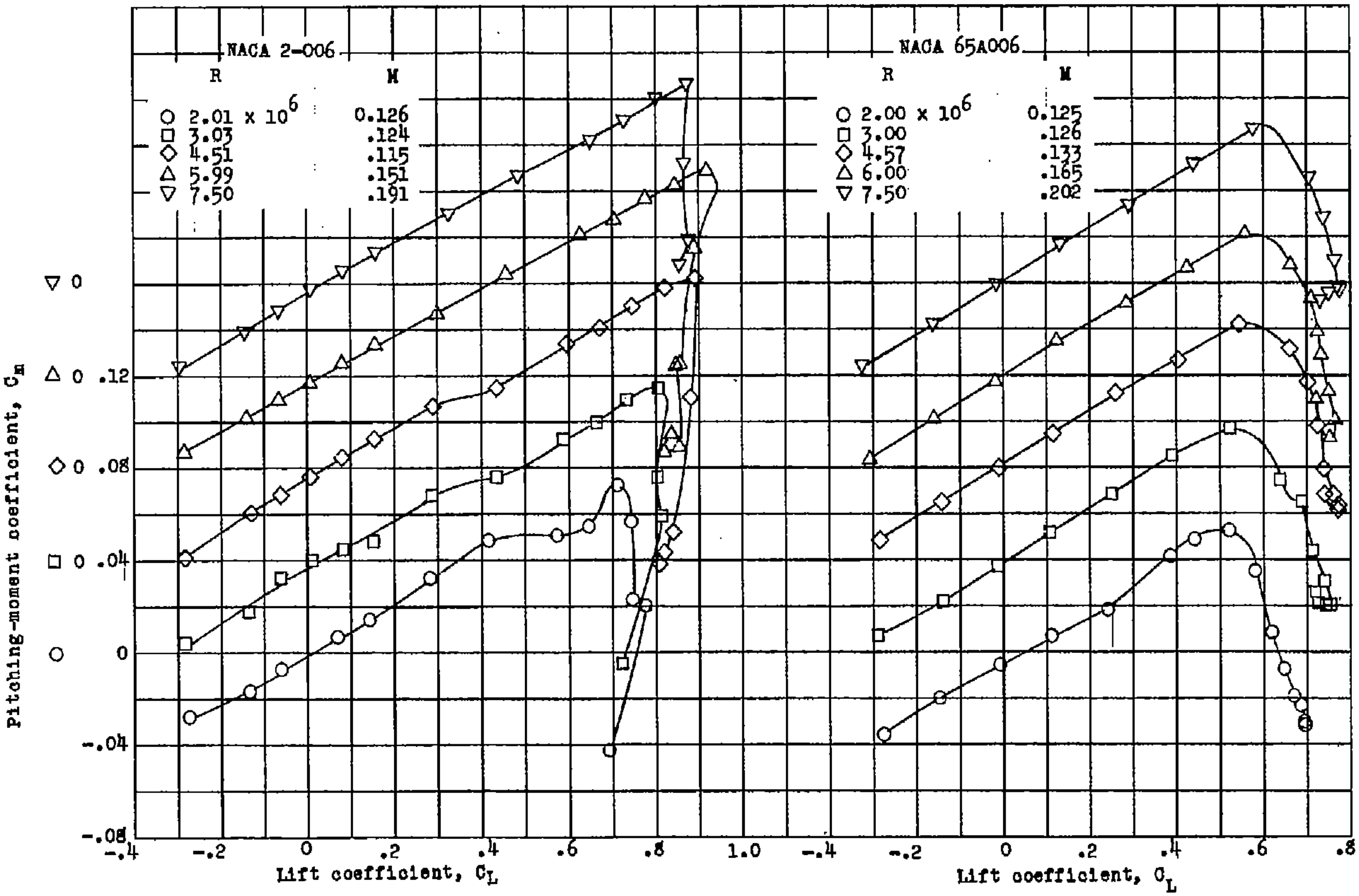
Figure 2.- Photograph of one of the models mounted in the Langley low-turbulence pressure tunnel.



(a) Lift.

Figure 3.- Low-speed aerodynamic characteristics of two wings of similar plan form with NACA 2-006 and NACA 65A006 airfoil sections.

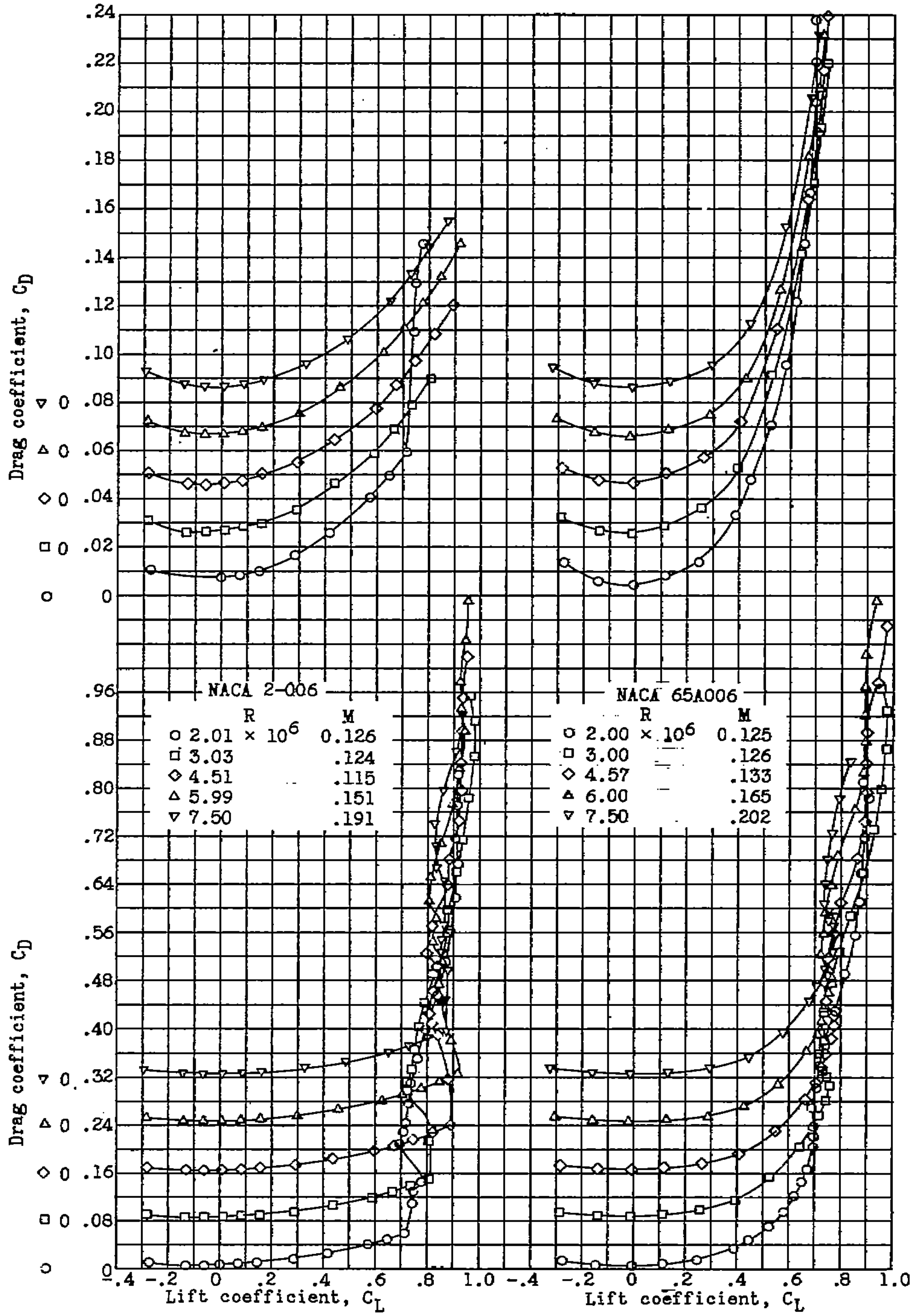
[redacted]



(b) Pitching moment.

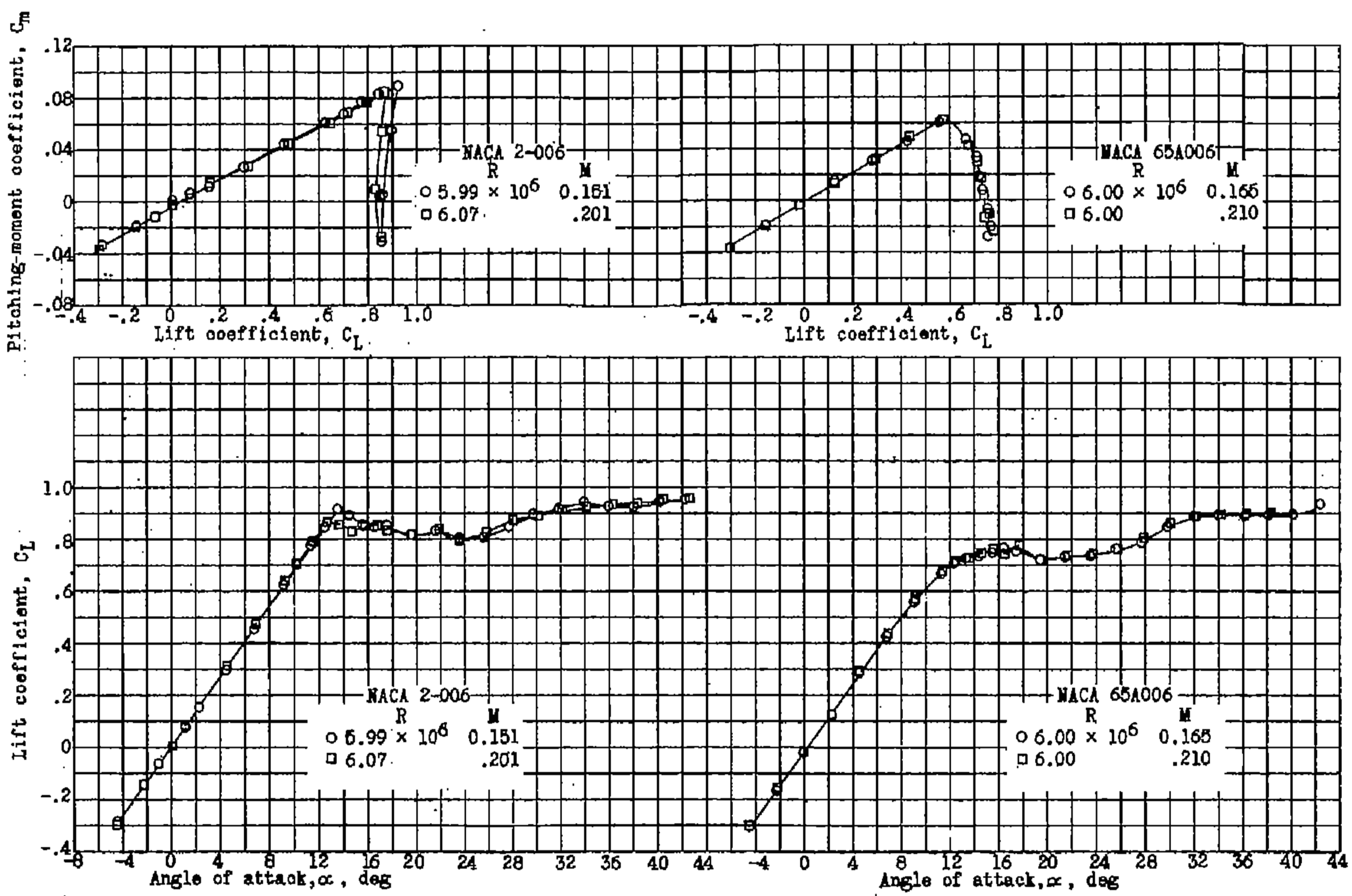
Figure 3.- Continued.

[redacted]



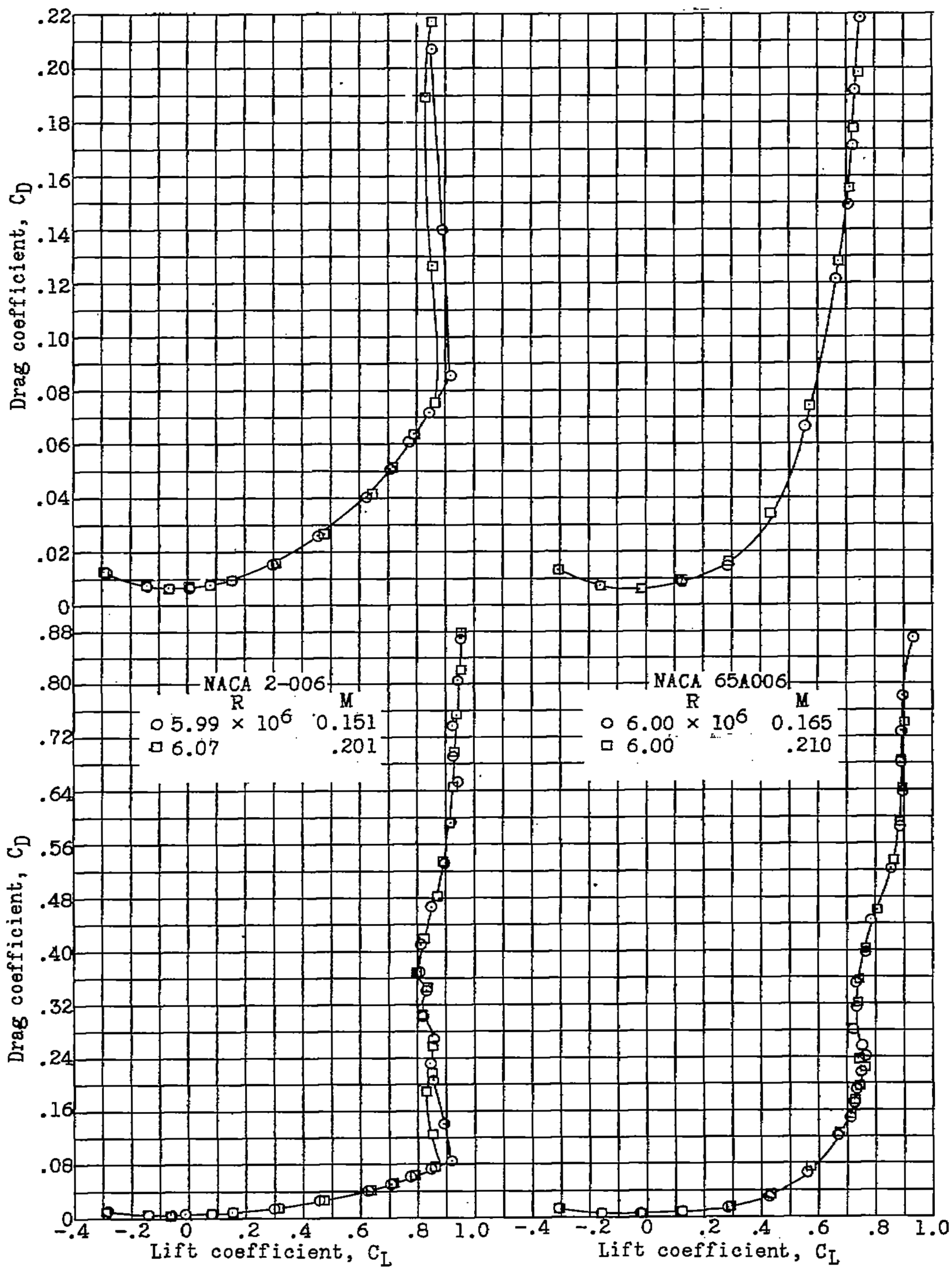
(c) Drag.

Figure 3.- Concluded.



(a) Lift and pitching moment.

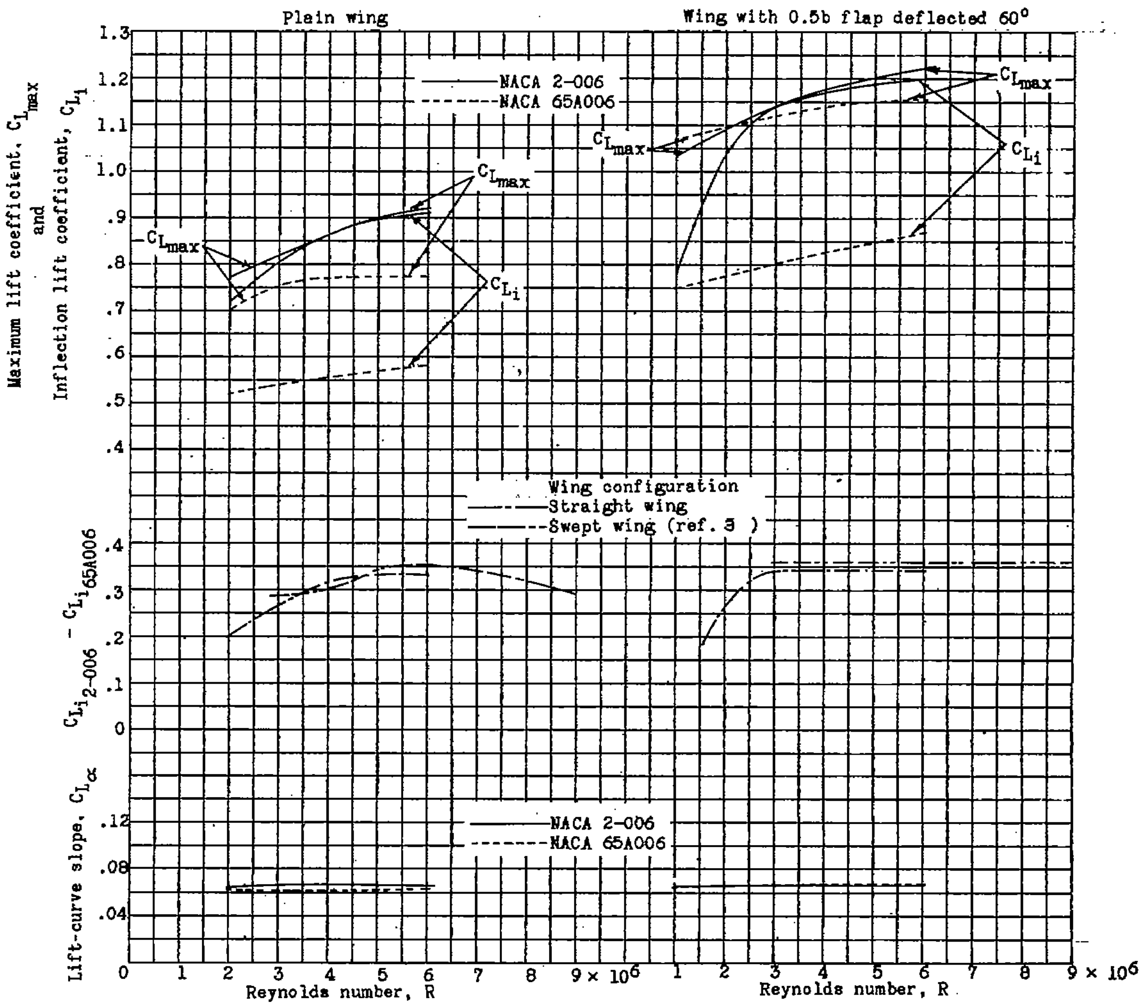
Figure 4.- Effects of Mach number upon the aerodynamic characteristics of two wings of similar plan form with NACA 2-006 and NACA 65A006 airfoil sections.



(b) Drag.

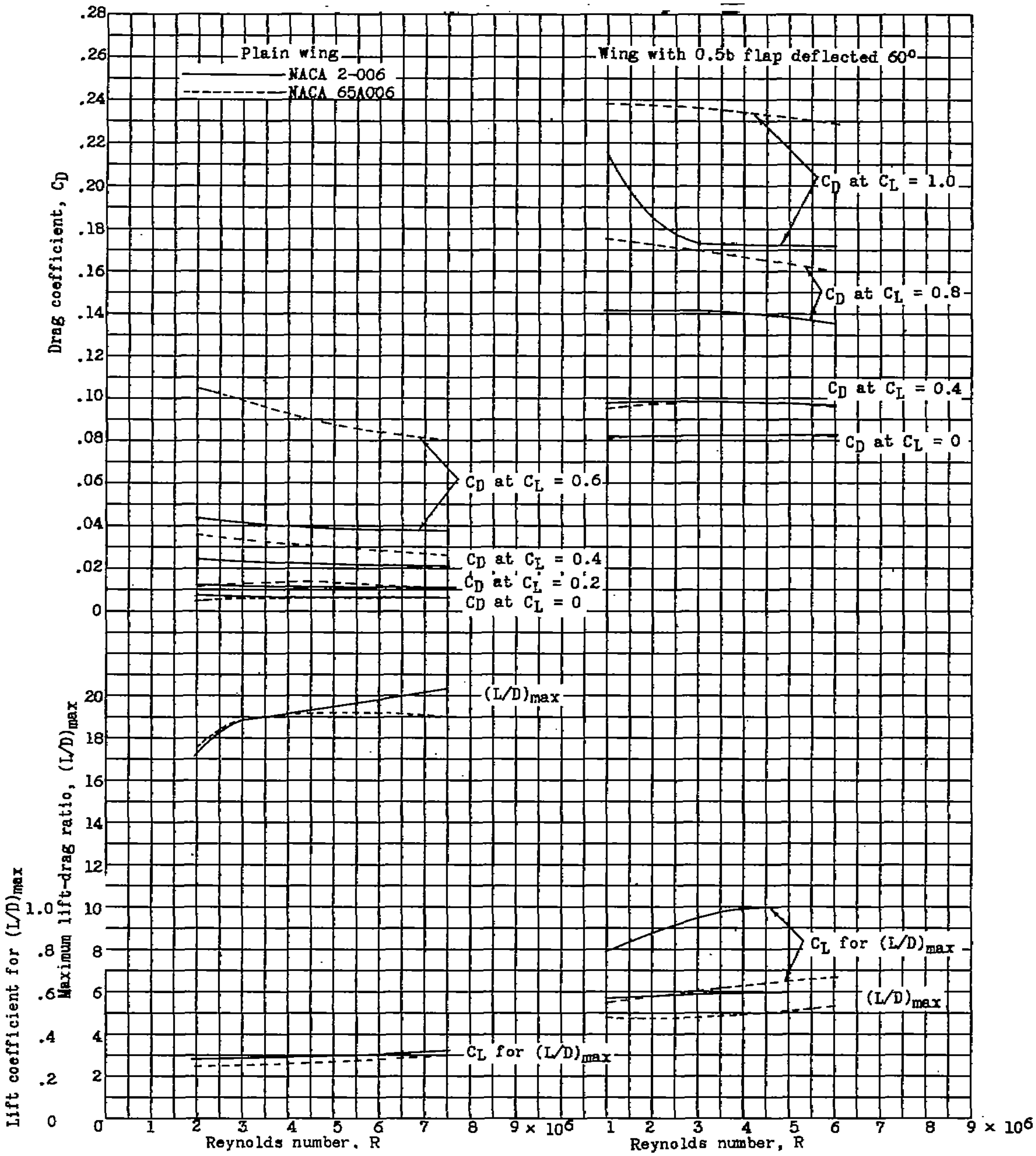
Figure 4.- Concluded.

[redacted]



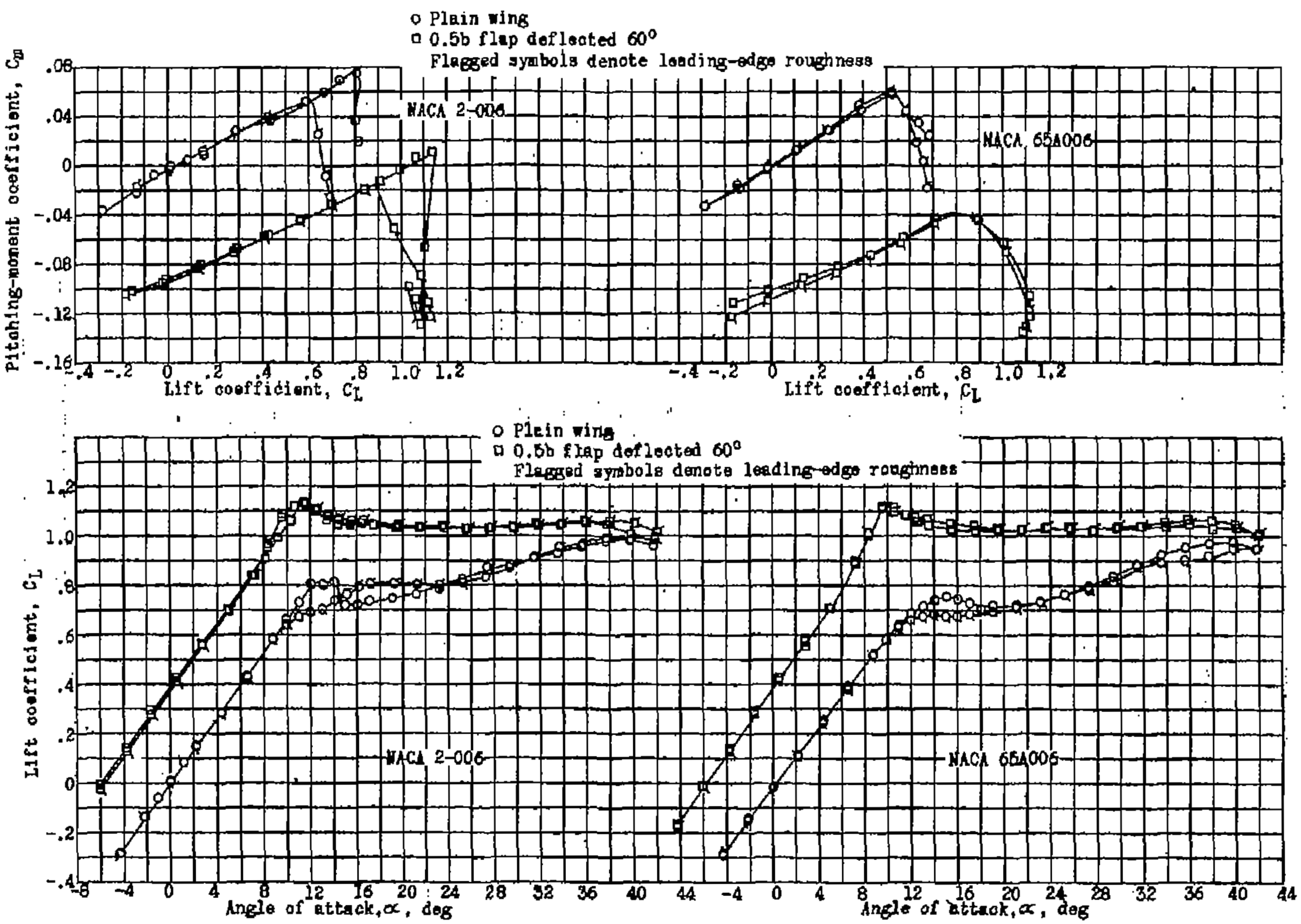
(a) Lift.

Figure 5.- Comparison of the low-speed aerodynamic characteristics of two wings of similar plan form with the NACA 2-006 and NACA 65A006 airfoil sections with and without 0.5b flaps.



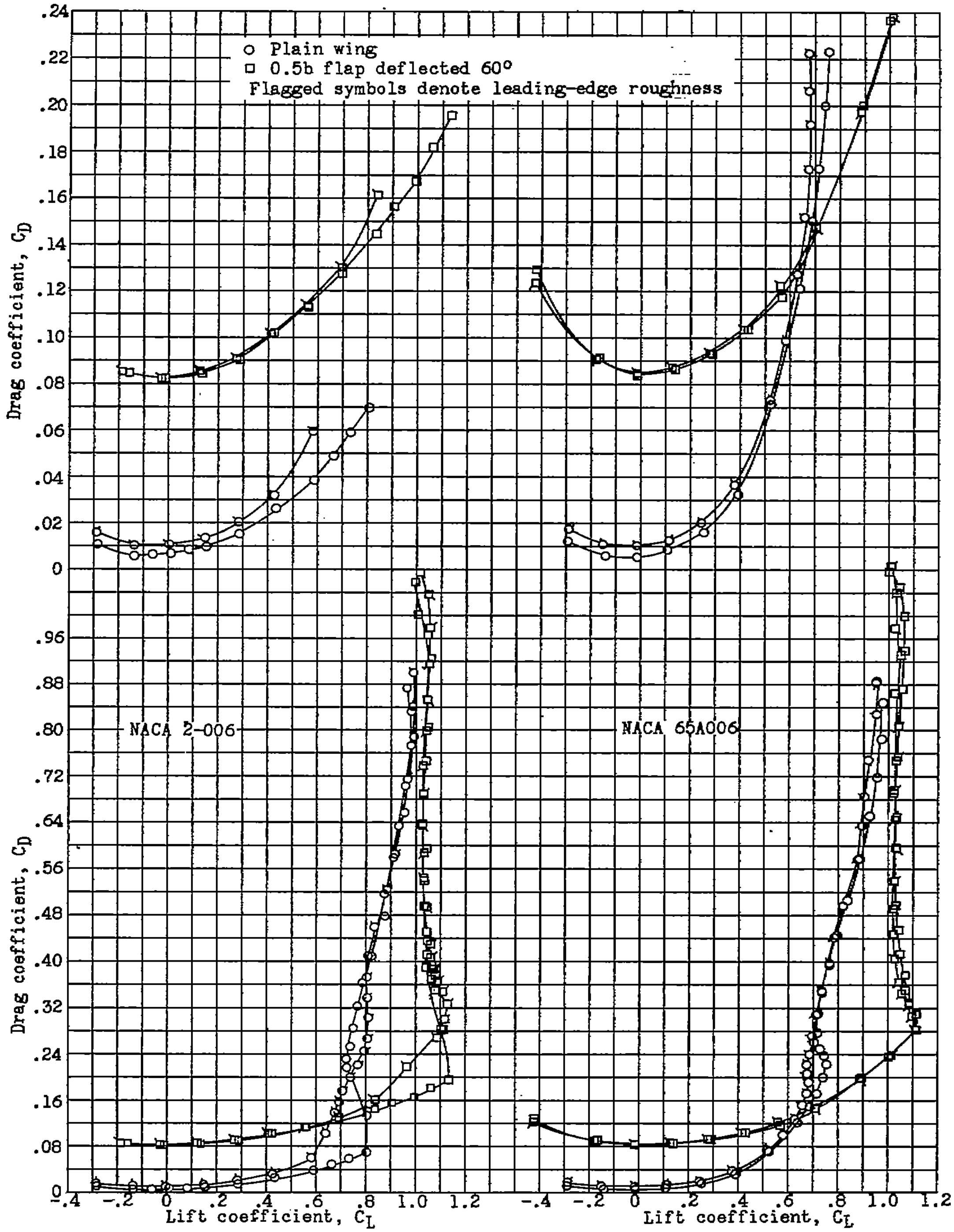
(b) Drag.

Figure 5.- Concluded.



(a) Lift and pitching moment.

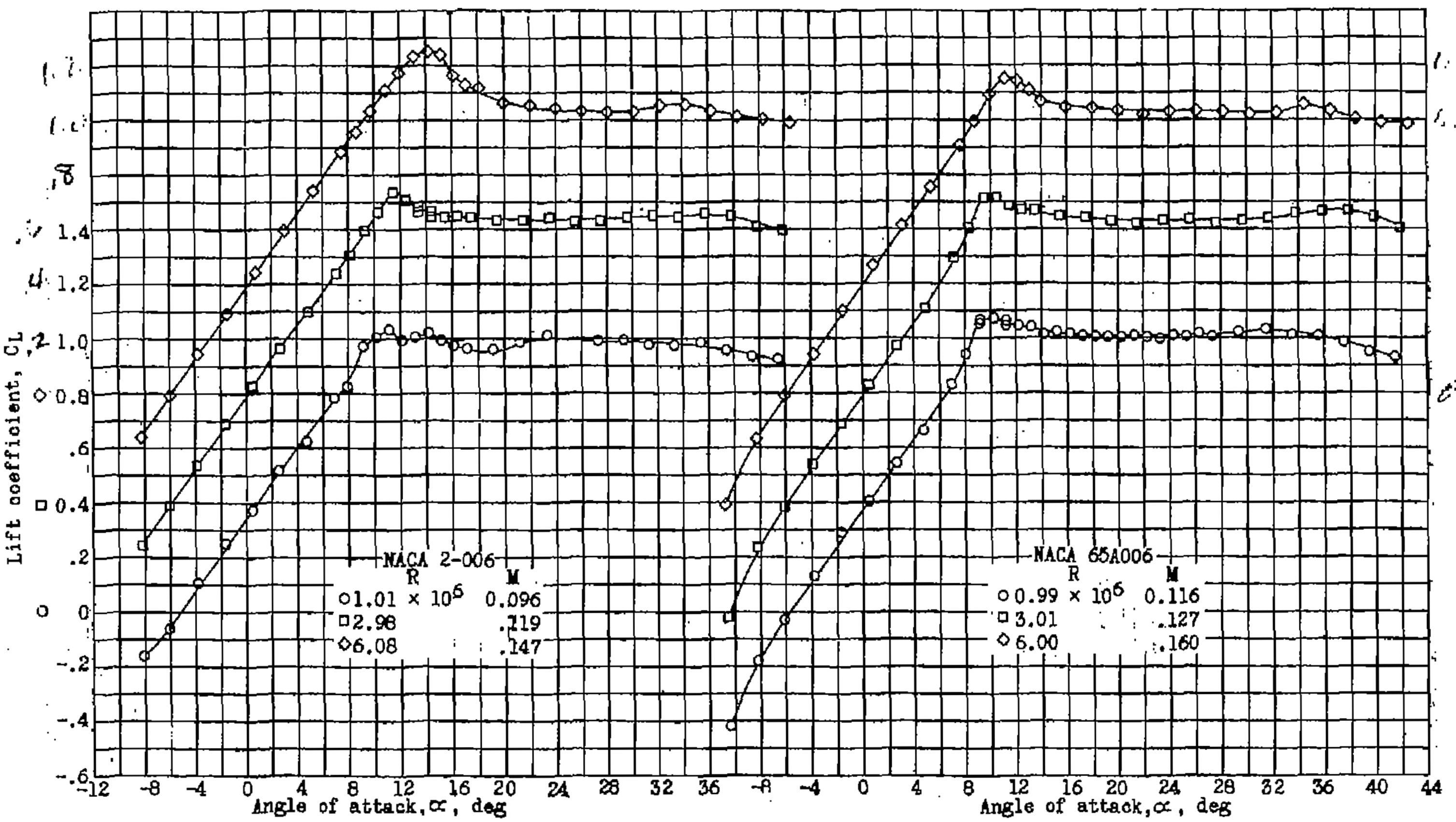
Figure 6.- Effects of leading-edge roughness upon the aerodynamic characteristics of two wings of similar plan form with NACA 2-006 and NACA 65A006 airfoil sections with and without 0.5b flaps. $R = 3.0 \times 10^6$.



(b) Drag.

Figure 6.- Concluded.

[redacted]



(a) Lift.

Figure 7.- Low-speed aerodynamic characteristics of two wings of similar plan form with NACA 2-006 and NACA 65A006 airfoil sections with 0.5b flaps deflected 60°.

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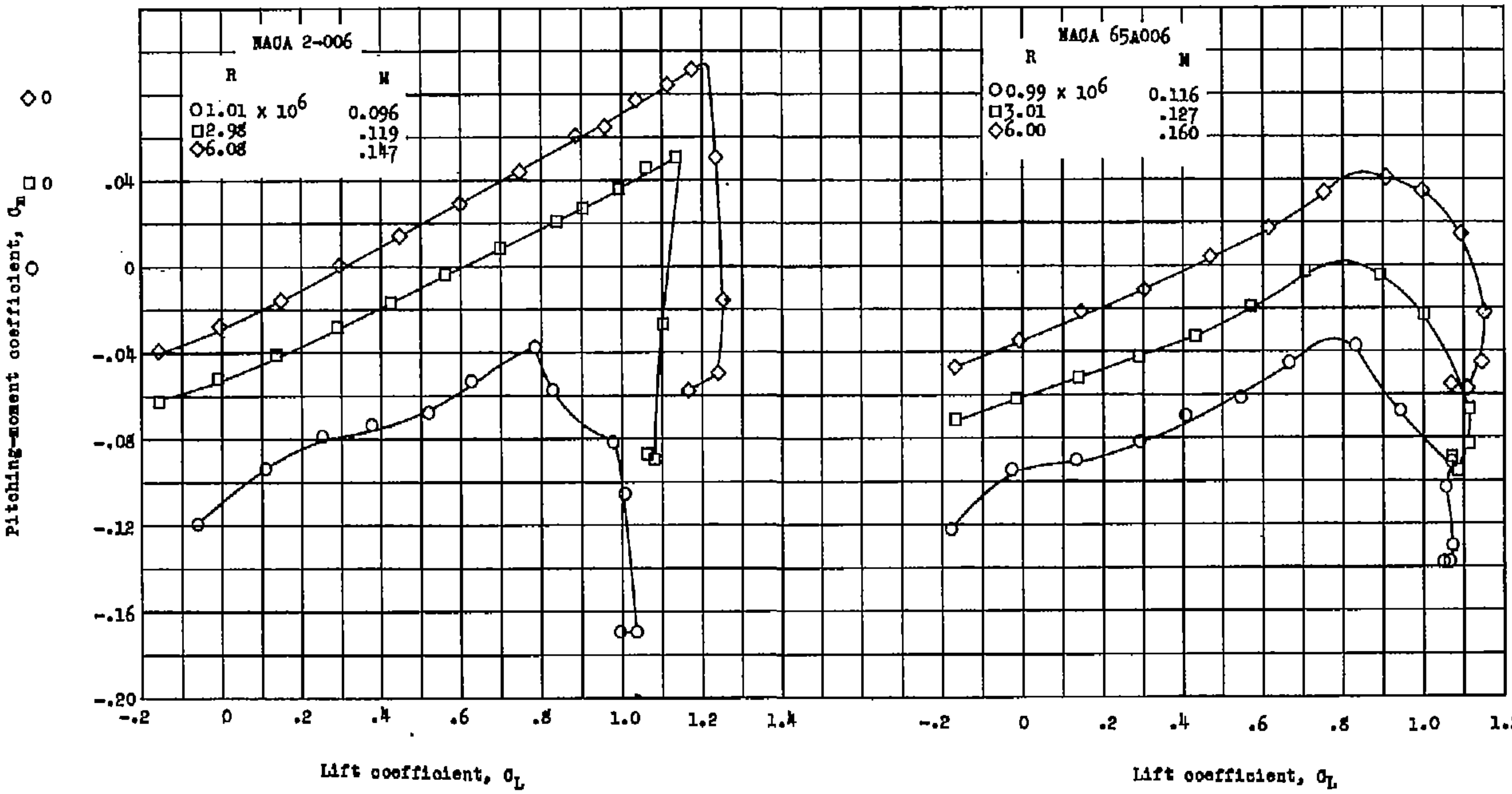
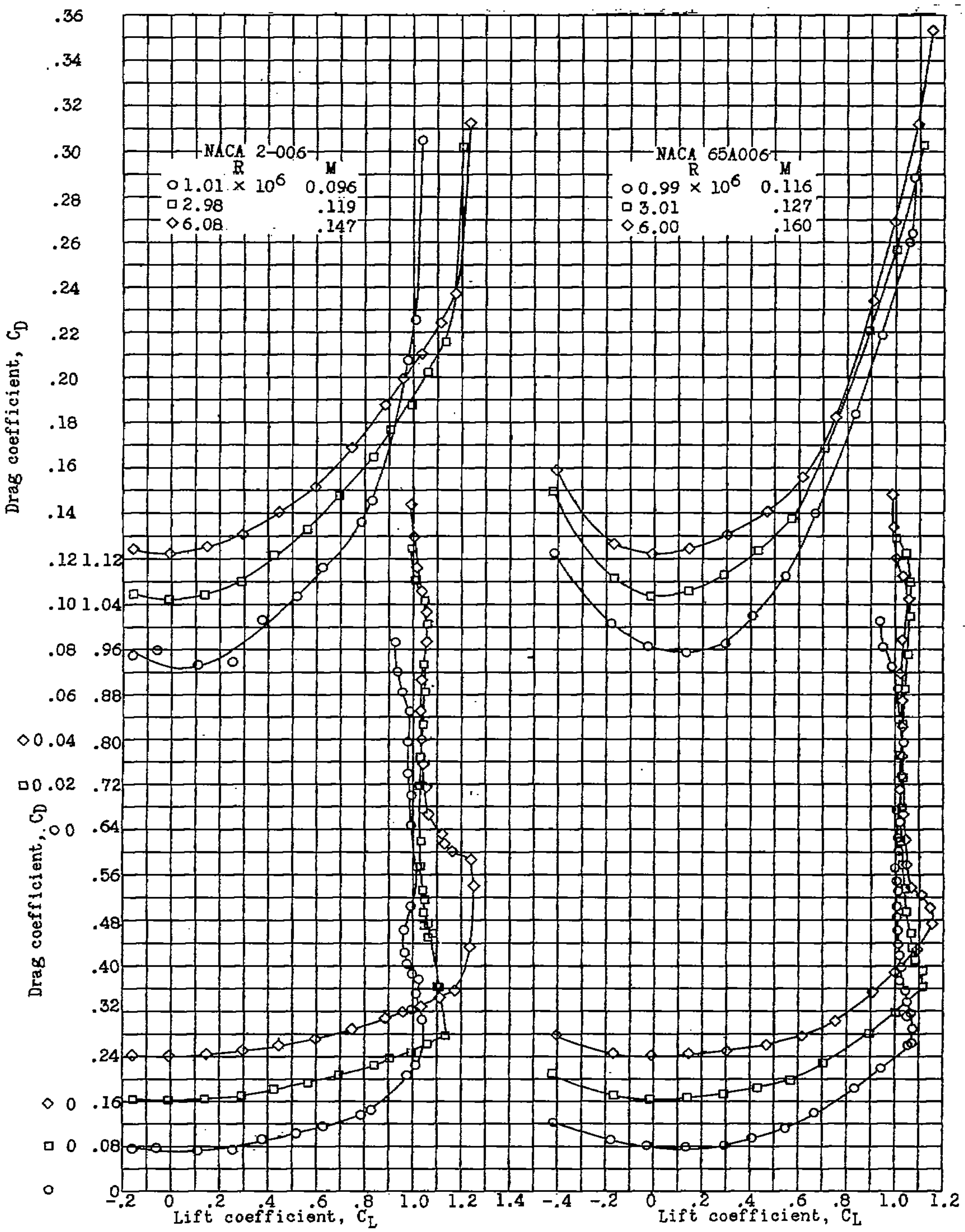


(b) Pitching moment.

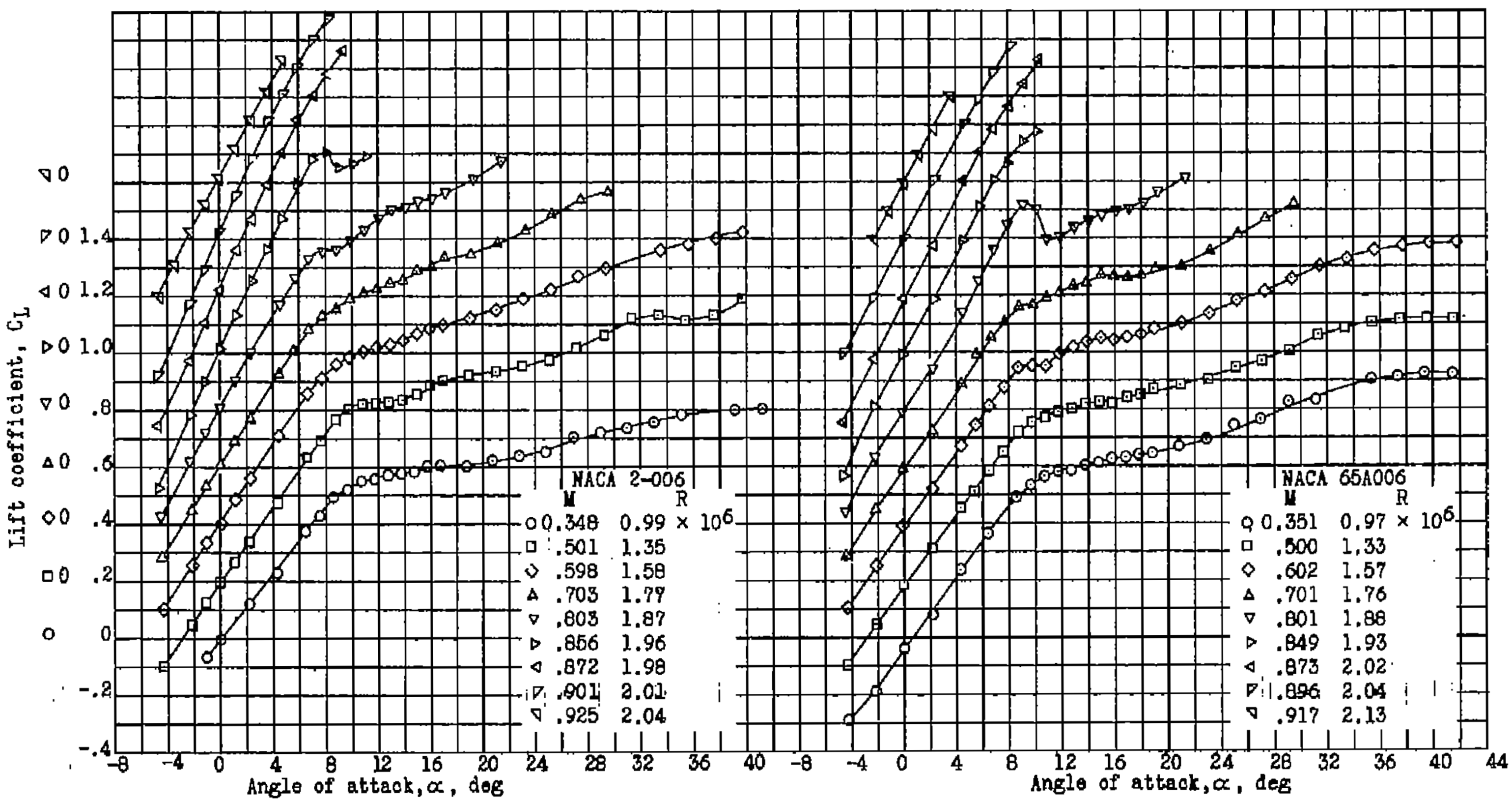
Figure 7.- Continued.

[redacted]



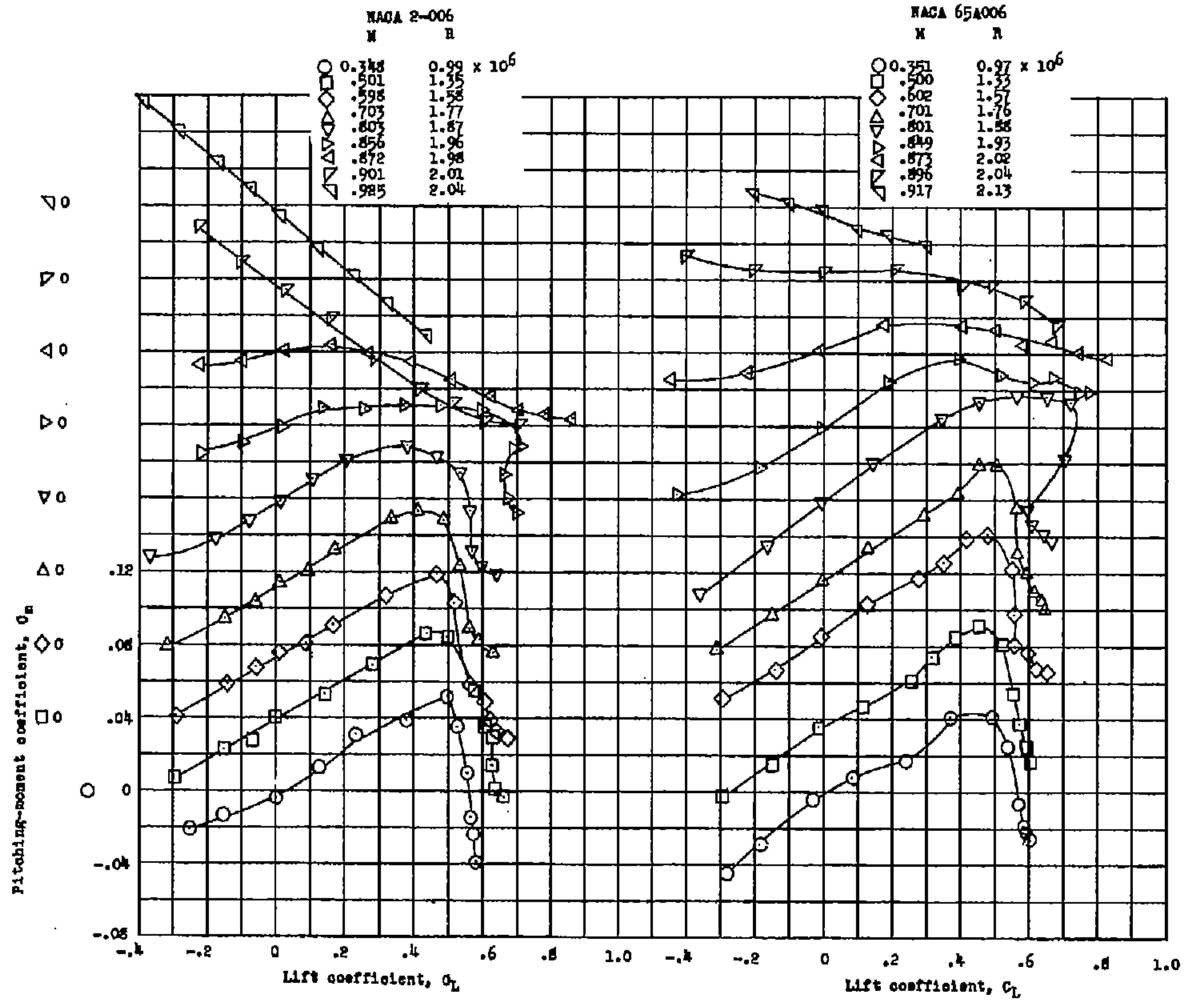
(c) Drag.

Figure 7.- Concluded.



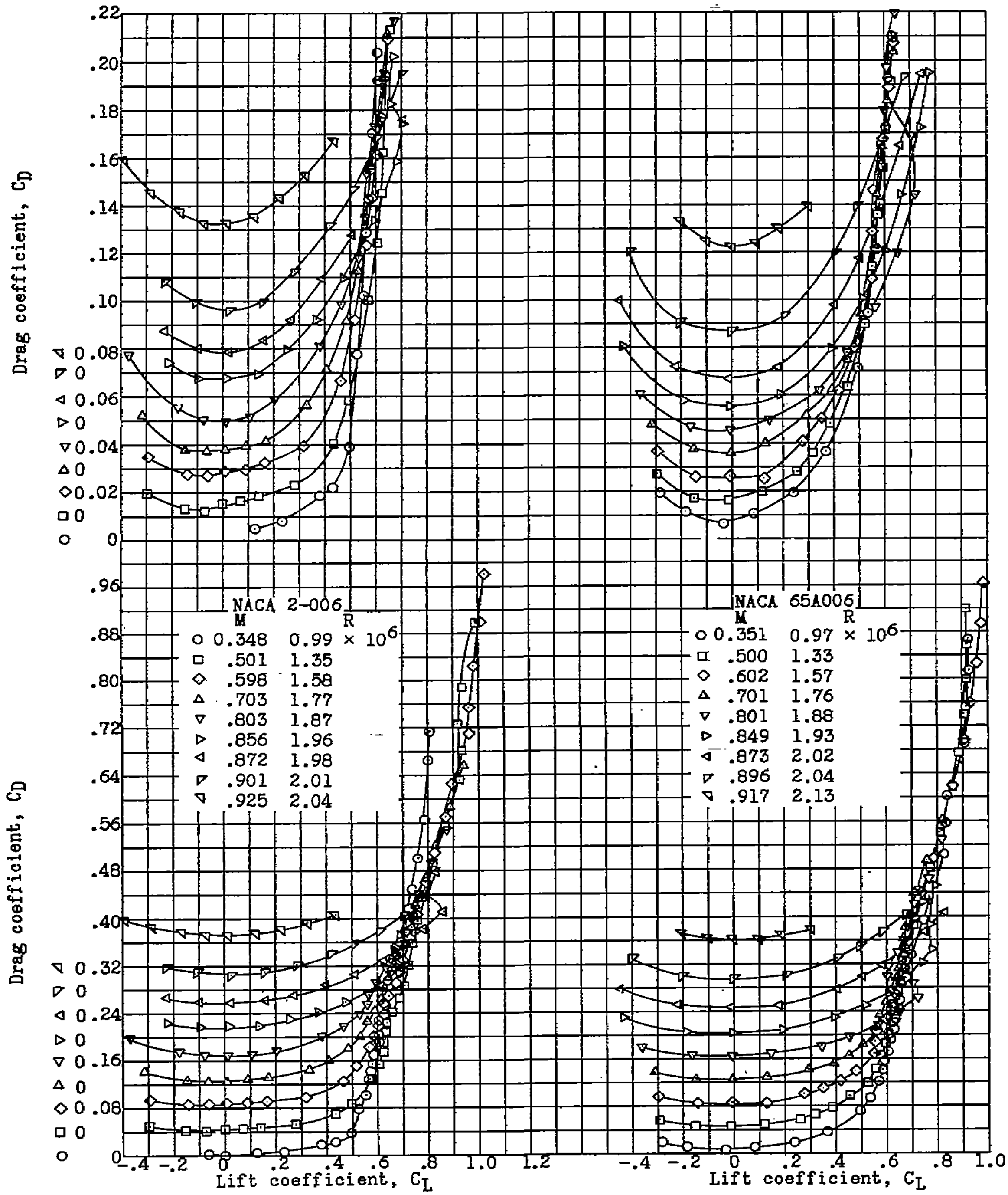
(a) Stagnation pressure, 9 inches of mercury (approx.).

Figure 8.- High-speed aerodynamic characteristics of two wings of similar plan form with NACA 2-006 and NACA 65A006 airfoil sections.



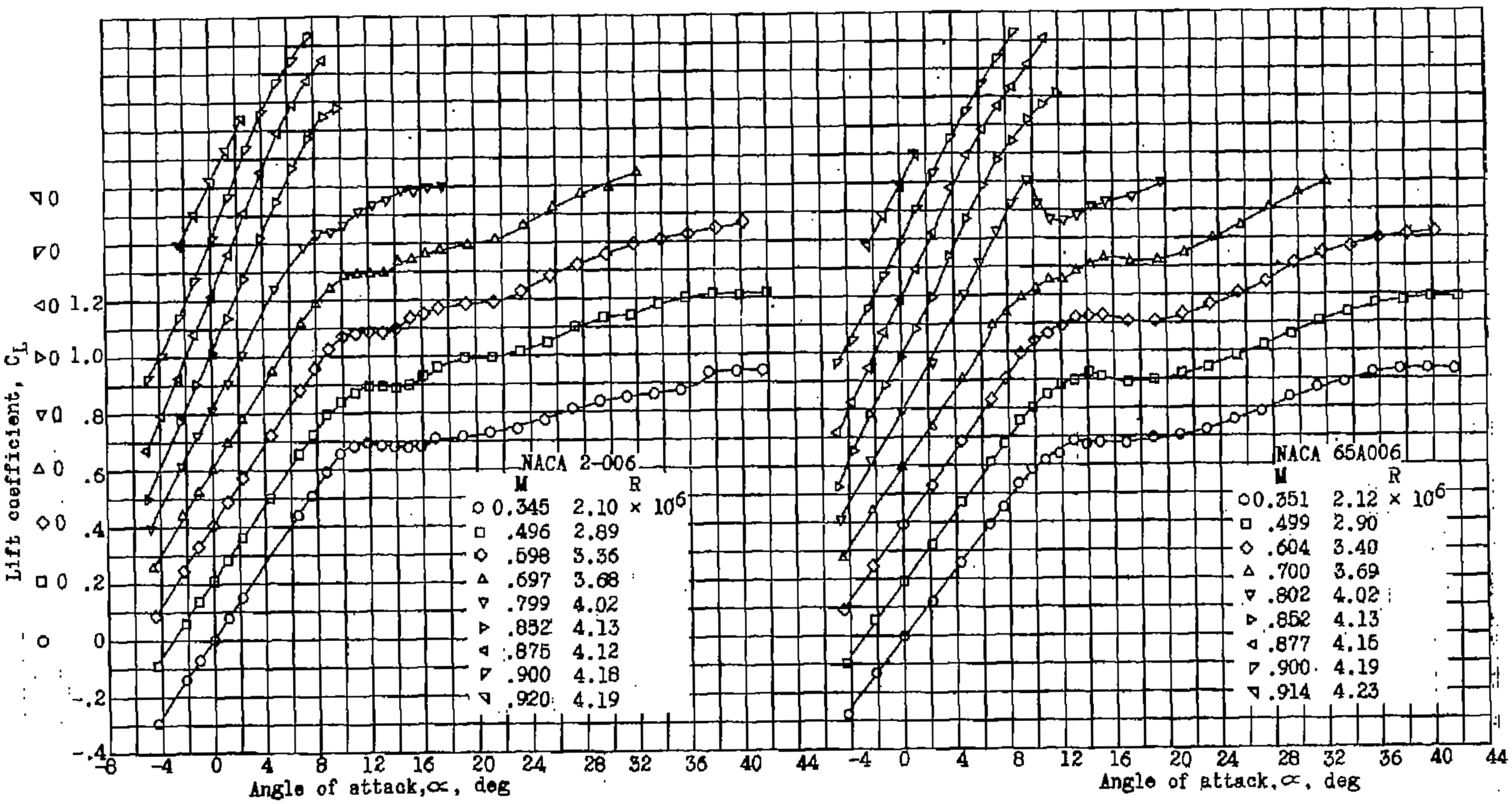
(a) Continued.

Figure 8.- Continued.



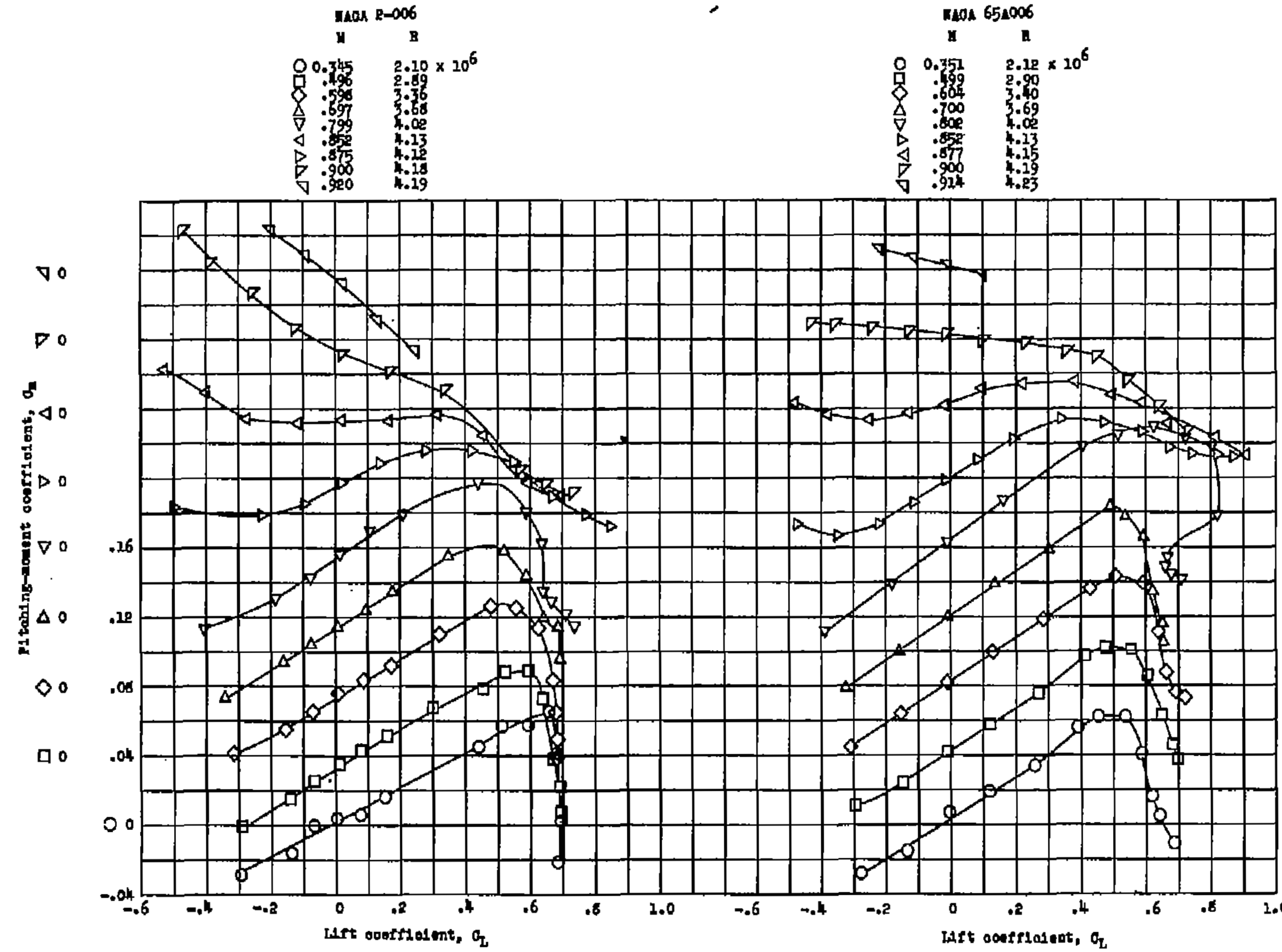
(a) Concluded.

Figure 8.- Continued.



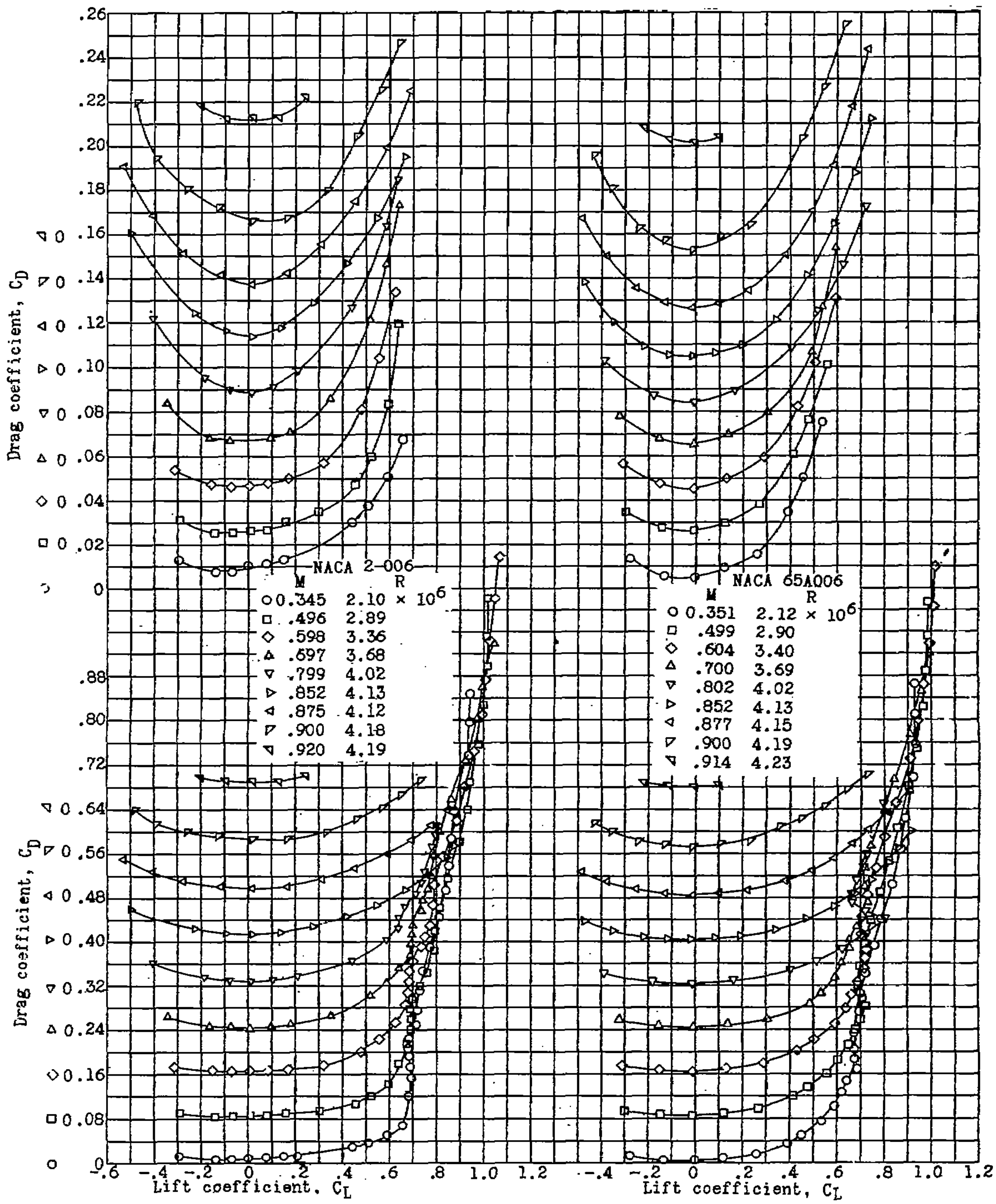
(b) Stagnation pressure, 20 inches mercury (approx.).

Figure 8.- Continued.



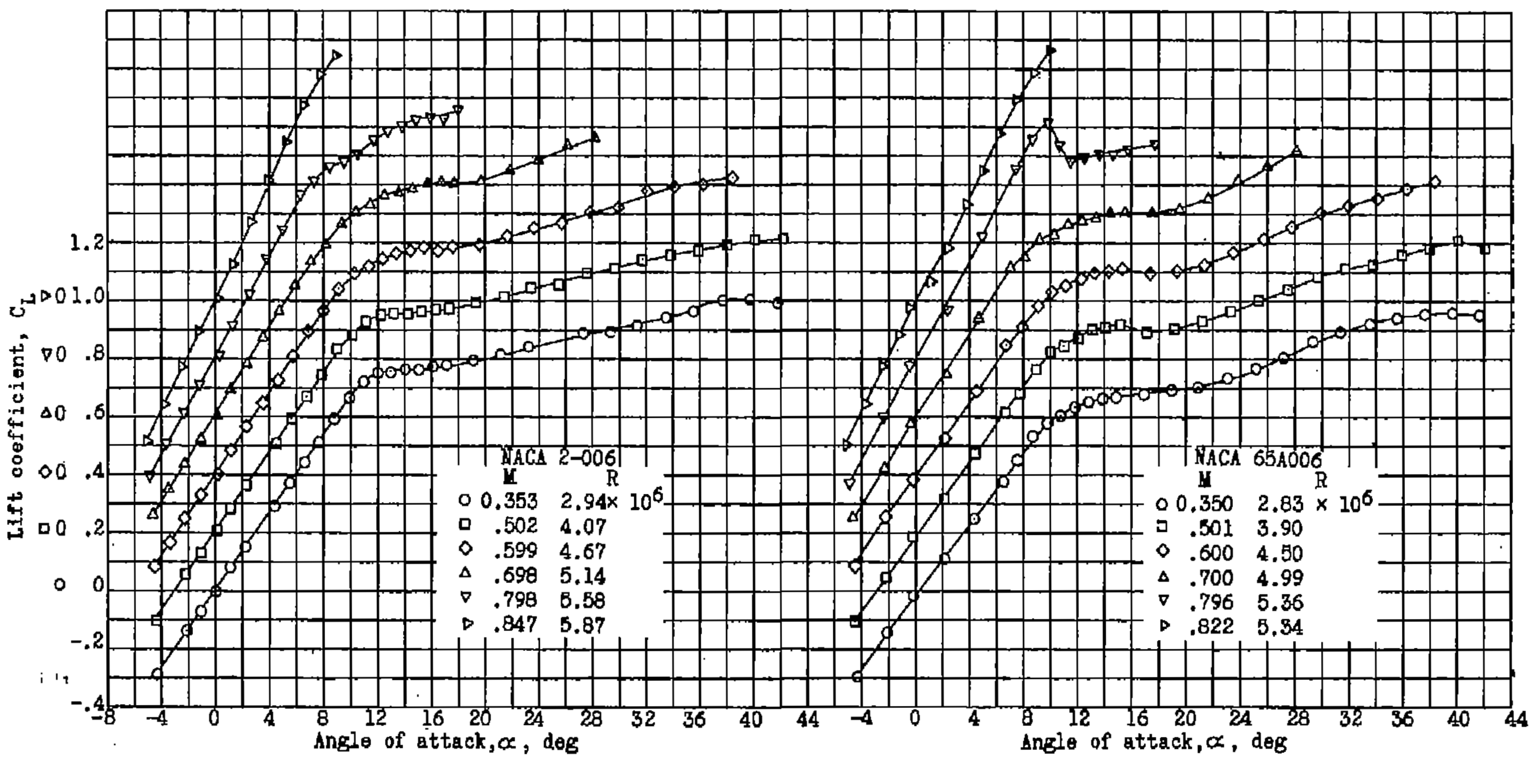
(b) Continued.

Figure 8.- Continued.



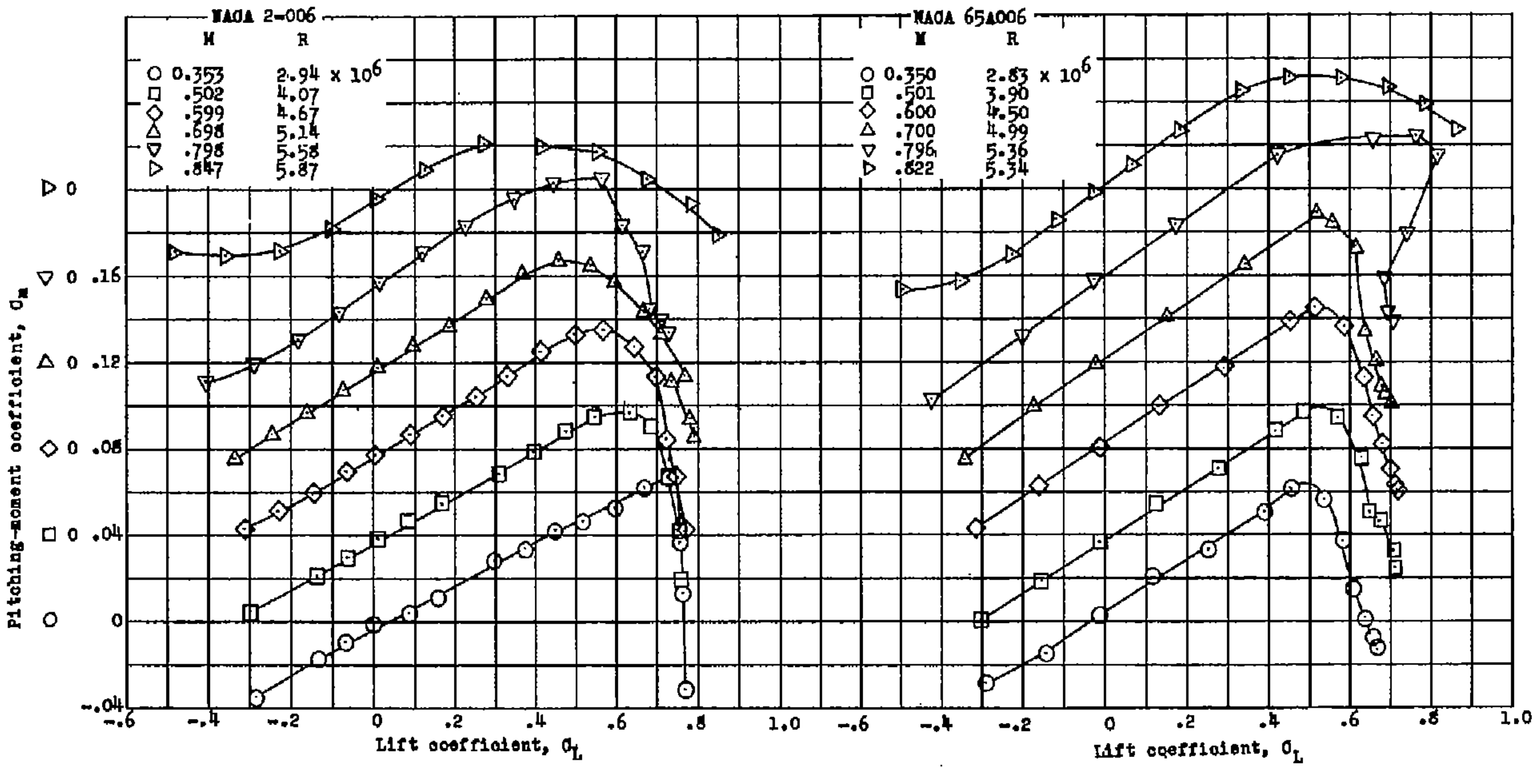
(b) Concluded.

Figure 8.- Continued.



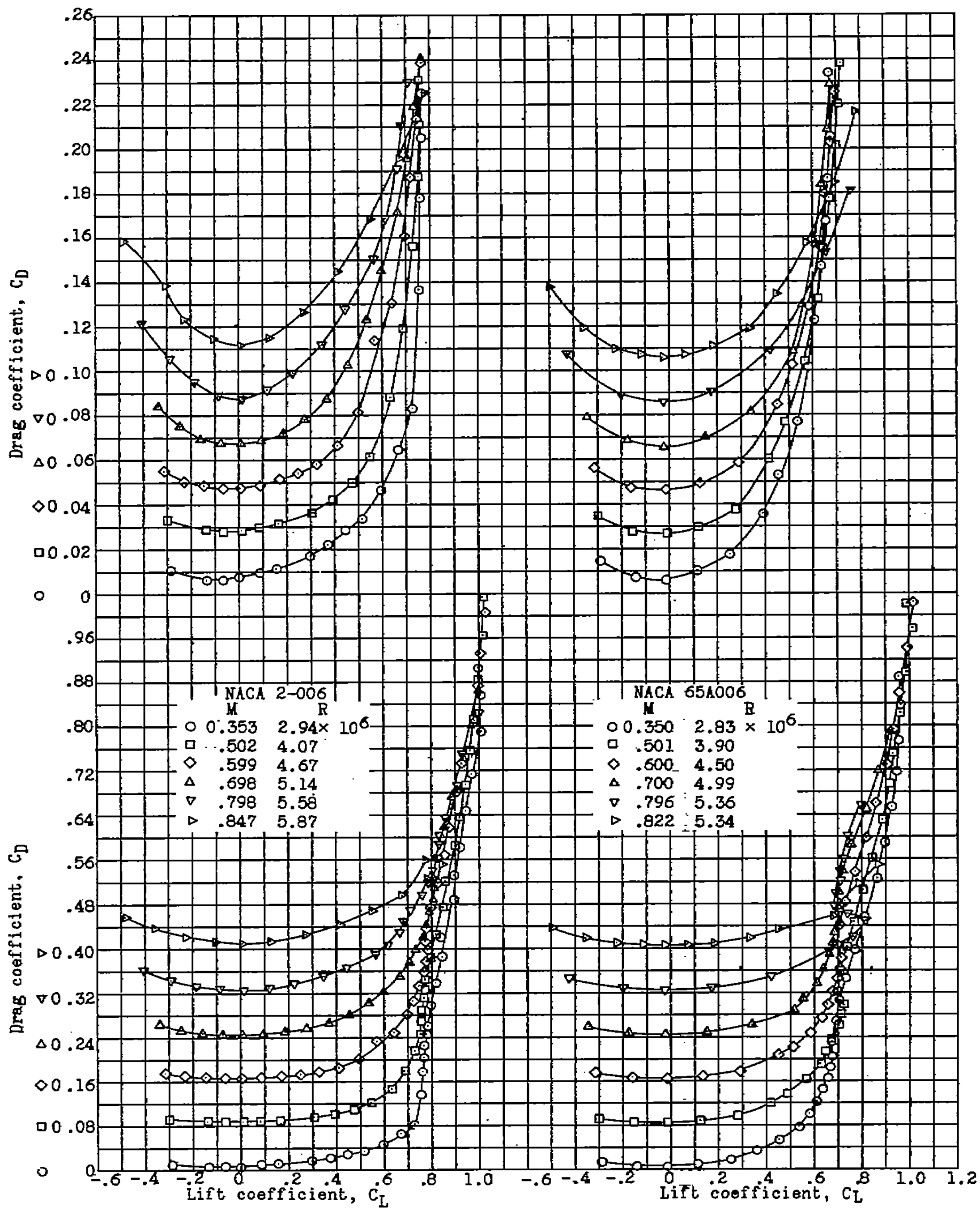
(c) Stagnation pressure, 27 inches mercury (approx.).

Figure 8.- Continued.



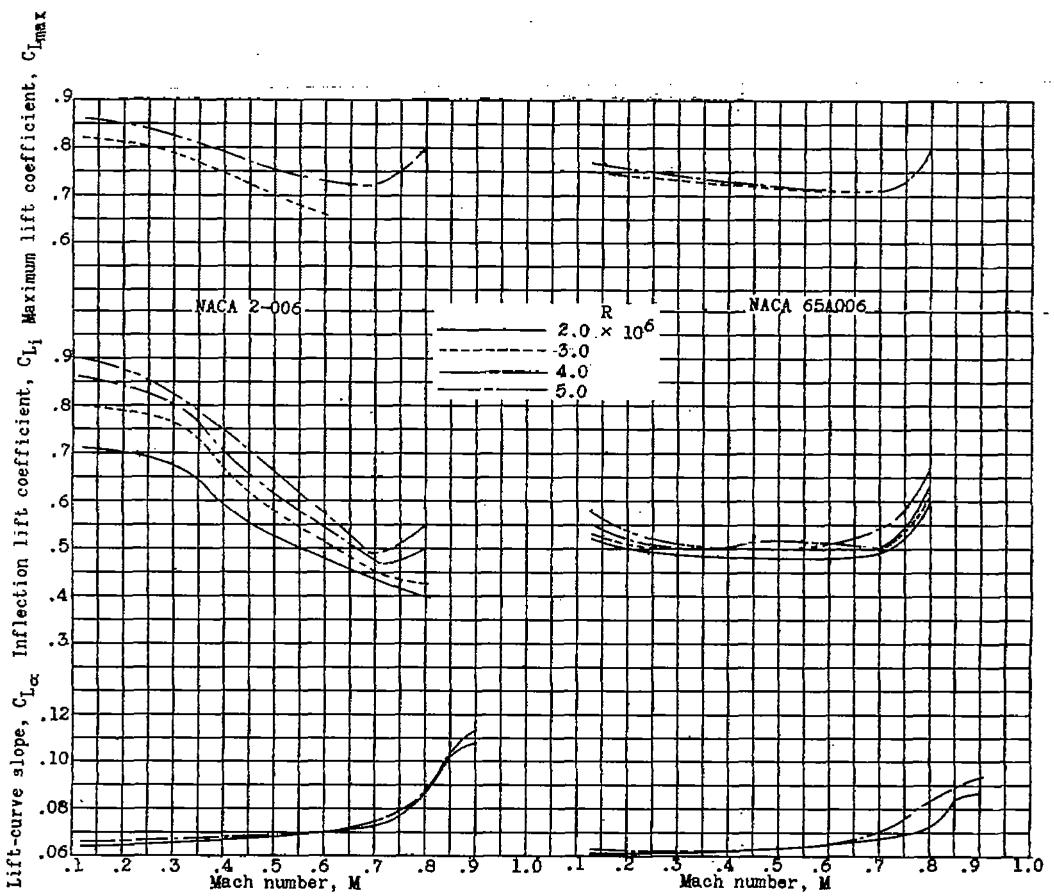
(c) Continued.

Figure 8.- Continued.



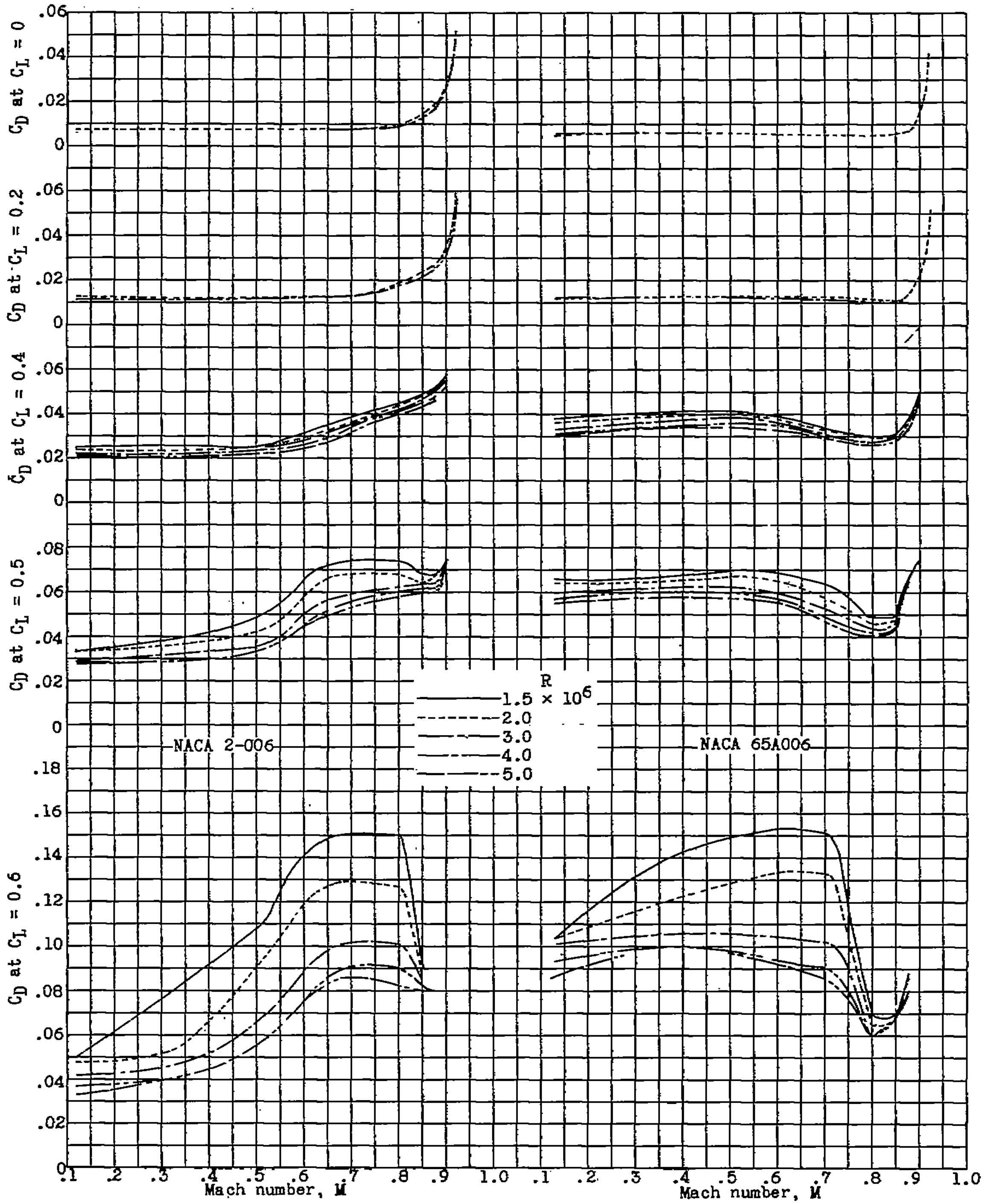
(c) Concluded.

Figure 8.- Concluded.



(a) Lift.

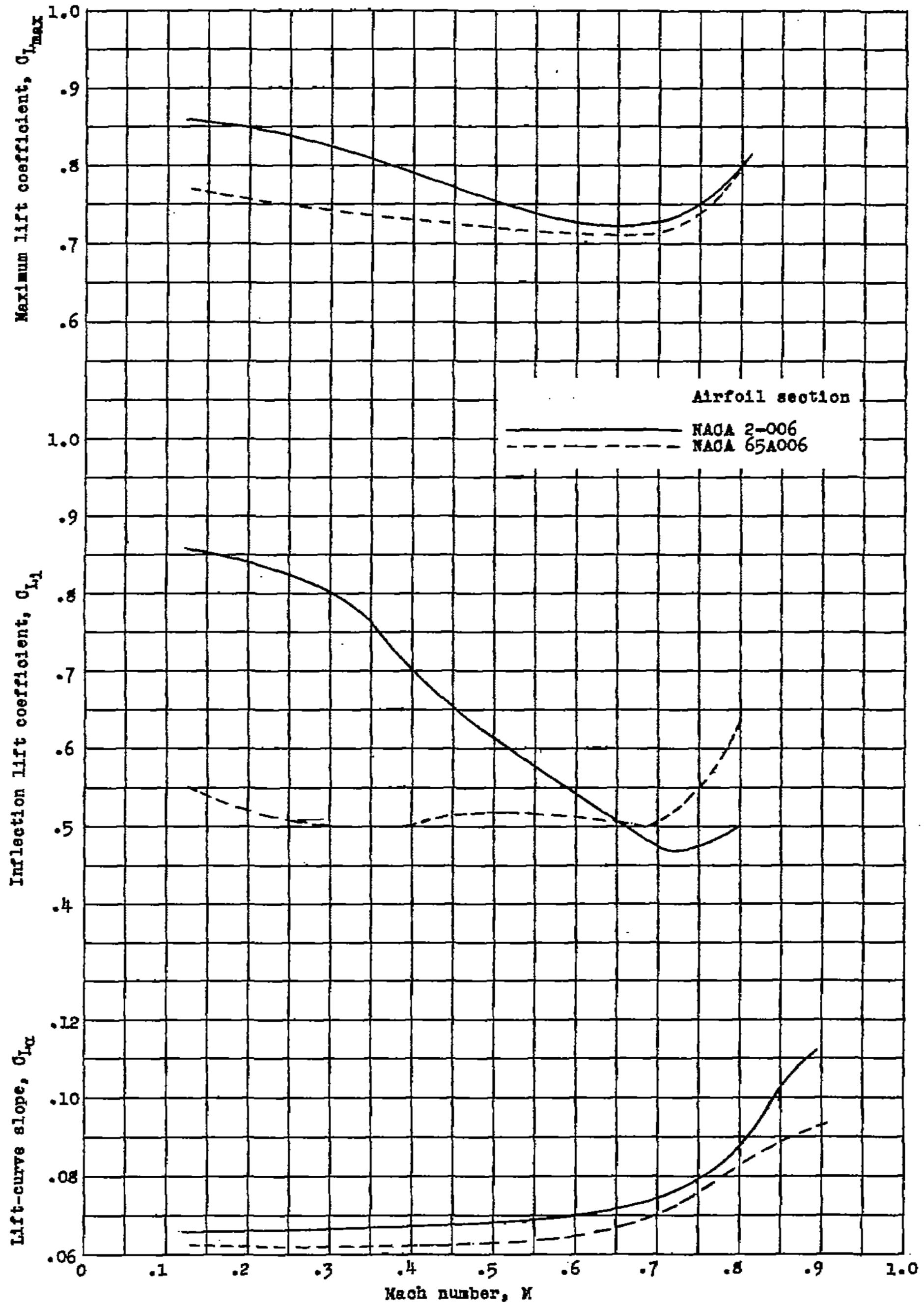
Figure 9.- Effects of variations of Mach number upon the aerodynamic characteristics of two wings of similar plan form with the NACA 2-006 and NACA 65A006 airfoil sections for several Reynolds numbers.



(b) Drag.

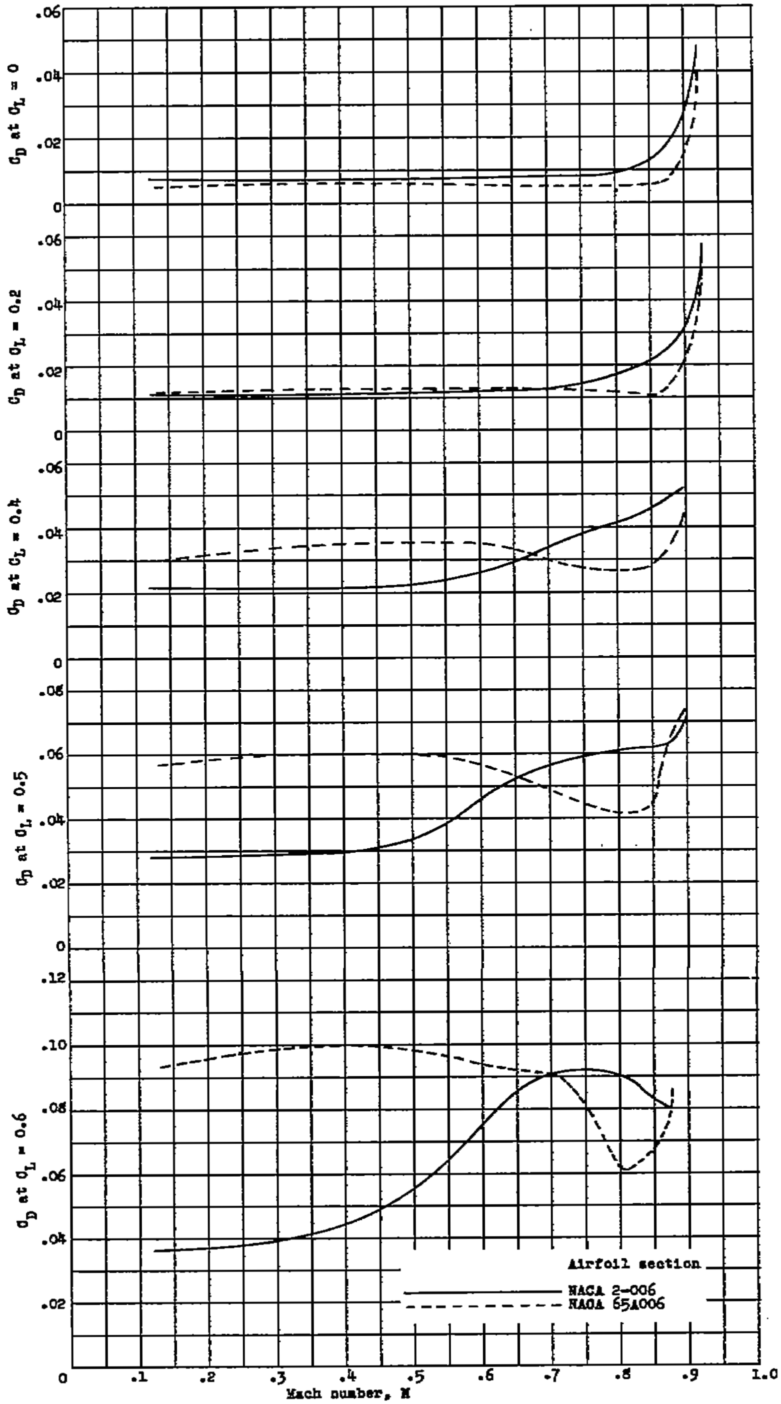
Figure 9.- Concluded.

[redacted]



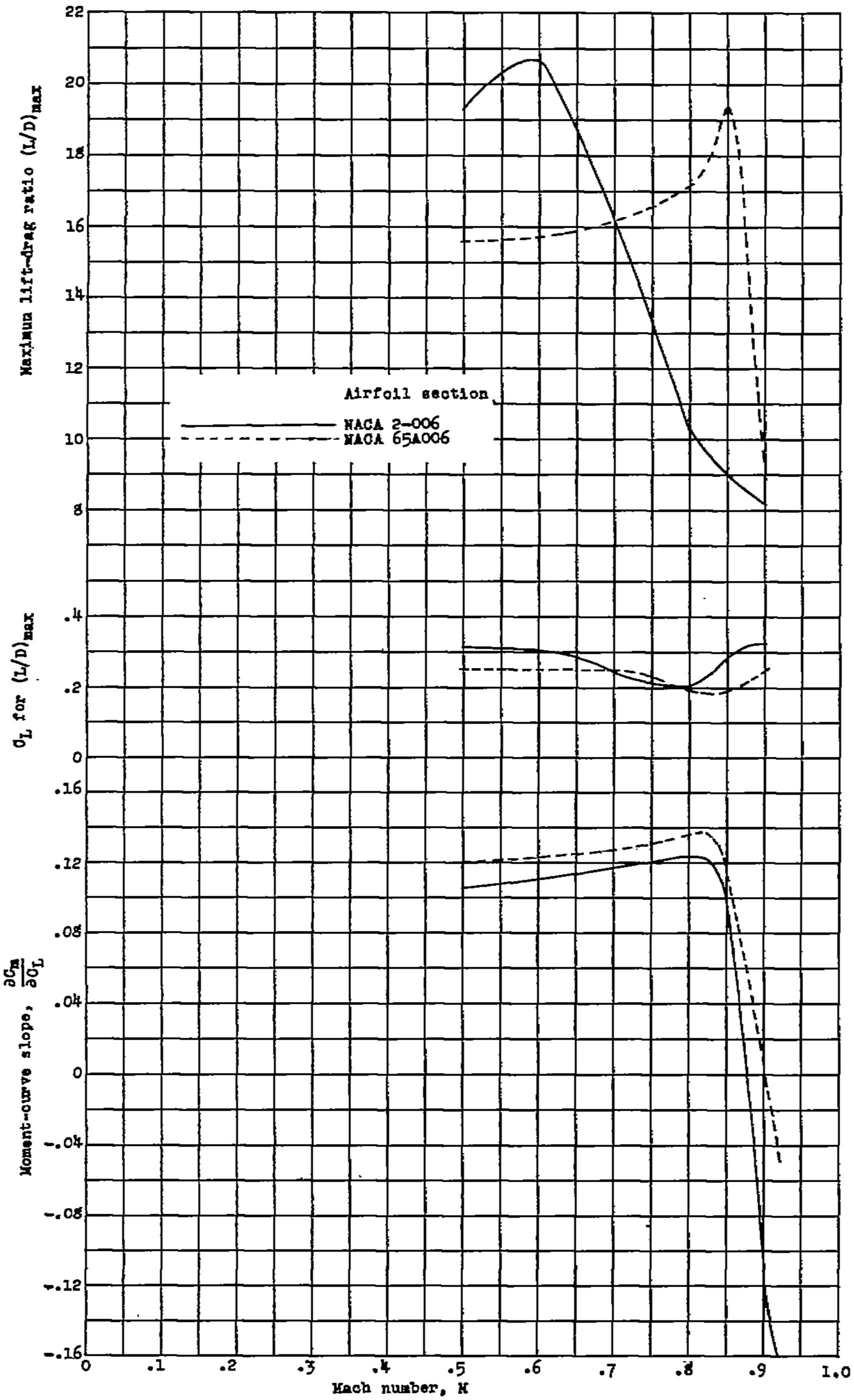
(a) Lift.

Figure 10.- Comparison of the aerodynamic characteristics of two wings of similar plan form with the NACA 2-006 and NACA 65A006 airfoil sections. $R = 4.0 \times 10^6$.



(b) Drag.

Figure 10.- Continued.



(c) Maximum lift-drag ratio and moment-curve slope.

Figure 10.- Concluded.

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