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RESEARCH MEMORANDUM

FLIGHT-DETERMINED PRESSURE DISTRIBUTIONS OVER A SECTION OF THE 35° SWEPT WING OF THE DOUGLAS D-558-II RESEARCH AIRPLANE AT MACH NUMBERS UP TO 2.0

By Gareth H. Jordan and Earl R. Keener

High-Speed Flight Station
Edwards, Calif.

NATIONAL ADVISORY COMMITTEE
FOR AERONAUTICS
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SUMMARY

Measurements of pressure distributions have been made over a wing midsemispan station on the 35° sweptback wing of the Douglas D-558-II research airplane at Mach numbers from 1.17 to 2.0.

The results of the investigation indicate that, as the angle of attack increased at the higher Mach numbers, the pressure coefficient for a vacuum limited the extent to which the upper-surface pressures could expand. Consequently most of the increase in section normal-force coefficient at high angles of attack can be attributed to the increase in pressure over the lower surface.

At high subsonic speeds the center of pressure rapidly moved rearward with increasing Mach number. At supersonic Mach numbers the center of pressure moved rearward both with increasing Mach number and with increasing angle of attack.

INTRODUCTION

Flight tests of the 35° sweptback wing of the Douglas D-558-II research airplane are being conducted by the NACA High-Speed Flight Station at Edwards, Calif. A pressure survey has previously been made of the wing surface to determine the chordwise and spanwise load distribution at subsonic and transonic Mach numbers. Some of these data have been reported in reference 1. Because of the interest in the wing section characteristics of subsonic-type airfoils at supersonic speeds, sufficient instrumentation was included in the airplane during recent exploratory flights at supersonic speeds to determine the chordwise pressure distribution of a midsemispan wing station perpendicular to the

30-percent-common-chord line. The data presented herein show the effect of Mach number and angle of attack in the Mach number range of 1.17 to 2.00.

SYMBOLS

$b/2$ wing semispan, 12.5 ft

C_{N_A} airplane normal-force coefficient, nW/qS

c local wing chord of midsemispan station perpendicular to 30-percent-common-chord line, 5.88 ft

$c_{m_{c/4}}$ section pitching-moment coefficient about 0.25c,

$$\int_0^1 \frac{p_L - p_U}{q} (0.25 - x/c) \cdot d\frac{x}{c}$$

c_n section normal-force coefficient, $\int_0^1 \frac{p_L - p_U}{q} d\frac{x}{c}$

c_{n_U} contribution of upper surface to section normal-force coefficient, $\int_0^1 \frac{p_o - p_U}{q} d\frac{x}{c}$

c_{n_L} contribution of lower surface to section normal-force coefficient, $\int_0^1 \frac{p_L - p_o}{q} d\frac{x}{c}$

g acceleration due to gravity, ft/sec^2

M free-stream Mach number

n normal load factor, g units

P pressure coefficient, $\frac{p - p_o}{q}$

P_{cr} critical pressure coefficient (pressure coefficient at sonic velocity), $\frac{2}{\gamma M^2}\left[\left(\frac{2}{\gamma + 1} + \frac{\gamma - 1}{\gamma + 1} M^2\right)^{\frac{\gamma}{\gamma - 1}} - 1\right]$

p local static pressure, lb/sq ft

p_o free-stream static pressure, lb/sq ft

q free-stream dynamic pressure, lb/sq ft

S total wing area, including area projected through fuselage, 175 sq ft

W airplane weight, lb

x chordwise distance rearward of leading edge of local chord, ft

x_{cp} chordwise center of pressure, $\left(0.25 - \frac{c_{m_{c/4}}}{c_n}\right)100$, percent chord

α airplane angle of attack, deg

γ ratio of specific heats

Subscripts:

L lower surface

U upper surface

DESCRIPTION OF AIRPLANE AND ORIFICE STATION

The Douglas D-558-II research airplane used in these tests is shown in figure 1. A three-view drawing of the airplane showing the general overall dimensions is shown in figure 2. Physical characteristics of the airplane are given in table I.

The airplane was designed for Mach numbers above 1.0, and has a wing whose 30-percent-common-chord line is swept back 35°. The wing taper ratio and aspect ratio are 0.565 and 3.57, respectively.

The orifice station for which data are presented in this paper is a midsemispan station, normal to the 30-percent-common-chord line, as shown in figure 3. This midsemispan station intersects the 30-percent-common-chord line at 0.574b/2 and extends over the leading-edge slat and trailing-edge flap. The root and tip wing sections, normal to the 30-percent-common-chord line, are NACA 63-010 and 63_1-012 airfoils, respectively. The wing section thickness is 10.86 percent of the chord at the orifice station, the ordinates of which are presented in table II. For these tests the leading-edge slat was locked in the closed position and the trailing-edge flap was undeflected.

INSTRUMENTATION

Standard NACA instruments pertaining to the pressure-distribution measurements were installed in the airplane to record indicated free-stream static and dynamic pressures, normal acceleration at airplane center of gravity, airplane angle of attack, and angle of sideslip. All instruments were synchronized by a common timer.

An NACA high-speed pitot-static tube was mounted on a boom which projected from the nose of the airplane. The angle-of-attack and angle-of-sideslip vanes were attached to the nose boom. The position error introduced by the pressure field in the vicinity of the tube was calibrated by comparing the static pressure measured from the airspeed head and the altitude of the airplane measured by radar with the pressure and altitude determined from a radiosonde balloon released at the time of flight.

Flush-type orifices installed in the wing skin were connected by 1/8-inch-inside-diameter tubing to NACA 24-cell recording manometers located in the instrument compartment. The length of tubing varied from 15 to 20 feet. One side of each manometer cell was connected to the orifice and the other side was vented to the instrument compartment. The instrument compartment pressure was recorded separately to establish a reference pressure for the manometers.

TESTS AND METHODS

Wing section pressure-distribution data were obtained during two dives to $M \approx 2.0$ at altitudes from 70,000 to 55,000 feet and from wind-up turns at Mach numbers between 1.17 and 1.85 at altitudes from 45,000 to 65,000 feet.

Mach number and free-stream static pressure were obtained from the measured free-stream static and impact pressures by using the airspeed calibration mentioned previously. The measured wing surface pressures were reduced to pressure coefficients. Chordwise distributions of these pressure coefficients were plotted for the test section and mechanically integrated to obtain normal-force coefficient and pitching-moment coefficient.

ACCURACY

The accuracy of the test results is estimated to be within the following limits:

M	M = 1.2, ±0.01
	M = 2.0, ±0.03
P	±0.03
c_n	±0.04
$c_{m_{c/4}}$	±0.01
C_{N_A}	±0.02
α, deg	±1.0

RESULTS AND DISCUSSION

Pressure Distributions

The chordwise pressure coefficients obtained at supersonic Mach numbers over the wing midsemispan station are given in tabular form in tables III to IX. From these data representative pressure distributions were selected that illustrate the changes that occurred with Mach number and angle of attack. Figures 4 and 5 show the effect of Mach number at $c_n \approx 0.25$ and $c_n \approx 0.40$, respectively. Figures 6 to 10 show the effect of angle of attack on the chordwise pressure distribution at various Mach numbers from 1.17 to 2.00.

Effect of Mach number.- Pressure distributions at $c_n \approx 0.25$ are shown in figure 4 for Mach numbers from 0.65 to 2.00. The pressure distributions at M = 0.65, 0.85, and 0.90 are from reference 1 and are presented for the purpose of comparing the supersonic distributions from the present tests with those at subsonic Mach numbers from the previous tests.

The distribution at $M = 0.65$ in figure 4 is typical for the subsonic-type airfoil in subcritical flow. A negative pressure peak occurred at the leading edge of the upper surface, followed by a sharp pressure recovery. The high negative pressures at the peak resulted from the rapid expansion around the comparatively small leading-edge radius. Behind the negative pressure peak the local velocity increased and the pressure decreased to the 35-percent chord, the maximum thickness location, behind which a gradual pressure recovery occurred.

At $M = 0.85$ in figure 4 compressibility effects changed the distribution to that typical of transonic flow. The prominent leading-edge negative pressure peak disappeared; the pressure coefficients over the maximum thickness location were more negative on both surfaces than at $M = 0.65$; and over the forward part of the upper surface, the flow was supercritical terminated by a shock wave behind the maximum thickness location at about 50 percent chord.

The shock wave on the upper surface moved rearward to about 70 percent chord with increase in Mach number to 0.90, and the flow over the midsection of the lower surface was supersonic, probably terminated by a shock wave at about 60 percent chord.

At $M = 1.16$ the shock waves on both surfaces were still ahead of the trailing edge. Reference 2, which presents pressure distributions and schlieren photographs for a 45° sweptback wing-fuselage combination at Mach numbers up to 1.11, confirms the fact that for sweptback wings the shock wave does not reach the trailing edge until some supersonic Mach number, which undoubtedly depends upon the angle of sweep of the trailing edge.

As the Mach number increased to 2.00 the pressure coefficients on both surfaces became in general more positive, the shock wave on the upper surface moved rearward to the trailing edge, and the lower-surface shock appears to have become weaker, followed by an expansion over the trailing edge.

In general, the pressure distributions in figure 5 at $c_n \approx 0.40$ indicate the same trends with Mach number as those at $c_n \approx 0.25$.

<u>Effect of angle of attack</u>.- Pressure distributions at several values of wing-section normal-force coefficient for $M \approx 1.17$, 1.37, 1.56, 1.85, and 2.00 are shown in figures 6 to 10. The effects of angle of attack upon the pressure distributions at supersonic speeds were similar at all the above Mach numbers. On the upper surface the pressures were affected by the low values of the pressure coefficient for a vacuum $\left(P_{vacuum} = -\frac{2}{\gamma M^2}\right)$, thus limiting the extent to which the upper-surface

pressures could expand as the angle of attack increased. As a result, the pressures ahead of the shock wave reached a near vacuum state at $\alpha \approx 12^{\circ}$ for $M \approx 1.37$ and at $\alpha \approx 9^{\circ}$ for $M \approx 1.56$, and the pressure coefficients from the leading edge to the shock position were nearly constant at these angles of attack.

At all Mach numbers presented the lower-surface pressure coefficients became more positive as the angle of attack increased.

Wing-Section Aerodynamic Characteristics

The variation of section normal-force coefficient with angle of attack for $M \approx 1.17$, 1.37, 1.56, 1.85, and 2.00 is shown in figure 11. The variation was almost linear, and a general decrease in slope occurred as the Mach number increased.

Figure 12 shows the variation of the upper- and lower-surface normal-force coefficients with c_n at $M \approx 1.17$, 1.37, and 1.56. As previously mentioned, the upper-surface pressure coefficients were noticeably limited at the higher Mach numbers by the pressure coefficient for a vacuum. Figure 12 shows that as the angle of attack increased at $M \approx 1.37$ and 1.56 normal-force coefficient for the upper surface c_{n_U} reached a maximum value above which the increase in c_n came from the increase in pressure over the lower surface. This effect can also be seen in the pressure distributions of figure 8 at $M \approx 1.56$.

It may be seen that as c_n increased from 0.6 to 0.7 the upper-surface pressures remained essentially constant, whereas the lower-surface pressures became noticeably more positive.

Figure 13 shows the variation of pitching-moment coefficient with normal-force coefficient. The curves have a stable variation with c_n, and indicate that a decrease in slope occurred at $c_n \approx 0.4$.

Figure 14 shows the variation of the center of pressure with normal-force coefficient at $M \approx 1.17$, 1.37, 1.56, and 1.85. The curves are limited to values of c_n above 0.2 since they go to infinity at $c_n = 0$. In general, the center of pressure moved rearward with increasing c_n.

Figure 15 shows the variation of the center of pressure with Mach number at $c_n \approx 0.25$. Included in the figure are data from reference 1. At $M = 0.83$ to 0.90 the center of pressure moved rearward from about 23 percent chord to about 35 percent chord. Supersonically the center of pressure moved rearward to about 41 percent chord at $M = 2.00$.

CONCLUSIONS

Results of pressure-distribution measurements over a wing midsemispan station of the 35° sweptback wing of the Douglas D-558-II research airplane at supersonic Mach numbers indicate that:

1. As the angle of attack increased at the higher Mach numbers, the pressure coefficient for a vacuum limited the extent to which the upper-surface pressures could expand, and consequently most of the increase in normal-force coefficient at high angles of attack can be attributed to the increase in pressure over the lower surface.

2. At high subsonic speeds the center of pressure rapidly moved rearward with increasing Mach number. At supersonic speeds the center of pressure moved rearward both with increasing Mach number and with increasing angle of attack.

High-Speed Flight Station,
National Advisory Committee for Aeronautics,
Edwards, Calif., December 27, 1954.

REFERENCES

1. Peele, James R.: Flight-Determined Pressure Measurements Over the Wing of the Douglas D-558-II Research Airplane at Mach Numbers up to 1.14. NACA RM L54A07, 1954.

2. Whitcomb, Richard T., and Kelly, Thomas C.: A Study of the Flow Over a 45° Sweptback Wing-Fuselage Combination at Transonic Mach Numbers. NACA RM L52D01, 1952.

TABLE I

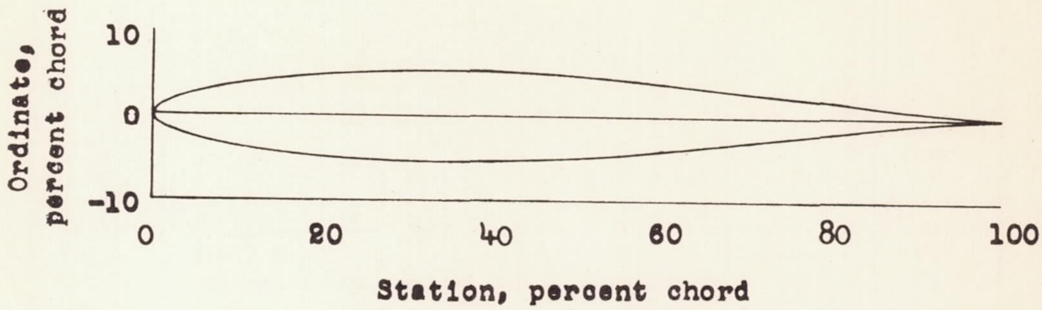
PHYSICAL CHARACTERISTICS OF THE DOUGLAS D-558-II AIRPLANE

Wing:	
Root airfoil section (normal to 0.30 chord of unswept panel)	NACA 63-010
Tip airfoil section (normal to 0.30 chord of unswept panel)	NACA 63_1-012
Total area, sq ft	175.0
Span, ft	25.0
Mean aerodynamic chord, in.	87.301
Root chord (parallel to plane of symmetry), in.	108.51
Extended tip chord (parallel to plane of symmetry), in.	61.18
Taper ratio	0.565
Aspect ratio	3.570
Sweep at 0.30 chord of unswept panel, deg	35.0
Sweep of leading edge, deg	38.8
Incidence at fuselage center line, deg	3.0
Dihedral, deg	-3.0
Geometric twist, deg	0
Horizontal tail:	
Root airfoil section (normal to 0.30 chord of unswept panel)	NACA 63-010
Tip airfoil section (normal to 0.30 chord of unswept panel)	NACA 63-010
Total area, sq ft	39.9
Span, in.	143.6
Mean aerodynamic chord, in.	41.75
Root chord (parallel to plane of symmetry), in.	53.6
Extended tip chord (parallel to plane of symmetry), in.	26.8
Taper ratio	0.50
Aspect ratio	3.59
Sweep at 0.30 chord line of unswept panel, deg	40.0
Dihedral, deg	0
Vertical tail:	
Airfoil section (normal to 0.30 chord of unswept panel)	NACA 63-010
Effective area, (area above root chord), sq ft	36.6
Height from fuselage reference line, in.	98.0
Root chord (chord 24 in. above fuselage reference line), in.	116.8
Extended tip chord (parallel to fuselage reference line), in.	27.0
Sweep angle at 0.30 chord of unswept panel, deg	49.0
Fuselage:	
Length, ft	42.0
Maximum diameter, in.	60.0
Fineness ratio	8.40
Power plant:	
Rocket	LR8-RM-6
Airplane weight, lb:	
Full rocket fuel	15,787
No fuel	9,421

TABLE II

PROFILE AND ORDINATES OF THE ORIFICE STATION

(NACA $63_{(10)}$-0(10.86) AIRFOIL)



[Stations and ordinates given in percent of local chord]

Station	Upper surface	Lower surface
0	0	0
.5	.900	-0.900
.75	1.090	-1.090
1.25	1.385	-1.385
2.5	1.907	-1.907
5.0	2.650	-2.650
7.5	3.204	-3.204
10	3.651	-3.651
15	4.337	-4.337
20	4.827	-4.827
25	5.162	-5.162
30	5.363	-5.363
35	5.430	-5.430
40	5.363	-5.363
45	5.176	-5.176
50	4.883	-4.883
55	4.496	-4.496
60	4.034	-4.034
65	3.512	-3.512
70	2.945	-2.945
75	2.352	-2.352
80	1.757	-1.757
85	1.182	-1.182
90	.656	-0.656
95	.232	-0.232
100	0	0
L.E. radius: 0.908		

TABLE III

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[$M \approx 1.17$]

	Percent chord	Pressure coefficient					
		a	b	c	d	e	f
Upper surface	1.2	0.331	0.276	-0.133	-0.202	-0.198	-0.230
	2.6	.216	.210	-.124	-.220	-.222	-.247
	5.0	.096	.093	-.061	-.159	-.198	-.206
	19.3	-.025	.023	-.266	-.272	-.272	-.304
	35.0	-.363	-.352	-.364	-.376	-.388	-.386
	51.2	-.146	-.141	-.346	-.324	-.355	-.354
	63.8	-.238	-.186	-.342	-.337	-.375	-.373
	70.8	-.218	-.212	-.319	-.315	-.297	-.288
	75.5	-.218	-.212	-.230	-.272	-.289	-.303
	80.0	-.193	-.187	-.230	-.254	-.246	-.278
	85.1	-.122	-.095	-.195	-.211	-.214	-.239
	94.6	-.001	-.001	-.061	-.046	-.090	-.058
Lower surface	0	0.762	0.740	0.742	0.683	0.724	0.696
	.7	.336	.457	.620	.642	.655	.665
	3.6	.070	.090	.333	.364	.392	.403
	5.8	.045	.044	.333	.330	.327	.354
	9.1	-.122	-.095	.143	.215	.226	.222
	18.9	-.001	-.001	.108	.093	.126	.131
	30.8	-.262	-.232	-.021	.001	-.011	.020
	34.4	-.218	-.212	-.124	-.115	-.073	-.066
	39.7	-.266	-.235	-.070	-.055	-.057	-.017
	43.6	-.193	-.187	-.124	-.116	-.132	-.124
	50.6	-.430	-.418	-.194	-.159	-.164	-.132
	56.1	-.314	-.212	-.159	-.150	-.148	-.115
	63.7	-.286	-.277	-.203	-.244	-.205	-.197
	70.6	-.266	-.212	-.221	-.168	-.181	-.148
	75.1	-.379	-.392	-.142	-.168	-.148	-.141
	84.8	-.170	-.141	-.159	-.115	-.131	-.140
	94.5	.070	-.002	.043	.047	.048	.046
	98.6	.047	.046	.054	.041	.035	.033
	M	1.110	1.152	1.182	1.159	1.167	1.170
	C_{N_A}	.012	0	.199	.217	.239	.256
	α	-1.3°	-1.5°	1.7°	1.9°	2.3°	2.6°
	c_n	-.030	-.040	.219	.244	.266	.285
	$c_{m_{c/4}}$	.0112	.0144	-.0192	-.0218	-.0266	-.0256

TABLE III.- Continued

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.17]

	Percent chord	Pressure coefficient					
		g	h	i	j	k	l
Upper surface	1.2	-0.252	-0.275	-0.308	-0.354	-0.434	-0.485
	2.6	-.278	-.268	-.312	-.396	-.409	-.489
	5.0	-.261	-.276	-.312	-.349	-.440	-.489
	19.3	-.334	-.332	-.359	-.404	-.432	-.505
	35.0	-.416	-.428	-.438	-.443	-.535	-.584
	51.2	-.408	-.356	-.383	-.412	-.417	-.433
	63.8	-.370	-.375	-.378	-.406	-.433	-.488
	70.8	-.326	-.340	-.343	-.349	-.369	-.353
	75.5	-.294	-.292	-.312	-.333	-.314	-.361
	80.0	-.260	-.275	-.271	-.269	-.296	-.290
	85.1	-.237	-.244	-.225	-.231	-.250	-.322
	94.6	-.066	-.076	-.090	-.081	-.117	-.098
Lower surface	0	0.735	0.675	0.660	0.654	0.605	0.588
	.7	.676	.708	.719	.740	.790	.811
	3.6	.446	.429	.457	.516	.545	.563
	5.8	.398	.421	.449	.492	.507	.539
	9.1	.242	.244	.274	.312	.325	.348
	18.9	.145	.156	.203	.186	.247	.300
	30.8	.042	.047	.070	.132	.129	.150
	34.4	-.050	-.044	-.034	-.003	.049	.037
	39.7	-.009	-.004	.005	.029	.049	.093
	43.6	-.132	-.077	-.044	-.020	-.008	-.004
	50.6	-.116	-.109	-.067	-.059	-.086	-.060
	56.1	-.131	-.132	-.129	-.097	-.053	-.050
	63.7	-.203	-.180	-.177	-.160	-.110	-.068
	70.6	-.139	-.156	-.114	-.081	-.030	-.018
	75.1	-.117	-.110	-.076	-.083	-.040	-.021
	84.8	-.131	-.124	-.098	-.058	-.045	-.010
	94.5	.077	.081	.081	.104	.117	.114
	98.6	.031	.028	.029	.037	.049	.053
	M	1.173	1.180	1.183	1.183	1.176	1.165
	C_{N_A}	.286	.310	.349	.396	.452	.501
	α	3.0°	3.4°	4.1°	4.8°	5.7°	6.5°
	c_n	.324	.330	.371	.414	.470	.542
	$c_{m_{c/4}}$	-.0307	-.0326	-.0390	-.0445	-.0477	-.0627

TABLE III.- Concluded

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.17]

	Percent chord	Pressure coefficient					
		m	n	o	p	q	r
Upper surface	1.2	-0.535	-0.570	-0.593	-0.617	-0.654	-0.690
	2.6	-.548	-.582	-.598	-.639	-.669	-.715
	5.0	-.548	-.562	-.598	-.622	-.628	-.725
	19.3	-.548	-.555	-.614	-.614	-.612	-.706
	35.0	-.628	-.677	-.655	-.687	-.685	-.772
	51.2	-.460	-.555	-.502	-.501	-.713	-.753
	63.8	-.468	-.519	-.485	-.477	-.505	-.673
	70.8	-.388	-.434	-.445	-.493	-.474	-.621
	75.5	-.364	-.407	-.397	-.387	-.425	-.574
	80.0	-.346	-.424	-.370	-.384	-.341	-.420
	85.1	-.324	-.339	-.284	-.273	-.270	-.377
	94.6	-.132	-.144	-.131	-.160	-.156	-.142
Lower surface	0	0.542	0.477	0.521	0.455	0.451	0.310
	.7	.830	.788	.839	.841	.838	.880
	3.6	.603	.727	.634	.626	.664	.779
	5.8	.532	.516	.570	.562	.568	.695
	9.1	.364	.349	.401	.441	.406	.555
	18.9	.308	.302	.313	.278	.300	.479
	30.8	.164	.172	.199	.197	.202	.355
	34.4	.052	.052	.079	.073	.105	.235
	39.7	.108	.113	.127	.108	.088	.282
	43.6	.018	.016	.028	.025	.045	.202
	50.6	-.045	-.090	-.059	-.040	-.011	.221
	56.1	-.044	-.015	-.010	.027	.039	.160
	63.7	-.070	-.065	-.029	-.017	.016	.098
	70.6	.004	.045	.031	.027	.015	.141
	75.1	-.031	-.032	-.037	-.025	.003	.042
	84.8	.028	.012	.039	.059	.080	.197
	94.5	.105	.143	.116	.121	.166	.230
	98.6	.052	.032	.055	.051	.056	.094
	M	1.158	1.185	1.147	1.140	1.134	1.179
	C_{N_A}	.548	.574	.601	.621	.648	.833
	α	7.2°	7.6°	8.0°	8.4°	8.8°	-------
	c_n	.580	.624	.629	.639	.697	.914
	$c_{m_{c/4}}$	-.0698	-.0822	-.0739	-.0787	-.0979	-.1411

TABLE IV

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.37]

	Percent chord	Pressure coefficient						
		a	b	c	d	e	f	g
Upper surface	1.2	0.231	-0.216	---	-0.304	-0.316	-0.331	-0.359
	2.6	.185	-.266	---	-.321	-.318	-.365	-.393
	5.0	.185	-.299	---	-.337	-.318	-.365	-.408
	19.3	.016	-.316	---	-.385	-.397	-.412	-.424
	35.0	-.253	-.448	---	-.496	-.444	-.491	-.502
	51.2	-.152	-.547	---	-.544	-.539	-.491	-.533
	63.8	-.233	-.425	---	-.464	-.492	-.475	-.565
	70.8	-.152	-.497	---	-.480	-.444	-.491	-.533
	75.5	-.135	-.349	---	-.417	-.413	-.428	-.440
	80.0	-.135	-.396	---	-.398	-.410	-.425	-.437
	85.1	-.135	-.250	---	-.298	-.318	-.286	-.362
	94.6	-.034	-.233	---	-.257	-.239	-.223	-.237
Lower surface	0	0.842	0.651	---	0.558	0.553	0.553	0.547
	.7	.574	.779	---	.718	.836	.850	.791
	3.6	.264	.403	---	.451	.494	.556	.535
	5.8	.231	.338	---	.373	.463	.509	.535
	9.1	.084	.311	---	.300	.345	.360	.451
	18.9	.117	.245	---	.252	.266	.282	.326
	30.8	-.035	.058	---	.102	.070	.101	.191
	34.4	-.085	-.019	---	-.002	.045	.061	.091
	39.7	-.119	.031	---	.014	.077	.108	.138
	43.6	-.101	-.053	---	-.020	.026	.042	.042
	50.6	-.251	-.167	---	-.146	-.098	-.067	.138
	56.1	-.135	-.118	---	-.098	-.097	-.081	.042
	63.7	-.167	-.152	---	-.116	-.115	-.068	-.036
	70.6	-.119	-.134	---	-.098	-.081	-.081	-.034
	75.1	-.216	-.135	---	-.085	-.084	-.068	-.068
	84.8	-.135	-.134	---	-.098	-.129	-.049	-.034
	94.5	-.001	.031	---	.074	.073	.074	-.037
	98.6	.016	-.002	---	-.002	-.002	.045	-.080
	M	1.390	1.351	---	1.371	1.376	1.377	1.378
	C_{N_A}	.074	.382	---	.448	.499	.546	.593
	α	-.1°	4.8°	---	5.9°	6.7°	7.4°	8.2°
	c_n	.055	.406	---	.463	.474	.504	.572
	$c_{m_{c/4}}$	-.0022	-.0554	---	-.0701	-.0678	-.0749	-.0870

TABLE IV.- Concluded

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.37]

	Percent chord	Pressure coefficient						
		h	i	j	k	l	m	n
Upper surface	1.2	-0.390	-0.467	-0.516	-0.499	-0.517	-0.614	-0.602
	2.6	-.393	-.424	-.488	-.488	-.506	-.556	-.575
	5.0	-.377	-.424	-.535	-.519	-.537	-.620	-.575
	19.3	-.424	-.486	-.551	-.519	-.569	-.635	-.591
	35.0	-.533	-.596	-.614	-.566	-.632	-.699	-.657
	51.2	-.518	-.533	-.661	-.645	-.616	-.635	-.657
	63.8	-.518	-.596	-.629	-.645	-.616	-.667	-.673
	70.8	-.518	-.533	-.661	-.660	-.647	-.651	-.608
	75.5	-.424	-.440	-.535	-.551	-.569	-.572	-.542
	80.0	-.436	-.452	-.547	-.500	-.533	-.567	-.553
	85.1	-.330	-.330	-.457	-.425	-.443	-.493	-.428
	94.6	-.268	-.330	-.410	-.425	-.396	-.382	-.378
Lower surface	0	0.473	0.421	0.388	0.420	0.313	0.226	0.338
	.7	.825	.826	.901	.951	.919	.820	1.043
	3.6	.597	.581	.614	.661	.695	.699	.854
	5.8	.582	.612	.598	.661	.679	.683	.773
	9.1	.451	.435	.483	.546	.533	.536	.604
	18.9	.357	.372	.373	.422	.548	.520	.588
	30.8	.207	.283	.283	.345	.347	.348	.443
	34.4	.170	.138	.170	.170	.250	.219	.342
	39.7	.123	.169	.154	.186	.265	.235	.310
	43.6	.088	.057	.103	.150	.182	.198	.272
	50.6	-.020	.026	-.021	.011	.089	.105	.158
	56.1	-.018	.044	.013	.014	.076	.093	.178
	63.7	-.006	-.037	-.008	.024	.070	.101	.139
	70.6	-.018	-.018	.013	.029	.108	.156	.195
	75.1	.009	.024	.038	.085	.116	.255	.203
	84.8	-.018	.013	-.018	.029	.108	.140	.195
	94.5	.150	.165	.196	.212	.261	.245	.320
	98.6	.091	.060	.091	.076	.124	.124	.146
	M	1.378	1.378	1.373	1.373	1.368	1.363	1.345
	C_{N_A}	.636	.690	.756	.799	.855	.906	.965
	α	9.1°	10.0°	11.2°	11.9°	12.8°	13.7°	14.7°
	c_n	.599	.660	.749	.770	.842	.894	.930
	$c_{m_{c/4}}$	-.0998	-.1120	-.1360	-.1389	-.1514	-.1677	-.1678

TABLE V

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.56]

	Percent chord	Pressure coefficient					
		a	b	c	d	e	f
Upper surface	1.2	0.255	0.074	0.017	-0.025	-0.035	-0.077
	2.6	.236	.043	-.035	-.045	-.044	-.119
	5.0	.129	-.024	-.100	-.110	-.119	-.140
	19.3	.023	-.113	-.188	-.154	-.172	-.204
	35.0	-.189	-.258	-.297	-.306	-.310	-.364
	51.2	-.119	-.247	-.352	-.306	-.332	-.332
	63.8	-.186	-.314	-.379	-.344	-.348	-.380
	70.8	-.189	-.224	-.308	-.262	-.310	-.343
	75.5	-.130	-.280	-.352	-.317	-.332	-.375
	80.0	-.129	-.224	-.317	-.293	-.319	-.351
	85.1	-.130	-.224	-.286	-.262	-.257	-.300
	94.6	-.060	-.189	-.221	-.176	-.215	-.215
Lower surface	0	0.889	0.898	0.951	0.755	0.789	0.736
	.7	.668	.614	.668	.709	.790	.770
	3.6	.372	.448	.503	.544	.586	.565
	5.8	.337	.334	.395	.437	.470	.459
	9.1	.200	.244	.271	.335	.350	.318
	18.9	.212	.166	.173	.205	.265	.297
	30.8	.045	.104	.079	.144	.141	.130
	34.4	-.036	-.013	-.046	.020	.041	.041
	39.7	-.024	-.021	-.046	.064	.073	.073
	43.6	-.025	-.091	-.069	-.025	-.014	-.004
	50.6	-.153	-.102	-.123	-.057	-.035	-.067
	56.1	-.095	-.124	-.166	-.099	-.055	-.055
	63.7	-.117	-.124	-.123	-.079	-.046	-.068
	70.6	-.083	-.091	-.155	-.077	-.066	-.066
	75.1	-.151	-.102	-.113	-.058	-.036	-.037
	84.8	-.071	-.124	-.166	-.143	-.087	-.119
	94.5	.010	-.014	-.036	.018	.049	.059
	98.6	0	-.091	-.111	-.056	-.044	-.066
	M	1.581	1.585	1.585	1.585	1.589	1.587
	C_{N_A}	.107	.200	.251	.301	.351	.390
	α	.6°	2.2°	3.0°	3.9°	4.7°	5.4°
	c_n	.109	.222	.274	.305	.357	.375
	$c_{m_{c/4}}$	-.0109	-.0310	-.0397	-.0422	-.0554	-.0608

TABLE V.- Concluded

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.56]

	Percent chord	Pressure coefficient					
		g	h	i	j	k	l
Upper surface	1.2	-0.195	-0.203	-0.285	-0.311	-0.331	-0.328
	2.6	-.195	-.204	-.255	-.282	-.323	-.310
	5.0	-.227	-.236	-.329	-.354	-.375	-.341
	19.3	-.270	-.289	-.329	-.344	-.375	-.372
	35.0	-.399	-.385	-.434	-.427	-.479	-.423
	51.2	-.388	-.385	-.435	-.437	-.448	-.444
	63.8	-.445	-.410	-.469	-.481	-.491	-.455
	70.8	-.366	-.364	-.445	-.416	-.448	-.392
	75.5	-.399	-.407	-.456	-.458	-.448	-.402
	80.0	-.322	-.340	-.379	-.372	-.372	-.378
	85.1	-.324	-.300	-.382	-.365	-.385	-.330
	94.6	-.195	-.183	-.255	-.244	-.271	-.279
Lower surface	0	0.651	0.704	0.604	0.580	0.546	0.562
	.7	.751	.827	.810	.853	.866	.923
	3.6	.631	.702	.663	.692	.723	.790
	5.8	.557	.587	.559	.611	.641	.709
	9.1	.362	.457	.452	.506	.537	.606
	18.9	.319	.404	.357	.402	.381	.503
	30.8	.161	.245	.210	.258	.308	.378
	34.4	.052	.126	.114	.195	.195	.287
	39.7	.105	.201	.219	.216	.257	.307
	43.6	.017	.070	.069	.099	.109	.201
	50.6	-.025	.038	.059	.043	.109	.160
	56.1	-.002	.041	.030	.029	.081	.163
	63.7	-.048	-.005	.025	.045	.045	.127
	70.6	-.056	-.002	-.002	.040	.029	.112
	75.1	-.027	.016	.015	.035	.035	.137
	84.8	-.107	-.055	-.065	-.002	-.002	.071
	94.5	.033	.113	.121	.140	.139	.221
	98.6	-.023	.052	.051	.102	.071	.184
	M	1.563	1.555	1.549	1.552	1.544	1.538
	C_{N_A}	.453	.497	.547	.603	.641	.699
	α	6.7°	7.5°	8.5°	9.6°	10.3°	11.4°
	c_n	.432	.500	.548	.578	.626	.686
	$c_{m_{c/4}}$	-.0624	-.0704	-.0893	-.0915	-.0982	-.1171

TABLE VI

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.77]

	Percent chord	Pressure coefficient					
		a	b	c	d	e	f
Upper surface	1.2	0.251	0.153	0.109	0.072	-0.014	-0.075
	2.6	.180	.088	.049	.029	-.038	-.100
	5.0	.142	.054	.026	-.020	-.076	-.112
	19.3	-.023	-.059	-.086	-.107	-.183	-.193
	35.0	-.189	-.194	-.198	-.229	-.227	-.249
	51.2	-.136	-.194	-.210	-.244	-.270	-.274
	63.8	-.186	-.247	-.229	-.273	-.278	-.293
	70.8	-.197	-.172	-.229	-.274	-.302	-.311
	75.5	-.174	-.262	-.198	-.267	-.296	-.299
	80.0	-.188	-.193	-.185	-.220	-.293	-.296
	85.1	-.144	-.206	-.175	-.188	-.195	-.193
	94.6	-.106	-.070	-.109	-.138	-.164	-.187
Lower surface	0	0.876	0.845	0.910	0.876	0.810	0.772
	.7	.608	.733	.751	.758	.838	.885
	3.6	.392	.477	.526	.541	.618	.648
	5.8	.325	.354	.453	.439	.568	.654
	9.1	.210	.269	.327	.329	.476	.496
	18.9	.195	.201	.258	.234	.313	.390
	30.8	.071	.106	.144	.163	.267	.294
	34.4	.022	.066	.080	.067	.112	.179
	39.7	-.023	-.059	.096	.094	.200	.229
	43.6	-.024	.030	.055	.028	.116	.146
	50.6	-.143	-.070	-.025	-.029	.066	.072
	56.1	-.099	-.047	-.032	-.024	.056	.049
	63.7	-.098	-.104	-.033	-.040	.034	.070
	70.6	-.099	-.025	-.028	-.094	.056	.074
	75.1	-.127	-.093	-.052	-.044	.052	.070
	84.8	-.084	-.047	-.055	-.066	.030	.018
	94.5	-.032	-.015	.018	.005	.097	.115
	98.6	-.054	.032	-.005	-.016	.087	.092
	M	1.794	1.778	1.793	1.774	1.785	1.749
	C_{N_A}	.119	.195	.231	.264	.398	.440
	α	1.5°	2.2°	3.6°	4.2°	6.1°	7.0°
	c_n	.123	.202	.246	.274	.397	.438
	$c_{m_{c/4}}$	-.0160	-.0291	-.0317	-.0397	-.0675	-.0707

TABLE VII

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[M ≈ 1.85]

	Percent chord	Pressure coefficient							
		a	b	c	d	e	f	g	h
Upper surface	1.2	0.357	0.349	0.236	0.262	0.211	0.075	0.060	0.023
	2.6	.269	.296	.187	.208	.150	.038	.043	-.020
	5.0	.286	.238	.142	.143	.114	-.008	-.013	-.026
	19.3	.024	.040	-.031	-.008	-.051	-.127	-.095	-.152
	35.0	-.077	-.075	-.121	-.138	-.152	-.219	-.183	-.196
	51.2	-.119	-.108	-.166	-.131	-.181	-.292	-.208	-.246
	63.8	-.126	-.147	-.171	-.164	-.199	-.294	-.242	-.266
	70.8	-.128	-.133	-.159	-.196	-.202	-.272	-.240	-.258
	75.5	-.144	-.133	-.136	-.196	-.217	-.286	-.258	-.277
	80.0	-.185	-.189	-.165	-.194	-.201	-.231	-.200	-.238
	85.1	-.085	-.075	-.114	-.123	-.138	-.206	-.152	-.183
	94.6	-.094	-.091	-.084	-.095	-.116	-.193	-.114	-.139
Lower surface	0	0.904	0.909	0.832	0.955	0.937	0.852	0.847	0.848
	.7	.492	.544	.557	.663	.735	.710	.804	.826
	3.6	.198	.292	.332	.440	.446	.453	.594	.606
	5.8	.257	.333	.303	.390	.396	.395	.495	.550
	9.1	.168	.222	.240	.288	.337	.328	.420	.445
	18.9	.041	.123	.112	.158	.157	.183	.263	.257
	30.8	-.019	.054	.078	.117	.158	.131	.218	.242
	34.4	-.052	-.001	-.008	.006	.064	-.002	.112	.112
	39.7	-.026	-.001	-.001	.042	.085	.031	.163	.150
	43.6	-.085	-.001	-.032	.012	.019	.029	.085	.085
	50.6	-.110	-.099	-.113	-.094	-.030	-.042	.060	.054
	56.1	-.170	-.141	-.099	-.095	-.066	-.087	-.013	.012
	63.7	-.168	-.131	-.127	-.094	-.087	-.101	-.014	-.009
	70.6	-.102	-.108	-.099	-.073	-.058	-.054	.012	.037
	75.1	-.159	-.131	-.105	-.101	-.080	-.088	.004	.022
	84.8	-.119	-.058	-.054	-.066	-.066	-.087	-.001	.012
	94.5	-.069	-.001	-.024	-.030	-.009	-.049	.054	.079
	98.6	-.102	-.058	-.046	-.022	-.022	-.034	.050	.043
	M	1.847	1.850	1.870	1.864	1.852	1.836	1.838	1.821
	C_{N_A}	-.004	.054	.103	.135	.196	.245	.305	.346
	α	-1.4°	$-.2^{\circ}$	$.7^{\circ}$	1.3°	2.5°	3.4°	4.6°	5.4°
	c_n	.007	.054	.099	.130	.182	.252	.302	.337
	$c_{m_{c/4}}$	-.0029	-.0106	-.0128	-.0154	-.0253	-.0381	-.0445	-.0547

TABLE VIII

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

[$M \approx 2.0$]

	Percent chord	Pressure coefficient					
		a	b	c	d	e	f
Upper surface	1.2	0.377	0.337	0.347	0.175	0.168	0.143
	2.6	.271	.245	.251	.103	.096	.084
	5.0	.240	.208	.219	.089	.061	.063
	19.3	.044	.027	.022	-.048	-.083	-.069
	35.0	-.095	-.103	-.107	-.178	-.180	-.193
	51.2	-.099	-.107	-.107	-.185	-.194	-.214
	63.8	-.138	-.165	-.151	-.223	-.231	-.252
	70.8	-.126	-.121	-.125	-.206	-.228	-.186
	75.5	-.149	-.168	-.157	-.212	-.207	-.242
	80.0	-.143	-.134	-.143	-.184	-.213	-.212
	85.1	-.117	-.149	-.135	-.199	-.200	-.200
	94.6	-.068	-.061	-.066	-.103	-.131	-.124
Lower surface	0	0.908	0.912	0.934	0.912	0.901	0.908
	.7	.509	.534	.533	.757	.799	.805
	3.6	.280	.305	.311	.492	.488	.533
	5.8	.240	.246	.270	.384	.420	.424
	9.1	.168	.171	.178	.294	.323	.333
	18.9	.079	.097	.104	.212	.206	.209
	30.8	.010	.020	.037	.131	.165	.194
	34.4	-.046	-.028	-.024	.075	.055	.056
	39.7	-.024	-.024	-.006	.027	.020	.022
	43.6	-.081	-.084	-.061	.019	.046	.047
	50.6	-.099	-.107	-.093	-.001	.012	.020
	56.1	-.104	-.117	-.098	-.007	.055	.029
	63.7	-.120	-.116	-.110	-.062	-.043	-.035
	70.6	-.105	-.112	-.112	0	-.007	.001
	75.1	-.155	-.147	-.142	-.069	-.057	-.042
	84.8	-.122	-.117	-.130	-.027	-.028	-.048
	94.5	-.064	-.043	-.047	-.008	.005	.027
	98.6	-.091	-.103	-.084	-.007	-.001	-.006
	M	1.955	1.958	1.954	2.001	2.001	1.999
	C_{N_A}	.006	.021	.033	.183	.210	.230
	α	-1.4°	-1.1°	$-.8^{\circ}$	2.6°	3.2°	3.6°
	c_n	.022	.039	.050	.210	.238	.246
	$c_{m_{c/4}}$	-.0045	-.0045	-.0054	-.0336	-.0390	-.0397

TABLE IX

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

OF THE D-558-II RESEARCH AIRPLANE

$[c_n \approx 0.09]$

	Percent chord	Pressure coefficient a	b	c	d	e	f
Upper surface	1.2	0.241	0.244	0.231	0.310	0.231	0.235
	2.6	.200	.186	.176	.315	.185	.197
	5.0	.044	.095	.137	.141	.185	.155
	19.3	.021	-.042	-.020	.042	.016	.014
	35.0	-.336	-.312	-.296	-.280	-.253	-.226
	51.2	-.180	-.188	-.178	-.206	-.152	-.142
	63.8	-.242	-.266	-.252	-.227	-.233	-.222
	70.8	-.202	-.188	-.178	-.206	-.152	-.184
	75.5	-.180	-.167	-.158	-.206	-.135	-.128
	80.0	-.179	-.166	-.157	-.102	-.135	-.113
	85.1	-.157	-.167	-.158	-.156	-.135	-.170
	94.6	-.023	-.022	-.040	-.057	-.034	-.071
Lower surface	0	0.707	0.728	0.960	0.745	0.842	0.835
	.7	.487	.521	.560	.474	.574	.639
	3.6	.218	.224	.270	.236	.264	.361
	5.8	.152	.162	.212	.163	.231	.305
	9.1	-.023	.081	.058	.017	.084	.183
	18.9	.044	.082	.078	-.008	.117	.183
	30.8	-.134	-.084	-.076	-.082	-.035	.026
	34.4	-.235	-.146	-.138	-.206	-.085	-.057
	39.7	-.235	-.167	-.158	-.156	-.119	-.057
	43.6	-.179	-.145	-.138	-.157	-.101	-.057
	50.6	-.377	-.330	-.293	-.204	-.251	-.182
	56.1	-.180	-.167	-.158	-.057	-.135	-.113
	63.7	-.221	-.205	-.194	-.082	-.167	-.139
	70.6	-.157	-.146	-.138	-.107	-.119	-.099
	75.1	-.374	-.246	-.252	-.227	-.216	-.181
	84.8	-.113	-.084	-.119	-.156	-.135	-.085
	94.5	.020	.039	.017	.016	-.001	-.001
	98.6	.044	.041	.039	.067	.016	.028
	M	1.201	1.256	1.293	1.293	1.390	1.490
	C_{N_A}	.062	.078	.083	.061	.074	.099
	α	$-.6^\circ$	$-.3^\circ$	$-.2^\circ$	$-.5^\circ$	0°	$.5^\circ$
	c_n	.032	.066	.055	.045	.055	.104
	$c_{m_{c/4}}$	-.0019	-.0070	-.0038	-.0163	-.0022	-.0109

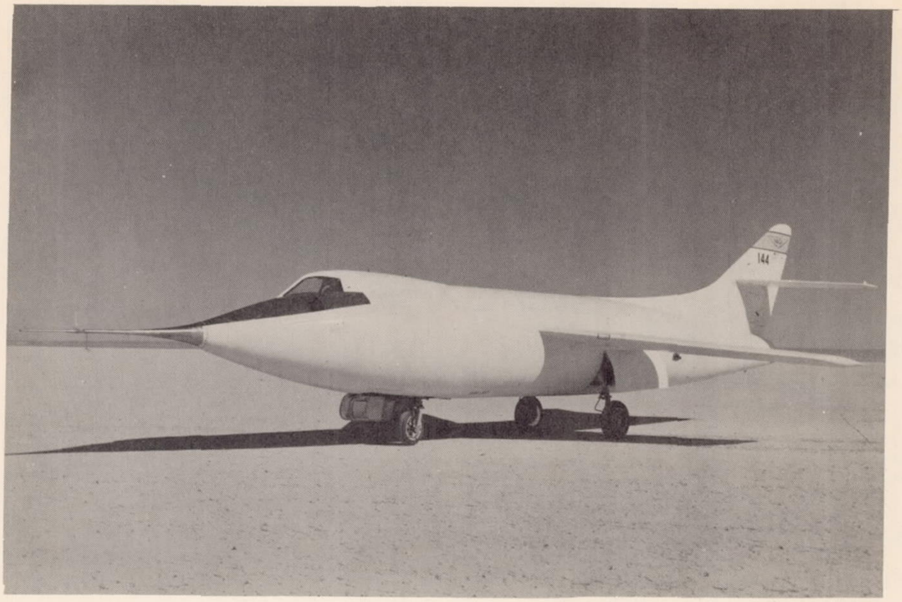
TABLE IX.- Concluded

PRESSURE COEFFICIENTS FOR A MIDSEMISPAN STATION ON THE WING

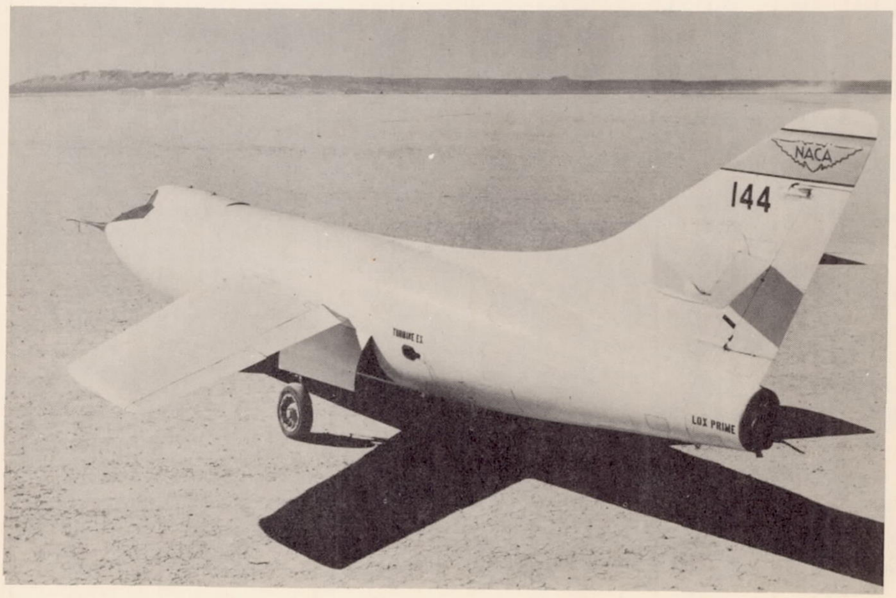
OF THE D-558-II RESEARCH AIRPLANE

$\left[c_n \approx 0.09\right]$

	Percent chord	Pressure coefficient				
		g	h	i	j	k
Upper surface	1.2	0.255	0.251	0.251	0.236	0.289
	2.6	.236	.164	.180	.187	.234
	5.0	.129	.136	.142	.142	.164
	19.3	.023	-.029	-.023	-.031	.005
	35.0	-.189	-.203	-.189	-.121	-.136
	51.2	-.119	-.138	-.136	-.166	-.125
	63.8	-.186	-.181	-.186	-.171	-.157
	70.8	-.189	-.193	-.197	-.159	-.160
	75.5	-.130	-.148	-.174	-.136	-.142
	80.0	-.129	-.210	-.188	-.165	-.135
	85.1	-.130	-.138	-.144	-.114	-.148
	94.6	-.060	-.093	-.106	-.084	-.089
Lower surface	0	0.889	0.894	0.876	0.832	0.923
	.7	.668	.603	.608	.557	.608
	3.6	.372	.378	.392	.332	.388
	5.8	.337	.351	.325	.303	.312
	9.1	.200	.246	.210	.240	.223
	18.9	.212	.155	.195	.112	.152
	30.8	.045	.086	.071	.078	.066
	34.4	-.036	-.047	.022	-.008	.023
	39.7	-.024	-.010	-.023	-.001	-.011
	43.6	-.025	-.020	-.024	-.032	-.002
	50.6	-.153	-.119	-.143	-.113	-.124
	56.1	-.095	-.074	-.099	-.099	-.089
	63.7	-.117	-.101	-.098	-.127	-.094
	70.6	-.083	-.111	-.099	-.099	-.083
	75.1	-.151	-.137	-.127	-.105	-.129
	84.8	-.071	-.102	-.084	-.054	-.083
	94.5	.010	-.011	-.032	-.024	-.042
	98.6	0	-.029	-.054	-.046	-.042
	M	1.581	1.708	1.794	1.870	1.889
	C_{N_A}	.107	.107	.119	.103	.094
	α	.6°	.7°	1.0°	.7°	.5°
	c_n	.109	.123	.123	.099	.097
	$c_{m_{c/4}}$	-.0109	-.0131	-.0160	-.0128	-.0112



(a) Three-quarter front view. L-87501



(b) Three-quarter rear view. L-87502

Figure 1.- Photographs of the Douglas D-558-II research airplane.

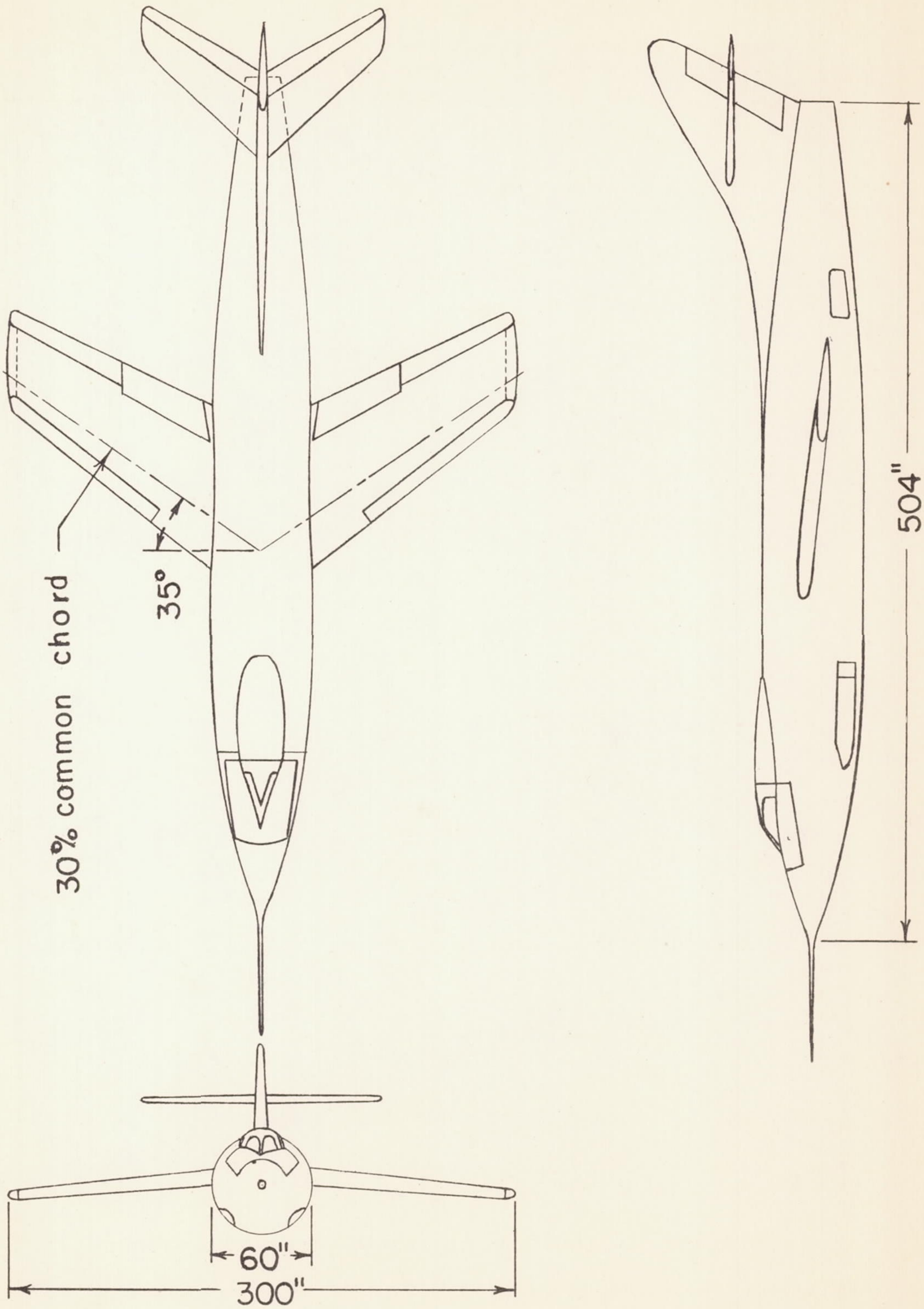


Figure 2.- Three-view drawing of the Douglas D-558-II research airplane.

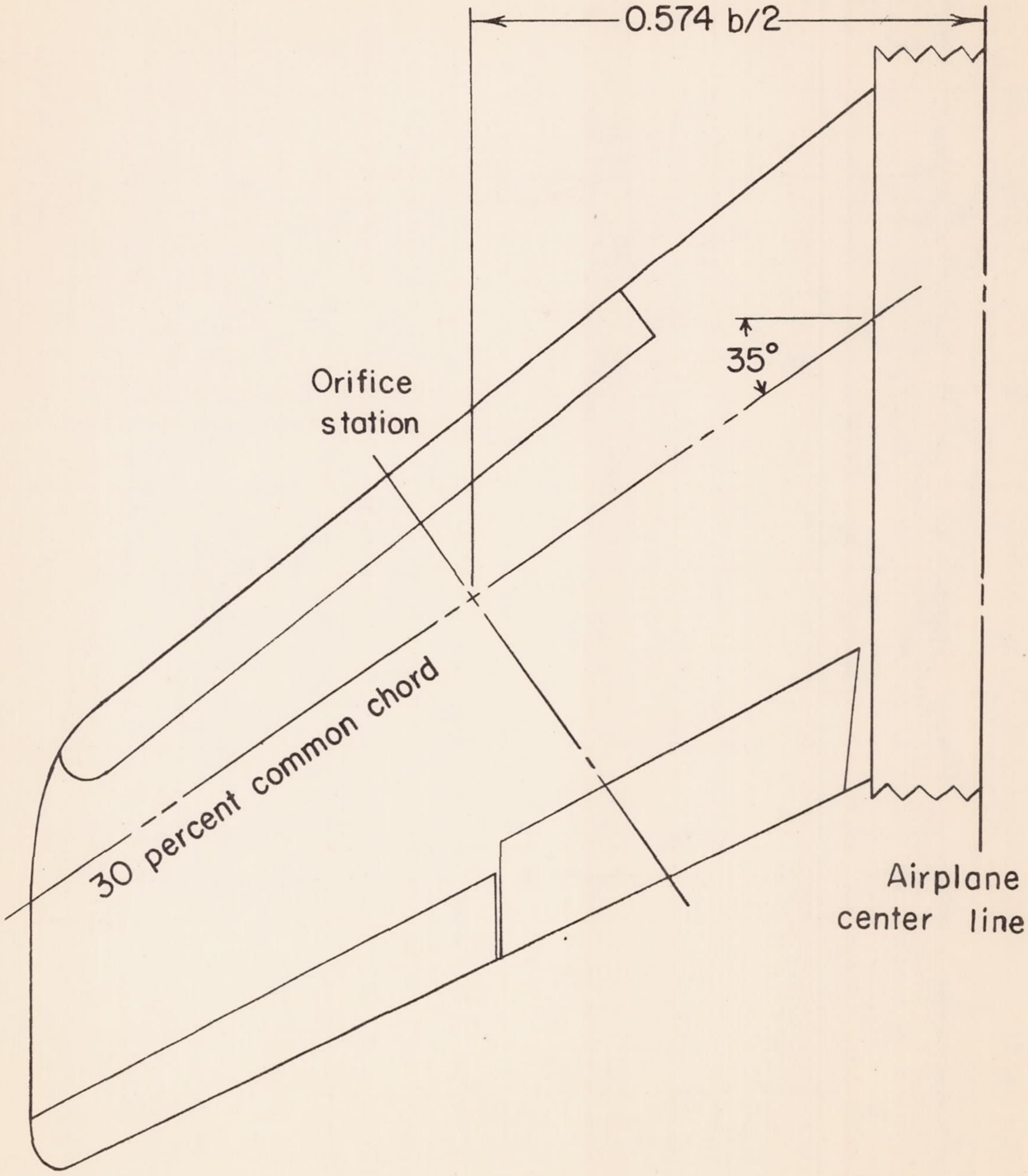


Figure 3.- Location of static-pressure orifices.

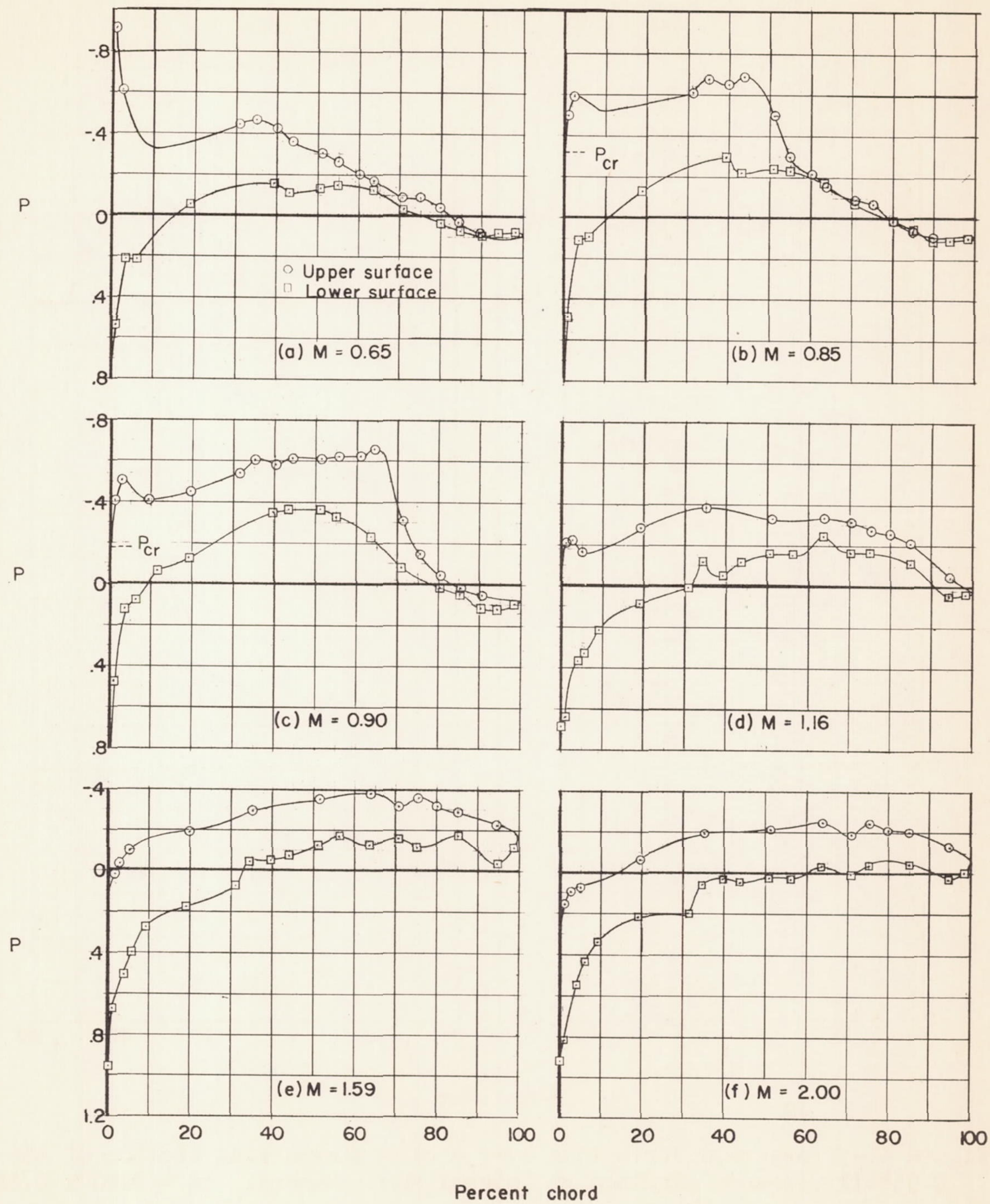


Figure 4.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane at several Mach numbers. $c_n = 0.25 \pm 0.04$.

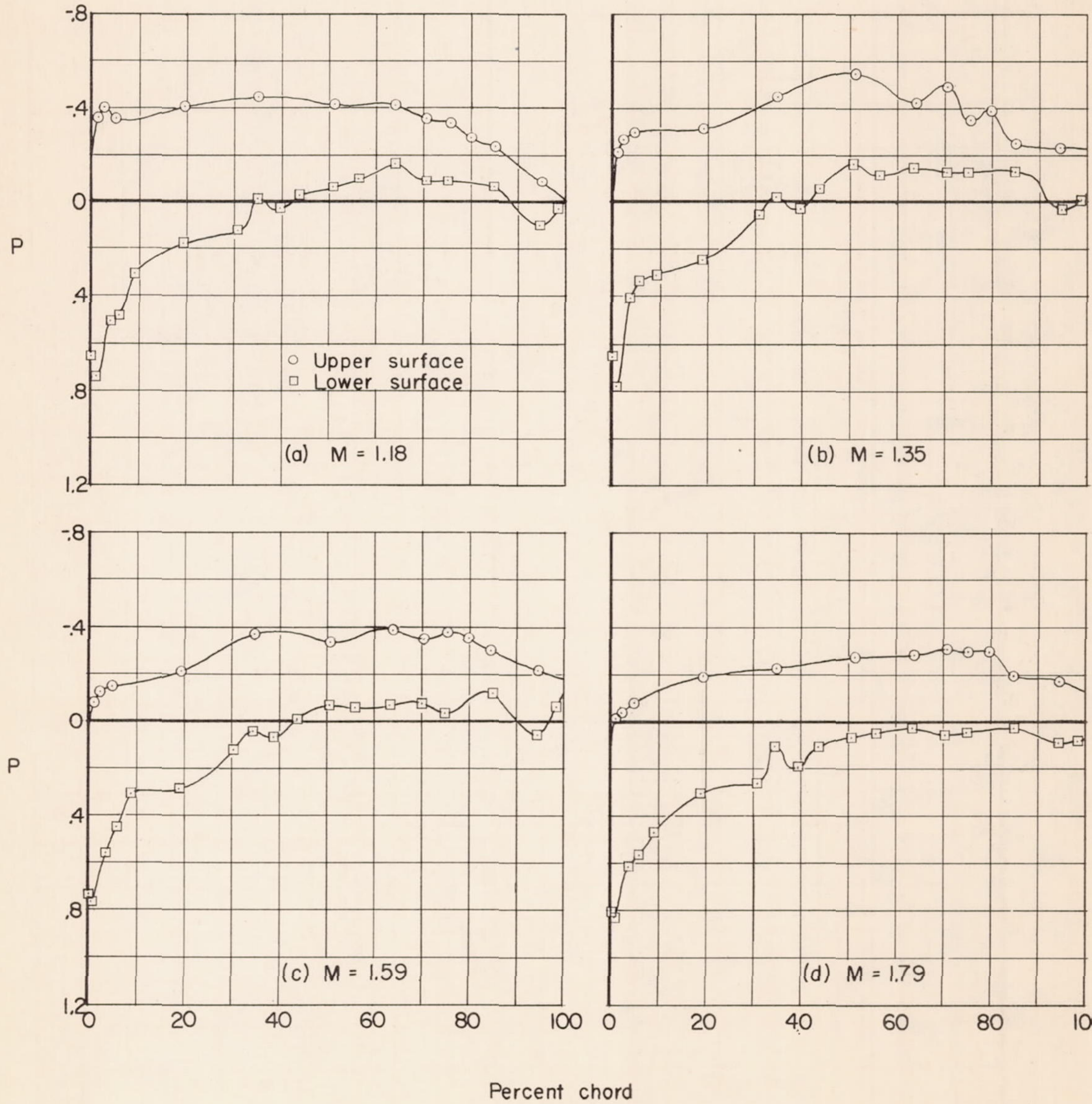


Figure 5.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane at several Mach numbers. $c_n = 0.40 \pm 0.02$.

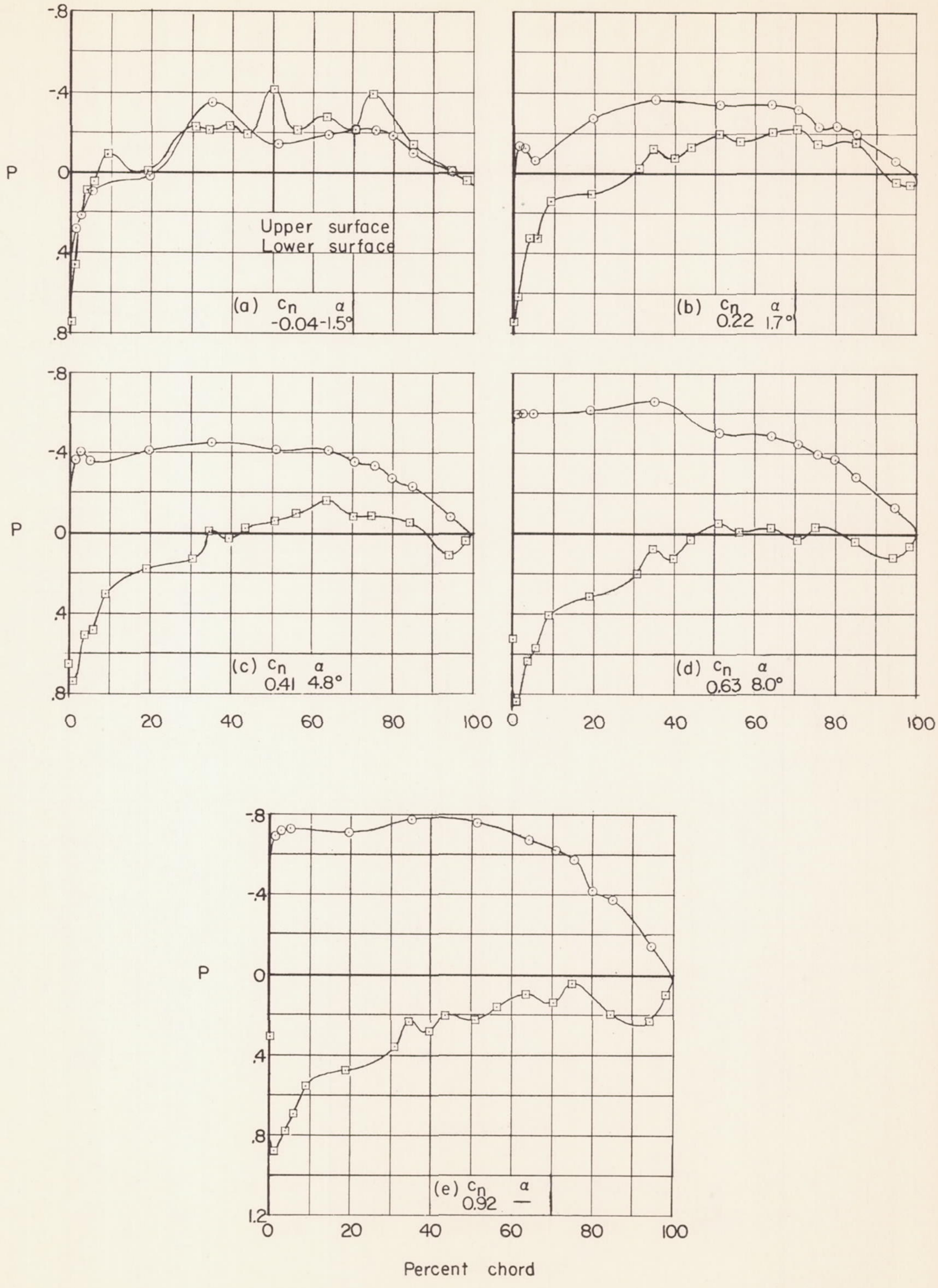


Figure 6.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane at several values of wing section normal-force coefficient. M = 1.17 ± 0.03.

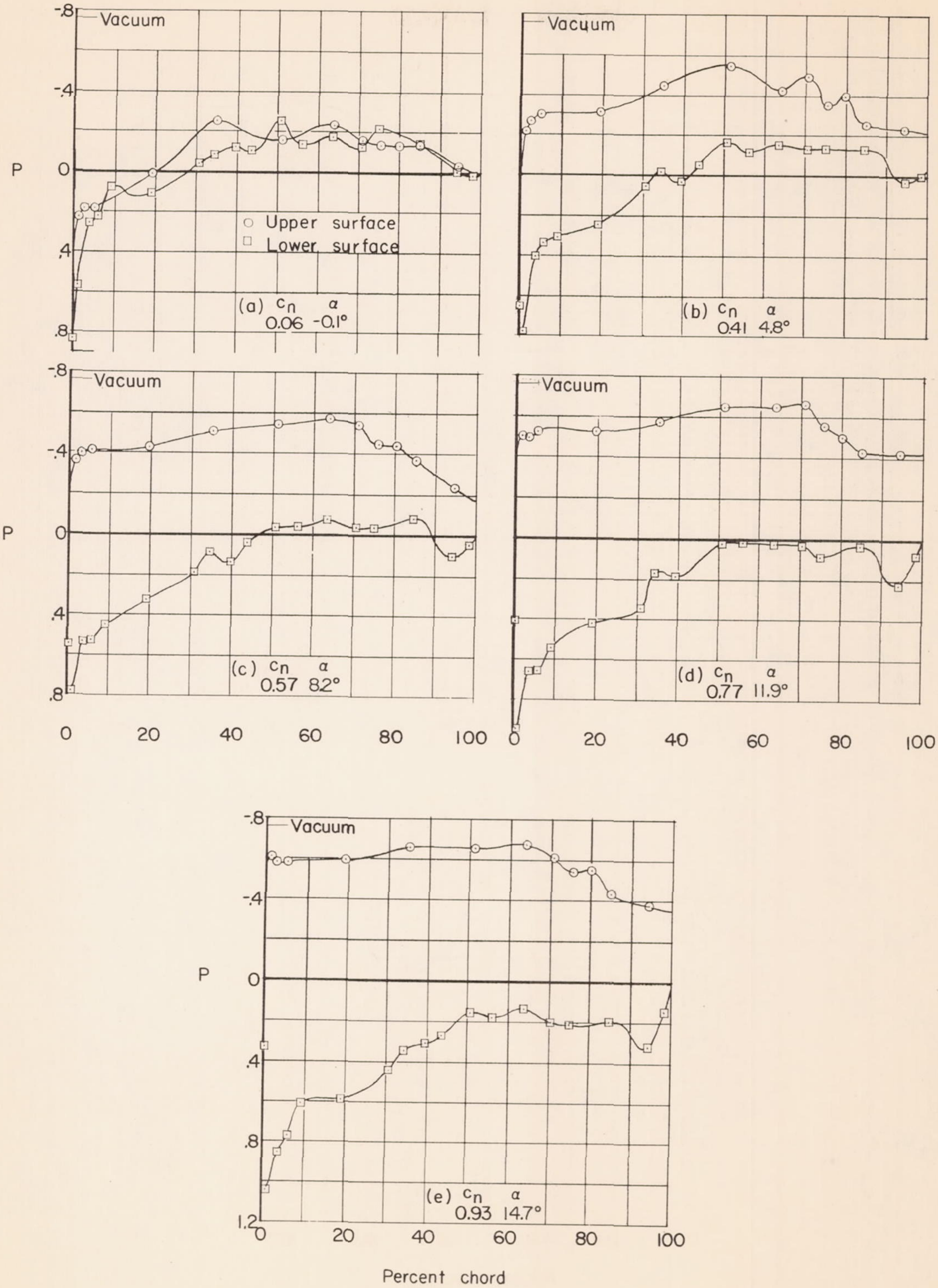


Figure 7.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane at several values of wing section normal-force coefficient. $M = 1.37 \pm 0.03$.

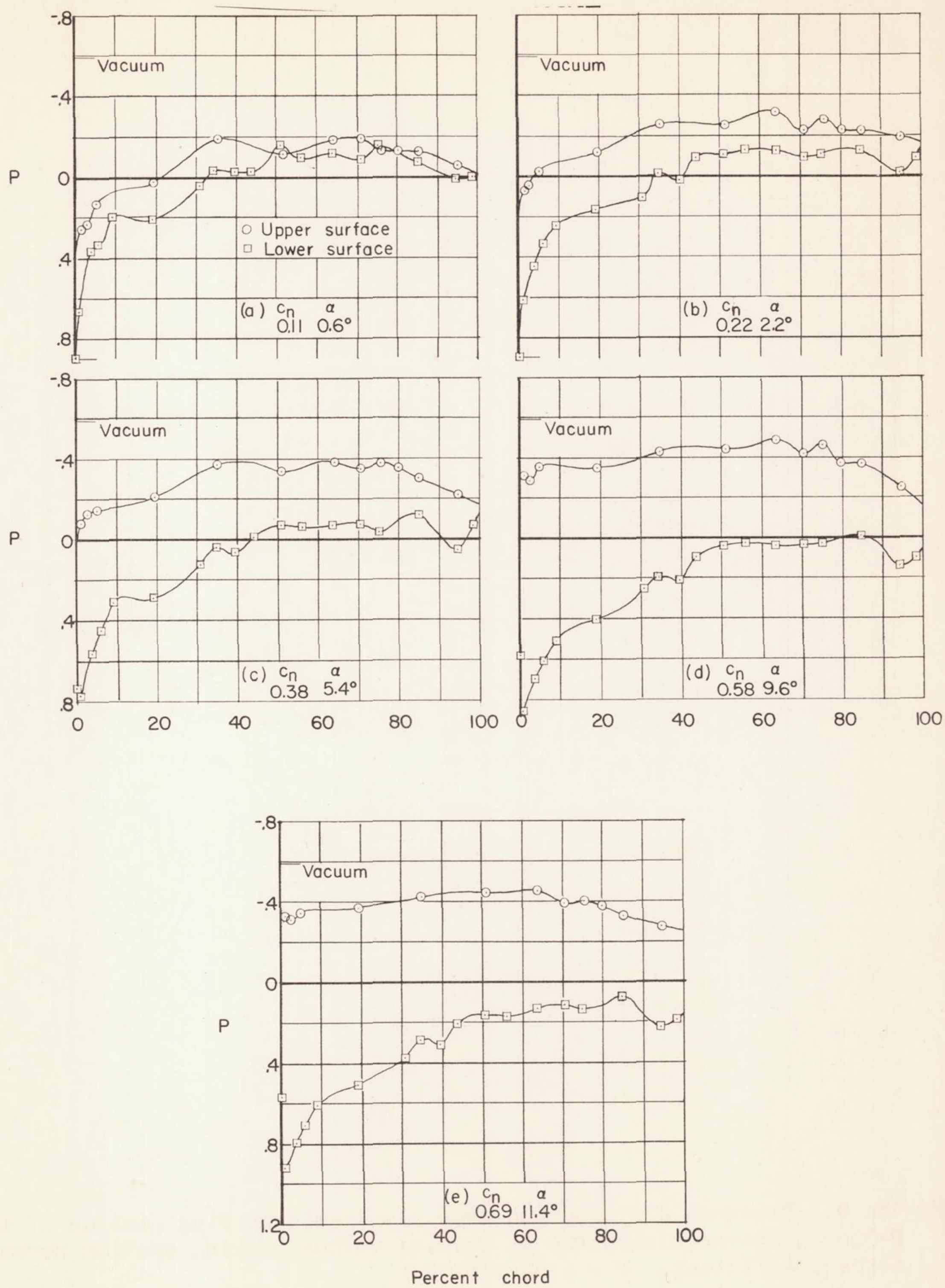


Figure 8.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane at several values of wing section normal-force coefficient. M = 1.56 ± 0.03.

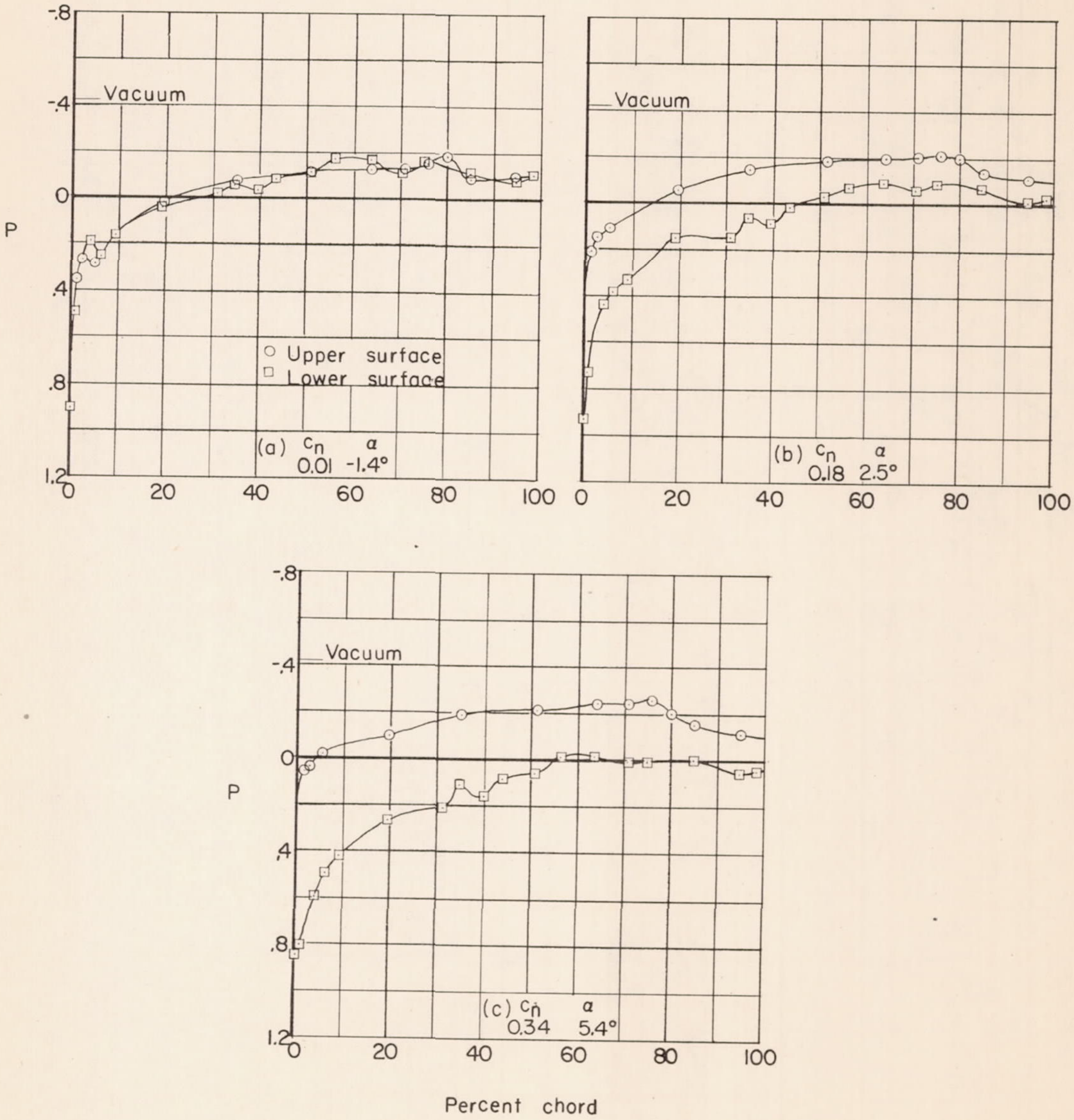


Figure 9.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane at several values of wing section normal-force coefficient. M = 1.85 ± 0.03.

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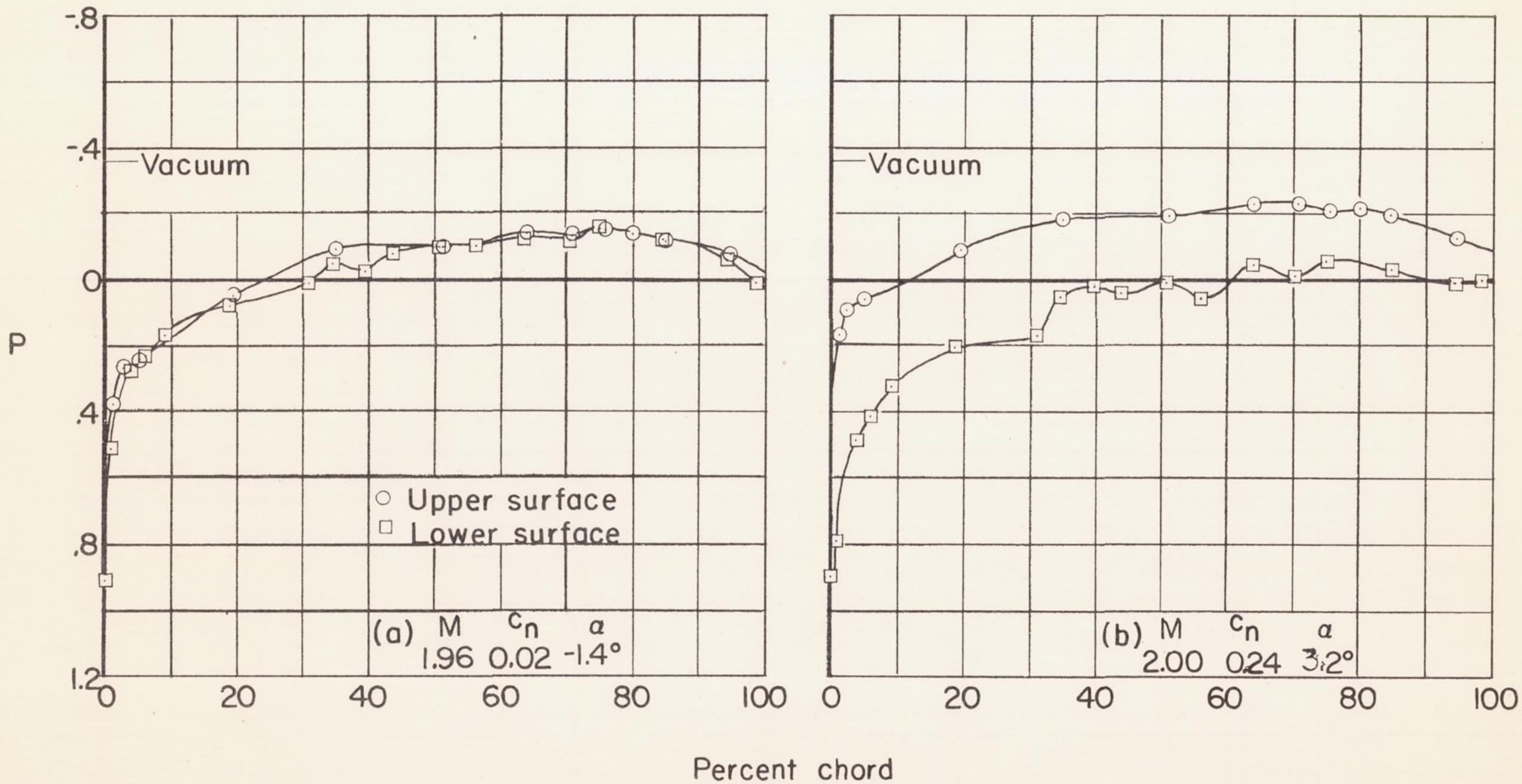

Figure 10.- Pressure distribution over a midsemispan wing station of the D-558-II research airplane. $M \approx 2.0$.

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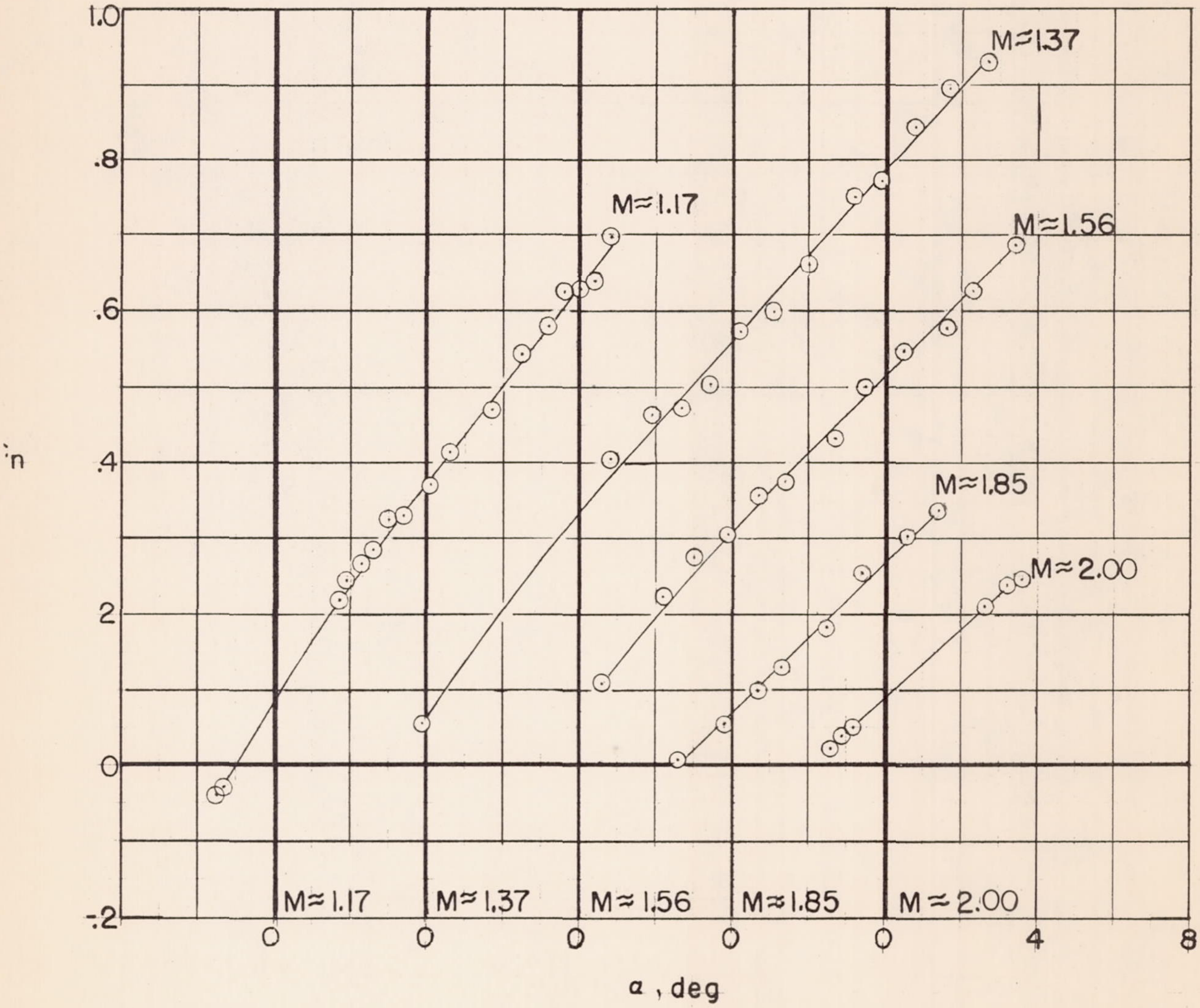

Figure 11.- Variation of wing section normal-force coefficient with airplane angle of attack at several Mach numbers.

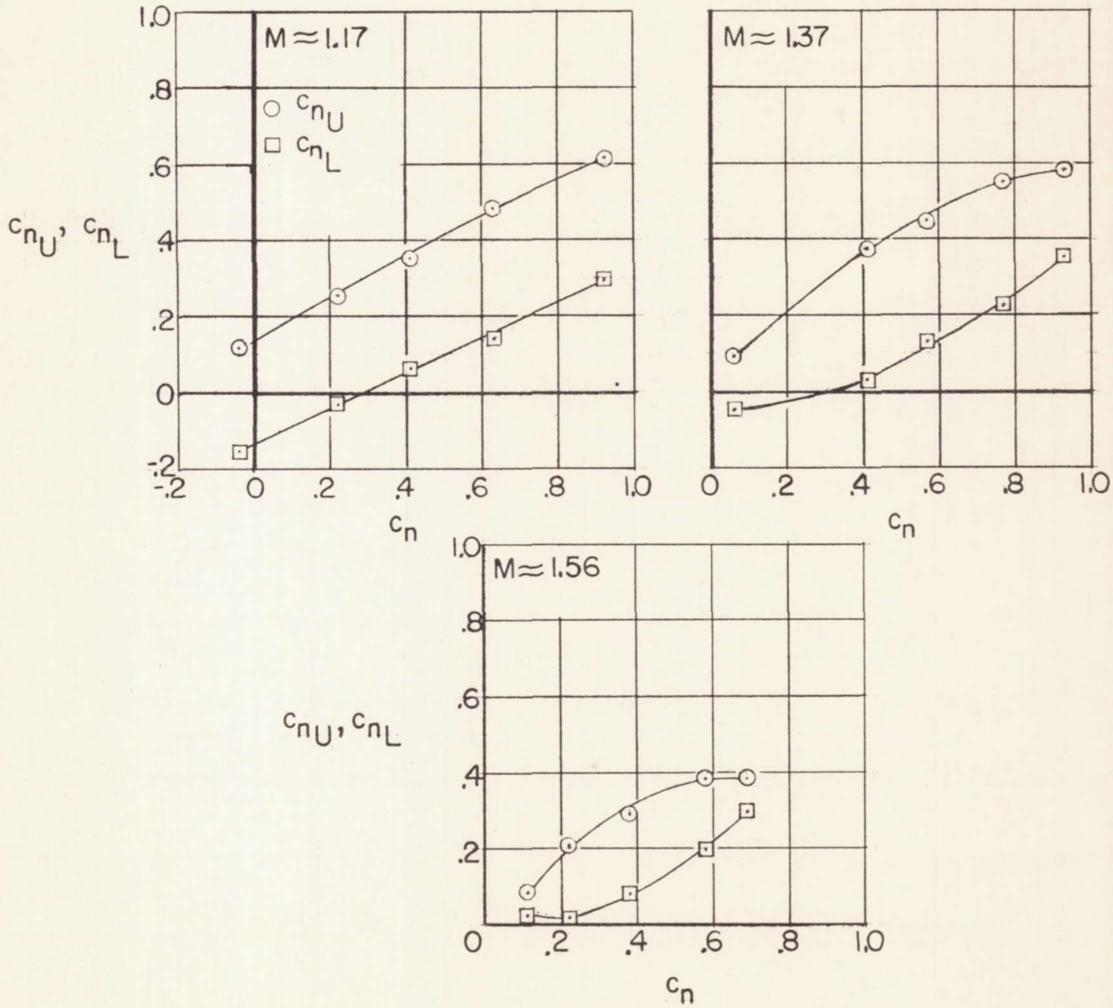

Figure 12.- Variation of upper- and lower-surface normal-force coefficients with total wing section normal-force coefficient at several Mach numbers.

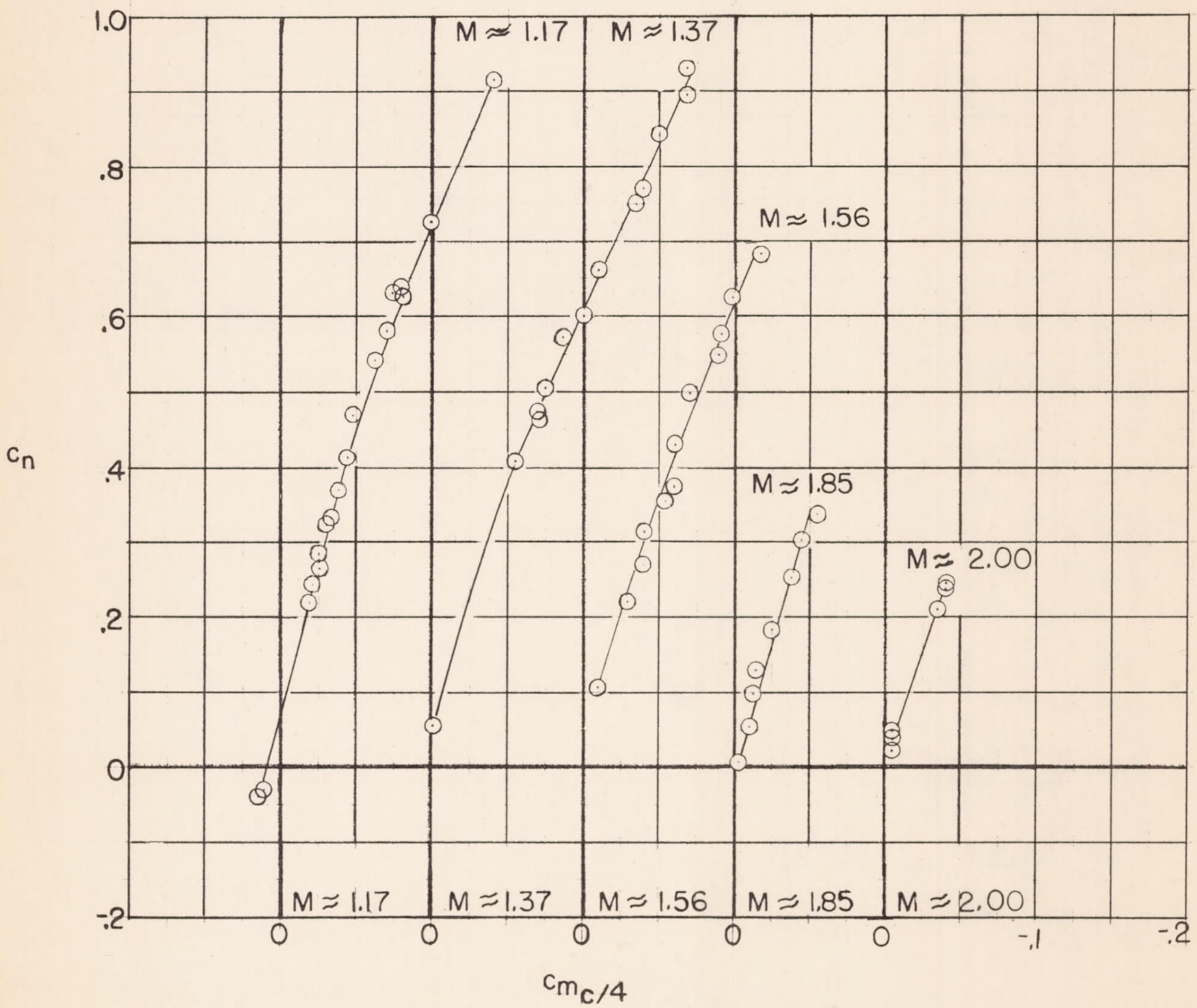

Figure 13.- Variation of wing section pitching-moment coefficient with wing section normal-force coefficient at several Mach numbers.

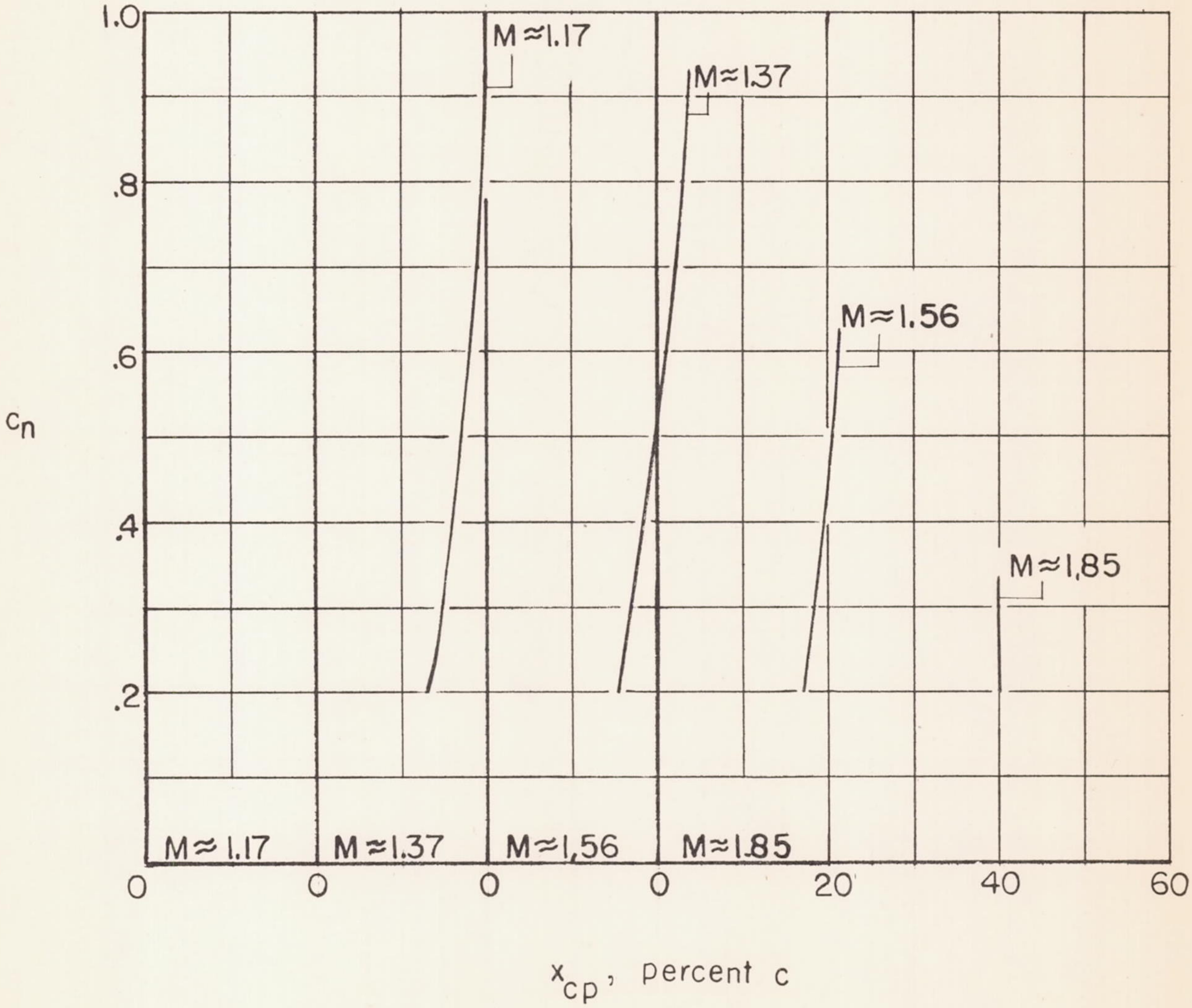

Figure 14.- Variation of wing section center of pressure with wing section normal-force coefficient at several Mach numbers.

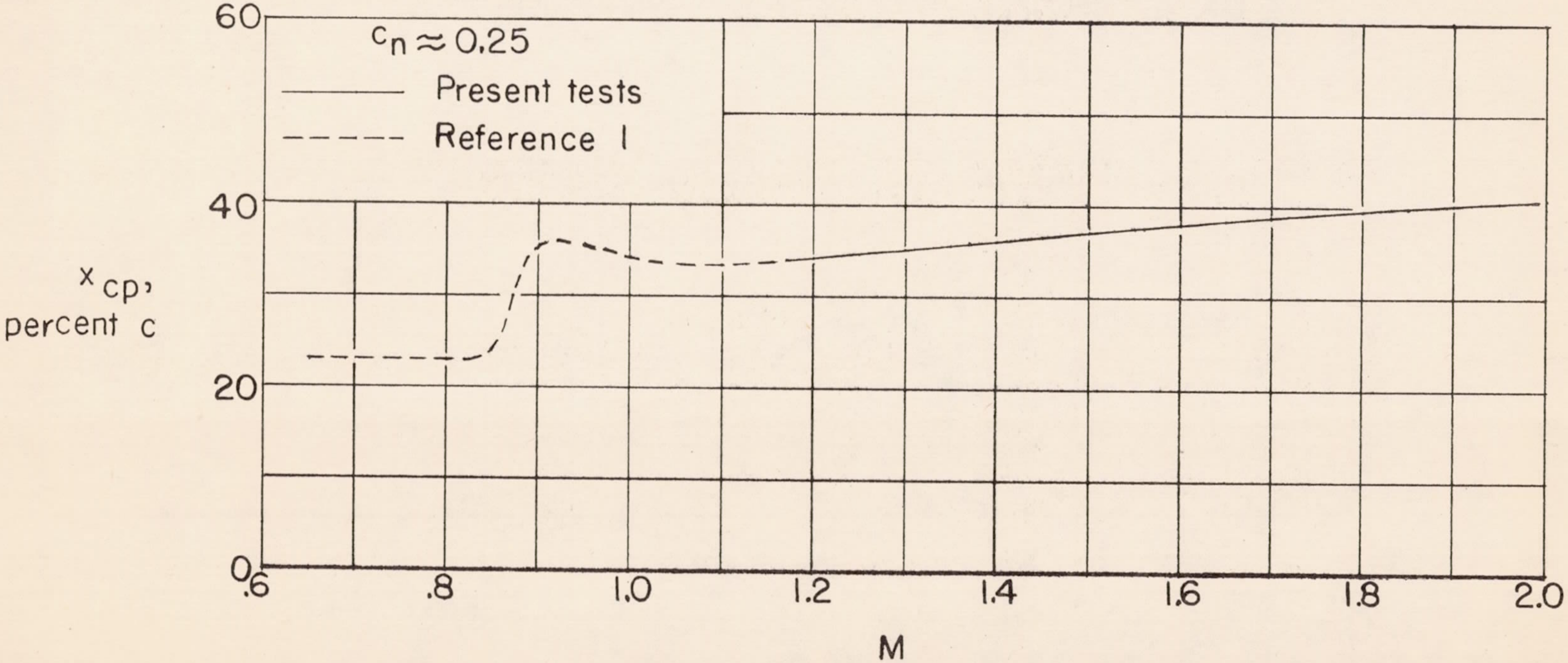

Figure 15.- Variation of center of pressure of the wing section with Mach number.

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